



NORTH I-25 EIS COMMUTER RAIL UPDATE



FINAL REPORT



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**PARSONS
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COLORADO
Department of
Transportation

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Acronyms

BNSF	BNSF Railway (Formerly Burlington Northern Santa Fe Railway Co.)
BRT	Bus Rapid Transit
CBI	Construction Bid Items
CDOT	Colorado Department of Transportation
CR	County Road
CTC	Centralized Traffic Control
CWT	Constant Warning Time
DEIS	Draft Environmental Impact Statement
DMU	Diesel Multiple Unit
DTR	Division of Transit and Rail
DUS	Denver Union Station
EIS	Environmental Impact Statement
EMU	Electric Multiple Unit
ENR	Engineering News Record
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GWR	Great Western Railway of Colorado
HSR	High-speed Rail
ICS	Interregional Connectivity Study
MP	Mile Post
NAMS	Northwest Area Mobility Study
NATA	North Area Transportation Alliance
NEPA	National Environmental Policy Act
NFRMPO	North Front Range Metropolitan Planning Organization
NWSS	National Western Stock Show
PTC	Positive Train Control
ROW	Right-of-way
RR	Railroad
RTD	Regional Transportation District
SCC	Standard Cost Code
SH	State Highway
STB	Surface Transportation Board
SUB	Railroad Subdivision
TAC	Technical Advisory Committee
TMO	Transportation Management Organization

1.0 Introduction

The North I-25 EIS Commuter Rail Update was a nine month study that developed up-to-date estimates related to right-of-way (ROW), commuter rail operating plan and cost estimates. With the updated information stakeholders in the North Front Range (NFR) maintain readiness to take next steps toward future implementation of commuter rail in the NFR.

1.1 Study Purpose

The purpose of the Commuter Rail Update is to advance the development of an integrated interregional transit system, focusing on recommended elements of commuter rail. The commuter rail is proposed by the North I-25 Environmental Impact Statement (EIS) to connect the NFR region to the Denver region, synthesizing the recommendations from a number of studies. A variety of studies over the last few years have come to some varying conclusions which bear further coordination and updating to common assumptions. The cumulative efforts of prior studies have created the foundation for this project.

- The State Freight and Passenger Rail Plan (March 2012), (a.k.a. State Rail Plan) provided a recommendation for Colorado to pursue project development as a means of positioning Colorado for future federal funds, for both passenger and freight rail.
- RTD's FasTracks planning in the form of the Northwest Area Mobility Study (NAMS) (August 2014) and the North Metro EIS have changed the expectations for connectivity with the NFR Commuter Rail. The North Metro line is being constructed as electric multiple unit (EMU) technology, whereas the NFR Commuter Rail plan was for diesel multiple units (DMU).
- The NAMS study has further concluded that the projected costs to use the BNSF Railway rail line and its property are much higher than previously expected. Consultant estimates, in coordination with BNSF (but not committed or guaranteed by BNSF), place the ROW operating rights at \$200 Million for RTD, or about \$5.0 to \$6.0 Million per mile. NAMS also provided a cost estimate to use the Longmont to 162nd Avenue and Colorado Blvd rail line at \$700 to \$800 Million, assuming much of the ROW cost would be borne by CDOT.
- CDOT's Interregional Connectivity Study (ICS) concluded that high speed rail along the I-25 corridor and commuter rail along the US 287/BNSF corridor could co-exist because they serve different markets. The ICS discussed the potential for commuter technologies to share track between the Longmont interchange area (SH 119/I-25) and RTD's North Metro end-of-line station near 162nd Avenue/Colorado Blvd.

2.0 North I-25 EIS Commuter Rail Option

The Update of the Commuter Rail element of the North I-25 EIS evaluates only the commuter rail option of the EIS. The highway and bus related improvements in the EIS are not addressed in this Update.

2.1 Background

- The North I-25 EIS (December 2011) recommended the implementation of commuter rail between Fort Collins and Denver, along the 287/BNSF alignment from Fort Collins to Longmont, transitioning eastward to meet up with the end-of-line station for RTD's North Metro line. Cost estimates at the time, using 2009 dollars, estimated \$649 Million

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(2009\$) for track from Fort Collins at the Downtown Transit Center to RTD's North Metro end-of-line at 162nd Avenue and Colorado Blvd. (Figure 1). The proposed commuter rail operation assumed joint use of the existing BNSF freight rail by the BNSF's freight trains and the commuter rail operation.

2.2 Changed Conditions since EIS

The North I-25 EIS was completed at a time when there was a greater expectation that an “Eastern Bypass” for freight rail might be created, promising to divert through-trains from the populated areas between Fort Collins and Denver to the eastern plains of Colorado, and allowing more track capacity to become available for passenger use. Also at the time the EIS was completed, the MAX Bus Rapid Transit (BRT) construction plans had not been finalized.

2.2.1. Changed Condition 1: Eastern Bypass “Inactive”

As of June 2012, CDOT issued a letter stating that the “Eastern Bypass” idea was officially inactive. That letter recognized a much-changed economy following the 2008-2009 banking and financial crisis. Additionally, greater attention to global warming and other environmental concerns has precipitated a shift from heavier reliance on coal to a heavier reliance on natural gas for electric power generation. All of this has occurred in a relatively short period of time, creating greater uncertainty for freight rail movements. What this has meant for freight railroads is a fundamental change in the business climate from one more reliant on track and infrastructure investment, to one more focused on investment in mobile capacity (locomotives and freight cars), and to just-in-time delivery. For this Commuter Rail Update, this business climate means there is a changed expectation, from available capacity for passenger rail to one where increasing through and regional railroad freight volumes are likely to remain in the US 287 corridor for the foreseeable future.

2.2.2. Changed Condition 2: MAX Bus Rapid Transit in the Railroad ROW

The North I-25 EIS examined connections between Northern Colorado communities and Denver including two choices: (A) Commuter rail along existing tracks following US 287 and (B) BRT commencing at I-25 and the Harmony Corridor. The MAX BRT has now been implemented in the Mason Street Corridor between the Fort Collins Downtown Transit Center and the Fort Collins South Transit Center just south of Harmony Road.

If commuter rail could operate on the existing BNSF Railway track, then commuter rail and MAX BRT would co-exist through the Mason Street Corridor. If commuter rail cannot operate on the existing BNSF Railway track due to overall train traffic, and a second track would be required to provide adequate rail capacity for commuter rail operation, Fort Collins has indicated that the North I-25 Commuter rail would likely be terminated at the South Fort Collins Transit Center. In this case, the commuter rail option would link to the Mason Corridor at the South Transit Center, and the Bus Rapid Transit option link at the existing Harmony Road Transit Center near I-25.

2.2.3. Changed Condition 3: FLEX Bus Service

FLEX bus service began in the US 287 Corridor between Fort Collins and Longmont in 2010. This regional bus route provides current, real-world experience with an operating plan that is similar to that proposed for commuter rail, with 30-minute peak frequencies and 60-minute off-peak frequencies. The FLEX route has 17 stops over a distance for which commuter rail plans 5 stops. Transfers to Denver and Boulder through the RTD bus system are available in Longmont. This service shows the commitment of local governments to the idea of creating and building a travel market toward the goal of possible eventual commuter rail implementation.

3.0 Stakeholder Involvement

The Update of the commuter rail element of the North I-25 EIS required stakeholder agreement on the various elements of the study itself and also to provide guidance throughout the effort to

CDOT and the consultant Project Team. The purpose of the stakeholder involvement was to identify and communicate how the study was to be conducted, what the opportunities were for input, and establish expectations for how that would occur. There were two key elements of the stakeholder involvement: 1) the initial one-on-one briefings with either individual stakeholder entities or “reasonably grouped” entities, and 2) the creation/utilization of a Technical Advisory Committee (TAC).

3.1 Stakeholder One-on-One Meetings / Other Outreach

It was important to gain agreement from the study stakeholders very early in the process on the study scope. This took place in advance of initiating the other study tasks in order to confirm that there was agreement on the key outcomes and process of the update. CDOT provided briefings to the NFRMPO Technical Advisory Committee on May 21st, and to the US 287 Coalition on June 26th, 2014 prior to beginning the study. Soon thereafter, with the consultant contract authorized, the Project Team and CDOT met individually with the following groups to understand stakeholder expectations for the update and for stakeholder involvement:

- RTD August 21, 2014
- North Front Range MPO August 22, 2014
- Boulder County, Longmont, N. Area Transp. Alliance (NATA) August 25, 2014
- Weld Co. Public Works, Dacono August 27, 2014
- Berthoud September 2, 2014
- BNSF Railway September 3, 2014
- Loveland September 11, 2014
- Larimer County September 11, 2014
- Weld Co. Public Works, Meade September 11, 2014
- Fort Collins September 24, 2014
- Frederick October 21, 2014

Meeting notes from each of these meetings and also a summary of all meeting are included in Appendix A.

3.2 Technical Advisory Committee (TAC)

Being primarily an update of technical information such as cost and operating plans, and with the intent to only analyze aspects of the preferred alternative which have changed, but neither to analyze new alignments nor re-open the EIS, the update work primarily involved staff and technical level people from stakeholder groups along the US 287 corridor between Fort Collins and Longmont, and from Longmont to Colorado/162nd Avenue. A TAC was formed following input from the stakeholders in the one-on-one meetings described above. The following entities appointed individuals to the TAC.

- Berthoud
- Boulder County
- Dacono
- Erie
- Firestone
- Fort Collins
- Frederick
- Larimer County
- Longmont
- Loveland
- North Area Transportation Alliance (NATA)
 - o Adams County
 - o Smart Commute TMO
- North Front Range MPO
- Regional Transportation District (RTD)
- Weld County

The four TAC meetings were held at different location throughout the study area. No study-specific public meetings were held, but the update process provided public information through existing public meetings (US 287 Coalition & NFRMPO), press releases, and the CDOT website. Copies of the PowerPoint presentations and meeting notes from the TAC meetings are included in Appendix B.



3.3 Policy Updates

CDOT provided policy updates at two points in the study. Presentations related to the proposed Scope of Work for the Update were made early in the summer of 2014 to the NFRMPO and the US 287 Coalition. Near the end of the study, policy level updates containing draft study findings were made to the NFRMPO and US 287 Coalition in addition the North Area Transportation Alliance (NATA). The PowerPoint presentation made at those policy briefings is included in Appendix B.

3.4 Other Presentations

At the request of the Colorado Rail Passenger Association (ColoRail), CDOT also provided a briefing on the study at the ColoRail winter meeting. The meeting was held on February 28th, 2015, with approximately 60 attendees, including students and other individuals from the North Front Range region.

4.0 Right-of-way Analysis Update

This section discusses the ROW requirements and assumptions from the original EIS and the changed conditions that exist presently. The Update will assess how the changed conditions above affect the previously-anticipated expectations for ROW availability and cost.

As originally developed there were five distinct segments of the corridor: (1) That portion of the BNSF corridor in Fort Collins where the MAX BRT has since been built, (2) From the south end of the BRT corridor in Fort Collins to Longmont which has BNSF Railway ROW, local road ROW, US 287 ROW and potentially private ROW, (3) Longmont to just west of I-25 which has SH 119 ROW, (4) the north/south portion of the alignment either using Weld County Road 7 (WCR) ROW and potentially private ROW, or the I-25 ROW in the area between SH 119 and the RTD's ROW, and (5) RTD ROW (previous Union Pacific's Boulder Branch) from the I-25 crossing to 162nd/Colorado.

4.1 EIS ROW Assumptions/Methodology

The original study area extended from Wellington, north of Fort Collins, along the I-25 corridor to the Denver Metro Area, and from US 287 on the west to US 85 to the east. Generally, improvements were proposed to occur along I-25 (highway and bus improvements), the BNSF ROW (rail improvements) and US 85 (highway and bus improvements). There was also an area of new ROW or ROW owned by the Union Pacific Railroad (UPRR) proposed for the Longmont-North Metro connection. This update considers only the I-25 North Commuter Rail as outlined in the Package A alternative of the EIS, which later became the commuter rail element of the Preferred Alternative.

Numerous facilities such as stations (for commuter bus, bus rapid transit, and/or commuter rail) along the I-25, BNSF and US 85 corridors, as well as maintenance facilities, were included in the Build Package A. The sites where these facilities would be located are presently on privately held and/or publicly owned parcels. Property for these facilities would need to be acquired. The ROW acreage and displacement impacts for these facilities were summarized in the EIS.

Major regional and neighborhood retail areas are common at the highway interchanges and roadway intersections of major streets along the corridor. Large areas of rural enclaves with agricultural and equestrian uses were, and still are, present. Large-lot (one-acre) estate development is common in newer developments. All land use patterns are influenced by transportation systems, topography, open space, and current patterns of development.

ROW impacts described the total amount of physical land (in acreage) that would be required as additional ROW for the Build Package A. Impacted properties included those properties where a build package would result in a partial or total acquisition of the property or modify access to the property. Access modifications included changing the locations of existing access to certain streets and providing new access from different streets. Displacements would occur where the impacts are substantial. Displaced occupants are eligible for relocation benefits. All agricultural, residential, industrial, and commercial land uses and ownership information were reported using

2006 data and did not consider future development or ownership changes that might occur prior to ROW acquisition for the proposed action.

The EIS ROW Cost Estimate, to the highest degree possible, was to determine the current (2006) values of properties that might be acquired at a future date. The costs associated with each type of ROW activity were estimated by using 2006 real estate market data, cost manuals, and the estimator's experience. The cost estimate was coordinated with personnel knowledgeable in the appraisal, acquisition and relocation disciplines. Field inspections were conducted to gather and consider pertinent information for preparation of the estimate. However, it should be noted, the estimate was not a formal appraisal. The EIS cost estimate did not consider the presence of geological hazards including mined areas or hazardous waste or material in the estimating process. Property values were estimated as if the properties were free and clear of geological hazards or hazardous waste or materials. Many parcels were determined to be partial acquisitions that require an estimate not only of the land being acquired, but also an estimate of the diminution of value, if any, to the remainder of the property or a cost to cure. The EIS cost estimate was based on the most probable worst case and highest cost assumptions. Specific parcels that might have been partial acquisitions are assumed, because of incomplete mapping and/or design or other factors, to be full acquisitions.

Detailed criteria were used in the EIS ROW evaluation including each of the following data fields described below:

- Parcel Number – Parcel number assigned by CDOT.
- Map Number – The aerial map page number.
- County – The County in which parcel is located.
- County PIN – The Property Identification Number assigned by the County.
- Owner – The property owner's name per assessor records.
- Property Address – The address of the property.
- Property Type – The property classification assigned by the County.
- Assessor Land Area – The total land area of the parcel assigned by assessor.
- Assessor Actual Land Value – The total actual land value estimated by assessor.
- Assessor's Improvement Area – The total improvement area assigned by assessor.
- Assessor's Actual Improvement Value – The total improvement value estimated by assessor.
- Impacted Area Land – The square footage of land acquisition.
- Impacted Area Improvement – The square footage of improvement acquisition.
- Cost Per Square Foot – The estimated dollar value per square foot. This estimate can be for land only or improvements including land.
- Full Take Cost – The type of taking and the estimated dollar value of the total acquisition cost.
- Partial Take Cost – The type of taking and estimated dollar value for land, improvements, and damages, if any, for the acquisition. Improvements include buildings, fences, landscaping etc. Damage estimate is based upon estimator's experience and size and location of take.
- Relocation Type – The type of relocation, i.e., residential, business or personal property. (Replacement housing costs, move costs, personal property, etc.).
- Total Costs – The estimated total acquisition and relocation costs.

Contingency Costs were applied to acquisition and relocation costs as part of the ROW cost estimate. Contingency costs provided for possibilities such as administrative settlements, court

awards, attorney fees, interest payments, court costs, appraisal, acquisition, relocation staff or consultant fees.

Access impacts were not considered in the EIS estimate. The estimate assumed reasonable access would be maintained. ROW needs were not defined clearly enough at the time of the estimate to assess access.

Table 1: Package A EIS - ROW (acres) to be acquired for Commuter Rail

PACKAGE A EIS- Transit Component Commuter Rail	
Component	ROW (acres)
Commuter Rail: Fort Collins to Longmont	167
Commuter Rail: Longmont to North Metro	168
Total Package A Transit ROW	335

Table 2: Package A EIS – Acres Impacted Associated with Business and Residential Relocations

PACKAGE A EIS – Transit Component Commuter Rail			
Component	Acres Impacted	Business Relocations	Residential Relocations
Commuter Rail: Fort Collins to Longmont	11	26	69
Commuter Rail: Longmont to North Metro	25	9	18
Total Package A Transit	36	35	87

Source: Developed from County GIS and engineering data, and North I-25 design footprint for EIS Alternatives.

4.2 Updated ROW Analysis

In this Update, the I-25 North Commuter Rail corridor was analyzed according to the following segments: 1) South Transit Center Station for the Fort Collins MAX BRT to North Loveland Station 2) North Loveland Station to Downtown Loveland Station, 3) Downtown Loveland Station to Berthoud Station, 4) Berthoud Station to North Longmont Station, 5) North Longmont Station to the Longmont Sugar Mill Station, 6) Longmont Sugar Mill Station to the SH 52 Station, and 7) SH 52 Station site to 162nd Avenue Station.

This Update evaluates the changed conditions from the EIS’s previously-anticipated expectations for ROW availability. Changed conditions shown below reflect working assumptions for this Update, and would need to be further evaluated and formally ratified in a Supplemental EIS or similar NEPA document before moving into implementation. Changed conditions are identified as those conditions and/or alignment deviations as follows:

- The commuter rail would no longer follow Weld County Road 7 north to SH 119.
- The station site originally located at I-25 & Weld County Road 8 is analyzed here with a working assumption of being located at I-25 and SH 52.
- The alignment would utilize RTD’s Northwest Area Mobility Study preferred alternative alignment from the 162nd Avenue Station site, which is the end of line for the North Metro Rail Line, extending along the RTD acquired UPRR line north and then westerly to I-25 at the Erie Interchange.
- Use, at no cost to the project, CDOT I-25 ROW between the north bound lane of I-25 and the frontage road from the Erie interchange to just south of SH 119. At this point the

alignment crosses to the west side of I-25 and skirts around the intersection of I-25 and SH 119 to continue west on the north side of SH 119 to Longmont, then turning north and following the EIS Package A alignment.

- Termination of the commuter rail at the Fort Collins South Transit Center Station rather than continuing on into downtown Fort Collins.
- Need for the commuter rail, to be separate from the freight track from Fort Collins to Longmont, to be impact-neutral on BNSF operations, ensure reliable passenger rail operations, and also include a maintenance road between these two tracks.

This update for changed conditions and to update the estimated ROW impacts and costs was not designed to provide the same level of detail and analysis as the original EIS. Where possible and applicable, the data from the original ROW analysis and cost estimate were incorporated into the final results reported here. All the basic assumptions of the EIS were applied to this update with the exception of the changed conditions listed above.

The total amount of physical land (in acreage) that would be required as additional ROW has changed from the build Package A due to the changed conditions. Impacted properties included those properties from the original Package A and newly impacted properties that would result in a partial or total acquisition of the property or modify access to the property. Access modifications included changing the locations of existing access to certain streets and providing new access from different streets. Displacements would occur where the impacts are substantial. Displaced occupants are eligible for relocation benefits. All agricultural, residential, industrial, and commercial land uses and ownership information were updated as appropriate to 2014 data and does not consider future development or ownership changes that might occur prior to ROW acquisition for the proposed action.

The updated ROW cost estimate utilizes land classification values to apply approximate values to affected properties that might be acquired at a future date. Each property was reviewed to determine the land class most applicable and then that land classification value was applied to the approximate ROW acquisition square footage to determine its value. Current real estate market data, cost manuals, and the estimator's experience were relied upon for this determination. This cost estimate, just as was the case with the EIS cost estimate, was based on the most probable worst case and highest cost assumptions. Specific parcels that might have been partial acquisitions are assumed, because of incomplete mapping and/or design or other factors, to be full acquisitions.

Appendix C contains conceptual plan and cross section drawings for the updated North I-25 Commuter rail Alignment.

A map on the following page (Figure 2) identifying the future commuter alignment assumed for this Update also depicts the station locations, the location of the proposed maintenance facility, and assumed passing track locations.

North I-25 EIS Commuter Rail Update

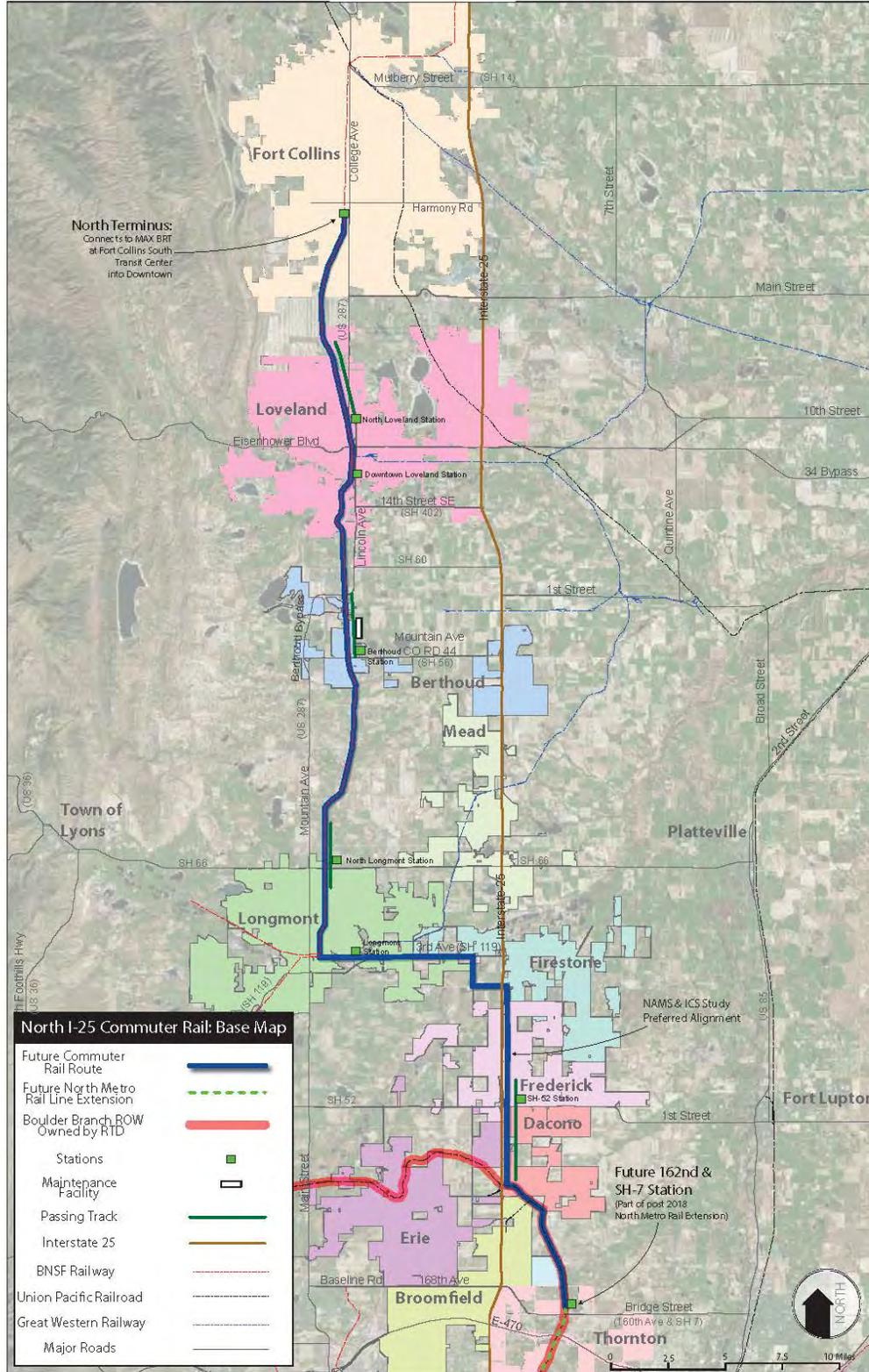


Figure 2: North I-25 Commuter Rail: Base Map

Table 3: North I-25 Commuter Rail - ROW (acres) to be acquired for Commuter Rail

North I-25 Commuter Rail Update	
Component	ROW (acres)
Segment 1: Fort Collins South Transit Center to North Loveland Station	6.3
Segment 2: North Loveland Station to Downtown Loveland Station	6.6
Segment 3: Downtown Loveland Station to Berthoud Station (includes maintenance facility site of approx. 30 acres)	37.3
Segment 4: Berthoud Station to North Longmont Station	4.6
Segment 5: North Longmont Station to Longmont Sugar Mill Station	7.5
Segment 6: Longmont Sugar Mill Station to SH 52 Station	8.1
Segment 7: SH 52 Station to 162 nd Avenue Station	8.7
Total Transit ROW	79.1

Table 4: North I-25 Commuter Rail – Acres Impacted Associated with Business and Residential Relocations

North I-25 Commuter Rail Update			
Component	Acres Impacted	Business Relocations	Residential Relocations
Segment 1: Fort Collins South Transit Center to North Loveland Station	0	0	0
Segment 2: North Loveland Station to Downtown Loveland Station	1.5	0	4
Segment 3: Downtown Loveland Station to Berthoud Station (includes maintenance facility site)	2.6	1	2
Segment 4: Berthoud Station to North Longmont Station	0	0	0
Segment 5: North Longmont Station to Longmont Sugar Mill	5.1	1	12
Segment 6: Longmont Sugar Mill Station to SH 52 Station	3	2	0
Segment 7: SH 52 Station to 162 nd Avenue	0	0	0
Total	12.2	4	18



Figure 3: Photo by *John Crisanti Photography*

The residential displacements in Segment 5 are concentrated along the existing BNSF ROW in the City of Longmont. These homes were constructed in the early 1900's to mid-1970's. The business displacements in Segment 6 are primarily concentrated along SH119.

Table 5: Land Classification Costs

I-25 North Commuter Rail Update	
Land Classification	Cost per SF Range
Agricultural	\$0.45 to \$0.60
Residential	\$1.10 to \$1.25
Industrial	\$12.75 to \$13.50
Commercial	\$21.50 to \$23.00

Table 6: Estimated ROW and Relocation Costs

I-25 North Commuter Rail Update		
Component	ROW (acres)	Cost per Segment (in 2014 \$)
Segment 1: Fort Collins South Transit Center to North Loveland	6.3	\$1,859,000
Segment 2: North Loveland to Downtown Loveland	6.6	\$6,971,000
Segment 3: Downtown Loveland to Berthoud (including Maintenance Facility at approximately \$800,000)	37.3	\$5,428,100
Segment 4: Berthoud to North Longmont Station	4.6	\$1,970,850
Segment 5: North Longmont Station to Longmont Sugar Mill Station	7.5	\$4,467,250
Segment 6: Longmont Sugar Mill Station to SH 52 Station	8.1	\$1,668,250
Segment 7: SH 52 Station to 162 nd Avenue	8.7	\$791,775
Business & Residential Relocation Cost (estimated)		\$2,150,000
Total Estimated ROW Cost with Relocation	79.1	\$25,306,225

5.0 Operations Plan Update

The Operations Plan Update includes a discussion of basic assumptions affecting proposed operations of the North I-25 EIS Commuter Rail. The overriding assumption for the EIS was that there would be joint freight and passenger rail operations from Fort Collins to Longmont sharing BNSF's existing single track freight rail line roughly paralleling US 287.

This update takes into consideration the various changed conditions from those that existed when the assumptions were made for the original operating plan in the EIS. RTD has made implementation schedule adjustments and design/cost/operating timetable adjustments on both the Northwest and North Metro corridors to which the North I-25 Commuter Rail would connect. The budget to construct Northwest Rail now places the completion schedule well beyond the originally-anticipated 2017 date. North Metro is now an electrified, not diesel, corridor. For the foreseeable future, the North Metro line will be single-track for much of its length and is funded only through the 124th Avenue station.

For the update, it was important to more fully engage the BNSF Railway in providing input to passenger and freight operations in proximity to each other on the BNSF-owned corridor. High-profile collisions of passenger rail vehicles with freight rail vehicles have resulted in a higher expectation of safety preparedness for both passenger and freight operators. This has included the Federal promulgation of positive train control (PTC) requirements nationally. BNSF has established and updated business practices for shared-corridor operations, known as "Commuter Passenger Principles." Those are included in **Appendix D**.

Finally, CDOT, through the Interregional Connectivity Study (ICS) spent two years considering the potential for long-term high speed rail investment. That study concluded that high speed rail and commuter rail would serve different purposes and markets in northern Colorado. High speed rail would have few stops and serve inter-city and inter-regional travel (including a connection to Denver International Airport), whereas light rail, bus rapid transit, and commuter rail are primarily intended to serve intra-city or intra-regional travel.

The update assumed that RTD's Northwest Rail (NW Rail) approved in the 2004 FasTracks vote will be completed to Longmont at some point in the future when RTD has sufficient funding to complete this commuter rail project from the 2016 end-of-line station at Westminster to Longmont. Also, the updated operating plan was developed to coordinate with RTD's proposed North Metro Rail scheduled for implementation to 124th Avenue in 2018. The update assumed that RTD would complete the proposed North Metro Rail line to 162nd Avenue prior to any further extension as part of the North I-25 Commuter Rail service.

No travel modeling work was done for this update. It is presumed that ridership will remain approximately the same as in the EIS. Future travel modeling (ridership) work will need to be done if any future actions or decisions, beyond this Commuter Rail update, warrant it.

5.1 EIS Operations Plan Assumptions

As noted earlier, the key assumption for the operating plan for the Commuter Rail in the EIS was joint operations of both BNSF's freight rail and the commuter rail on the BNSF single track alignment from downtown Fort Collins to east Longmont. There were no assumed time restrictions due to rail freight operations. This was part of Package A of the EIS that eventually became part of the Preferred Alternative.

From Longmont, there was a new commuter rail line that essentially paralleled SH 119 from Longmont to Weld County Road 7 just to the west of I-25. The commuter rail alignment then

followed Weld County Road 7 to where it intercepted the RTD's Boulder Branch rail ROW. It then proceeded along that ROW to the proposed 162nd Avenue station of RTD's North Metro Rail. The service was then assumed to continue to Denver Union Station (DUS) from 162nd Avenue to DUS on full double track.

The North I-25 EIS Commuter Rail operating plan assumed weekday service on every other North Metro Rail train will continue on to Fort Collins. RTD's proposed 15 minute peak and 30 minute off-peak service would then result in 30 minute peak and 60 minute off-peak for the North I-25 EIS Commuter Rail trains proceeding north. It was assumed that every other train arriving in Fort Collins would terminate at the Fort Collins South Transit Center with the alternate trains proceeding on into the Fort Collins Downtown Transit Center at Maple Street.

The following commuter rail stations were proposed in the EIS:

- Fort Collins Downtown Transit Center
- Colorado State University
- Fort Collins South Transit Center
- North Loveland at 29th Street
- Downtown Loveland at 6th Street
- Berthoud at SH 56
- North Longmont at SH 66
- Sugar Mill in Longmont
- Weld CR 8 / I-25

Two stations, North Loveland and Berthoud were proposed to have pedestrian overpass structures located at those stations.

A commuter rail vehicle maintenance facility was also proposed to be located just north of Berthoud.

The travel time was projected to be approximately 1 hour and 15 minutes between the Downtown Fort Collins station and 162nd Avenue, a distance of 48.71 miles. The average speed including all stops was 38.60 mile per hour. The total travel time between the Fort Collins Downtown Station and DUS was expected to be 1 hour and 43 minutes and the total travel time between the Fort Collins South Transit Center and DUS 1 hour and 31 minutes.

Four passing tracks were proposed for the corridor:

- About 1 mile north of the North Loveland station
- Just north of the Berthoud station
- 2 miles north of the North Longmont station
- Nearly 4 miles north of the Weld Co. Rd. 8/ I-25 station

5.2 Updated Operations Plan

There are five primary changed conditions that have an impact on the updated operations plan for North I-25 Commuter Rail.

- Commuter rail will operate on a separate track to the east of the BNSF freight rail line instead of joint operations on the BNSF line from Fort Collins to Longmont assumed in the EIS.
- North terminus ends at Fort Collins South Transit Center Station rather than continuing on into the Fort Collins Downtown Transit Center Station.
- In Longmont, two alternatives were evaluated. One would follow the existing BNSF wye to connect with the station site evaluated by RTD for the Northwest Rail line in the vicinity of 1st Avenue and Main Street. The second would curve to the east with a station near the Sugar Mill as was proposed in the EIS.
- In Weld Co, the commuter line is located between the northbound lanes of I-25 and the I-25 east frontage road instead of being adjacent to Weld County Road 7, as was assumed in the EIS.
- RTD has changed its operating plans for North Metro Rail; going from fully double tracked between DUS and 162nd Avenue to mostly single track with some passing sidings. Operating headways are proposed to be 20 minutes in the peak hour and 30 minutes in the off-peak.

The changed economic environment in the rail freight business has caused the proposed North I-25 Commuter Rail to operate on its own track instead of a shared operation with the BNSF's freight rail traffic as was assumed in the EIS. The BNSF portion of this commuter rail route is a key link in the railroad's Front Range Subdivision, a through route for freight flows and freight customers between the United States, Canada, and Mexico, as well as for worldwide goods movement. The freight rail business is a very dynamic industry and the BNSF's traffic is currently on the rise as this update is being completed. The freight rail traffic volumes of the Union Pacific Railroad and also the Great Western Railway in the NFR are also in a growth mode, due in part to energy-related development in Weld and Larimer Counties.

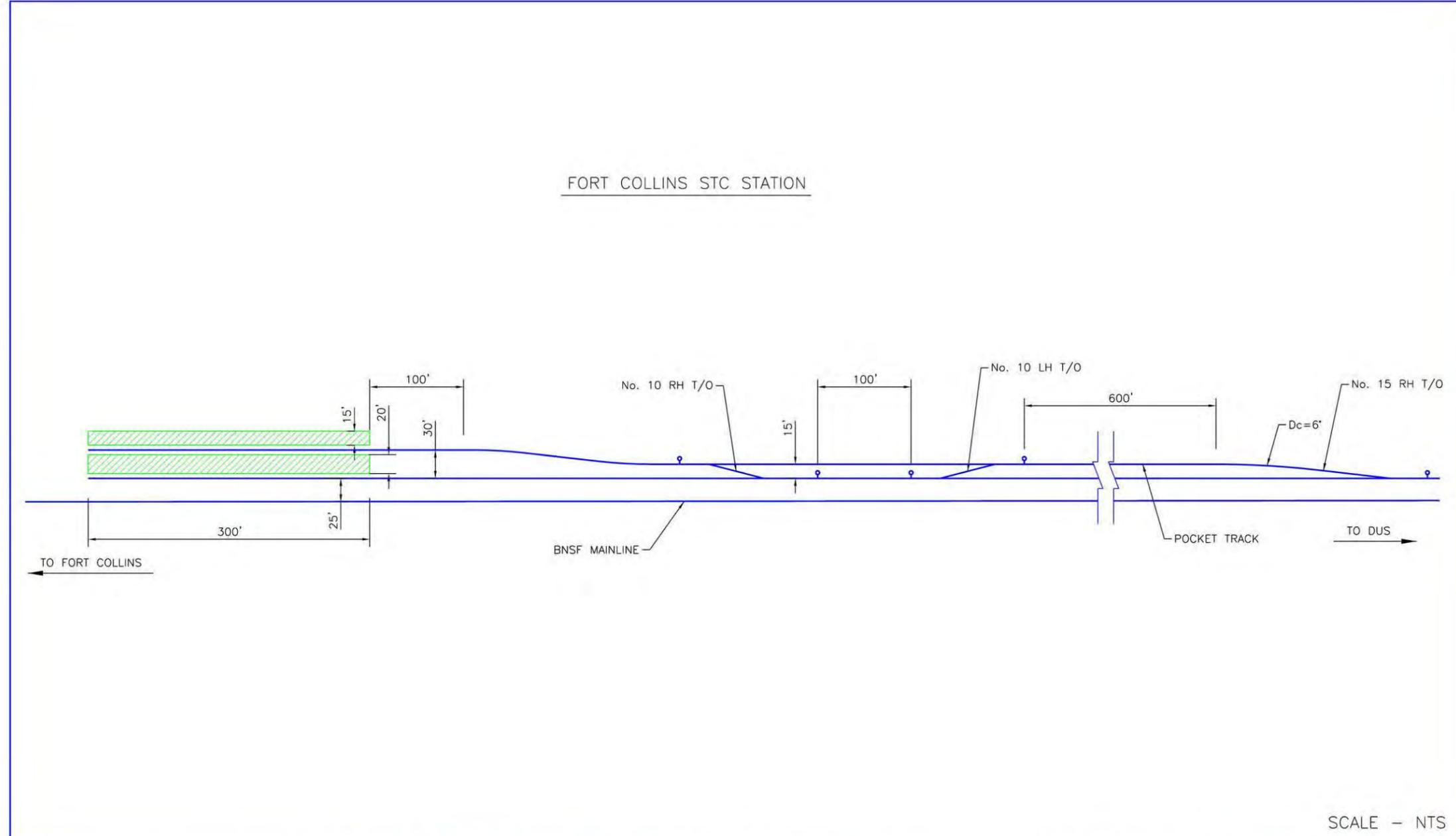
The safety related concerns stemming from high-profile fatalities from rail accidents in recent years between commuter rail and freight trains have also created the need for separating freight and passenger rail operations, the use of more expensive FRA compliant commuter rail vehicles, and for additional signaling and vehicle control systems not considered in the EIS. It should be noted that freight railroads have become almost twice as safe as they were ten years ago, with accidents and fatalities dramatically reduced. Railroads, like airlines, are an industry run with a "safety culture" always looking for ways to prevent future accidents or fatalities.

This additional, separate track for commuter rail raises the infrastructure costs of the project while at the same time makes for an inherently safer operation with no rail freight conflicts possible. Having the two freight and passenger tracks adjacent to one another, with a minimum separation of 25 feet between the centers of the two tracks, provides for the opportunity to place a maintenance road on the railroad right-of-way between the two tracks, permitting fast dispatch of track maintenance and repair equipment to problem areas, minimizing the time commuter rail service could be subject to service delays awaiting track repairs. It is assumed in the Update that that 10 foot wide maintenance road will be located between the freight and commuter rail tracks. This changed condition affects the northernmost 26 miles of the corridor between the South Fort Collins Transit Center and the point near downtown Longmont where the commuter rail alignment leaves the BNSF ROW.

The implementation of MAX BRT in the spring of 2014 changed the assumptions that had been included in the EIS. The City has now proposed that the commuter rail line will now terminate at the South Fort Collins Transit Center Station since double tracking would be required to separate freight and passenger operations in the Mason Street Corridor. Riders would proceed

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into Downtown Fort Collins or other intermediate stations using MAX BRT. See Figure 4 for a diagram of the commuter rail track configuration at the South Fort Collins Transit Center Station.



SCALE - NTS

Print Date:		Sheet Revisions			Colorado Department of Transportation 	NORTH I-25 COMMUTER RAIL DRAFT - CONCEPTUAL ALIGNMENT FT COLLINS STC STATION		Project No./Code
File Name:		Date:	Comments	init.		No Revisions:		
Horiz. Scale:	Vert. Scale: As Noted					Revised: 20 JAN 2015	Designer: R. GRAUBERGER	Structure Numbers
Unit Information	Unit Leader Initials					Void:	Detailer: B. WARDELL	Sheet Subsets
PARSONS BRINCKERHOFF 555 17th Street, Suite 300 Denver, CO 80202 Phone: (303) 632-8081 Fax: (303) 728-8938						Sheet Subsets:	Subset Sheets: of	Sheet Number

Figure 4: Ft. Collins Platform

Since the commuter rail service is proposed to terminate at the South Fort Collins Transit Center, the overall distances traveled by Commuter Rail between Fort Collins and DUS will be somewhat shorter than in the EIS. The stations proposed for the operations plan in this Update are the same as were proposed in the EIS with the exception of the station previously proposed near Weld County Road 8 and I-25 which is now proposed to be located in the northeast quadrant of the SH 52 and I-25 interchange. Table 7 identifies the proposed Commuter Rail Station locations for the Update. Because the commuter rail tracks and station platforms will be on the east side of the BNSF freight track, they will be adjacent to the proposed parking and station facilities at North Longmont and Berthoud. The pedestrian overpasses included in the EIS at those two stations will no longer be required. The same parking capacity that was assumed at the commuter rail stations in the EIS is being assumed for this Update as well.

Table 7: North I-25 Commuter Rail Stations

Station Name	Location
Fort Collins South Transit Center	South of Harmony Road
North Loveland	Just South of 39 th Street
Downtown Loveland	Approximately 6 th Street
Berthoud	North of SH 56, east of BNSF
North Longmont	North of SH 66, east of BNSF
Longmont	@ Sugar Mill
SH 52	NE Quadrant of SH 52 & I-25 Interchange
162 nd Avenue	North Metro Rail Station

The travel times for the updated operating plan are similar to those proposed in the EIS for most station-to-station destinations, and a total of five minutes longer from end-to-end, Ft. Collins South Transit Station to Denver Union Station. Even though the commuter rail operation will be on separate track, the alignment is still constrained due to grades and curves associated with the existing BNSF ROW. The running times and average and maximum speeds for the segments of the corridor between stations are shown in Table 8. The running time for the proposed commuter rail service between the Fort Collins South Transit Center and North Longmont is a little over 40 minutes. This compares with the current 50 minute travel time on the FLEX bus service between the South Fort Collins Transit Center and downtown Longmont.

Table 8: Running Time and Speeds between Stations

Station	Distance From Ft. Collins (miles)	Time Between Stations	Average Speed Between Stations	Total Trip Time	Maximum Speed in each Segment
Fort Collins South Transit Center	0.00	0:00		0:00	
North Loveland	7.08	8:45	57.1	8:45	70
Loveland	8.74	3:49	40.0	12:34	50
Berthoud	15.16	9:31	46.4	22:05	70
North Longmont	22.50	10:18	48.0	32:23	65
Longmont (Sugar Mill)	26.52	7:44	39.1	40:17	45
SH 52	36.32	11:43	55.8	52:00	75
162 nd Avenue	43.83	10:00	50.1	62:00	75
144 th Avenue	46.45	4:39	35.7	66:39	70
124 th Avenue	48.85	4:09	35.3	70:48	65
112 th Avenue	50.30	3:11	28.0	73:59	55
104 th Avenue	52.10	3:58	30.2	77:17	55
88 th Avenue	53.95	3:56	31.3	80:73	60
72 nd Avenue	56.34	4:01	35.7	84:74	70
NWSS	59.64	5:37	36.8	90:11	60
DUS	62.46	6:02	28.2	96:13	65

The Northwest Area Mobility Study completed by RTD in August of 2014 looked at an option of connecting Longmont to Denver by way of a “North Metro Extension”. Early in the detailed level evaluation of the North Metro Extension, the Weld County Road 7 alignment was noted by RTD and CDOT to have too much existing or pending development to continue using this particular alignment as a possible commuter rail corridor. Therefore, for this update, the I-25 corridor was used as the working assumption for the proposed commuter rail line between SH 119 east of Longmont and Weld County Road 8 and I-25. Meetings with CDOT Region 4 staff led to the proposed alignment for commuter rail between the northbound lanes of I-25 and the east I-25 Frontage Road.

There are a few locations in the corridor where BNSF rail freight customers are on the east side of the BNSF’s ROW. With the commuter rail line located to the east of the freight line, there will need to be interlocked diamond crossings of the commuter track to permit these customers to continue to have access to BNSF’s freight services. Any industry sidings would need to have electric lock switches where they cross the commuter rail line. This situation also exists north of downtown Loveland where the BNSF interchanges freight traffic with the Great Western Railway.

Even though there are no longer any conflicts with freight rail operations that would affect the commuter schedules, there need to be some passing sidings where the northbound and southbound commuter trains will meet en-route from Denver to Fort Collins and vice versa. The four proposed passing sidings are shown on Table 9.

Table 9: Proposed Passing Siding Locations

Location	Limits
Loveland	South of North Loveland Station / (north) 3 miles
Berthoud	South of Berthoud Station / (north) 2.4 miles
Longmont	South of North Longmont Station / (north) 2.1 miles
I-25 Frontage Road	From Furniture Row / (north) 4.6 miles

An overall conceptual operating schedule is shown on Table 10. This operating schedule is tied to RTD's opening day plan with 20-minute peak and 30 minute off peak service in the Denver Region, resulting in 40 minute peak and 60 minute off peak service in the North Front Range region.

Table 10: Example Weekday Operating Schedule

Depart Ft. Collins	Arrive DUS		Depart DUS	Arrive Ft. Collins
			6:00 AM	7:40 AM
5:10 AM	6:50 AM	➔	7:00 AM	8:40 AM
5:50 AM	7:30 AM	➔	7:40 AM	9:20 AM
6:30 AM	8:10 AM	➔	8:20 AM	10:00 AM
7:10 AM	8:50 AM	➔	9:00 AM	10:40 AM
8:10 AM	9:50 AM	➔	10:00 AM	11:40 AM
9:10 AM	10:50 AM	➔	11:00 AM	12:40 AM
10:10 AM	11:50 AM	➔	12:00 PM	1:40 PM
11:10 AM	12:50 PM	➔	1:00 PM	2:40 PM
12:10 PM	1:50 PM	➔	2:00 PM	3:40 PM
1:10 PM	2:50 PM	➔	3:00 PM	4:40 PM
2:10 PM	3:50 PM	➔	4:00 PM	5:40 PM
2:50 PM	4:30 PM	➔	4:40 PM	6:20 PM
3:30 PM	5:10 PM	➔	5:20 PM	7:00 PM
4:10 PM	5:50 PM	➔	6:00 PM	7:40 PM
5:10 PM	6:50 PM	➔	7:00 PM	8:40 PM
6:10 PM	7:50 PM	➔	8:00 PM	9:40 PM
7:10 PM	8:50 PM	➔	9:00 PM	10:40 PM
8:10 PM	9:50 PM	➔	10:00 PM	11:40 PM
9:10 PM	10:50 PM	➔	11:00 PM	12:40 PM
10:00 PM	11:50 PM	➔	12:00 AM	1:40 AM

The operating plan is closely linked to the operations of RTD's North Metro Rail. Summary information regarding North Metro Rail from RTD's website is included in **Appendix E**. RTD has set the following requirements for the operation of the North I-25 Commuter Rail DMU's on it North Metro Rail corridor.

- The DMU vehicles must weigh no more than the RTD's EMU vehicles operating on the North Metro Rail due to structure design standards for the North Metro Rail corridor. If heavier, the additional structural reinforcement must be paid by the North I-25 Commuter Rail project. RTD's loading standards are shown in **Appendix F**.
- The vehicles must be able to operate at RTD's high level platforms.
- The North I-25 commuter trains must stop at all North Metro Rail stations from 162nd Avenue to Denver Union Station.
- Every other North Metro Rail train will continue on to Fort Collins.

For compatibility with RTD's North Metro stations and Denver Union Station, the commuter rail vehicles will have a floor height of 50½ inches above the top of rail for use at high level station platforms. The high level platforms in turn would restrict clearance for BNSF freight operations with shared track operations and this is a further reason for separating tracks for the commuter rail service.

The analysis in this update also included an evaluation of the need for rail/highway grade crossing protection improvements and the need for grade separated crossings. The Technical Advisory Committee members described quiet zone studies either completed or under development. With 44 additional trains per day on average being added to the existing rail freight traffic, it was determined that this study would assume that quiet zone would be implemented at all of the at-grade crossings in the residential areas in the corridor. A listing of all proposed at-grade crossing locations and grade separated crossings along the North I-25 Commuter Rail corridor is included in **Appendix G**.



Figure 5: Photo by *John Crisanti Photography*

6.0 Cost Estimate Update

The Cost Estimate Update presents a summary of steps taken to analyze and present an estimated range of cost for the design, property acquisition and construction of the North I-25 Commuter Rail from the RTD end-of-line station at 162nd Avenue to the Fort Collins South Transit Center. This analysis consists of three components: a) the preparation of a detailed cost estimate based upon current assumptions and conceptual plan development; b) a reasonableness check comparing the Cost Update with other commuter rail lines within the U.S., and c) reasonableness checks against cost estimates prepared for the North I-25 EIS in 2009 and Northwest Area Mobility Study in 2014.

The commuter rail passenger service is proposed to operate on railroad property currently owned and operated by BNSF between Longmont and the Fort Collins South Transit Center, south of Harmony Road, alongside ongoing freight railroad service. The BNSF Railway, a private entity, requires that passenger rail operations using its facilities and property do so without degrading freight rail service or freight customers. BNSF will provide a cost to furnish a portion of its right-of-way for this passenger rail project at the time final negotiations are conducted and contracts are concluded to establish the proposed passenger rail service.

The estimated total for this Cost Estimate Update is approximately \$1.21 billion in 2014 constant dollars. However, because the project is still at a very conceptual level of plan development and discussions with the BNSF are still preliminary and on-going regarding corridor acquisition costs and freight requirements, this report provides a range of cost for the Cost Estimate Update. The recommended cost range falls between \$1.09 billion and \$1.39 billion for the construction and implementation of the North I-25 Commuter Rail Project. That represents a differential 10% below to 15% above the \$1.21 billion Cost Estimate Update.

6.1 Detailed Cost Estimate Spreadsheet

A detailed cost estimate spreadsheet (Cost Spreadsheet) was developed for the North I-25 Commuter Rail Update based upon conceptual layouts. The Cost Spreadsheet can be found in **Appendix H**. Quantities and estimated costs within the spreadsheet are summarized within seven segments corresponding to station locations as described in Section 5.1 of the Operations Plan Update within the report. At the current conceptual level, structures, retaining walls, track and associated earthwork quantities have been estimated through a combination of satellite imagery and field inspection.

The Cost Spreadsheet has been developed to correspond to Standard Cost Code (SCC) format as required by the Federal Transit Administration (FTA). SCC format provides for costs to be categorized per the following Cost Codes:

Table 11: Standard Cost Codes (SCC)

Standard Cost Code	Cost Category
10	Guideway and Track Elements
20	Stations, Terminals and Intermodal
30	Support Facilities, Yards, Shops, Admin. Bldgs.
40	Site work and Special Conditions
50	Systems
60	ROW, Land, Existing Improvements
70	Vehicles
80	Professional Services
90	Contingency

Within the Cost Spreadsheet, estimated costs have been shown within in each SCC category and have been “rolled up” into the SCC 10-90 Cost Categories. When possible, the Cost Spreadsheet was populated using available unit costs and percentage-of-construction costs from RTD’s FasTracks projects constructed or under construction within the metro area. On those items where FasTracks data were not available, unit costs were derived using a “bottom up” estimating approach where local material, labor and equipment costs were used to develop unit costs.

SCC Cost Categories 10-50 correspond to construction items related to track, stations, maintenance facility, structures, drainage and train safety components. Those Cost Categories are also referred to within the FTA vernacular as Construction Bid Items (CBI). The subtotal for those items is approximately \$578.0 million in 2014 dollars. SCC Cost Categories 60-80 correlate to ROW acquisition, purchase of diesel multiple unit vehicles and professional services. The total for those Cost Categories is \$344.6 million. A contingency amount (SCC 90) of 30% has been incorporated to arrive at a total estimated cost of \$1.21 billion. The 30%

contingency factor being used is considered appropriate for the current level of plan development. The estimated cost range has been placed at **\$1.09 billion to \$1.39 billion**.

6.2 Other Commuter Rail Systems in the U.S.

A survey of other transit properties around the country was undertaken to provide an overall reasonableness check of the North I-25 Commuter Rail Update and to allow comparison of unit costs in specialty areas such as vehicles and safety control systems.

A total of eight commuter rail lines were evaluated, for comparison purposes, as part of this study. The eight lines are geographically dispersed throughout the country and have been constructed within the past nine years. One commuter rail project is currently under construction. Representatives from the following commuter lines were interviewed to obtain cost and operational information:

Table 12: Other Commuter Rail Locations

Commuter Rail Line	Geographical Location
Rail Runner Express	Albuquerque, NM
SunRail	Orlando, FL
Westside Express	Portland, OR
Seattle Sounder	Seattle, WA
A-Train	Denton, TX
Frontrunner South	Salt Lake City, UT
Sprinter	Oceanview, CA
e-Bart	San Francisco, CA

In order to provide valid and usable cost comparisons, the total project costs provided by the various transit agencies were adjusted to 2014 dollars from the year bid prices for their specific projects were approved. Adjustments were made using national construction indices provided by Engineering News Record (ENR). ENR produces and provides to the public annual cost indices derived from specific material and labor costs. Indices are produced nationwide and by City in larger metropolitan areas. When possible, City indices were used in this study. Adjusted costs were calculated using the differential in indices from the year pricing was obtained to 2014 and multiplying total and component costs by that escalation factor. Table 13 provides a brief overview and per-mile cost comparisons of the commuter lines surveyed. Route miles are the number of miles in true distance from point to point, whereas track miles will always be the same or higher depending on the amount of double or triple track along the route. Detailed information on each commuter rail can be found in **Appendix I**.

The per-mile costs of the commuter lines were typically dependent upon the extent of improvements made to bring the line to an operational level. In some circumstances, an existing freight line was acquired by the transit agency and only track upgrades, safety improvements, station construction and vehicle procurement were required. On other commuter

lines, construction similar to that proposed on the North I-25 Commuter Rail was necessary and required new structures, new track, maintenance facility, stations, train safety features and associated improvements.

On those lines where an existing corridor was acquired by a transit agency and minimal improvements were made, costs typically ranged from \$7 million to \$13 million per track mile. On commuter lines where more extensive work was necessary, costs increased to between \$19 million and \$26 million per track mile.

The surveyed commuter line most similar to the proposed North I-25 Commuter Rail is the FrontRunner South connecting Salt Lake City, Utah and Provo, Utah. Completed in 2012, this 44.4 mile line is the same length as the proposed North I-25 Commuter Rail project and has several similarities with regard to cost and construction scope. Those similarities include; a corridor adjacent to an existing freight line (Union Pacific), number of stations (8), “Quiet Zone” designation along the corridor, acquisition of adjacent parcels needed for construction and urban area construction challenges. The approximate cost of the FrontRunner South was \$19.3 million per track mile. In comparison, the cost range of the North I-25 Commuter Rail is estimated between \$19.3 million and \$24.7 million per track mile. It should be noted additional train safety upgrades are currently being made to the FrontRunner that were not included in the original, stated per-mile cost.

6.3 EIS Cost Estimate Assumptions

A second reasonableness check was made between the North I-25 Commuter Rail Cost Update and the EIS cost estimate prepared in 2009. In order to provide a valid comparison, the costs within the EIS were categorized in SCC format and adjusted to 2014 dollars using the same procedure described previously in comparing commuter rail line costs. ENR construction cost indices for the City of Denver were used to arrive at comparable escalated values. The adjustment factor used was 19.8% or just under 4% per year. It should be noted the ENR Denver area adjustment factor is slightly higher than the nationwide factor for that same timeframe.

Table 14 provides a comparison of cost between each SCC category for the EIS and Update along with a brief description of revised assumptions.

The cost difference between the EIS and the Cost Spreadsheet after adjustment is approximately \$387 million. Upon analysis of the cost differentials, the following items were noted:

- As shown in table 14, the Update Cost Estimate has approximately \$242 million more in “contingency” than the EIS estimate. The 30% contingency factor being recommended in the Update is in line with FTA, FRA, RTD and industry practice considering the level of project development. In examining the EIS estimate, it appears that only a few items were included in the contingency category and that substantial contingencies were included in each of the SCC line items. This may also be a partial explanation as to why the EIS costs are higher in the areas of SCC 20 Stations/Terminals, SCC 30 Support Facilities (Yards, Shops, Administration Buildings), SCC 70 Vehicles, and SCC 80 Professional Services.
- SCC categories 10 (Guideway) and 40 (Site work) increased by approximately \$118.4 million or slightly over 30% of the total increase in cost. The increase from the EIS to the Update in these categories can be validated based upon the increase in track mileage (79%) required to separate commuter use from freight use.

- An additional \$100.1 million (26% of additional cost) has been built into the Cost Update in anticipation of ROW purchases.
- Upon analysis of the revised assumptions between the EIS and the Update, the Cost Categories and total cost of the two studies are reasonably similar.

6.4 Cost Comparison to Northwest Area Mobility Study (NAMS)

A third reasonableness check was performed to compare costs developed for the Update with the NAMS cost estimate developed in 2014. The NAMS estimate reflected costs from the 162nd Avenue Station to a terminal station at approximately Main Street and 1st Avenue in Longmont. The NAMS alignment was similar to that of the Update, however, there were two significant differences between the two studies; a) the length of double track assumed within the NAMS was 17.5 miles versus 4.7 miles in the Update, b) track paralleling I-25 in NAMS was assumed to be within the median of I-25 as opposed to the east side of I-25 in the Update. The total estimated cost in NAMS for that segment of commuter rail line was \$741.3 million. The comparable segment of rail in the Update is \$536.7 million with a resulting difference of \$204.6 million. The differential is primarily within the following two cost categories;

- Professional Services – The NAMS estimate contained \$71.4 million more in professional services due to higher percentages assumed for design and construction related services. The costs of Professional Services being used in the Update are based upon recent percentages used on similar projects within the Denver metro area.
- Contingency – The NAMS estimate contained \$82.3 million more for contingency based upon a higher contingency level (50% of construction bid items) versus the Update's assumption of 30% of all costs. The percentage of contingency and application as a percentage of total cost is considered reasonable for a project at this level of plan development.

Those two items in addition to the higher quantity of double track assumed within NAMS are the primary differences in cost between the NAMS and Update cost estimates.

Table 13: Transit Property Comparisons

COMMUTER RAIL LINE	ROUTE MI./ TRACK MI.	NUMBER OF TRACKS	SHARED WITH FREIGHT?	ROLLING STOCK	TOTAL COST/ ROUTE MI. (ADJUSTED)	TOTAL COST/ TRACK MI. (ADJUSTED)	CORE COST/ ROUTE MI. (ADJUSTED) *	CORE COST/TRACK MI. (ADJUSTED) *	DESCRIPTION
RAILRUNNER - New Mexico	97/97	Single track with passing track locations	Shared with freight and Amtrak	Locomotive w/ coaches	\$6.5 Million	\$6.5 Million	\$4.8 Million	\$4.8 Million	Track upgraded in various locations with 18 miles of new track. 15 stations constructed as part of project. Installation of PTC not being implemented.
SUNRAIL - Orlando FL	32/57.2	Double track except for 2 miles of single	Minimal sharing of track with CSX RR	Locomotive w/coaches	\$12.7 Million	\$7.1 Million	\$8.3 Million	\$4.3 Million	Project involved adding a second track to an existing line. 18 mi. of double track was initially in place prior to construction. Existing ROW wide enough for additional track. Temporal separation with freight line and Amtrak.
WESTSIDE EXPRESS - Portland, OR	15.3/20	Single track with passing track locations	Temporal separation used.	Diesel Multiple Unit (DMU)	\$13.5 Million	\$10.4 Million	\$9.5 Million	\$9.4 Million	Project consisted of track re-construction, additional track and bridge replacements. Existing ROW wide enough for construction of passing track. PTC currently being implemented.
SOUNDER - Seattle, WA	10.3/10.3	Single Track	Temporal separation used.	Locomotive w/coaches	\$13.7 Million	\$13.7 Million	\$4.1 Million	\$4.1 Million	Existing track was improved with new ties, rail and ballast. Agreement with BNSF in 2010 allowed permanent access and additional trips. Negotiated cost in 2010-\$185 million. PTC currently being implemented.
A-TRAIN - Denton, TX	21.3/25.6	Single track with 6 passing locations	Temporal separation used.	Diesel Multiple Unit (DMU)	\$16.0 Million	\$13.3 Million	\$8.4 Million	\$7.0 Million	Existing rail corridor was purchased. Track was upgraded. PTC currently being implemented.
FRONTRUNNER - Utah	44.4/55.5	Single with 11 miles of double track	Two-mile section shared with U.P	Locomotive w/ coaches	\$24.1 Million	\$19.3 Million	\$19.5 Million	\$15.6 Million	Project constructed an additional track within U.P. corridor with passing track. Challenging construction due to terrain and limited access. 20' wide corridor purchased from UPRR for 175-mi. corridor length. Cost of purchase - \$185 million. Similar in many respects to N. I-25 Commuter Rail. PTC being implemented after project completion.
SPRINTER - Oceanview, CA	22/33.5	Single Track with passing track locations	Temporal separation used.	Diesel Multiple Unit (DMU)	\$28.5 Million	\$18.7 Million	\$21.5 Million	\$14.6 Million	Existing track and bed were re-constructed and raised to accommodate passenger rail and remove flood potential. PTC installation outside original cost.
E-BART - San Francisco	10/20	Double track	No	Diesel Multiple Unit (DMU)	\$51.5 Million	\$25.8 Million	\$34.1 Million	\$17.0 Million	New 2-track line within Freeway ROW. Completion anticipated in 2018. PTC being implemented with current project.
N. I-25 COMMUTER RAIL UPDATE	44.0/56.2	Single track with passing track locations	Not shared. Access to sidings required however.	Diesel Multiple Unit (DMU)	\$27.4 Million	\$21.5 Million	\$21.5 Million	\$16.8 Million	Will have separate track within BNSF corridor, exclusive track when outside BNSF corridor and passing track. Update Cost Estimate includes stations, maintenance facility, double track for passing and major structure over I-25. Positive Train Control (PTC) is included in project. Construction access may be challenging.

*Core cost is total cost minus costs of stations, maintenance facility, rolling stock and ROW

Note: Cost for N. I-25 Commuter Rail Estimate based upon N. I-25 Cross-over with Sugar Mill Station Alignment - \$1,206.9 Million

Table 14: Cost Estimate Comparison Between E.I.S. and North I-25 Update

<u>SCC COST CODE</u>	<u>COST CODE DESCRIPTION</u>	<u>EIS COST TOTALS (IN MILLIONS OF 2009 DOLLARS)</u>	<u>EIS COST ADJUSTED TO 2014 (IN MILLIONS OF 2014 DOLLARS)</u>	<u>N. I-25 COMMUTER RAIL UPDATE COST (IN MILLIONS OF 2014 DOLLARS)</u>	<u>DIFFERENCE (IN MILLIONS)</u>	<u>EXPLANATION OF DIFFERENCE</u>
10	GUIDEWAY/TRACK ELEMENTS (TRACK AND STRUCTURES)	\$78.7	\$94.3	\$163.4	\$69.1	EIS assumed a Weld CR 7 alignment with sections of track shared with BNSF. EIS assumed 18.0 m. of single track and 6.7 mi. of double track. N. I-25 Commuter Rail Update Cost Estimate assumes 31.8 mi. of single track and 12.2 miles of double track. Total track mileage increased by 79%. Cost Estimate Update includes cost of BNSF track relocation where in conflict with N. I-25 Commuter Rail.
20	STATIONS/TERMINALS	\$32.8	\$39.3	\$15.0	(\$24.3)	Very similar assumptions between EIS and Cost Estimate Update except Update has no pedestrian overpasses and elevators assumed in EIS.
30	SUPPORT FACILITY (YARDS, SHOPS, ADMIN. BLDGS.)	\$56.9	\$68.2	\$25.5	(\$42.7)	N. I-25 Commuter Rail Update cost estimate update based upon similar structures and facilities on RTD FasTracks Projects.
40	SITE WORK AND SPECIAL CONDITIONS (STRUCTURES, RET. WALLS)	\$69.7	\$83.5	\$132.8	\$49.3	Cost differential is primarily due to expanded track length and associated construction.
50	SYSTEMS (COMMUNICATIONS, SIGNALS, ELECTRICAL, TRAIN CONTROL)	\$94.9	\$113.7	\$241.2	\$127.5	Current Cost Estimate Update includes Positive Train Control (PTC). Unclear whether EIS cost estimate included full PTC safety components.
60	RIGHT-OF-WAY, LAND, EXISTING IMPROVEMENTS	\$24.8	\$29.7	\$129.8	\$100.1	N. I-25 Commuter Rail Update provides a preliminary cost for ROW.
70	VEHICLES	\$150.8	\$180.7	\$91.0	(\$89.7)	EIS assumed 29 DMU vehicles at \$5.2 million each. Current operational plan requires a total of twenty one (21) DMU vehicles at an estimated cost between \$4.2 million-\$4.5 million each depending upon powered vs. unpowered.
80	PROFESSIONAL SERVICES	\$140.4	\$168.2	\$123.8	(\$44.4)	N. I-25 Commuter Rail Update costs are based upon typical percentages from similar projects.
90	CONTINGENCY	\$35.3	\$42.3	\$284.4	\$242.1	The 30% contingency factor used for the Update Cost Estimate is in line with FTA and FRA guidance and industry practice for this level of project development. The comparison here is difficult as it appears most contingencies in the EIS estimate are imbedded within the SCC line items.
	TOTALS	\$684.30	\$819.9	\$1,206.9	\$387.0	

Note: Preliminary estimate used – N. I-25 Cross-over with Sugar Mill Station Alignment

7.0 Summary / Recommendations

The 2011 North I-25 EIS recommended commuter rail from Fort Collins to DUS along the BNSF alignment from Fort Collins to Longmont and then connecting to RTD's North Metro Rail at the 162nd Avenue station.

The Colorado State Freight and Passenger Rail Plan (2012) prioritized Commuter Rail from Denver to Fort Collins as the state's highest priority commuter rail project after the RTD's FasTracks projects were completed. The State Rail Plan also contained several Policy Recommendations that are relevant to this Commuter Rail Update.

- 1) Position Colorado for future funding for freight and passenger-related infrastructure improvements. By updating the operations plan, associated ROW requirements, and project cost estimates, the state, regional and local stakeholders in the study area are better positioned to gain support for future federal, state and regional funding initiatives that may develop.
- 2) Develop and explore implementation options for a regional commuter rail system. This update now positions stakeholders prioritizing multi-modal transportation improvements in the North Front Range to be able to have up-to-date data available to determine how commuter rail fits into the overall transportation network required to maintain the growth and economic vitality this region of Colorado is experiencing.

There are additional steps to be taken before a commuter rail vision, such as the one evaluated in this Update, can be implemented. As a point of reference, **Appendix J** contains a "Commuter Rail Checklist" that was included in the Ohio State Rail Plan – 2010. Initial steps have been taken in regard to seeing commuter rail service in the North Front Range, and several remain.

Local and regional planning entities may choose to use information in this update when making zoning and development decisions. Preserving the corridor and ROW as described in this Update may be critical to minimizing future project costs.

As the population increases in the North Front Range, and as transportation infrastructure improvements in the region evolve, North I-25 Commuter Rail service will need to be re-evaluated. Updated ridership modeling and more detailed design will need to take place at that time.

The \$1.2 billion cost estimate (in 2014 dollars) associated with the assumptions in this Update will of course need to be revisited in the future as well. Because of the funding does not currently exist to implement this project, North I-25 Commuter Rail is seen as a long term goal. RTD currently has no estimate for when funding will be available to complete North Metro Rail beyond 124th Avenue. The operating plan for North I-25 Commuter Rail is to connect to North Metro Rail at 162nd Avenue.

Also, the stakeholders were clear in the development of this Update that increasing the highway capacity of North I-25 from SH 66 to Fort Collins is currently the highest priority for transportation improvements in the North Front Range. Funding for those improvements are not yet available either. The inter-regional express bus service (Bustang) being initiated in mid-2015 by CDOT is a next step in developing multi-modal transportation solutions called for in the North I-25 EIS.

Final NEPA clearances will need to be obtained. These will entail agreement on numerous details such as the final alignment for North I-25 Commuter Rail. What will be the final

alignment?: 1) east side of I-25 between SH 119 and Weld County Road 8, 2) along Weld County Road 7, supported by the Town of Erie and identified as the preferred alignment in the 2009 EIS, or 3) some other alignment. There are concept level conversations taking place at the conclusion of this Update between RTD, CDOT and NATA about possibly connecting RTD's North Metro Rail to I-25 near SH 7 rather than terminating at 162nd Avenue/Colorado Boulevard. This would obviously affect the routing, operations plan, etc. discussed in this Update.

Conversations with the BNSF Railway throughout the course of the Study were positive and collaborative. BNSF believes the proposed operating plan describes a very typical, straight forward commuter rail operation. Negotiations with the railroad would need to take place to finalize plans for the use of the BNSF corridor when a time certain commuter rail project is determined and funding sources for the project have been identified.

Conversations with the Federal Transit Administration (FTA), the Federal Railroad Administration (FRA), and/ or the Colorado Public Utilities Commission (PUC) would also need to occur. At a minimum, these organizations would provide safety review and operating authorizations. It would also need to be determined whether corridor characteristics and funding criteria at the time would make this corridor eligible and competitive for federal funding.

This Update has affirmed the vision and intent of the North I-25 EIS. This effort has provided updated information on rights-of-way, operating plan, and costs. The next steps can be summarized as follows:

Planning Phase (2-5 years)

- 1) Define a funding & finance plan, and decide whether to seek federal funding assistance
- 2) Complete a NEPA study to finalize alignments, impacts, mitigations, and implementation steps
- 3) Finalize the institutional / governance agreements for funding and oversight for the construction phase, for the start-up phase, and for on-going operations & maintenance, including local, regional, state, and federal levels of government (as appropriate), and including BNSF Railway and other private interests.

Construction Phase (2-5 years)

- 4) After 1-3 are complete, order equipment and build the system
- 5) Hire an operator and equipment maintainer if the governance entity is not the operator
- 6) Establish a service management team for recurring train scheduling, passenger communications, operations, and maintenance

Start-Up Phase

- 7) Complete safety certifications & systems testing (6 months)
- 8) Begin Revenue Service