



## Technical Memorandum No. 9

Project No. C SWOO-242

Study Findings and Recommendations  
May 18, 2005



## Addendum

The proposal submitted by the two railroads contained a wide variety of components that were proposed to be carried out as part of this relocation project. One of these components was a bypass at Utah Junction. This bypass grade separates UP and BN tracks and adds trackage that allows UP train movements to flow east/west through the junction without having to complete a time consuming maneuver within the UPRR's North Yard.

The UP has subsequently implemented these Utah Junction improvements with its own funding. Implementation of the Utah Junction improvements is recognized as a private investment toward this project that will be accounted for as appropriate as part of future negotiations relating to this Study. With the implementation of the Utah Junction improvements by the UPRR earlier than anticipated, the private/public benefits accrue to the project earlier without materially affecting the cost/benefit analysis of the overall project.

The content of this document will read as though the Utah Junction improvements have not yet been incorporated.



Table of Contents	Page
Addendum.....	i
Introduction .....	1
Technical Memorandum No. 4, Data Collection and Evaluation of Railroad Project.....	1
Technical Memorandum No. 5, Evaluation of Public Benefits .....	2
Technical Memorandum No. 6, Additional Railroad Project Impacts.....	3
Technical Memorandum No. 7, Public Benefits of Potential Future Passenger Rail.....	4
Technical Memorandum No. 8, Funding and Financing Strategies .....	4
Study Conclusions.....	6
Recommended Next Steps.....	6



## Introduction

The purpose of this Technical Memorandum is to summarize the overall findings of the of the Public Benefits & Costs Study of the Proposed BNSF/UP Front Range Railroad Infrastructure Rationalization Project (the Project) and recommend some next steps. Relevant parts of Technical Memorandums No. 4 through 8 are summarized with highlights of their content. Technical Memorandum No. 5, Evaluation of Public Benefits, contains the key findings of the Study. Technical Memorandum No. 8, Funding and Financing Strategies, suggests means by which the Project could be funded and financed. The concluding portion of this memorandum outlines a next, higher level of evaluation appropriate for moving the Project forward if a decision is made to do so.

## Technical Memorandum No. 4, Data Collection and Evaluation of the Railroad Project

The proposed Project is very large in scope and scale and is therefore related to numerous other studies, both ongoing and completed. Most of these studies were identified prior to the start of the Study while some were found after the Study was underway. They were reviewed by various Consultant team members and summarized as a resource for the whole team. The 10 most valuable among these are summarized in the memorandum. Seven are completed studies; the DM&E Railroad Powder River Basin Draft EIS, Colorado State Rail Plan - Rail Bypass Feasibility Study, East Corridor Major Investment Study, RTD FasTracks Executive Summary, Metro Vision 2020 Plan, Metro Vision 2025 Interim Regional Transportation Plan, and the North Metro Transportation Study. Three ongoing studies are also summarized: Spokane's Bridging the Valley Transportation Study; the Chicago Regional Environmental and Transportation Efficiency project (CREATE); and the Los Angeles Ports Alameda Corridor Study. In addition to the hard copy reports, about 70 websites were referenced for data and information, especially for plant and animal resources.

Both the Burlington Northern Santa Fe Railway and Union Pacific Railroad provided a large amount of data about facilities, equipment, and operations. This data is presented in numerous tables and figures. Where Study needs required projections beyond that available from the railroads, the Consultant team extended the forecasts.

A Geographical Information System (GIS) database was used as a tool for data collection, organization, and presentation. By turning selected layers of information on or off, customized graphics were created to map topic related data.

Major daily train volume changes expected between No-Build and Build Options in the year 2030 in selected areas are:

- South of Denver - from 44 (No-Build) to 16 (Build) trains per day.
- New north-south trackage on the Eastern Plains - from 0 (No-Build) to 37 (Build) trains per day.
- East of Denver (Peoria to Limon) - from 11 (No-Build) to 51 (Build) trains per day.
- North of Denver (toward Greeley) - from 19 (No-build) to 9 (Build) trains per day.
- North of Denver (toward Brush) - from 45 (No-Build) to 18 (Build) trains per day.
- Northeast Colorado, no significant changes.

The Project cost estimate prepared by the railroads was reviewed. Adjustments by the Consultant to the estimate removed some elements and recommended increases in cost to a few others. The overall impact was to reduce the original Project cost estimate by less than 5%, to \$1.17 billion.

In order to try and preliminarily understand the level of general public support and/or concern around the Project, a survey was sent to approximately 600 selected statewide "opinion shapers" and other community leaders (70 were returned). On the whole, it was found that:





- The overwhelming majority (89%) feel that the overall Project impact would be positive;
- Few (4%) feel that the overall Project impact would be negative;
- Economic development, reduced traffic congestion and passenger rail facilitation were often cited as major benefits; and
- The most cited concern was grade crossing safety on the Eastern Plains.

A glossary of typical terms used throughout this study is included at the end of Technical Memorandum No. 4.

#### Technical Memorandum No. 5, Evaluation of Public Benefits

A major benefit of the Build Option will be north-south operating efficiency gains along railroad corridors. Trains will typically travel 96 fewer miles through Colorado while saving 2.8 hours in north-south travel, amounting to an estimated \$235 million in quantifiable cost savings through 2030. Similarly, east-west savings from the proposed North Denver improvements will generate an estimated benefit of \$458 million.

The estimated cost of grade separations avoided by the Build Option total \$60 million. (These are described in detail in Technical Memorandum No. 7.)

At-grade crossing delays that can be avoided will save an estimated \$332 million. Since much of the freight train traffic reduction occurs in more densely populated areas, a large volume of road traffic will benefit from the Project. Most of the areas of increased train traffic are rural so although there will be an increase of delays at any at-grade crossings, it will impact fewer motorists, thus reducing the benefit minimally.

A major benefit of the Build Option comes from increased economic development. These benefits are:

- Western Colorado coal mining's midrange benefit estimate of \$118 million.
- Front Range economic development's midrange benefit is \$470 million.
- Urban Land redevelopment which generates a one time capital gain of \$32 million plus \$0.6 million annual property tax revenues.
- Eastern Colorado private benefits total \$34 million for the midrange.
- Eastern Colorado grain producers are projected to reduce shipping costs, and by removing some truck traffic there will also be savings on highway maintenance for a total \$29 million midrange benefit.

For each of the four construction years, net new job creation in the construction industry totals 937 construction-related jobs and 789 supporting and ancillary jobs. These jobs create an annual increase in federal tax revenues of about \$16.3 million per year and an increase in State and local tax revenues of about \$6.5 million. These impacts apply only during the assumed years of construction.

There are several safety benefits of the Build Option. Vehicle/train accidents avoided would save an estimated \$9.6 million over the period. By providing an alternate route the Build Option could avoid high population densities, as well as providing an alternate route for HAZMAT transportation. In addition, the Build Option would provide redundancy that could be very beneficial in the case of a terrorism incident.

An overall but very preliminary assessment of environmental impacts found no fatal flaws for the Build Option. Noise and vibration reduction produces a one-time property value increase of \$87 million due to reduced noise with an accompanying \$1.5 million annual property tax increase. The midrange air quality benefit estimates the value of emissions costs avoided by the Build Option at \$245 million. Public energy use is projected to be reduced by \$21 million due to reduced idle time of vehicles at railroad at-grade crossings.



There are also qualitative benefits for the Build Option. The Front Range will receive a visual benefit from fewer train operations and less land used by the heavy industrial function of railroad yards. Quality of life benefits accrue to the Front Range in the form of reduced negative train traffic impacts and to eastern Colorado in the form of economic development and jobs.

Total direct Project benefits are summarized in Table 5-24 of Technical Memorandum No. 5 for the midrange Build Option. These are estimated to be \$2.29 billion (\$128 million annualized), for both private and public sector stakeholders.

Final demand for Colorado goods and services are projected to increase by approximately \$438 to \$738 million during the construction period. Associated federal, state and local tax revenues also are projected to increase by approximately \$74 to \$97 million in this same period.

Finally, a probability model was applied to the benefits findings to examine changes in results based on the variability of the individual inputs. This statistical analysis further tests the sensitivity of the benefits actually occurring under varying conditions. These tests show that the most frequently estimated total benefit is \$2.4 billion with a 90% probability that total benefits will exceed \$4.4 billion.

#### **Technical Memorandum No. 6, Additional Railroad Project Impacts**

Technical Memorandum No. 6 looked at a variety of other impacts that could accompany or result from the Build Option. These impacts are summarized below.

- The Towner Line could be tied into train movements along the new line from Aroya to Las Animas by providing a wye connection allowing this state owned line to potentially serve new businesses and offer a new, alternative east-west route.
- Tennessee Pass is judged by the UP as unlikely to reopen given that there is presently no financial advantage to running on these steep grades at high altitudes. Any possible benefits are significantly outweighed by the costs of putting the route back in operation.
- The most significant shortline railroad impact of the Build Option would be the reopening of the Denver Rock Island line as a component of east-west travel time reduction.
- The Build Option could facilitate a consolidated mainline route through Castle Rock leaving the UP line through town open for commuter rail.
- It is the intent of both railroads to consider and maintain a competitive balance for this Railroad Project.
- The motor carrier industry is likely to benefit from improved vehicular access to the two proposed new intermodal facilities.
- The Build Option would be likely to lower transportation costs for Colorado coal.
- Kansas's grain shipment could benefit as new rail service opportunities are offered.
- Colorado and neighboring states' regional shippers will benefit from new and/or improved rail transportation service.



## Technical Memorandum No. 7, Public Benefits of Potential Future Passenger Rail

The Project will impact future passenger rail proposals in the form of (a) Denver-area light rail or commuter rail lines planned by RTD or (b) other intercity passenger rail lines planned outside the Denver area. The Study identified three specific potential passenger rail projects with definite, quantifiable benefits from the Build Option. The Build Option would likely facilitate the implementation of other passenger rail projects, considered in this Study to have only uncertain or qualitative benefits.

The three specific potential passenger rail projects with definite quantifiable benefits are: RTD's East and North Metro corridors and the South Front Range Corridor, from Denver to Colorado Springs. At the time of this writing, there is no clear sponsor for the South Front Range passenger rail proposal, but several prior studies have recommended the line.

Under the No-Build Option, RTD's East Corridor may require a 3,400-foot structure to pass above York Street to avoid impacts to the UP operations at Pullman yard. The estimated cost of this structure is \$44 million, including additional right-of-way (ROW) needed to avoid interference with UP's operations east toward Sandown Junction. The Build Option avoids this cost as the number of trains drops from 11 in the No-Build to 3 in the Build.

Under the No-Build Option RTD's North Metro Corridor requires an estimated 18 acres of ROW west of the UP mainline at an estimated cost of \$5.6 million. This additional ROW is required to avoid interference with UP's Pullman yard. The Build Option avoids this cost as the UP will have minimal operations with Pullman yard relocated out to the east.

Under the No-Build Option the South Front Range Corridor project would require \$21.5 million of ROW purchase adjacent to I-25 as far south as Castle Rock and an additional \$58.5 million ROW purchase from Castle Rock to Colorado Springs. The track cost difference between the Build and No-Build yields an estimated savings of \$74 million, for a total net Build benefit of \$154 million.

The total savings for the three quantifiable passenger rail projects, if the Build Option is implemented, is estimated at \$204 million.

The Build Option would essentially not affect RTD's US 36, West Line, and Gold Line Corridors. The North Front Range Corridor preferred alternative assumes commuter rail along an I-25 alignment and thus would also not directly benefit from the Build Option.

## Technical Memorandum No. 8, Funding and Financing Strategies

Several relevant case studies have been reviewed and summarized. These are:

- Alameda Corridor - Funding for this \$2.4 billion project was in the form of public sector grants and revenue bonds supported by freight railroad tolls applied to each twenty-foot equivalent container unit (TEU) moved through the corridor.
- Chicago "CREATE" Rail Upgrade - CREATE is still in the formative stages of development. The railroads have committed to a funding ceiling equal to the level of estimated private sector benefits of \$212 million.
- Denver T-REX Transportation Corridor Expansion.
- Reno ReTRAC Rail Access Corridor - The ReTRAC funding program envisions using both railroad and local dedicated revenues for major funding. Dedicated project revenues will include lease income



- from the railroad use of the depressed corridor, downtown special assessment district taxes, hotel room tax increment, and local sales tax increment financing.
- Texas SH 130 Toll Highway - The project funding program will rely extensively, though not exclusively, on toll-supported revenue bonds.

For purposes of financial analysis, an expected Project cost range was established by decreasing the expected "midrange" cost by 10% for the "low" capital cost scenario and increasing it by 30% for the "high" capital cost scenario. The resulting range is \$1.1 billion to \$1.5 billion. For purposes of study, it is also assumed that the Project would be developed over the four-year timeframe of 2006 through 2009, with operations starting in 2010.

Expanded Project benefits, for the purpose of determining the Project benefit-cost ratios and allocating funding responsibilities, include the sum of the direct, as well as the indirect benefits, as follows:

- Projected total direct benefits resulting from the Project (see Tech Memo No. 5), plus
- Projected salary income from the net increase in jobs created directly and indirectly by the Project, and
- The projected annual increase in State severance from added Western Colorado coal produced as a result of the Project.

Hence, for the midrange scenario, the summation of expanded Project benefits (direct plus indirect) has an estimated net present value of approximately \$5.2 billion. The net present value of total costs is estimated to be approximately \$1.2 billion. Therefore:

- The midrange scenario produces an (expanded) benefit-cost ratio of 4.3 for the Project, and
- Private sector benefits of \$1.4 billion account for 27% of total Project benefits, while public sector benefits of \$3.8 billion account for 73% of total Project benefits.

Potential support for the Project depends on several factors besides total benefits. These are:

- The potential level of Project support from stakeholders
- Competitive interest
- Willingness/ability to provide support (fund the project)
- Immeasurable or qualitative benefits.

Qualitative impacts suggest there will be significant public-interest benefits in the area of the State's quality of life, image, environment and economic attractiveness.

Possible Project financing strategies include:

- Traditional financing strategies
  - Most highway projects are "pay-as-you-go"
  - Congress-authorized Grant Anticipation Revenue Vehicles (GARVEEs).
- Menu of innovative financing strategies
  - Direct Project Grants
  - Revenue Bonds
  - State Bonds
  - Municipal Bonds
  - Private Bonds
  - Anticipation Notes
  - Loan and Credit Support

Debt financing adds significant costs to projects but expedites their completion. Options for project financing include:



- No Financing Option - funded on a pay-as-you-go basis from both private and public sector sponsors.
- Public Share Financing Option - public sector portion is financed by private-issue, taxable debt. Private sector pays for its portion out of cash reserves on a pay-as-you-go basis.
- Private Share Financing Option - private sector portion financed by public-issue, tax-exempt debt over the two-year term of the financing. Public sector pays out of cash reserves on pay-as-you-go basis.
- Public and Private Financing Option - financed by both public-issue, tax-exempt debt, and private-issue, taxable debt, commensurate with the allocation of funding responsibilities among public and private sector sponsors.

### Study Conclusions

- Under any scenario studied, there is more than sufficient benefit accruing to the citizens of Colorado to warrant the investment of public dollars in the proposed Project.
- The major stakeholders of the Project include the private sector (railroad industry, coal industry, economic development community, and grain industry) and the public sector (federal, state and local governments, and transit providers).
- When resources are scarce and there are numerous competing project agendas, adequate project funding requires a balance of both public and private sector financial support.
- The wide variance in distributing funding responsibilities by a major stakeholder group reflects the level of uncertainty over both the estimated Project benefits and the inclination of stakeholders to accept funding responsibilities commensurate with their benefits.
- A wide variety of traditional and innovative funding and financing arrangements are available to expeditiously move the Project from concept to construction.
- While debt-financing approaches raise the total costs of projects over their service life, project sponsors are able to realize the benefits of these endeavors much sooner and potentially at lower life-cycle costs than using traditional approaches.
- The ultimate Project funding and financing plan should be tailored to take into consideration the capabilities, constraints, and interests of each Project sponsor.
- The projected long-term benefits suggest that when evaluating whether to proceed further with this Project, careful consideration be given to the potential role this Project could play in the following ideals:
  - Promoting Colorado's economic vitality,
  - Providing greater mobility and accessibility for both freight and passenger travel in the State,
  - Improving air quality along the Front Range,
  - Preserving Colorado's quality of life for its citizens, and
  - Enhancing the State's national and international competitive position.

### Recommended Next Steps

Considerable work needs to be completed in order to secure the required consensus from all of the project beneficiaries, both public and private. The findings and recommendations outlined above are largely the opinion of the Consultant. Communications among the project participants needs to substantially increase and hence, more information will inevitably be needed in order to win the necessary project approvals. In anticipation of this, the following tasks are likely to be the most important, in the short-term.

- *Public Involvement.* If the general public is going to be expected to pay for a portion of the project costs, a more comprehensive public involvement program must be developed, in accordance with federal requirements and local practices.



- *Environmental Studies.* If federal funding is expected to be used for any portion of the project costs, the National Environmental Policy Act (NEPA) process must be started soon and followed to conclusion. This will be a significant effort thus time is of the essence.
- *Funding and Financing Negotiations.* All the Project beneficiaries must reach a funding and financing agreement, at least in principle, very soon. More in-depth study is likely to be needed to improve stakeholder confidence in the direct and indirect (qualitative and quantitative) benefit calculations in the Study.
- *Project Development.* Finally, the Proposed BNSF/UP Front Range Railroad Infrastructure Rationalization Project is really a “program” with several component projects, each in a different stage of engineering development. Some components have been developed from a conceptual perspective with little or no design to support them. Other components are well-developed, with significant design and some construction already underway. All the projects will need to be advanced to a minimum level of preliminary design in order to increase stakeholder confidence in the overall Project capital cost estimate.