



North Metro Corridor

Final Environmental Impact Statement and Final Section 4(f) Evaluation

Executive Summary



R e g i o n a l T r a n s p o r t a t i o n D i s t r i c t

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EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The Federal Transit Administration (FTA), in cooperation with the Regional Transportation District (RTD) prepared this Final Environmental Impact Statement (FEIS) for the North Metro Corridor Project to be in compliance with the National Environmental Policy Act of 1969 (NEPA). The North Metro Corridor Project proposes approximately 18 miles of commuter rail transit from downtown Denver, Colorado, north to State Highway (SH) 7. North Metro would serve Denver, Commerce City, Thornton, Northglenn, and Adams County (see Figure ES-1).

The Preferred Alternative would be located adjacent to and east of the existing BNSF Brush Subdivision from the Denver Union Station (DUS) access in Denver to roughly the Adams County line. The alignment would then leave the BNSF Railway right-of-way (ROW) to proceed north on a cross-country alignment that generally parallels O'Brian Canal to the west to bypass Sand Creek Junction, and then would be located within the existing Union Pacific (UP) Boulder Branch Alignment between 70th Avenue and the SH 7/162nd Avenue area.

In 2009, RTD purchased the UP Boulder Branch ROW. Although the UP Railroad no longer owns this rail alignment, for the purposes of this document, it will continue to be referred to as the UP Boulder Branch. The UP Boulder Branch stretches 33 miles from Brighton Boulevard in Commerce City to the Valmont Power Plant in Boulder. Only the first 12 miles (southern end) will be used for the North Metro Corridor.

Transit users will be able to access North Metro from eight stations in the corridor.

This FEIS has been prepared in accordance with the Council on Environmental Quality regulations (40 *Code of Federal Regulations* [CFR] 1500) and the joint FTA/Federal Highway Administration (FHWA) regulations (23 CFR 771 and 23 CFR 774). The FEIS is to be released for public and agency review on 28 January 2011, with a comment period ending 1 March 2011. During this period, RTD will hold public hearings, at which time formal comments will be taken and recorded as part of the public record for this project. Comments can also be submitted as described in Section ES.6, Public Comment and Agency Coordination. Comments will be considered and responded to in the Record of Decision (ROD).

FIGURE ES-1. NORTH METRO CORRIDOR STUDY AREA SHOWING THE PREFERRED ALTERNATIVE



What Happened Since the Release of the Draft Environmental Impact Statement (DEIS)?

The principle activities and refinements to the project that occurred between the DEIS and FEIS can be summarized as follows:

- **Key issues unresolved at the end of the DEIS:** There were two key issues unresolved in the DEIS. Those issues were choosing the Preferred Alternative alignment and the preferred station alternative in Denver. In addition, there were a number of public comments and comment from the City of Thornton on the DEIS regarding the 88th Avenue Station alternative recommended in the DEIS. All of these issues are addressed in this FEIS and are described below.
 - Concerns over safety adjacent to Suncor Refinery in the A-3 alignment, along with conflicts with existing railroad operations led to the B-2 alternative denoted in the DEIS being chosen as the Preferred Alternative in the FEIS. Comments from the public also showed more overall support for the B-2 Alternative. This FEIS therefore recommends the B-2 alignment as the Preferred Alternative.
 - Subsequent to the release of the DEIS, the City and County of Denver held a public meeting soliciting comment on the two station alternatives for the Denver station: Coliseum/Stock Show South or Coliseum/Stock Show North. The City and County of Denver and the public showed overwhelming support for the Coliseum/Stock Show North station (renamed the National Western Stock Show Station) and that station is recommended in this FEIS as the Preferred Alternative.
 - Comments from the public and the City of Thornton led to the changing of the Preferred Alternative for the 88th Avenue Station in this FEIS to the 88th Avenue Station with Relocated Welby Road. The City of Thornton has now committed to relocating Welby Road and the station alternative recommended in this FEIS reflects that action.
- **Response to Comments:** Agency and public comments received on the DEIS were addressed and incorporated into the FEIS, where appropriate. Chapter 8, Response to Agency and Public Comments provides a table with responses to all agency and public comments received during the public comment period following the release of the DEIS. The following are the more prevalent comments heard:
 - Support for the North Metro line being built sooner.
 - Support for the Electrical Multiple Unit (EMU) vehicle technology.
 - Support for the B-2 Southern Alignment with some support for the A-3 Alignment.
 - Support for the National Western Stock Show Denver Station.
- **Updated Travel Demand Estimates:** The Denver Regional Council of Governments updated regional land use and travel demand forecasts for 2035. This information was incorporated into the travel demand forecasts for North Metro Corridor resulting in higher ridership and greater parking demand at the stations.
- **Change in Assessment Periods:** Opening day changed from 2015 to 2020 and the future horizon date changed from 2030 to 2035 to reflect the most recent regional planning assumptions.

- **Refinement of Preferred Alternative:** Based on changes in travel demand, refinement of the operations plan, and coordination with local governments on stations, the Preferred Alternative was refined.
- **Revised Impacts and Mitigation Measures:** Based on updated design of the Preferred Alternative, impacts were reassessed and mitigation measures were refined.

The specific changes related to the Preferred Alternative follow.

- **Operations & Costs:** Opening day changed from 2015 to 2020 and the future horizon date changed from 2030 to 2035. Table ES-1 summarizes the main differences in operations and cost elements from the DEIS to the FEIS:

TABLE ES-1. SUMMARY OF OPERATIONS AND COST ELEMENTS

Operations and Cost Elements	DEIS (2030)	FEIS (2035)
Ridership	14,300 daily riders	24,500 daily riders
Total Opening Day Parking	3,100 spaces	4,020 spaces
Total Horizon Year Parking	3,670 spaces	8,490 spaces
Travel Time	27 minutes	32 minutes
Train Sets	3-car	4-car
Opening Day Capital Cost ¹	\$1.066 Million	\$910 Million

Source: North Metro Corridor Project Team, 2010.

Notes:

¹ Based on Annual Program Evaluation

- **Alignment:** In the Southern Section the B-2 alignment option was selected as part of the Preferred Alternative. In the DEIS, the Build Alternative included a double-track configuration between DUS and just south of 128th Avenue and a single-track configuration from this point to the end of line. In the FEIS, the alignment is single-track with passing track segments in five locations. In addition, an overpass was selected for the 104th Avenue and 120th Avenue grade separations.
- **Stations:** Preferred station locations were selected for the eight stations as shown in Table ES-2. The station layouts were refined to reflect ongoing coordination with local governments and agencies. In addition, the station layouts were revised to accommodate the increased ridership, including adding parking structures at five of the stations, as shown in Table ES-3.

TABLE ES-2. FEIS PREFERRED STATION OPTIONS RECOMMENDED BY THE DEIS

Station Target Area	DEIS Station Options	FEIS Station Name
Coliseum/Stock Show (Denver)	<ul style="list-style-type: none"> • Coliseum/Stock Show South • Coliseum/Stock Show North <i>(No recommendation made in DEIS)</i> 	<ul style="list-style-type: none"> • National Western Stock Show (FEIS recommended) • Coliseum/Stock Show North which was renamed to National Western Stock Show Station)
Commerce City	<ul style="list-style-type: none"> • 68th Avenue • 72nd Avenue South (<i>recommended</i>) 	<ul style="list-style-type: none"> • 72nd Avenue (same as DEIS recommendation)
88 th Avenue (Thornton)	<ul style="list-style-type: none"> • 88th Avenue (<i>recommended</i>) • 88th Avenue with Welby Road Relocation 	<ul style="list-style-type: none"> • 88th Avenue (FEIS changes recommended alternative to 88th Avenue with Welby Road Relocation and alternative is renamed 88th Avenue)
104 th Avenue (Thornton)	<ul style="list-style-type: none"> • 104th Avenue (<i>recommended</i>) 	<ul style="list-style-type: none"> • 104th Avenue (same as DEIS recommendation)
112 th Avenue (Northglenn)	<ul style="list-style-type: none"> • 112th Avenue Parking West of York Street (<i>recommended</i>) • 112th Avenue Parking East of York Street 	<ul style="list-style-type: none"> • 112th Avenue (same as DEIS recommendation)
124 th Avenue (Thornton)	<ul style="list-style-type: none"> • 124th Avenue (<i>recommended</i>) 	<ul style="list-style-type: none"> • 124th Avenue/Eastlake (same as DEIS recommendation)
144 th Avenue (Thornton)	<ul style="list-style-type: none"> • 144th Avenue West (<i>recommended</i>) • 144th Avenue East • 144th Avenue Split 	<ul style="list-style-type: none"> • 144th Avenue (same as DEIS recommendation)
162 nd Avenue (Thornton)	<ul style="list-style-type: none"> • 162nd Avenue West • 162nd Avenue East (<i>recommended</i>) 	<ul style="list-style-type: none"> • SH 7/162nd Avenue (same as DEIS recommendation)

Source: North Metro Corridor Project Team, 2010.

TABLE ES-3. PARKING SUMMARY – HORIZON YEAR¹

Station/park-n-Ride	DEIS Parking Spaces	FEIS Parking Spaces
National Western Stock Show	120 (surface)	210 (surface)
72 nd Avenue	300 (surface)	330 (surface)
88 th Avenue	500 (surface)	1,500 total (structure)
104 th Avenue	550 (surface)	1,460 total 740 (structure) 720 (surface)
112 th Avenue	300 (surface)	1,200 (structure)
124 th Avenue/Eastlake	400 (surface)	960 (structure)
144 th Avenue	400 (surface)	370 (surface)
SH 7/162 nd Avenue Area	1,100 (surface)	2,460 total 2,300 (structure) 1,60 (surface)
TOTAL	3,670	8,490

Source: North Metro Corridor Project Team, 2010.

Note: ¹ DEIS horizon year is 2030, FEIS horizon year is 2035

- **Major Changes in Impacts:** Table ES-4 summarizes the major changes in impacts between the DEIS and FEIS.

TABLE ES-4. MAJOR CHANGES IN IMPACTS BETWEEN THE DEIS AND FEIS

Resource Area	DEIS Impact	FEIS Impact
Land Acquisition, Displacements, and Relocation of Existing Uses	13-17 business relocations Zero to six residential relocations 80-106 acres of acquisition	Six business relocations One residential acquisition 121.68 acres of acquisition
Parklands and Recreation Areas	Four parks and eight recreational trails/multi-use path facilities	Eight parks and 13 recreational trails/multi-use path facilities
Noise and Vibration	139 moderate (8 upper) and four severe post mitigation impacts 37,200 to 39,600 linear feet of noise barriers	180 moderate (one upper) and no severe post mitigation impacts 16,500 linear feet of noise barriers
Wetlands	2.6 to 3.0 acres of wetlands 2.3 to 3.8 acres of other water features	2.0 acres of wetlands 2.0 acres of other water features
Section 4(f)	Direct use of between 14 and 18 Section 4(f) resources (between 9 and 13 of which are anticipated to be <i>de minimis</i> impacts)	Direct use of 26 Section 4(f) resources (22 of which are <i>de minimis</i> impacts)

Source: North Metro Corridor Project Team, 2010

ES.1.1 Why Was this Report Written?

This document was written to describe the alternative development and evaluation process, to assist decision-makers and the public in understanding the benefits of the proposed action, to identify a Preferred Alternative, and to address the potential impacts associated with implementation of the North Metro Corridor Project. It follows the NEPA requirements to evaluate the impacts to the human and natural environment that would result from development of the project, and describes the recommended mitigation measures to off-set unavoidable impacts. A ROD from the FTA will be required before the project can be advanced to final design, ROW acquisition, equipment and facilities procurement, and construction.

ES.1.2 Where Is this Project?

As shown in Figure ES-2, the North Metro corridor study area is a wedge-shaped area and includes lower Downtown Denver at the southern boundary, and the Adams County-Weld County line at the northern boundary. The North Metro corridor study area is in the Denver, Colorado, metropolitan area and encompasses the northern portion of the City and County of Denver (CCD), parts of Commerce City, the cities of Northglenn and Thornton, and parts of Adams County. The corridor is southwest of Brighton. Residents of all these jurisdictions would use the service.

ES.1.3 How Do You Read the FEIS?

The FEIS is organized as follows:

Executive Summary – Provides a summary of the document, including a project description, the Purpose and Need, alternatives considered, affected environment and environmental consequences (and recommended mitigation measures), transportation, evaluation of alternatives, and public comment and agency coordination.

Chapter 1: Purpose and Need – Presents a discussion of the purpose of the project, the need for mobility improvements, and the goals for the project.

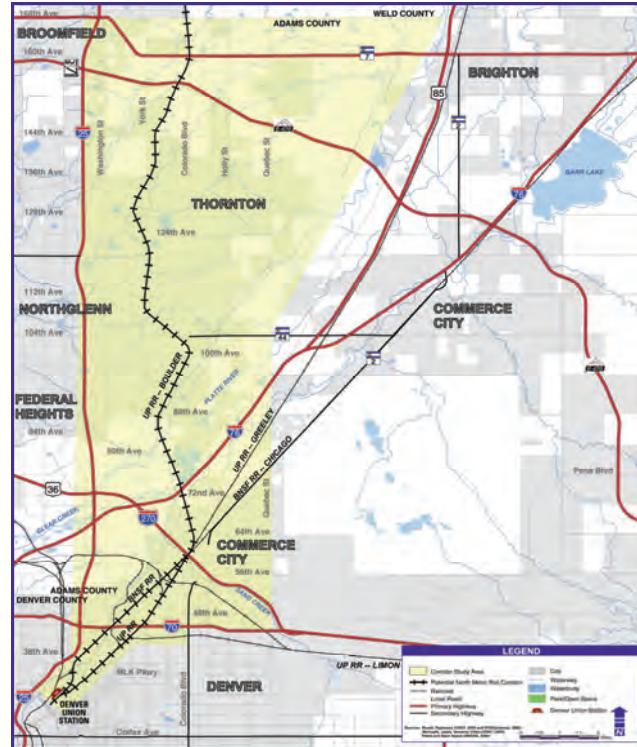
Chapter 2: Alternatives Considered – Describes the alternatives development and screening process used to identify and define the No Action Alternative and Preferred Alternative to be evaluated in detail for the North Metro corridor study area.

Chapter 3: Affected Environment and Environmental Consequences – Describes the existing social, economic, and natural environmental conditions in the North Metro corridor study area and in smaller project study areas, which vary in size by resource, and the anticipated impacts associated with the No Action Alternative and Preferred Alternative. The information is organized by resource topics, alignments, and stations. Mitigation measures are also identified in this chapter. These mitigation measures will be finalized in the ROD.

Chapter 4: Transportation – Discusses the existing transportation system and the anticipated benefits and impacts that would result from implementation of the No Action Alternative and Preferred Alternative. Potential mitigation measures are also identified.

Chapter 5: Evaluation of Alternatives Considered – Provides a comparative analysis of the No Action Alternative and Preferred Alternative regarding how well they meet the project Purpose and Need. A financial summary and feasibility is also provided.

FIGURE ES-2. NORTH METRO CORRIDOR STUDY AREA



Chapter 6: Public Comment and Agency Coordination – Describes the public involvement process, including coordination with the Local Governments Team (LGT), the Agency Working Group (AWG), and the general public for selecting the Preferred Alternative. The AWG includes the joint lead agencies, RTD and FTA, cooperating and participating agencies, and the railroads.

Chapter 7: Final Section 4(f) and 6(f) Evaluation – Describes the results of the Section 4(f) and 6(f) analyses conducted to demonstrate the protection of parklands, recreational resources, wildlife and waterfowl refuges, and historic sites.

Chapter 8: Response to Agency and Public Comments – Provides and lists responses to all agency and public comments received during the public comment period following the release of the Draft Environmental Impact Statement (DEIS).

References – Lists the sources for all references cited in this document

Appendix A – List of Environmental Impact Statement (EIS) Preparers

Appendix B – List of EIS Recipients

Appendix C – Basic Engineering

Appendix D – Cultural Resources Information

Appendix E – North Metro Corridor Coordination Plan

Appendix F – Agency Correspondence

Appendix G – FasTracks *Programmatic Cumulative Effects Analysis*

Appendix H – 404(b)(1)

ES.2 PURPOSE AND NEED

ES.2.1 Why Do We Need this Project?

Transit options to serve the North Metro corridor study area have been studied for more than 20 years. Previous studies have consistently shown that mobility improvements have been needed for many years. Multi-modal travel alternatives to the single-occupant vehicle in the corridor would support this need. The purpose and supporting needs of the project are described below.

ES.2.1.1 Purpose

The purpose for the proposed North Metro Corridor Project is to implement high-capacity, fixed-guideway transit within the North Metro corridor between DUS access and the 162nd Avenue area.

ES.2.1.2 Needs

This study addresses several transportation-related issues in the North Metro corridor study area. In summary, the North Metro Corridor Project would help meet the following needs:

- Need for mobility improvements.
- Need for regional connectivity.
- Need to serve traditional and new transit users.
- Need to support community and regional plans, including the voter-approved *FasTracks Plan* (RTD 2004).
- Need to qualify for federal funding programs.

ES.2.2 What Are the Goals of this Project?

The goals for the North Metro Corridor Project were used to define the evaluation criteria for the alternatives considered in this FEIS. These goals were endorsed through the agency and public processes conducted for the project, and are listed in Table ES-5.

TABLE ES-5. GOALS FOR THE NORTH METRO CORRIDOR STUDY AREA FIXED-GUIDEWAY TRANSIT PROJECT

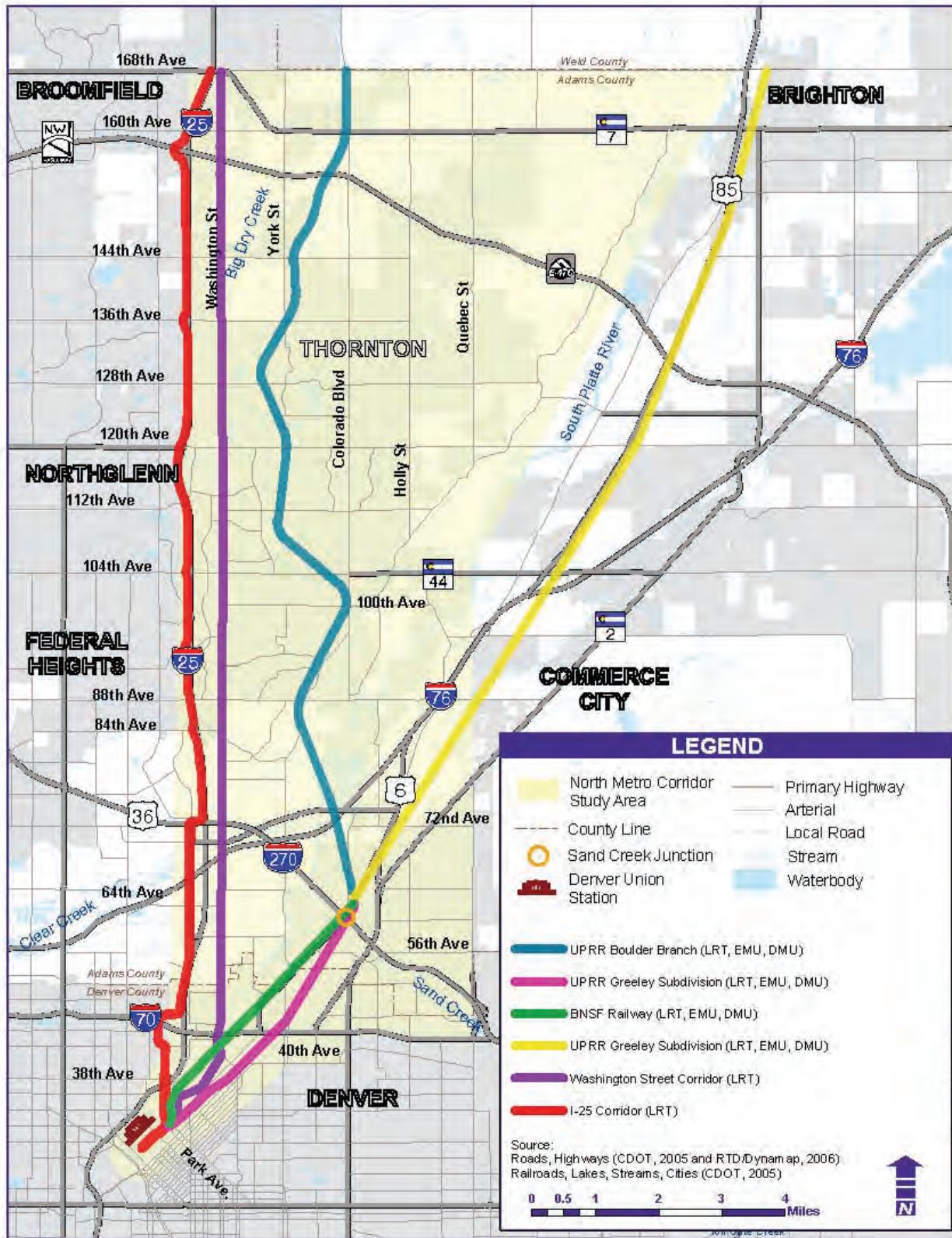
Goal	Description	Objective
1	Provide a cost-effective high-capacity transit option in the North Metro corridor study area.	Best Value
2	Provide a high-quality and reliable transit service that reduces travel times, reduces delays, and encourages travel by more efficient and environmentally sensitive means than motor vehicle travel.	High Reliability and Performance
3	Provide system linkage with other FasTracks corridors.	Improved Efficiency
4	Fulfill existing land use and transit oriented development plans in the North Metro corridor study area.	Sustainable Land Use
5	Enhance access to jobs, entertainment, recreation, shopping, and other activities for existing and future residents of the North Metro corridor study area.	Improved Local Economy
6	Provide equitable transit opportunities regardless of financial means, to the North Metro corridor study area residents and employees.	Equal Opportunity
7	Improve the environmental sustainability and development of communities.	Sustainable Communities

Source: North Metro Corridor Project Team, 2008.

ES.3 ALTERNATIVES CONSIDERED

The North Metro Corridor EIS evaluated numerous alternatives to meet the Purpose and Need for the corridor. Alternatives were developed and evaluated to address the travel markets in the North Metro corridor study area, to minimize environmental impacts, and in response to input from the agency and public involvement process. The alternatives each include several elements, including alignments, transit modes, vehicle technologies, transit station locations, and service. The range of alignment corridors considered for the alternatives is illustrated in Figure ES-3.

FIGURE ES-3. INITIAL ALIGNMENTS CONSIDERED FOR THE NORTH METRO CORRIDOR



ES.3.1 Alignment Alternatives

To fulfill the purpose of the North Metro corridor to provide service between DUS and the 162nd Avenue area, these initial alignment corridors were evaluated:

- UP Railroad Alignment (which consists of the UP Greeley Subdivision to the UP Boulder Branch)
- BNSF/UP Boulder Branch Railroad Alignment (which consists of the BNSF Brush Subdivision to the UP Boulder Branch)
- Interstate 25 (I-25) Corridor
- Washington Street Corridor (two options)
- UP Greeley Subdivision from DUS to Brighton

The alignment lays the groundwork for the other components of the alternatives, which include technology and stations. The alignment and technology alternatives are described in Table ES-6.

TABLE ES-6. ALIGNMENT AND TECHNOLOGY ALTERNATIVES

Alignment and Technology Alternatives
No Action Alternative
Transportation System Management/Travel Demand Management (TSM/TDM)
Light Rail Transit (LRT) Technology
Paralleling UP Railroad (UP Greeley/UP Boulder Branch) on West
Paralleling BNSF/UP Boulder Branch on West
Paralleling UP Railroad Greeley Subdivision on East or West
Paralleling Interstate-25 on West
On Washington Street in Median
On Washington Street in Median with Traffic Lane Reduction
Diesel Multiple Unit (DMU) Technology
UP Alignment (UP Greeley/UP Boulder Branch)
BNSF/UP Boulder Branch
UP Railroad Greeley
Electric Multiple Unit (EMU) Technology
UP Alignment (UP Greeley/UP Boulder Branch)
BNSF/UP Boulder Branch
UP Railroad Greeley
Other Alternatives
Locomotive Hauled Coaches
Bus Rapid Transit
Streetcar
Monorail
Subway
Third Rail
Double-decker DMU or EMU
East to West Connections Roadway
East to West Circumferential Commuter Rail
Quebec Street

Source: North Metro Corridor Project Team, 2008.

Note: UP = Union Pacific

ES.3.1.1 Additional Options for Sand Creek Junction in the Southern Section

Early in the project, RTD identified a need to bypass a heavily congested railroad junction where the UP Railroad and BNSF Railway lines cross each other at-grade in the Southern Section of the corridor. The BNSF Railway and UP Railroad cross over Sand Creek and under I-270 at a very constrained area known as Sand Creek Junction. RTD considered a number of alignment options for going over or through Sand Creek Junction or bypassing it to the west or east. These alignment options and sub-options included Alignment A, going through, over, or near the junction; Alignments B, C, and D, bypassing to the west side of Sand Creek Junction (also referred to as the cross-country alignments); and Alignments E and F, bypassing to the east side (see Figure ES-4 for the main options).

ES.3.1.2 Technology Alternatives

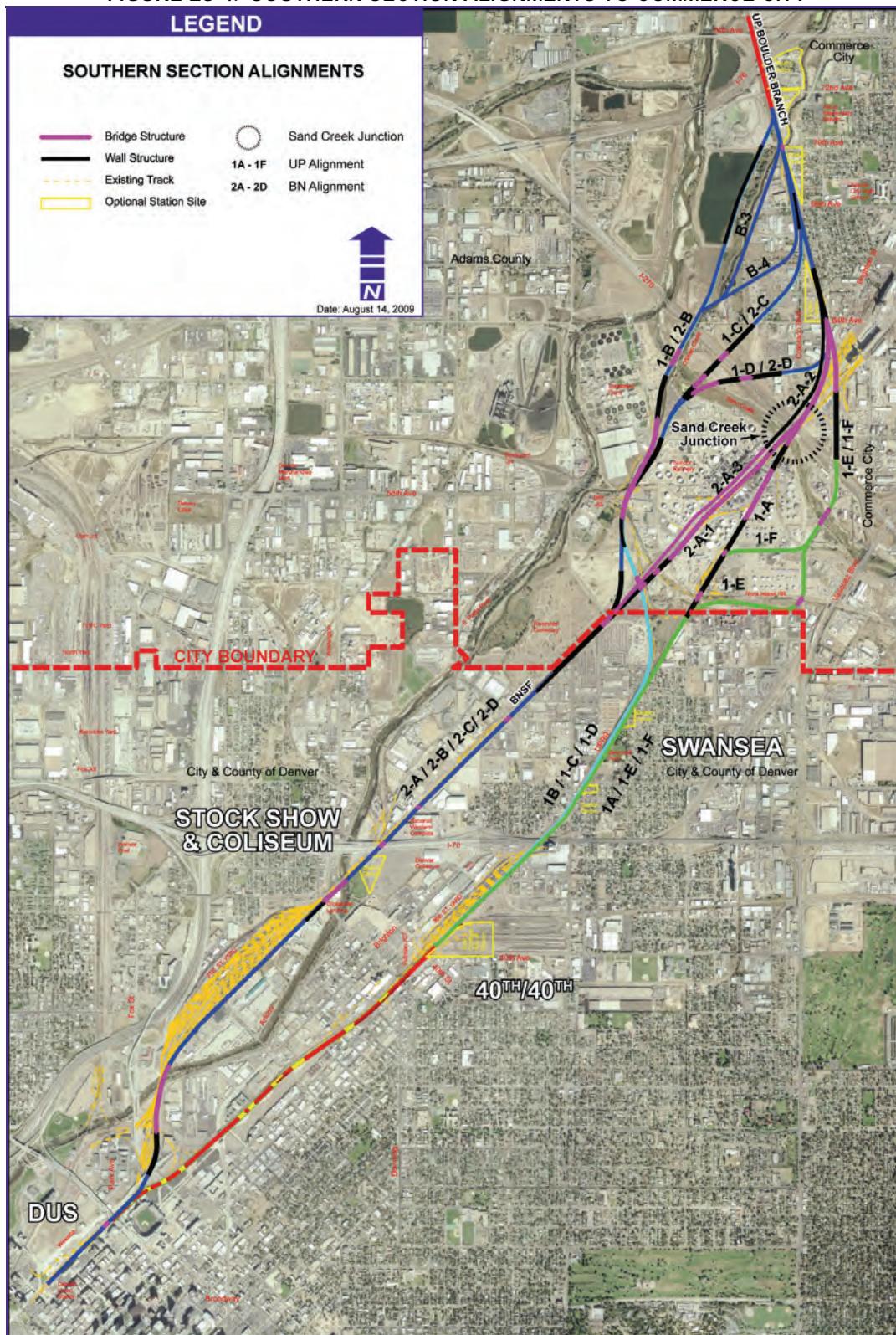
The UP Railroad Company has formally documented that vehicles that do not meet Federal Railroad Administration (FRA) compliance standards for vehicle safety would not be allowed to operate alongside freight rail vehicles within a shared ROW without a separation distance in excess of 50 feet, large barrier walls, or temporal separation. The BNSF Railway Company has provided no formal statement but has implied a similar policy.

Light rail transit (LRT) technology does not comply with FRA vehicle safety standards, and with the position of each of the railroad companies, LRT cannot be implemented within these freight railroad corridors. As a result, the FRA-compliant commuter rail technologies that were considered for the railroad alignment alternatives are diesel multiple unit (DMU) and electric multiple unit (EMU). Therefore, LRT technology was only considered along separate alignments or parallel to freight railroad ROW.

During the conceptual alternatives process of the North Metro study, appropriate transit technology alternatives were matched with the alignments. LRT was considered for all the alignments, but DMU and EMU were only considered applicable to the UP Boulder Branch, the BNSF/UP Boulder Branch, and the UP Railroad Greeley rail corridors. The DMU and EMU vehicle technologies were not considered along the I-25 or Washington Street corridors due to the vehicles' geometric limitations in operating along those roadway corridors, and because the introduction of a heavier rail technology is not compatible with traffic when LRT is the standard application.

The resulting initial conceptual alternatives are shown in Table ES-6. These technology alternatives were evaluated using two levels of screening. Level 1 screening involved a fatal flaw analysis, and Level 2 screening provided an expanded conceptual screening step to determine key tradeoffs related to project goals. At the conclusion of Level 2 screening, commuter rail was selected over all other transit technologies, and the DMU and EMU vehicle technologies continued to be evaluated in the DEIS.

FIGURE ES-4. SOUTHERN SECTION ALIGNMENTS TO COMMERCE CITY



Source: North Metro Corridor Project Team, 2009.

ES.3.1.3 Station Locations

The North Metro corridor has eight station target areas. The station target areas were selected because they fit within communities that could provide sufficient ridership, support local plans, and possibly help fulfill future transit oriented development (TOD) plans around the station sites. It is desirable for rail stations to be approximately 2 miles apart, on average. The recommended stations are described in Section ES.3.6.3, Stations. Through a series of station planning meetings, municipal representatives and the general public were included in the station development and evaluation process.

ES.3.2 How Were the Alignment and Technology Alternatives Evaluated?

The evaluation process initially included three levels of screening with the intent to select the most feasible alignment(s), vehicle technology, and station options for further analysis in the DEIS. Two subsequent screening levels (Level 4 and Level 5) were added to address unique issues that were introduced during the study process. Each screening level was formalized with milestone meetings for the public, the LGT, and the AWG.

ES.3.2.1 Alternatives Evaluation Screening Criteria

The specific alternatives evaluation screening criteria are presented in Table ES-7.

TABLE ES-7. ALTERNATIVES EVALUATION CRITERIA AT EACH LEVEL OF SCREENING

Screening Level	Criteria	Goal/Focus
Level 1 (Fatal Flaw)	<ul style="list-style-type: none"> • Does the alternative concept meet the project Purpose? • Does the alternative concept meet the project Need? 	Screen initial list of alignment alternatives and vehicle technologies. Evaluate station target areas.
Level 2 (Conceptual)	<ul style="list-style-type: none"> • Fulfillment of Purpose and Need at Level 1. • Mobility improvements. • Affordability/cost effectiveness. • Environmental impacts. • Community impacts/benefits. • Compatibility with related plans. • Degree of community support. • Degree of agency support. 	Screen refined list of alignment alternatives and technologies.
Level 3 (Preliminary Evaluation)	<ul style="list-style-type: none"> • Fulfillment of Purpose and Need at Level 1 and Level 2. • Cost/affordability. • Technical feasibility/compatibility. • Mobility improvements. • Environmental impacts. • Transit supportive of land use and future travel patterns. • Compatibility with related projects. • Degree of community support. • Degree of agency support. 	Evaluate the BNSF Railway and UP Railroad alignments from DUS to 84 th Avenue; evaluate cross-country and other Southern Section alignments A through F and evaluate all station options. Evaluate DMU and EMU vehicle technologies.

TABLE ES-7. ALTERNATIVES EVALUATION CRITERIA AT EACH LEVEL OF SCREENING

Screening Level	Criteria	Goal/Focus
Level 4 (Southern Section Cross-Country Alignments)	<ul style="list-style-type: none"> • Same as Level 3 criteria. • Additional criteria specific to Level 4 including residential and/or business impacts. 	Further evaluate cross-country alignments, B-1 through B-4; further evaluate station options. Evaluate DMU and EMU vehicle technologies.
Level 5 (Re-evaluation of Southern Section BNSF Railway and UP Railroad Alignments)	<ul style="list-style-type: none"> • Mobility improvements. • Guideway costs. • Railroad ROW impacts. • ROW/property impacts. • Environmental justice impacts. • Degree of community support. • Degree of agency support. 	Re-evaluate the BNSF Railway and UP Railroad alignments from DUS in the Southern Section, due to higher costs than anticipated in negotiations between RTD and UP Railroad in January 2008; due to costs and changes in technology; re-evaluate the previously screened-out BNSF Alignment A, and evaluate newer iterations of the A alignments introduced in May 2009, alignments A-2 and A-3; evaluate BNSF station options; evaluate modified/refined station options in remainder of corridor. Evaluate DMU and EMU vehicle technologies.

Source: North Metro Corridor Project Team, 2009.

Notes:

DMU = diesel multiple unit
 DUS = Denver Union Station
 EMU = electric multiple unit
 ROW = right-of-way
 RTD = Regional Transportation District
 UP = Union Pacific

Another key discriminator included within the environmental impacts criteria at each level is an assessment as to whether an alternative would be the Least Environmentally Damaging Practicable Alternative for aquatic resources.

ES.3.2.2 Summary of Alternatives Evaluated in the DEIS

The No Action Alternative was advanced through all levels of screening, and was fully evaluated in the DEIS as required by NEPA. The Build Alternative that was evaluated in the DEIS included multiple options for alignments in the Southern Section, as well as options for vehicle technologies, and stations.

The alignment alternative advanced to the DEIS was the modified BNSF outside the BNSF Brush Subdivision ROW from DUS to Sand Creek Junction and the UP Boulder Branch Alignment north of Sand Creek Junction (this alternative is henceforth referred to as the BNSF/UP Boulder Branch Alternative). It begins at DUS in the Southern Section, runs adjacent to the BNSF Brush Subdivision, and would use one of the four alignment options to avoid Sand Creek Junction before connecting to the UP Boulder Branch in Commerce City. The four alignment options in the Southern Section were further analyzed in the DEIS as well, and included A-3, B-2, B-3, and B-4. With respect to the vehicle technology, EMU and DMU were evaluated in the DEIS.

ES.3.2.3 Summary of Screening Results and DEIS Evaluation

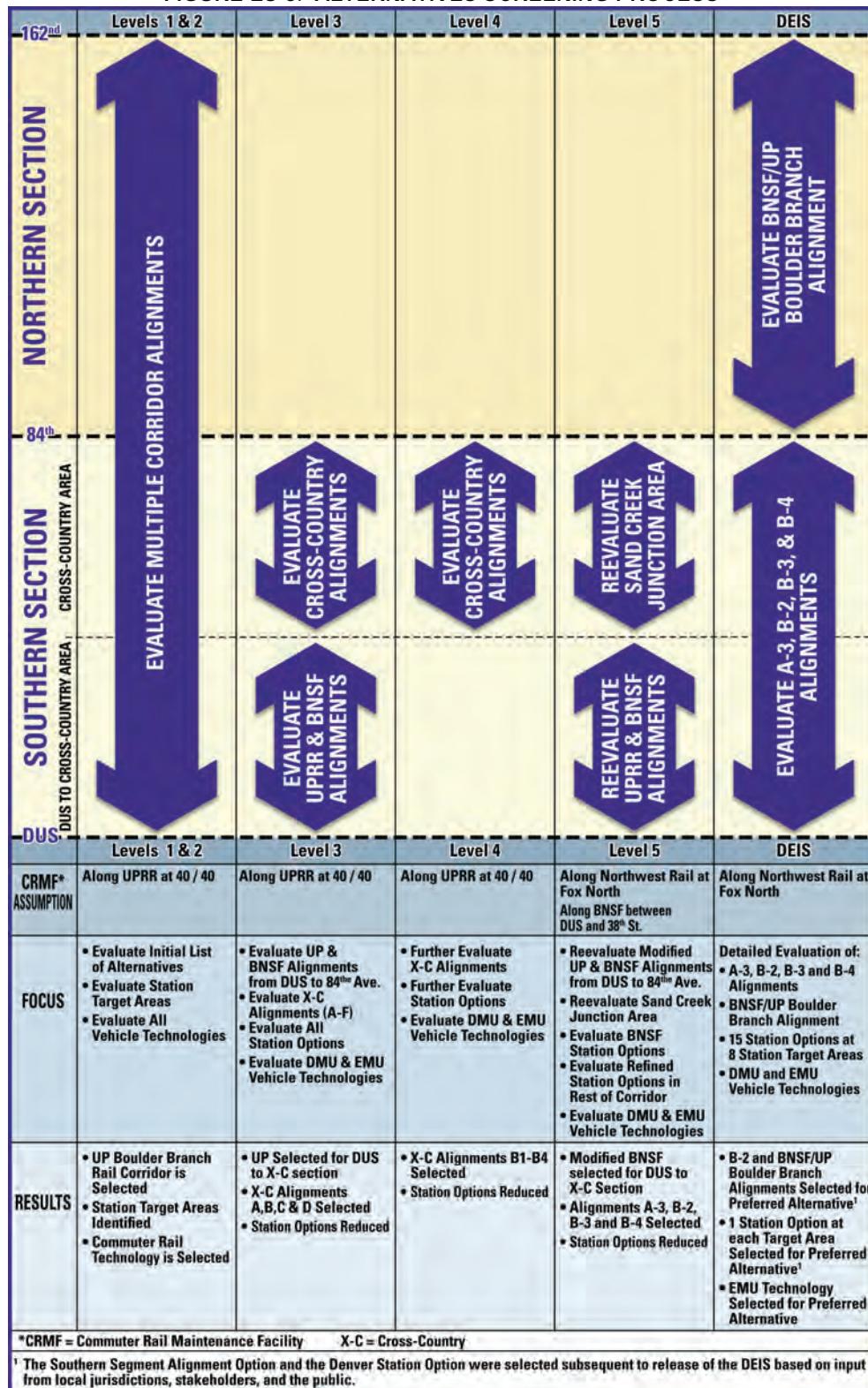
The overall screening process is illustrated in Figure ES-5. The graphic shows the segments of the corridor that were addressed at each screening level in the alternatives analysis. The process for evaluating stations and technologies is also noted.

The DEIS evaluation identified many trade-offs among the Southern Section alignment options (A-3, B-2, B-3, and B-4), but did not select a Preferred Alternative. Subsequent to the release of the DEIS, RTD received input from local jurisdictions, stakeholders, and the public. Based on this input, RTD recommended the B-2 alignment as an element of the Preferred Alternative because it has fewer environmental and community impacts than B-3 and B-4, provides a safer route past the Suncor Energy (U.S.A.) Inc. refinery than A-3, and has no identified conflicts with railroad operations compared to the other alternatives.

The evaluation of vehicle technology indicated that both EMU and DMU meet the Purpose and Need of the North Metro Corridor Project, and although EMU costs more up-front than DMU primarily due to electrification, its payback time – the number of years that it takes for its lower O/M costs to offset its higher up-front costs – results in lower total costs over the life of the vehicles. EMU technology also interfaces well with the other RTD commuter rail corridors, has fewer adverse community impacts in terms of air quality and noise, and more support among the community and participating agencies. Therefore, EMU was recommended over DMU as the preferred vehicle technology in the DEIS.

As detailed in Section 2.2.4.2, Station Screening, RTD recommended a preferred station option in the DEIS at all but the Denver station target area. A recommendation for the Denver station was made subsequent to the DEIS based on input from CCD, stakeholders, and the public, and is discussed in Section 2.2.4.2. Each station option was further refined in the FEIS to reduce impacts, in response to stakeholder comments. The station options are illustrated in Chapter 2, Figures 2-15 through 2-22.

FIGURE ES-5. ALTERNATIVES SCREENING PROCESS



Source: North Metro Corridor Project Team, 2010.

ES.3.3 Station Screening

As shown on Table ES-7, criteria were developed for each level of screening and endorsed through the agency and public involvement process. Each level of screening was considered a project milestone. At each project milestone, input was solicited from local governments, agencies, and the public. This input was used to refine the alternatives at each level.

ES.3.3.1 Station Evaluation Screening Criteria

Initially, more than four dozen station options were suggested for the eight station target areas in the corridor. Station screening occurred during levels 3, 4, and 5 evaluations. Specific criteria were used for the station screening, as with the alignment screening, with increasing detail as the evaluations progressed. Station screening criteria included the following six categories:

1. Mobility (ridership, parking demand, and access needs)
2. Operational (track alignment compatibility)
3. Site Configuration (accommodation of parking/facility needs)
4. Community (demographics, interests, and compatibility)
5. Economic (existing businesses and future development)
6. Environmental (sensitivity of resources)

During the station screening, certain key discriminators became apparent from the results of the evaluation. These discriminators aided the project team's decisions to set aside or advance station options to the DEIS for detailed analysis. These key discriminators included:

- **Ridership Potential** – Projected demand and nearby future population and employment.
- **Parking** – Initial and future demand, and opportunities to accommodate supply.
- **Access** – Parking, transit, and pedestrian/bicycle.
- **ROW** – Property acquisition and economic and business impacts.
- **Community Acceptance** – Agency and public concerns or support.
- **Environmental Considerations** – Hazardous material site impacts, and impacts to sensitive environmental and community resources, such as parks and trails, cultural/historic properties, aquatic/wetland areas, and effects from noise.

ES.3.3.2 Results from the Station Screening Process

Of the more than four dozen station options for the eight station target areas, 15 station options were advanced to the DEIS for further evaluation. These options and their recommendations are listed above in Table ES-2. The station names were simplified for the FEIS.

ES.3.4 What Are the Alternatives Presented in the FEIS?

The following alternatives are analyzed in this FEIS:

- **No Action Alternative**
- **Preferred Alternative:** EMU on the BNSF/UP Boulder Branch Alignment

Each of these is described in more detail below.

ES.3.5 What Is the No Action Alternative?

The No Action Alternative provides a base of comparison for determining the impacts of project alternatives. It does not mean that no improvements occur. The No Action Alternative includes existing projects and financially committed projects to respond to the expected growth in the North Metro corridor study area to the year 2035. These projects would be completed with or without implementation of the North Metro corridor Preferred Alternative. By accounting for other projects to be built in a corridor or study area, the No Action Alternative provides the benchmark from which the Preferred Alternative is evaluated. Both transit and highway projects are part of the No Action Alternative.

ES.3.5.1 Transit Projects

The No Action Alternative includes existing transit service and facilities inside the North Metro corridor study area and committed improvements, including improved bus service and facilities, identified in the Denver Regional Council of Government's (DRCOG) *Metro Vision 2035 Regional Transportation Plan (Metro Vision 2035 Plan)* (DRCOG 2010). It also includes the entire *FasTracks Plan* (RTD 2004) except for the North Metro Corridor Project.

ES.3.5.2 Highway Projects

The No Action Alternative roadway network in the region, including within the North Metro corridor study area, is assumed to be the roadway projects included in the DRCOG *Metro Vision 2035 Plan* (2010), the *2008-2013 Transportation Improvement Program* (2009), and the local jurisdiction's Capital Improvement Programs. A complete list of these roadway improvements is included in Chapter 2, Alternatives Considered.

ES.3.6 What Is the Preferred Alternative?

The alignment, technology, station, and service elements of the Preferred Alternative are described below. The transit and highway projects described in the No Action Alternative are also part of the Preferred Alternative.

ES.3.6.1 Proposed Alignment

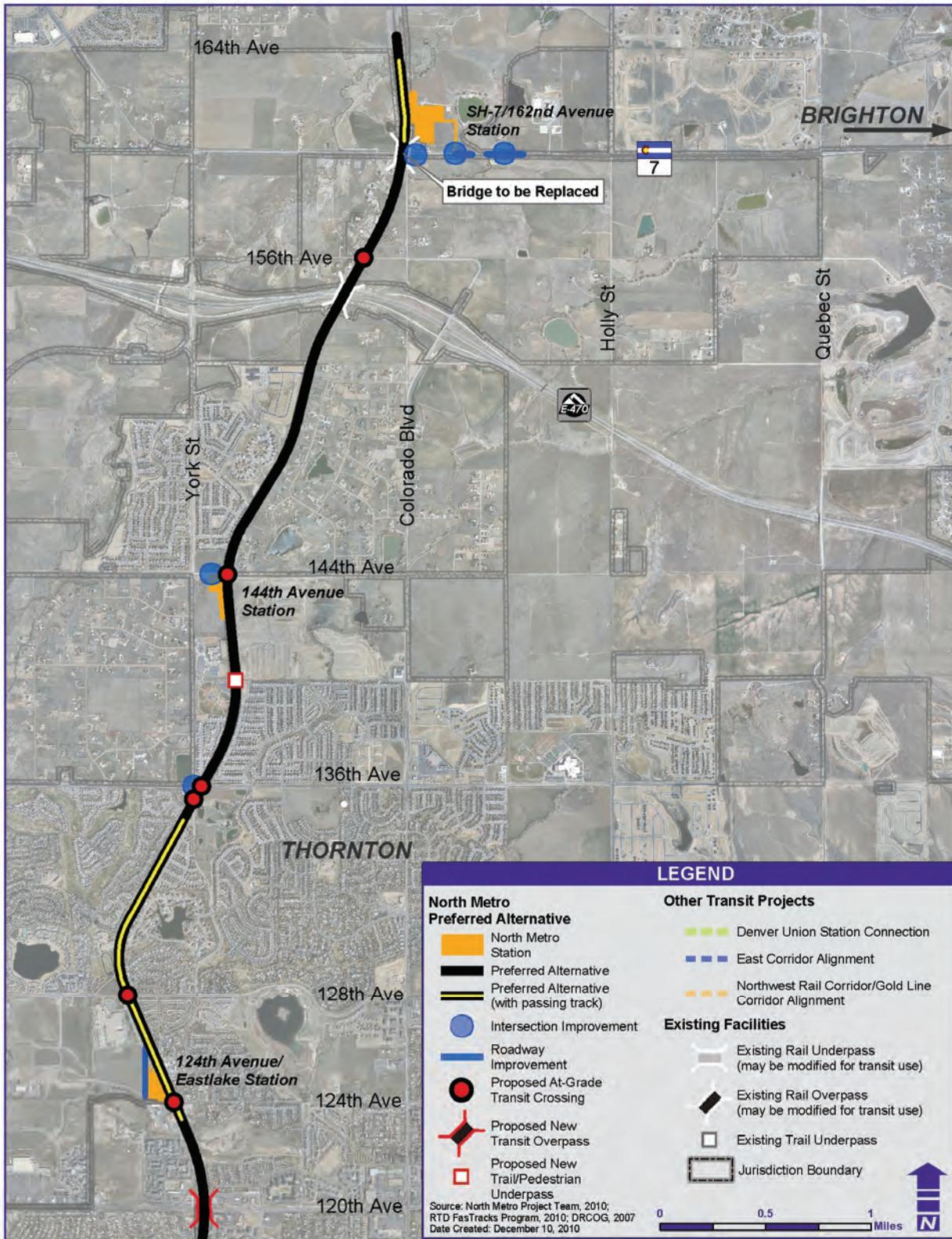
For evaluation purposes, the corridor was divided into two sections. The Southern Section covers the area from the DUS access to 84th Avenue. The Northern Section continues from 84th Avenue to the terminus, the 162nd Avenue area. Figure ES-6 through Figure ES-8 provide detailed maps of the Preferred Alternative.

The Preferred Alternative alignment generally follows the BNSF Brush Subdivision to UP Boulder Branch between DUS and the 162nd Avenue area, a distance of approximately 18 miles. This is referred to as the BNSF/UP Boulder Branch Alternative. The southern terminus is at the DUS access point (at approximately 20th Street), and the northern terminus is the 162nd Avenue area in Thornton. The Preferred Alternative is located adjacent to and just east of the BNSF mainline (Brush Subdivision) in Denver. In Commerce City, the Preferred Alternative crosses over the BNSF mainline and is generally adjacent to the O'Brian Canal through private commercial and industrial parcels in what is referred to as the "cross-country area." (The Preferred Alternative follows what had been described in the DEIS as alignment option B-2 in the Southern Section.) The alignment connects with the UP Boulder Branch ROW near West 70th Avenue. North of Commerce City, the Preferred Alternative remains within the UP Boulder Branch ROW, which was purchased by RTD in 2009.

FIGURE ES-6. PREFERRED ALTERNATIVE DETAIL — DUS ACCESS TO 74TH AVENUE

North Metro Corridor

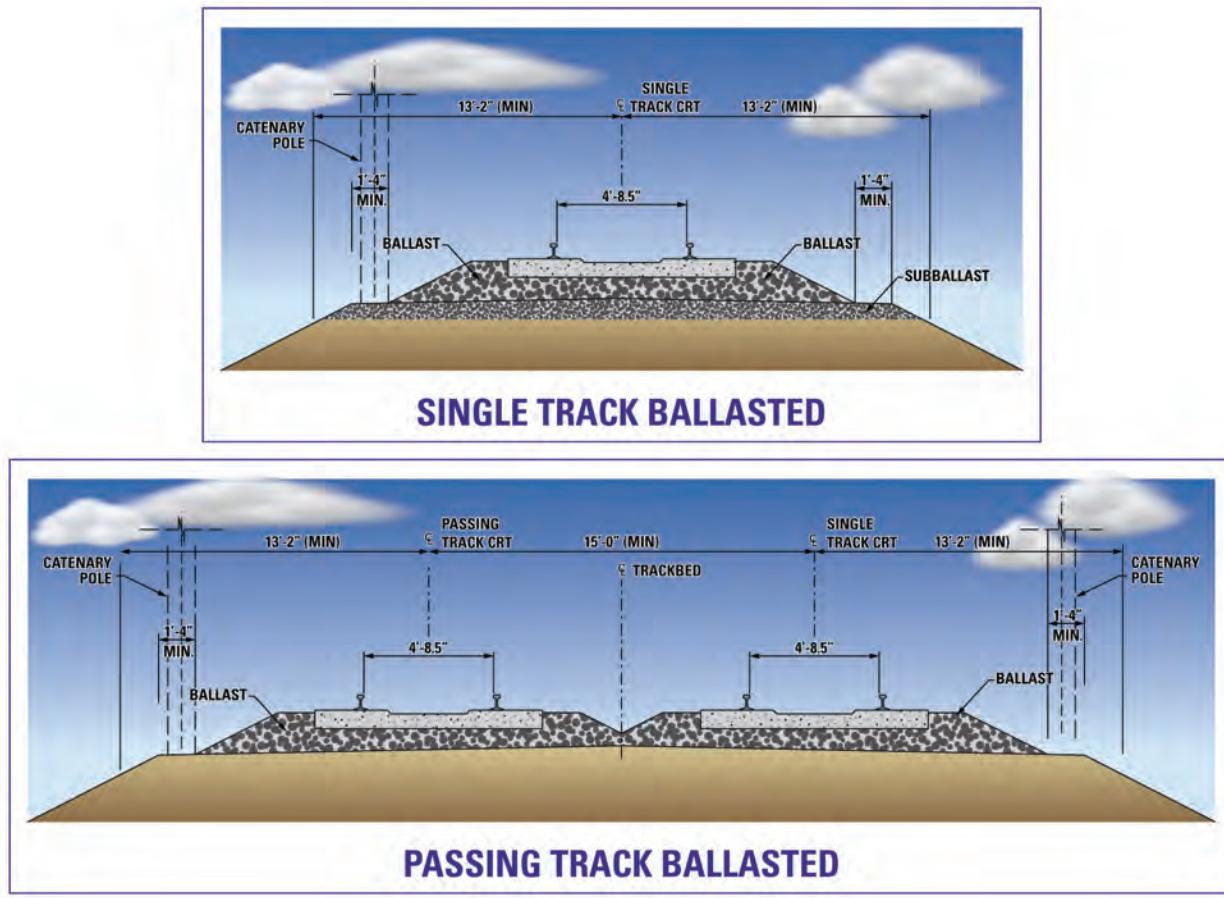
FIGURE ES-7. PREFERRED ALTERNATIVE DETAIL — 74TH AVENUE TO 120TH AVENUE


FIGURE ES-8. PREFERRED ALTERNATIVE DETAIL — 120TH AVENUE AREA TO 162ND AVENUE AREA

North Metro Corridor

The majority of the alignment is single-track, with passing track segments in five locations: between DUS and 38th Street; between south of 72nd Avenue and just north of I-76; between north of Thornton Parkway and just north of 104th Avenue; between south of 124th Avenue and south of York Street; and between SH 7 and the end of line – approximately 162nd Avenue. The second track in these locations allows trains in two directions to pass without delay, thus maintaining the peak period service plan for 15 minute headways between DUS and the SH 7/162nd Avenue Station. The typical trackway section is shown in Figure ES-9.

FIGURE ES-9. COMMUTER RAIL TYPICAL TRACKWAY (TANGENT SECTION)



Source: North Metro Corridor Project Team, 2010.

ES.3.6.2 Proposed Technology

As a result of the DEIS analysis, EMU was selected as the preferred commuter rail vehicle technology for the North Metro Corridor Project. This was primarily due to cost effectiveness when considering total fleet requirements and operating costs over a long-term horizon. The EMU vehicles require electrification of the tracks by an overhead contact system (commonly called an “overhead catenary system”) along the corridor to provide power. It is anticipated that RTD would locate an electric substation for all EMU technology in the Gold Line corridor or the East corridor. The two autotransformers required by North Metro for power would be located within properties identified to be acquired for either a station or the alignment, and impacts

would be contained therein. Representative locations have been identified as at the 88th Avenue Station and within the UP Boulder Branch ROW north of 136th Avenue.

ES.3.6.3 Stations

In addition to the existing Denver Union Station in lower downtown, there are eight proposed stations in the North Metro corridor. Two stations are located in the Southern Section, while the remaining six stations are located in the Northern Section. The Southern Section stations are the National Western Stock Show Station in Denver and the 72nd Avenue Station in Commerce City. The Northern Section stations from south to north are the 88th Avenue Station and 104th Avenue Station in Thornton, the 112th Station in Northglenn, and the 124th Avenue Station, 144th Avenue Station, and SH7/162nd Avenue Station in Thornton. Table ES-2 above lists station target areas, station options from the DEIS, and the recommended stations in the FEIS.

ES.3.6.4 Proposed Train Service

Service would generally be provided from 5 a.m. (morning) to 11:30 p.m. on weekdays; Friday and Saturday night service would extend to 1:30 a.m. Base headways (time between trains) would be 30 minutes with 15 minute headways during weekday peak commuting hours. Weekends and holidays would be more limited than weekday service. Travel time would be 32 minutes between DUS and 162nd Avenue, with 24,500 riders per weekday (2035).

A mid-day layover track would be provided in the Southern Section near 31st Street. This facility would primarily be used to store trains between the weekday morning and afternoon peak periods, and for emergencies. It would not typically be used for overnight storage or for maintenance. A tail track would be provided north of the SH 7/162nd Avenue Station to stage trains preparing to head south or for emergencies.

ES.3.6.5 Commuter Rail Maintenance Facility

The Preferred Alternative must also access RTD's Commuter Rail Maintenance Facility (CRMF) at the Fox North site. The North Metro corridor, Gold Line, East corridor, and Northwest Rail trains would use the same maintenance facility. The North Metro trains would need to travel to the CRMF for overnight storage and maintenance, which is approximately 2.5 miles from DUS. The Fox North Site is adjacent to railroad ROW that would serve the future Gold Line and Northwest Rail commuter rail corridors. The UP Railroad north yard and the BNSF Railway trailer-on-flatcar yard are west of the proposed CRMF site, and an Owens Corning manufacturing facility is on the north. The CRMF site was evaluated in the *CRMF Supplemental Environmental Assessment to FasTracks Commuter Rail Corridors* (FTA and RTD 2009) which serves as a supplement for the *Gold Line DEIS* (FTA 2008) and *East Corridor DEIS* (FTA 2009a).

The CRMF was subsequently included in the *Gold Line Corridor FEIS* (FTA 2009b) and *East Corridor FEIS and Section 4(f) Evaluation* (FTA 2009c). In November 2009, a ROD was issued for both these projects which included the CRMF. The CRMF would include a maintenance shop, EMU rail storage yard, DMU rail storage yard, employee facilities, administrative offices, employee parking facilities, a maintenance-of-way building, and a lay-down yard. The operation of the CRMF would be ongoing 24 hours per day, 7 days per week.

ES.3.7 Cost and Financing

North Metro's capital costs for the year of expenditure dollars for 2020 and 2035 for the Preferred Alternative are estimated to cost \$910 million for the initial project in 2020 (2010 Annual Program Evaluation), with an additional \$150 million for parking and platform expansion and additional vehicles in 2035. A Transportation Infrastructure Finance and Innovation Act of 1998 loan is a portion of the current concept for financing the North Metro corridor, along with additional funding from other sources, such as the Railroad Rehabilitation and Improvement Financing Program and the FTA's New Starts Funding Program.

ES.4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

ES.4.1 What Human or Environmental Resources Were Considered?

Key resources and human or environmental conditions that were evaluated in the FEIS are listed in Table ES-8. The impacts of the Preferred Alternative that have proven to be of greatest concern to the public are discussed in more detail below.

TABLE ES-8. RESOURCES EVALUATED IN THE NORTH METRO CORRIDOR FEIS

Resources Evaluated	
Social Impacts	Air Quality and Energy
Environmental Justice	Noise and Vibration
Land Use	Biological Resources
Economic	Mineral Resources
Farmlands	Water Quality and Floodplains
Land Acquisition	Wetlands
Archaeological, Historic and Paleontological Resources	Hazardous Materials
Visual Resources	Utilities
Parklands and Open Space	Public Safety and Security

Source: North Metro Corridor Project Team, 2009.

Note:

FEIS = Final Environmental Impact Statement

Impacts have been minimized because the majority of the project would be located in a railroad ROW with the exception of the alignment in the Southern Section and at station locations. In addition, significant public input identified concerns and allowed the team to address, avoid, or minimize these concerns through the design process.

ES.4.2 What Kinds of Environmental Effects Would the Project Have?

The predicted impacts of the Preferred Alternative are discussed below for resources identified as of greatest concern to the public and agencies. A summary of all the impacts and proposed mitigation measures associated with the implementation of the Preferred Alternative is provided in Table ES-10 at the end of the Executive Summary.

ES.4.2.1 Social Impacts and Environmental Justice

The Preferred Alternative would increase mobility and access to community facilities throughout the North Metro corridor study area. Introducing a new commuter rail alignment to avoid the Sand Creek Junction area would not cause a barrier effect, since the alignment would closely follow the O'Brian Canal, which currently acts as a barrier. Farther north, the existing UP Railroad ROW separates neighborhoods and existing social trails cross the UP Railroad ROW. Use of the alignment for commuter rail would eliminate the social trails across the rail corridor between the neighborhoods and could affect community cohesion, especially in newer neighborhoods. To maintain connections, pedestrian crossings of the alignment would be provided at formal street crossings, as well as at new grade-separated overpasses at 104th Avenue and 120th Avenue, at some station platforms, and at proposed trail underpass crossings for Fernald Trail in Commerce City and the Rocky Top Middle School connector in Thornton. No community facilities would be displaced.

Environmental justice regulations were created because of concerns that land uses and facilities were being placed in minority and low-income communities without regard to the consequences of these actions. Therefore, projects are evaluated to assess if there are disproportionate impacts to minority and low-income communities as compared to the general population. The evaluation for North Metro did not find any disproportionate impacts; however, there would be some additional benefits to these communities.

One of the needs of the project is to serve traditional transit users, who include elderly, minority, and low-income populations that are dependent on public transportation because they do not own, or prefer not to use, private vehicles. There would be benefits to minority and low-income populations from implementing the Preferred Alternative because of increased mobility and access to transit including the North Metro commuter rail line as well as the FasTracks system. Indirect benefits would result from better access to jobs and services through the transit system and potential TOD-related job creation.

ES.4.2.2 Land Use, Zoning, and Economic Considerations

The Preferred Alternative would be compatible with and would support regional and local plans. Land use changes are expected as a result of induced development (TOD and other mixed-use). TOD advantages include more compact development, more cost-effective infrastructure investment, less automobile dependency and congestion, and improved air quality. Such land use policies also improve the performance of the transit system through increased ridership and revenues.

All of the local governments in the North Metro corridor study area have prepared plans, or are in the process of preparing plans, to take advantage of the benefits of the Preferred Alternative. The impact analysis concludes that the Preferred Alternative would be both compatible with and supportive of existing and future land use and transportation planning within the North Metro corridor study area.

The Preferred Alternative would impact six businesses that have been identified to require relocation. These impacts would affect approximately 352 employees. This number of relocations counts exclusively businesses, which is distinct from the total properties identified for relocation.

Construction of the Preferred Alternative, however, would result in the creation of an estimated 4,680 construction-related jobs per year (2,750 direct and 1,930 indirect) during the construction period estimated at 3 years. The Preferred Alternative, overall, would have a minor measurable effect on the jobs/housing balance as it may result from TOD plans at station areas in the Northern Section of the Preferred Alternative.

Overall, the assessed valuation of impacted parcels, including the assessed valuation of parcels with tax-exempt status, of the Preferred Alternative (from the alignment and stations), is \$5,081,177. In the long-term, changes in these assessed values would be offset by the anticipated TOD. Changes in taxable retail sales from development in the Preferred Alternative are anticipated to result from changes in retail development within the corridor resulting from TOD. The retail development changes anticipated from the Preferred Alternative are largely limited to changes in the development plans surrounding stations as a result of TOD opportunities. Four stations with TOD plans anticipate an increase in retail development, among other land uses: the 88th Avenue, 124th Avenue/Eastlake, 144th Avenue, and SH 7/162nd Avenue stations.

ES.4.2.3 Land Acquisition, Displacements, and Relocation of Existing Uses

Land acquisition has been one of the top concerns throughout the public involvement process of the EIS. Implementation of the Preferred Alternative would require acquisition of 121.68 acres. The acquisitions would be for the areas of the alignment outside of the railroad ROW, proposed stations, and mitigation measures, such as improved drainage or station access. Total acquisition acreage in the Southern Section would be 46.38 acres for the alignment and 17.03 acres for the two stations, with four business relocations and one relocation of an exempt property. The Preferred Alternative in the Southern Section would require easements from the BNSF Railway. It would also require the rebuilding of Brighton Boulevard, south of York Street; however, this property would not be acquired by RTD.

In the Northern Section, the alignment would require the acquisition of 9.02 acres, including the relocation of one residential and one business property. The proposed stations would require the acquisition of 49.25 acres and the relocation of one business. The impacts for the alignment in the Northern Section would generally be small, sliver impacts because RTD purchased the UP Boulder Industrial Lead (UP Boulder Branch) in 2009.

In addition to property acquisition, impacts to business operations at several sites were identified. RTD will continue to work with these affected businesses to minimize or mitigate for these impacts.

ES.4.2.4 Archaeological, Historic, and Paleontological Resources

Cultural resources (archaeological and historic resources) are regulated through Section 106 of the National Historic Preservation Act (Public Law 89-665, 15 October 1966; 16 *United States Code* 470 *et seq.*, as amended through 2006) and the Archeological and Historic Preservation Act. Historic properties are defined at 36 CFR 800.16(l)(1) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP]."

The potential for impacts to historic and archaeological resources is important to the North Metro corridor study area stakeholders. The FEIS analysis indicates that the Preferred

Alternative would result in adverse impacts to one historic site and two archaeological sites. These sites are as follows:

- **Quimby Railroad Stop (5AM2111).**
- **Eastlake Railroad Stop (5AM2114)**
- **Historic Farmstead (5AM2158)**

ES.4.2.5 Visual and Aesthetic Qualities

The visual impact of the North Metro Corridor Project has been a concern identified in the public involvement process, especially with respect to the noise walls and overpasses.

Implementation of the Preferred Alternative would involve the installation of the following elements that would change the visual quality in the corridor:

- Eight transit stations and park-n-Ride facilities, including five parking structures in the 2035 horizon year
- Noise barriers and corridor fencing
- More than 18 miles of overhead catenary systems and trackway
- Overpasses at 104th Avenue and 120th Avenue

All of these features would represent a visual change, with the degree of change dependent on the surrounding environment at specific locations.

ES.4.2.6 Parklands and Recreation Areas

There are over 100 private and public parks and recreational resources located within the North Metro corridor study area, and more than 60 resources (existing and proposed) within the project study area. Project team members coordinated with CCD, Adams County, Commerce City, City of Northglenn, City of Thornton, and the Greenway Foundation in a series of meetings to discuss identification, impacts, and mitigation measures for these resources. The Preferred Alternative would directly impact eight parks/open space areas and 13 recreational trails/multi-use paths. Parks and open space impacts generally include relatively small areas along the margin of the property that through mitigation commitments would not affect the continued use and function of these facilities or diminish the recreational opportunities. Impacts to Globeville Landing Park would affect the frisbee golf course and require the removal of trees along the commuter rail alignment. The impacts would be mitigated through funding for master planning and replacement of trees as well as restoration of temporary impacts. Recreational trails and multi-use paths within the direct impact area would be realigned or incorporated into the design to maintain the continued use and function of these facilities. The regional trail access from the Fernald Trailhead and the Rocky Top Middle School Connector Trail would both cross the commuter rail alignment via new trail underpasses and the Signal Ditch Trail would be realigned to cross the alignment adjacent to 128th Avenue. Potential indirect impacts are also identified for several parkland resources including reduced visibility for trail users associated with new rail bridges; and increased use of resources due to increased access. Temporary construction activities could cause inconvenience to trail users passing through the project area, but recreational access would be maintained using measures such as walking structures or temporary detours.

ES.4.2.7 Noise and Vibration

Noise is one of the principal environmental impacts associated with rail transit projects, and has been a key public concern throughout the North Metro corridor public involvement process. Figure ES-10 provides context for various types of noise levels.

For the Preferred Alternative in the design year (2035) without mitigation, there would be severe noise impacts predicted at one school plus 438 residences, and moderate impacts projected at 562 residences. The noise impacts are projected to be slightly less on opening day (2020), with 10 fewer severe impacts and 98 fewer moderate impacts. The impacts are predicted at residences within 50 to 940 feet from the proposed near track, depending on the direct impact area.

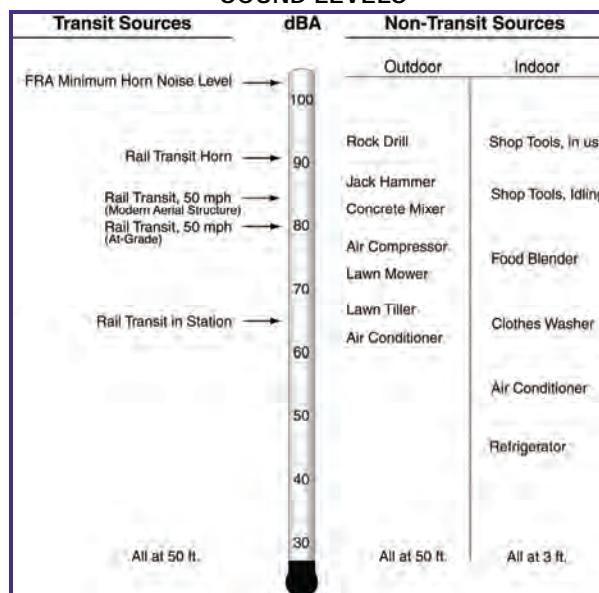
The proposed mitigation approach is to first establish "Quiet Zones" at all at-grade crossings of streets near affected noise-sensitive areas and then to construct noise barriers at those locations where residual severe and moderate noise impacts are reasonable to mitigate according to FTA and RTD policy. (See Figure ES-11 for a Quiet Zone explanation.) Based on this approach, a total of 16,500 feet of 8- to 12-foot-high noise barriers is recommended.

With the recommended Quiet Zone and noise barrier mitigation measures, it is predicted that 180 moderate impacts would remain and only one of these moderate impacts would be in the upper 50% of the impact range in the design year (2035). Based on detailed vibration analysis, no vibration impacts are projected for the Preferred Alternative; therefore, no mitigation is currently recommended.

ES.4.2.8 Natural Resources – Wetlands

Wetland and other water features are considered important resources by several relevant government agencies. The protection of these resources is critical for maintaining the physical, chemical, and biological integrity of aquatic resources in the United States (US). As a result, impacts to wetlands and the other waters are closely regulated. The loss of wetlands and the functional values they provide is a continuing problem in the US. The development of new linear transportation infrastructure projects has the potential to add to that loss. As a result, wetlands in the project study area are located, identified, and evaluated. Designs are then

FIGURE ES-10. TYPICAL A-WEIGHTED SOUND LEVELS



Source: North Metro Corridor Project Team, 2010.

FIGURE ES-11. QUIET ZONE

Quiet Zone

A Quiet Zone is an area where crossings of the rail line include sufficient safety mechanisms, so that trains are no longer required to sound their horns when crossing. Quiet Zones need to be implemented by local government through approvals from the Public Utilities Commission (PUC), FRA, and the railroads. RTD can assist but cannot submit the application to implement a Quiet Zone. Quiet Zone construction is part of the project costs.

Source: North Metro Corridor Project Team, 2008.

assessed for the ability to avoid the wetlands completely, minimize impacts to them, or, as a last resort, mitigate the impacts.

The Preferred Alternative, if implemented, would directly and permanently impact 2.0 acres of wetlands (0.9 acres jurisdictional) and 2.0 acres of other water features (1.3 acres jurisdictional).

ES.4.2.9 Hazardous Materials

Properties with landfills or hazardous materials present could substantially affect the feasibility or overall cost of the project. Impacts can result from current or historic land uses or releases of hazardous substances (i.e., pesticides, volatile organic compounds, semi-volatile organic compounds, and heavy metals) or petroleum products (e.g., gasoline, diesel fuel, and lubricants). The presence of these materials can cause project delays and increased costs, particularly if they are not identified prior to construction. Hazardous material contamination would be avoided where possible, and adequate protective measures taken before, during, and after construction.

Multiple hazardous material sites were identified within the project study area. Generally, the most heavily contaminated areas extend from the DUS access to the Commerce City area. Fewer sites are present north of 84th Avenue. Direct impacts along the Preferred Alternative include 90 high-ranked sites within 500 feet of the alignment and roadway improvements, all but six of which are in the Southern Section. Temporary construction impacts could occur if hazardous materials are encountered during construction resulting in potential human health hazards and costs to remove. These potential impacts would be more prevalent in the Southern Section.

ES.4.2.10 Public Safety and Security

Based on historic experience, the proposed North Metro Corridor Project would have no effect on crime in the North Metro corridor study area. Crime at the transit stations or on the transit vehicles is expected to reflect the crime activity of the surrounding communities, which would be similar to the No Action Alternative.

Emergency plans for the North Metro rail line are developed in consultation with the Fire and Life Safety Committee, which will continue to address issues and develop detailed emergency plans. Fencing and barriers will prevent trespassing on the trackway.

During construction, traffic control plans will minimize potential impacts on emergency response times, and securing construction sites will minimize potential safety hazards at the site.

ES.4.2.11 Section 4(f)

Section 4(f) of the United States Department of Transportation Act of 1966, as amended and codified in Title 49 *United States Code* § 303, declares that “[i]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Section 4(f) was enacted in response to a growing awareness and concern on the part of the public and its elected representatives of the encroachment of a growing transportation system on parklands and historic sites. Section 4(f) also states that transportation programs and projects that require the use of protected lands shall not be approved unless a determination is made that:

1. there is no feasible or prudent alternative to the use of land; and
2. the project or program includes all possible planning to minimize harm resulting from the use.

The Preferred Alternative would result in a direct use of 26 Section 4(f) resources of which 22 are *de minimis* or minimal impacts. Mitigation for these sites was addressed under parks and archaeological and historic properties.

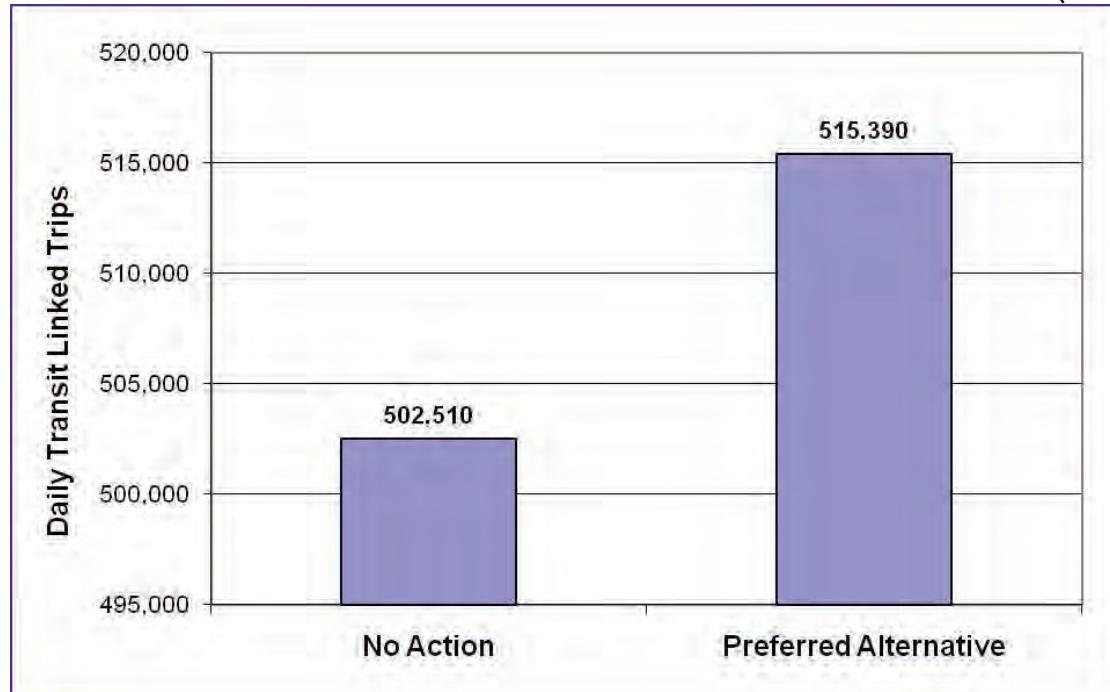
ES.5 TRANSPORTATION

In comparison to the No Action Alternative, the Preferred Alternative would affect future transit and roadway operations. No permanent or long-term impacts on freight operations or bicycle and pedestrian facilities are anticipated.

ES.5.1 What Impacts Would the Preferred Alternative Have on Transit?

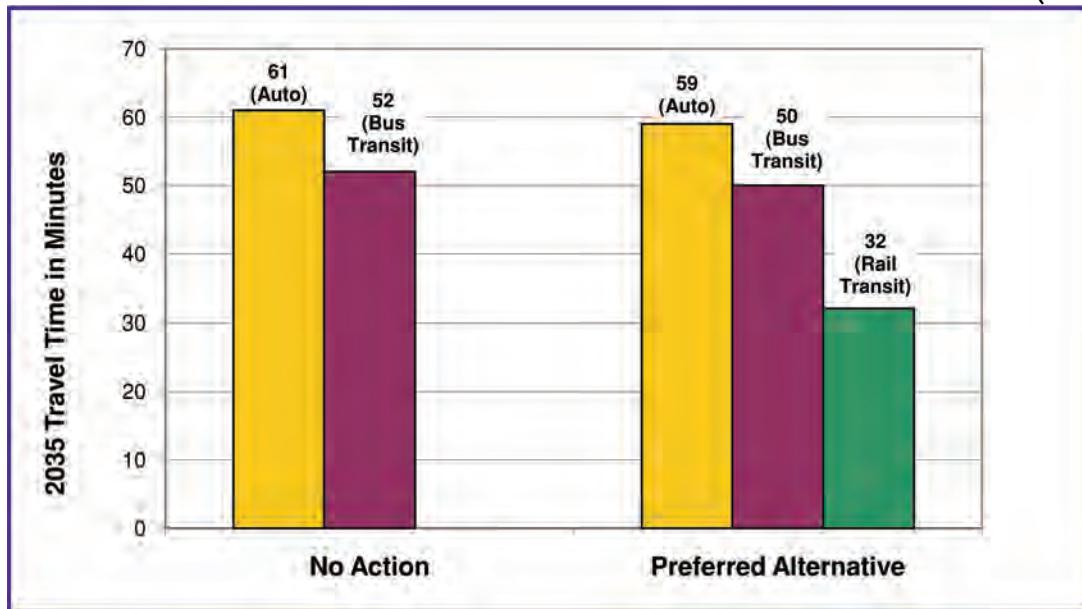
The Preferred Alternative would result in improved transit service, travel time, and capacity. Figure ES-12 shows system-wide linked transit trips forecast for the No Action Alternative and the Preferred Alternative. Linked trips provide a comparison of the overall transit ridership impact on the entire system. The average weekday ridership for the Preferred Alternative would be 24,500 in 2035. The Preferred Alternative would generate approximately 12,880 more system-wide transit-linked trips than the No Action Alternative.

FIGURE ES-12. NORTH METRO CORRIDOR SYSTEM-WIDE DAILY LINKED TRANSIT TRIPS (2035)



Source: DRCOG, 2010.

As shown on Figure ES-13, the Preferred Alternative will provide the fastest peak period transit travel time, at 32 minutes, between SH 7 and DUS in 2035. Transit times for the No Action Alternative and the Transportation System Management alternative assume express bus service traveling on I-25 bus/high-occupancy vehicle lanes into DUS. The Preferred Alternative exhibits a 46 % improvement in travel time over the automobile, and a 36% improvement over bus transit times in the No Action Alternative. Highway automobile travel times remain similar among all alternatives due to travelers utilizing the best available travel routes, and travelers shifting from local streets to the highway system when more roadway capacity is made available.

FIGURE ES-13. TRAVEL TIME COMPARISON 162ND AVENUE TO DENVER UNION STATION (2035)

Source: DRCOG, 2010.

Table ES-9 shows the impact to vehicle miles traveled (VMT), vehicle hours traveled (VHT), and vehicle hours of delay (VHD) of each alternative in the North Metro corridor study area and the Denver metropolitan region. These are measures of roadway travel demand, congestion, and delay, respectively. Delay measurements consider the difference between traveling at freeflow speeds (uncongested) versus the time it would take to travel the same distance under congested conditions.

TABLE ES-9. STUDY AREA VEHICLE MILES TRAVELED, VEHICLE HOURS TRAVELED, AND VEHICLE HOURS OF DELAY COMPARISON (AVERAGE WEEKDAY 2035)

Measurement	North Metro Corridor Study Area		
	No Action Alternative	Preferred Alternative	Reduction for Preferred Alternative Over the No Action Alternative
Vehicle Miles Traveled (VMT)	10,682,380	10,640,210	-42,170
Vehicle Hours Traveled (VHT)	349,580	345,960	-3,620
Vehicle Hours Delayed (VHD)	95,230	92,700	-2,530

Source: DRCOG, 2010.

Note:

- = negative

Both regionally and in the North Metro corridor study area, the difference in VMT and VHT is just over 1% or less when comparing the No Action Alternative and Preferred Alternative. In the regional analysis, the Preferred Alternative shows a reduction over the No Action Alternative of approximately 170,000 VMT, indicating a reduction in overall travel throughout the region. Within the North Metro corridor, the change in VHD represents the greatest overall percentage change among congestion measures. Within the North Metro corridor study area, the estimated reduction in VHD provided by the Preferred Alternative over the No Action Alternative is 2,530 hours (2.7%).

North Metro Corridor

ES.5.2 What Roadway Impacts Would the Project Have?

Roadway congestion levels can have a prominent effect on travel times and the propensity of travelers to utilize transit. The tradeoffs between automobile and transit travel have been examined as part of this multi-modal transportation system. Due to disproportionate rates of the projected daily VHT and VMT between 2007 and 2035, congestion is expected to extend the peak hours and lower overall average speeds. Southern portions of the North Metro corridor generate a greater degree of truck traffic due to industrial land uses and freight container transfers that occur between railroad cars and trucks. Although these roadway conditions are present in the corridor, the majority of roadway impacts from the Preferred Alternative for the North Metro Corridor Project are anticipated to be centered at the station access points and adjacent intersections. It is anticipated that some intersections would be affected by the traffic at the eight stations or the rail crossings and require mitigation. Mitigation will include the addition of signals, turn lanes, minor lane widening at intersection approaches/departures, modifying access at existing intersections, or in some cases, a combination of these elements.

ES.5.3 What Railroad/Roadway Crossing Improvements Would Be Made?

Rail crossing treatments have been proposed for the Preferred Alternative at-grade crossings based on RTD's *Grade Crossing Evaluation Methodology* (2006), and to support the requirements for implementing Quiet Zones. As a result, the Preferred Alternative would incorporate 14 at-grade crossing improvement projects in the North Metro corridor study area. These mitigation measures will generally provide lights and dual gates. In some locations, intersections near crossings will need improvements. In addition, two grade-separated crossings have been proposed at 104th Avenue and 120th Avenue, where at-grade crossings exist today.

ES.5.4 What Are the Impacts to Freight Rail Operations?

The Preferred Alternative would allow for shared use of tracks for freight rail and commuter rail operations between slightly north of 70th Avenue and slightly south of 120th Avenue. RTD executed an agreement with the UP Railroad Company in 2009 allowing for this shared freight operation. To serve an existing customer in this section, deliveries to the freight rail customer would occur at night when the commuter rail is not operating. In the section south of 70th Avenue, track would not be shared with freight rail operations; therefore, there would be no impacts on freight rail operations that could not be mitigated.

As part of the North Metro corridor Preferred Alternative, commuter rail vehicles would be maintained at RTD's proposed CRMF Fox North Site. Access to the CRMF site for North Metro corridor vehicles would be via the shared mainline tracks for the proposed FasTracks Gold Line/Northwest Rail commuter rail lines. There would be no impact to freight rail operations related to CRMF access.

ES.6 PUBLIC COMMENT AND AGENCY COORDINATION

A Public Involvement Program (PIP) and Corridor Coordination Plan (CCP) (as required by the Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users [SAFETEA-LU], 2005) were developed and implemented for the North Metro Corridor Project. These plans blended ongoing engagement strategies with intense outreach organized around key project milestones.

ES.6.1 How Has the Public Been Involved With This Project?

The public has been involved in the North Metro Corridor FEIS since the beginning of the project in September 2006 (Figure ES-14). Public workshops were held nine times at two locations in the corridor at SAFETEA-LU decision milestones, before the FEIS was released. Two public hearings were held upon the release of the DEIS.

FIGURE ES-14. COORDINATION PROCESS AND PROJECT SCHEDULE



Source: North Metro Corridor Project Team, 2010.

In addition, the PIP included community/issue forums, various stakeholder meetings, and station-specific meetings with numerous community, civic, neighborhood, and municipal committees and organizations. These small-group meetings engaged stakeholders in more community-specific ways than is possible with larger workshops. In order to give everyone ample opportunity to engage in the public process, outreach was also implemented specifically for minority and low-income communities.

ES.6.2 How Have Agencies Been Involved?

The Local Governments Team (LGT) and Agency Working Group (AWG) have been involved in the project from its inception. All project information was presented first to the LGT for review and input, then to the public through public workshops, and then to the combined LGT and AWG at agency milestone meetings. As outlined in the CCP, and agreed to by all participating and cooperating agencies, public involvement was organized as described below.

ES.6.2.1 Local Governments Team

This is comprised of a “policy group” of one or two elected officials and a “technical group” of staff members chosen by each of the following local/regional government entities:

- City of Brighton
- Commerce City
- CCD
- City of Northglenn
- City of Thornton
- Adams County
- DRCOG

ES.6.2.2 Agency Working Group

The AWG is comprised of the lead agency (FTA), LGT members (as participating agencies) and representatives from the following state and federal cooperating and participating agencies, and the railroads:

- FTA
- RTD (staff and board members)
- United States Army Corps of Engineers (USACE)
- Colorado Department of Transportation (CDOT)
- United States Environmental Protection Agency
- United States Fish and Wildlife Service
- State Historic Preservation Officer (SHPO)
- Colorado Department of Public Health and Environment
- Colorado Division of Wildlife
- Urban Drainage and Flood Control District
- FHWA
- FRA
- BNSF Railway Company
- UP Railroad Company

ES.6.3 How Can the Public Provide Effective Input to FTA and RTD?

Several options are available for contacting FTA and RTD. The North Metro Corridor project team will continue its proactive community engagement efforts through the completion of the FEIS and receipt of the FTA decision document. To provide information on the FEIS, the North Metro Corridor project team will disseminate information via the project website, e-mail blasts, and aggressive outreach to local media and conduct two public hearings.

Comments related to the FEIS will be accepted until 1 March 2011. Comments can be submitted verbally or in writing. Verbal comments will only be accepted at the two public hearings. Written comments can be submitted via the following methods:

- Online at www.RTD-FasTracks.com - click on North Metro Corridor
- E-mail to comments@RTDNorthMetro.com
- Mail information requests and comments to:

David Beckhouse
Federal Transit Administration (FTA), Region 8
c/o North Metro Project Team
999 18th Street, Suite 900
Denver, CO 80202

- Submit comments via fax at 303-693-7738
- Drop off at either of the two public hearings
- Complete a comment form at either of the two public hearings

Comments received on the FEIS by 1 March 2011 will be responded to in the ROD.

ES.7 WHAT ARE THE REMAINING ISSUES TO BE RESOLVED?

As the project progresses into further design phases and the ROD, there are several key issues to be resolved, including:

- Continue coordination with local governments, FRA, and the Public Utilities Commission to help facilitate implementation of Quiet Zone(s) in the project study area.
- Ensure appropriate Americans with Disabilities design guidelines are used at station sites that meet FRA operational requirements.
- Completed Phase II studies for hazardous materials. Additional studies may be required once final engineering design is underway.
- Continue coordination with the railroads on operations.
- Investigate safety issues regarding evacuation of commuter rail vehicles throughout the entire alignment. Continue coordination with local emergency responders on this subject and other safety issues, including crime prevention.
- Continue coordination with CDOT regarding state highway ROW impacts and mitigation.
- Continue coordination with CDOT on the I-70 East Project.
- Continue coordination with affected property owners to avoid, minimize, or mitigate impacts.
- Complete Section 106 Consultation with SHPO on finding of effect for the one remaining archaeological site.
- Finalize the Memorandum of Agreement (MOA) between the SHPO, FTA, and RTD regarding adversely affected archeological sites or historic structures (draft MOA has been completed and is included in the FEIS).
- Notify the Advisory Council on Historic Preservation (AHP) of adverse effects for historic properties to provide an opportunity for their participating in the MOA.
- Continue coordination with Colorado State Parks and National Park Service on Section 6(f).



- Coordinate with United States Fish and Wildlife Service (USFWS) on consultation requirements per Section 7 Environmental Species Act (ESA) and the requirements for the Platte River Recovery Implementation Plan.
- Applied for 404(b)(1) Individual Permit from USACE.

Table ES-10 provides a summary of the impacts and proposed mitigation measures associated with the implementation of the Preferred Alternative.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Social Impacts and Environmental Justice		
Community Cohesion and Safety at Pedestrian Crossings	Construction and Operations	<ul style="list-style-type: none"> RTD's policy is to construct a fence along the entire rail line to deter trespassers and increase safety and security. This will minimize the safety issues associated with pedestrians, especially children, crossing tracks where informal trails currently exist. Maintain existing grade-separated street and trail crossings. Proposed grade-separated street crossings at 104th Avenue and 120th Avenue, and at the Rocky Top Middle School Connector Trail pedestrian underpass will provide options for crossing the railroad tracks safely. See Chapter 4, Transportation, for mitigation specific to the numerous at-grade crossings. These measures will maintain pedestrian connections and community cohesion.
Overflow Parking in Neighborhoods	Operations and Design	<ul style="list-style-type: none"> Coordinate with local jurisdictions on a parking management program if informal parking demand materializes.
Temporary Construction Impacts (Including Traffic Congestion, Noise, Air, and Visual)	Construction	<ul style="list-style-type: none"> Communication with individuals, companies, and communities through diverse media will take place to advertise the availability of travel options and services. An internet-based local information network will be created that provides promotions; real-time transit information; updates on construction, route closures, and alternative route information; and other transportation information and services. Working with the communities, RTD will prepare a Construction Management Plan that specifies public communications and construction means and methods to reduce or mitigate the inconveniences of construction such as noise, dust, visual blight, construction traffic, and preservation of access to homes, businesses, and community facilities. RTD will coordinate with impacted neighborhoods prior to and during construction activities. See Chapter 4, Transportation. See Section 3.8, Noise and Vibration. See Section 3.7.1, Air Quality. See Section 3.5, Visual and Aesthetic Qualities.
School Access	Construction	<ul style="list-style-type: none"> A School Outreach Plan for the construction phase of the project will be developed that provides an overview of what local schools can expect during construction, including safe behavior in work zones, basic safety measures, and a tentative schedule of construction activities and traffic control measures with bus, automobile, and pedestrian detours.
Acquisition of Residential or Business Property in Southern Section	Construction	<ul style="list-style-type: none"> Acquisition and relocation assistance, consistent with the Uniform Act, will be provided. RTD will provide free, 1-year transit passes to all household members of low-income and minority residential households that are acquired and relocated. An informational meeting will be held for businesses being relocated. The meeting will provide an introduction and overview of the process associated with the Uniform Act, as well as information on available resources.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Construction-related Impacts, Such as Noise, Air Quality, etc.	Construction	<ul style="list-style-type: none"> A Construction Management Plan will be developed and coordinated with affected neighborhoods (residents and businesses). The plan will include elements specific to communication on road closures, air quality, noise, vibration, water quality, hazardous waste control, visual impacts, noxious weed management, archeological monitoring, safety, security, and traffic control. See the specific resource sections of this FEIS for additional details on mitigation measures.
Land Use and Zoning		
Land Use and Zoning	None	<ul style="list-style-type: none"> • None.
Economic Considerations		
Impeded Access	Construction	<ul style="list-style-type: none"> Construction management plans will be created and work with local communities will take place. Alternative routes and access to properties affected by construction will be provided. Clear signs and directions for alternate access points will be provided. Coordination with local groups, neighborhoods, communities, and jurisdictions will take place. Night construction to accelerate construction in critical areas will be conducted. Temporary access during normal business hours will be provided, where possible.
Property Acquisitions	Construction and Operations	<ul style="list-style-type: none"> Design modification will be used to reduce the number of property acquisitions where practicable. The acquisition of real property interests will comply fully with the Uniform Act and the Fifth Amendment of the US Constitution. The Uniform Act applies to all acquisitions of real property or displacements of people resulting from federal or federally-assisted programs or projects. All impacted owners will be provided notification of RTD's intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests.
Farmlands		
Farmlands	None	<ul style="list-style-type: none"> • None.
Land Acquisition, Displacements, and Relocation of Existing Uses		
Acquisition of Properties	Construction and Operations	<ul style="list-style-type: none"> Acquisition. The acquisition of real property interests will comply fully with the Uniform Act and the Fifth Amendment of the US Constitution. The Uniform Act applies to all acquisitions of real property or displacements of people resulting from federal or federally-assisted programs or projects. All impacted owners will be provided notification of RTD's intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Relocations	Construction and Operations	<ul style="list-style-type: none"> • Relocation Analysis. RTD will prepare a relocation analysis to enable relocation activities to be planned in such a manner that the problems associated with the displacement of businesses are recognized and solutions are developed to minimize the adverse impacts of displacement. The relocation study will estimate the number, type, and size of business and non-profit organizations to be displaced, and the approximate number of employees that may be affected; and will consider any special advisory services that may be necessary from RTD and other cooperating agencies. • Relocation Assistance Advisory Service. Relocation assistance will include determining the relocation needs and preferences of each business to be displaced, and explaining the relocation payments and other assistance for which the business owner is eligible; providing current and continuing information on the availability, purchase prices, and rental costs of comparable replacement commercial properties; and providing information on other programs administered by the Small Business Administration and other federal, state, and local programs offering assistance to the displaced businesses. Relocation assistance will also be provided to residential property owners. • Relocation. The Uniform Act will provide numerous benefits to these individuals to assist them both financially and with advisory services related to relocation. • Payments. The relocation payments provided to displaced persons will be determined by federal eligibility guidelines. • Informational Meeting. An informational meeting will be held for businesses being relocated. The meeting will provide an introduction and overview of the process associated with the Uniform Act, as well as consolidated information on resources available, including assistance from local, state, and federal agencies and private agencies in the community. The meeting will not provide details related to individual eligibility.
NWSS Complex	Construction and Operations	<ul style="list-style-type: none"> • RTD will continue to coordinate with NWSS to address impacts to the operations at the horse barn. One potential solution, as discussed with NWSS, is to modify the existing horse barn at the NWSS complex to mitigate for the impacts to the access and operations associated with the loading at the rear of the building. The modifications will not reduce the existing capacity of the building.
Taxi Development	Construction and Operations	<ul style="list-style-type: none"> • RTD will continue discussions with Taxi to address the loss of 75 spaces that are part of the planned development.
Brighton Boulevard	Construction	<ul style="list-style-type: none"> • A new 8-foot parking lane would be striped on the east side of Brighton Boulevard, north of the Brighton Boulevard and York Street intersection (south of Columbine Street), to mitigate for loss of parking on the west side of Brighton Boulevard.
Metro Wastewater Property	Construction and Operations	<ul style="list-style-type: none"> • RTD will continue to work with Metro Wastewater to mitigate impacts to their planned improvements.
Denver Water-Miller Reservoir Property	Construction and Operations	<ul style="list-style-type: none"> • RTD will mitigate for the capacity lost due to the alignment. In addition, RTD will mitigate for access impacts to the pump/intake system and will relocate the caretaker's house (the location is currently unknown).

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
72 nd Avenue Gravel Company Owned by Frei Albert and Sons, Inc.	Operations	<ul style="list-style-type: none"> For the Preferred Alternative in 2020, the existing access to the gravel operations between O'Brian Canal and the existing track will be relocated slightly to the north, so that there is a separate access from the proposed park-n-Ride. For the Preferred Alternative, when the platform needs to be expanded to allow for eight vehicles (assumed to be in 2035), the rail line grade-crossing for the gravel operations will be relocated another 400 to 500 feet to the north to allow for the expanded platform.
104 th Avenue Station	Construction and Operations	<ul style="list-style-type: none"> In order to minimize conflicts and maximize the area for buses, plaza, and loading docks, all traffic operations, including the shopping center service vehicles and employees, and buses behind the shopping center at 104th Avenue, is proposed as one-way from the northwest to the southeast (from 104th Avenue towards Colorado Boulevard). There will be a median separating bus traffic from center employees and all other center services that occur behind the building (i.e., delivery trucks). Patrons of the park-n-Ride wishing to access westbound 104th Avenue would need to either turn out of the park-n-Ride, north onto Colorado Boulevard, and then west on 104th Avenue or walk their way through the park-n-Ride underneath the track and platform structure. Vehicles will not be able to cut through the shopping center as center and park-n-Ride traffic are segregated. The three parking spaces that will be impacted at the Grease Monkey will be resupplied in a different location on the parcel once construction is complete.
Temporary Construction Easements	Construction	<ul style="list-style-type: none"> Temporary construction easements will be needed to build the North Metro Corridor Project. The extent of these easements is not known at this time and appropriate mitigation measures will be determined during project design.
Archaeological, Historic, and Paleontological Resources		
ARCHAEOLOGICAL AND HISTORIC		
Adverse Effects to Two Archaeological Resources:	Construction	<ul style="list-style-type: none"> Adhere to mitigation measures as stipulated in the MOA.
<ul style="list-style-type: none"> Quimby Railroad Stop (5AM211) Eastlake Railroad Stop (5AM214) 		
Potential Impacts to Unknown Archaeological Resources	Construction	<ul style="list-style-type: none"> Contractor training program will be undertaken to promote resource awareness and avoid impacts. A professional archaeologist will monitor construction activities; and if resources are discovered, work will cease in the vicinity and SHPO will be notified. Procedures for post-review discoveries identified in the MOA will be followed.
Adverse Effects to one historic resource:	Permanent	<ul style="list-style-type: none"> Adhere to mitigation measures as stipulated in the MOA.
<ul style="list-style-type: none"> Historic Farmstead (5AM2158) 		

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
PALEONTOLOGICAL		
Direct Impacts from Ground Disturbing Activities	Construction	<ul style="list-style-type: none"> Standard mitigation measures, which follow the guidelines of the Society of Vertebrate Paleontology and meet the standards of federal agencies and the State of Colorado, will be implemented to avoid or minimize impacts to paleontological resources. If paleontological resources are uncovered in the CDOT ROW during project construction in areas not being actively monitored, the CDOT Paleontologist will be notified. Areas of no paleontological sensitivity within the APE do not require mitigation.
Visual and Aesthetic Qualities		
Staging Materials for Construction	Construction (Temporary)	<ul style="list-style-type: none"> Construction staging areas will be screened or fenced to minimize views of construction materials. Staging areas and surroundings will be replaced and rehabilitated with vegetation as soon as possible after construction. Grasses, forbs, shrubs, or trees will be replaced with similar vegetation.
Lighting	Operations (Permanent)	<ul style="list-style-type: none"> Lights used will be low-glare and directed downward to minimize light spill and glare to residents and adjacent roads. LED and "dark sky" lighting practices are recommended.
Noise Walls (Residential) and Station Locations Adjacent to Property Owners	Operations (Permanent)	<ul style="list-style-type: none"> Local municipalities will be consulted on the design of walls and structures.
Fencing	Operations (Permanent)	<ul style="list-style-type: none"> Southern Section: post and cable on the two South Platte River and South Platte River Trail crossings and high tensile rural fence at Steele Street Park area.
Replacing/Adding Bridge/Aerial Structures	Operations (Permanent)	<ul style="list-style-type: none"> Local municipalities will be consulted for design, color, and material criteria for design guidelines.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Parklands and Recreation Areas	Impact	Impact Type	Mitigation Measures
At-grade Sidewalk, Trail, and Bike Route Crossings at Streets	Construction and Operations	Operations	<ul style="list-style-type: none"> • See Chapter 4, Transportation, for mitigation measures.
Direct Impacts to At-grade Trail Crossings of the Alignment (Not at Streets)	Construction and Operations	Operations	<ul style="list-style-type: none"> • At the regional trail access from Fernald Trailhead, a trail underpass will be provided. The trail will be realigned and accommodated underneath the proposed alignment and the existing alignment via an underpass approximately 300 feet north of the existing crossing location. The trail will reconnect with the existing trail alignment on the west side of O'Brian Canal. This will allow trail users to cross the alignment without delays. • Signal Ditch Trail will be realigned to route users across the alignment along 128th Avenue. The existing pedestrian facility along 128th Avenue will be upgraded to a 10-foot multi-use path between the UP Railroad Trail on the east side of the alignment and the Signal Ditch Trail west of the alignment. • At Rocky Top Middle School Connector Trail, a trail underpass will be provided at the existing crossing location to maintain the connectivity between neighborhoods, the school, and the ball fields. • The segment of Eastlake Reservoir #1 Sidewalk/Local Trail across the alignment would be realigned to improve safety. • This trail currently crosses the alignment adjacent to the south side of 124th Avenue, which crosses the alignment at an approximately 30 degree angle. The realignment of the trail would detach the trail from the roadway at this location and route it across the alignment at approximately a 90 degree angle (perpendicular).
Direct Impacts to Trails and Pedestrian Facilities Due to Stations, Roadway or Drainage Improvements	Construction and Operations	Operations	<ul style="list-style-type: none"> • The Colorado Agricultural Trail would be reconstructed and incorporated into the design of the 88th Avenue station following a similar alignment to the current trail. • The connection between the Colorado Agricultural Trail and the 88th Avenue sidewalk will be reconstructed to maintain the current function of this recreational facility so that no long-term impacts will occur. • The 112th Avenue Detached Multi-use Path/South Sidewalk will be reconstructed to maintain the current function of this recreational facility so that no long-term impacts will occur. • The Eastlake Reservoir #1 Sidewalk/Local Trail will be reconstructed to maintain the current function of this recreational facility so that no long-term impacts will occur. • The Haven Trail near the 144th Avenue Station will be reconstructed to maintain the current function of this recreational facility so that no long-term impacts will occur.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Temporary Impacts to Trail Crossings of the Alignment (Not at Streets)	Construction	<ul style="list-style-type: none"> • Closure of trails during construction will be avoided to the greatest extent possible. Before beginning construction, adequate trail detours, including advanced notice and signing will be provided. Detour signage will comply with the Americans with Disabilities Act of 1990 and Part 6F of the <i>Manual on Uniform Traffic Control Devices</i> (FHWA 2007). Use of trail detours will be limited to only those periods of construction activity that are necessary for safety. Specific details about closures, including duration and detour routes, will be determined during final design. • Walking structures could be employed for some trail crossings in order to prevent or limit the need for closures. In addition, the contractor will be required to publicly announce any trail closures and will be expected to provide clearly marked detours. • If necessary, the contractor could provide trail protection in the form of a flagger for at-grade crossings in order to avoid or minimize closures. • Construction equipment staging will not occur on trails.
Temporary Impacts to Trails Due to Station Construction	Construction	<ul style="list-style-type: none"> • Closure of trails during construction will be avoided to the greatest extent possible. Before beginning construction, adequate trail detours, including advanced notice and signing will be provided. Detour signage will comply with the Americans with Disabilities Act of 1990 and Part 6F of the <i>Manual on Uniform Traffic Control Devices</i> (FHWA 2007). Use of trail detours will be limited to only those periods of construction activity that are necessary for safety. Specific details about closures, including duration and detour routes, will be determined during final design. • The new section of the Colorado Agricultural Trail would be constructed prior to demolition of the existing alignment. • Trail access would be maintained during construction either via the existing or new trail alignment.
Direct Impacts to Parks:	Construction and Operations	<ul style="list-style-type: none"> • Monetary compensation for trees removed. • Funding for master plan of frisbee golf course. • The portion of the disturbed area that is associated with temporary impacts will be restored to a condition that is at least as good as that which existed prior to the project. • The area impacted for drainage improvements will be regraded so as not to impact recreational/open space use. • Regrade so as not to impact recreational/open space use.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
<ul style="list-style-type: none"> Eastlake Railroad Property: 0.85 acre due to drainage and station improvements. Larry Walker Ball Fields: 0.02 acre to parking due to new trail underpass. Cherrywood Park III: 0.4 acre due to new trail underpass. Fallbrook Farms Detention/Playground: 0.4 acre due to new trail underpass. 	<ul style="list-style-type: none"> Regrade so as not to impact recreational/open space use. The portion of the disturbed area that is associated with temporary impacts will be restored to a condition that is at least as good as that which existed prior to the project. Regrade so as not to impact parking supply. No mitigation. Avoid impact to playground. 	
Direct/Indirect Impacts to Grade-separated Trails	Construction and Operations	
<ul style="list-style-type: none"> South Platte River Trail (first crossing): new bridge pier in greenway. South Platte River Trail (second crossing): Reduced visibility due to new bridge. Grange Hall Creek Trail: second track added over trail underpass. 	<ul style="list-style-type: none"> See the Section 6(f) Evaluation in Chapter 7, Final Section 4(f) and 6(f) Evaluation, for mitigation measures associated with impacts to the greenway at the first crossing of the South Platte River Trail northeast of Park Avenue. At the location of the new bridge structure (northeast of 38th Street near Globeville Landing Park), mirrors, signage, and underpass lighting will be provided to enhance visibility for trail users. The existing pedestrian underpass will be extended by 20 feet to accommodate the extra width of the rail tracks. 	
Direct Impacts to Fallbrook Farms Trail Due to New Trail Underpass	Construction	<ul style="list-style-type: none"> Relocate the existing connection to the Rocky Top Middle School Connector Trail to maintain access between these two trails.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Air Quality	Impact	Impact Type	Mitigation Measures
Air Quality Impacts During Construction and Operations	Operations	<ul style="list-style-type: none"> • No mitigation required; however, general air quality mitigation strategies for the FasTracks Program will be implemented. These may include: <ul style="list-style-type: none"> – Encouraging people to use alternative methods of travelling from nearby neighborhoods to the transit stations, including bus, pedestrian access, and bicycle. – Idling reduction technologies to reduce idling times for diesel engines (applicable to trucks and buses). RTD could give priority to contractors that use these technologies on new equipment or that retrofit older equipment. – Purchasing new RTD vehicles and retrofitting the existing vehicle fleet with emissions equipment. – Modifying buses with more efficient electronic engine controls and fuel injections. – Purchasing new buses equipped with particulate filters and exhaust re-circulators. – Using low-sulfur diesel fuel or bio-diesel (B20) in buses. – RTD currently uses a 3-minute bus idle limit that requires drivers to shut down their engines after idling for more than 3 minutes. – RTD currently has maintenance procedures to reduce emissions. These include periodic emission opacity testing, scheduled front-end alignments to improve fuel efficiency, and optimizing transmission shifting points. – RTD is currently conducting a demonstration program using hybrid diesel-electric buses for service routes. – Optimizing signal timing at intersections leading to stations to minimize idling time. 	

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Air Quality Impacts During Construction and Operations	Temporary Construction	<ul style="list-style-type: none"> • RTD will include language in the construction specifications that will require all construction equipment to be equipped in accordance with USEPA requirements. • Site-specific mitigation measures will be included in a construction management plan. • Construction-related fugitive emissions will be minimized by implementing dust control practices that may include: <ul style="list-style-type: none"> – Water or wetting agents to manage dust. – Wind barriers and wind screens to minimize the spreading of dust in areas where large amounts of materials are stored. – A wheel wash station and/or large-diameter cobble apron at egress/ingress areas to minimize dirt being tracked onto public streets. – Vacuum-powered street sweepers to control dirt tracked onto streets. – Covering all dump trucks leaving the site. – Covering or wetting temporary excavated materials. – Using a binding agent for long-term excavated materials. – Monitoring for PM₁₀ to allow for the real-time modification or implementation of various dust control measures. – Prohibiting unnecessary idling of construction equipment. – Locating diesel engines and motors as far away as possible from residential areas. – Locating staging areas as far away as possible from residential areas. – During winter construction, installing engine pre-heater devices to eliminate unnecessary idling. – Prohibiting tampering with equipment to increase horsepower or to defeat the effectiveness of emission control devices. – Requiring construction vehicle engines to be properly tuned and maintained. – Using construction vehicles and equipment with the minimum practical engine size for the intended jobs. • Work will be scheduled outside of normal hours for sensitive receptors or the facilities will be adjusted (should only be necessary in extreme circumstances, such as construction immediately adjacent to a health care facility, church, outdoor playground, or school).
Energy	Construction and Operations	<p>Design efforts to reduce energy consumption and overall VMT will be implemented as follows:</p> <ul style="list-style-type: none"> • Multiple access points will be created for parking lots, where possible. • “Kiss-n-Ride” drop-offs will be designed to maximize efficiency and to minimize the number of vehicles idling. • Stations will be positioned to be more easily accessible by pedestrians and bicyclists. • Park-n-Ride improvements will be designed to decrease energy consumption, consistent with RTD’s sustainability policy.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Noise and Vibration	Impact	Impact Type	Mitigation Measures
Noise Related to Temporary Construction Activities	Construction		<ul style="list-style-type: none"> • Applicable local noise regulations will be followed. • Nighttime construction in residential neighborhoods will be avoided, when possible. • Stationary construction equipment will be located as far as possible from noise-sensitive sites. • Noise barriers, such as temporary walls or piles of excavated material, will be constructed between noisy activities and noise-sensitive receivers. • Construction-related truck traffic along roadways will be re-routed to cause the least disturbance to residents. • A communications plan for construction activities will be developed.
Noise from Train Operations	Operations and Design		<ul style="list-style-type: none"> • RTD will work with the municipalities to establish Quiet Zones. • 16,500 feet of 8- to 12-foot-high noise barriers will be constructed as follows: <ul style="list-style-type: none"> – 1,200-foot barrier south of 104th Avenue on the west side (12-feet high) – 1,300-foot barrier north of 104th Avenue on the east side (8-feet high) – 3,700-foot barrier south of York Street on the east side (12-feet high) – 3,900-foot barrier south of York Street on the west side (10-feet high) – 300-foot barrier south of 136th Avenue on the west side of York Street (10-feet high) – 2,400-foot barrier north of 136th Avenue on the east side (12-feet high) – 1,900-foot barrier north of 136th Avenue on the west side (8-feet high) – 1,800-foot barrier south of E-470 on the west side (12-feet high) • As a result of more advanced engineering completed following the DEIS, noise analysis indicated that impacts are reduced and therefore noise wall mitigation requirements have decreased. Since exact vehicle specifications and track design will not be known until Final Design, RTD will establish a Noise Mitigation Fund in the amount of \$10 million. This money will be held until Final Design is completed; thereafter, a new noise analysis will be conducted to determine any changes to mitigation requirements which will subsequently be paid for through the use of these funds as necessary.
Vibration from Temporary Construction Activities	Construction		<ul style="list-style-type: none"> • Nighttime construction in residential neighborhoods will be avoided, where possible. • Alternative construction methods will be used to minimize the use of impact and vibratory equipment (e.g., pile drivers and compactors). • Construction-related truck traffic will be re-routed to roadways that will cause the least disturbance to residents.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Biological Resources		
Loss of Vegetation	Construction	<ul style="list-style-type: none"> • Grading plans will minimize removal of riparian vegetation. • During construction, vehicle operation will be limited to designated construction areas, and the limits of the construction area will be fenced where they are adjacent to sensitive habitats, including riparian areas, wetlands, and upland trees and shrubs. • Silt fencing, erosion logs, temporary berms, and other BMPs will be used to prevent degradation of habitats adjacent to construction. • Temporary disturbance will be seeded with an appropriate mixture of native grasses and forbs. Shrubs will be planted where appropriate, such as in willow-dominated riparian areas or other habitats that naturally include shrubs. • Disturbed riparian habitat will be planted with native trees and shrubs and be seeded and re-graded as soon as practicable and biologically appropriate. Native grasses, forbs, and shrubs will also be seeded in riparian areas. • MBTA mitigation measures will be followed to avoid violations in riparian areas. • All impacted trees in RTD ROW with a diameter at breast height greater than 1 inch will be replaced at a 1:1 ratio.
Loss of Prairie Dog Colonies	Construction	<p>RTD guidance on prairie dog mitigation will be implemented. This mitigation includes:</p> <ul style="list-style-type: none"> • Corridor projects will be designed and constructed to avoid and minimize impacts to prairie dog colonies greater than 2 acres in area as long as doing so does not increase impacts to other resources and is not cost prohibitive. • If a colony is less than 2 acres, but has the potential to expand into areas that are currently inactive (i.e., not constrained), the available and accessible habitat will be the determining factor of size of the area to be considered. • Relocation of prairie dogs will be coordinated with CDOW and the local jurisdiction, and conducted in compliance with the CDOW Permit to Capture and Relocate Prairie Dogs. • If a relocation site cannot be located for prairie dog towns greater than 2 acres, the prairie dogs will be captured and donated to raptor rehabilitation facilities or turned over to the USFWS for the Black-footed ferret reintroduction program. • At no time will RTD authorize earthmoving activities that result in burying live prairie dogs. If needed, humane techniques will be used for killing the prairie dogs. • CDOT prairie dog policy is very similar and will be implemented on CDOT ROW.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Migratory Bird Treaty Act (MBTA)	Construction	<ul style="list-style-type: none"> • In compliance with the MBTA, construction activities in grassland, wetland, stream, and woodland habitats, and those that occur on bridges that will otherwise result in the take of migratory birds, eggs, young, and/or active nests will be avoided. • The provisions of MBTA are applicable year-round; most migratory bird nesting activity in eastern Colorado occurs during the period of 1 April to 31 August. However, some migratory birds are known to nest outside of the primary nesting season. Raptors can be expected to nest in woodland from 1 February through 15 July. • A qualified biologist will conduct surveys during the nesting season prior to construction to determine the presence or absence of nesting migratory birds. These surveys will include CDOT structures. Where possible, nesting may be prevented until construction is complete. The results of field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, will be maintained on file for potential review by the USFWS, until such time as construction on the proposed project has been completed. • A qualified biologist will conduct raptor nesting surveys during an appropriate season (generally 1 May through 1 June) to determine the presence of active raptor nests. If an active nest is located, season buffers will be established and coordinated with CDOW to prevent disturbance of nesting birds during construction. • The USFWS Colorado Field Office will be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities. Adherence to these guidelines will help avoid the unnecessary take of migratory birds and the possible need for law enforcement action. • The CDOT I-270 bridge over the O'Brian Canal will be surveyed for swallows prior to construction. If construction is to occur during the nesting season for swallows between 1 April and 31 August, all nests will be removed prior to 1 April and then every 3 days until construction begins. (Birds that build nests during construction do so of their own accord and those nests will not need to be knocked down.) If construction begins outside of the nesting season, nests will not be knocked down.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Spread of Noxious Weeds	Construction	<p>An integrated Noxious Weed Management Plan will be developed. This plan will be implemented during construction and will include identification of noxious weeds in the area, weed management goals and objectives, and preventive and control methods. Preventive measures include the following:</p> <ul style="list-style-type: none"> • Contractors' vehicles will be inspected before they are used for construction to ensure they are free of soil and debris capable of transporting noxious weed seeds or roots. • Noxious weeds observed in and near the construction area at the start of construction will be treated with herbicides or physically removed to prevent seeds blowing into disturbed areas during construction. Noxious weeds identified during construction will be identified and treated. • Potential areas of topsoil salvage will be assessed for presence and abundance of noxious weeds prior to salvage. • Topsoil from heavily infested areas will be treated by spraying, taking the topsoil off-site, or by burying the topsoil during construction. • Areas of temporary disturbance will be reclaimed in phases throughout the project construction and seeded using a permanent native seed mixture. If areas are complete and permanent seeding cannot occur due to the time of year, mulch and mulch tackifier will be used for temporary erosion control until seeding can occur. • Only certified weed-free mulch and bales will be used in the project study area. • Weed control will use the principles of integrated pest management to treat target weed species efficiently and effectively by using a combination of two or more management techniques (biological, chemical, mechanical, and/or cultural). Weed-control methods will be selected based on the management goal for the species, the nature of the existing environment, and methods recommended by Colorado weed experts. The presence of important wildlife habitat or T&E species will be considered when choosing control methods.
Impacts to Aquatic Habitats	Construction	<ul style="list-style-type: none"> • BMPs will be used to control erosion and sedimentation during construction and to protect water quality in streams. BMPs may include berms, brush barriers, check dams, erosion control blankets, filter strips, sandbag barriers, sediment basins, sheet mulching, silt fences, straw-bale barriers, surface roughening, and/or diversion channels. A spill prevention and emergency response plan will be prepared and used during construction, for storage and the handling and use of chemicals, fuels, and similar products. • See Section 3.10.2, Water Resources and Water Quality.
Impacts to Special Status Species – Burrowing Owls	Construction	<p>CDOW recommendations for surveys and protection of nesting burrowing owls (state-listed threatened) will be followed:</p> <ul style="list-style-type: none"> • Surveys will be conducted prior to construction to determine presence of burrowing owls in prairie dog towns and the locations of occupied nests. Surveys will be conducted for any construction activities in suitable habitat from 15 March to 31 October. • Construction will be avoided within 150 feet of burrows used by burrowing owls from 15 March to 31 October.
Depletion of the Platte River System	Construction and Operations	Continued coordination with USFWS on Section 7 ESA consultation and the requirements for the Platte River Recovery Implementation Plan.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Mineral Resources, Geology, and Soils	Impact	Impact Type	Mitigation Measures
Erosion and/or Aggradation	Construction; Also Operations If Not Properly Mitigated During Construction	<ul style="list-style-type: none"> The following measures will be implemented to mitigate for potential erosion and/or aggradation where applicable and practicable: drainage systems to direct surface water and runoff, slope design, covered slopes during construction, engineered fill, and prompt and appropriate revegetation. 	
Loss of Opportunity to Extract Mineral Resources	Construction and Operations	<ul style="list-style-type: none"> Legal analysis will be conducted of the project's impacts on mineral rights and existing extractive activity for sand/gravel and oil/gas. Project components will be sited within the railroad ROW or where quarrying has been completed to the extent practicable. 	
Interference with Operation of Existing Mineral Extraction Operations	Construction and Operations	<ul style="list-style-type: none"> RTD will coordinate with owners to minimize project impacts on existing extraction operations (i.e., sand/gravel and oil/gas). A curb cut off the impacted access road of a producing well at the SH 7/162nd Avenue Station to the bus loop of the station area will be provided to allow continued access to the well. 	
Water Resources and Water Quality			
Groundwater Dewatering	Construction	<ul style="list-style-type: none"> Discharge will be into nearby storm sewer in accordance with the discharge permit. Contaminated dewatering water will be treated and discharged in accordance with discharge permit obtained through CDPHE and CDNR. Water supply reduced from the pumping of dewatering wells will be augmented under Colorado law. 	
Groundwater Quality	Construction and Operations	<ul style="list-style-type: none"> All portions of the Preferred Alternative, including the construction phase, will include BMPs that will act to improve water quality from current conditions. These BMPs are required by RTD, the local jurisdiction, and the State of Colorado. 	
Possible Removal of Water Supply or Monitoring Infrastructure in the Project Footprint	Construction	<ul style="list-style-type: none"> Active wells that are removed for the Preferred Alternative will be replaced as part of the Preferred Alternative. Operational monitoring and supply wells that are indirectly impacted will either be replaced in the same or similar locations, depending on the site conditions, or will be monitored for changes to water quality and supply during construction and operation. Non-operational monitoring and supply wells will be abandoned in accordance with state requirements. The water supply reservoir impact is a reduction of 5.6 acre-feet in storage capacity for the Miller reservoir. This impact is less than 0.27% of the 2080 acre-feet of storage in Miller reservoir, and 0.0008% of the nearly 700,000 acre feet of total storage for Denver Water. This loss of storage is expected to be mitigated through payment to Denver Water at a negotiated price per acre-foot and/or final engineering to potentially reduce the loss of storage. 	

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Surface Water Quality of Streams and Lakes, and Public Water Supply Facilities	Construction and Operations	<ul style="list-style-type: none"> • Where direct impacts will occur within the normal high water mark of a waterbody, coffer pilings or other separation techniques will be constructed and maintained to isolate the excavation from the rest of the waterbody. • Water quality monitoring before, during, and after construction is recommended for perennial waterbodies that are directly impacted. • The stormwater mitigation required will be sufficient to mitigate surface waterbodies in the indirect impact area, and for direct impacts to intermittent or some ephemeral waterbodies. • All of the measures listed for Stormwater Quality and Spills will be followed. • The temporary loss of storage in Miller Reservoir during construction can be mitigated through the use of coffer dams or by drawing down the reservoir and constructing when there is low demand for the storage (i.e. winter). The potential impacts to the quality of the water during construction will be mitigated through the use of coffer dams to protect the water supply and/or through use of special equipment and procedures for working in water. Potential impacts to water quality during operation in Miller Reservoir are expected to be mitigated through retention pond installation and routing of stormwater to them to contain storm flows from the track area. • During project construction in CDOT ROW areas, comply with the CDOT Water Quality Consent Decree, which was issued to CDOT by CDPHE (effective January 2009).
Stormwater Quality	Construction and Operations	<ul style="list-style-type: none"> • Temporary construction BMPs, such as seed, mulch, embankment protectors, grade techniques, inlet protection, silt fences, and vehicle tracking prevention will be used and maintained for construction activities as required by the laws and regulations for the location. • Permanent BMPs, such as extended detention basins, grass buffers, and grass swales for the stations, particularly 104th Avenue Station, will be constructed and maintained as required by the laws and regulations for the location. Stormwater runoff is highly regulated during construction and operation. By designing the BMP according to RTD and local criteria, and with the acquisition of appropriate permits from the local jurisdictions, no additional mitigation is required. • Project-specific water quality plans will be developed. • Project-specific stormwater management plans will be developed.
Spills	Construction and Operations	<ul style="list-style-type: none"> • Spill Prevention, Control, and Countermeasure Plan will be developed. • Spill controls will be implemented.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Wetlands and Other Waters		
Loss of Wetlands Due to the Placement of Dredged or Fill Material	Construction	<ul style="list-style-type: none"> Adhere to the mitigation requirements as specified in the 404 CWA permit, (likely to be an individual permit). Mitigation for wetland impacts will initially be sought on-site. In the event that suitable on-site mitigation is infeasible, credits will be purchased from a wetland bank. For any wetlands on CDOT ROW, whether jurisdictional or non-jurisdictional, a Wetland Finding Report shall be prepared for CDOT review and approval. All impacted wetlands on CDOT ROW shall be mitigated. Wetland areas designated as areas of temporary disturbance to be used for construction access will be covered with geotextile, straw, and soil, or construction matting prior to use. The location and design of any temporary crossing of any water features will be approved by the USACE.
Unnecessary and Unplanned Wetland Impacts	Construction	<ul style="list-style-type: none"> Prior to construction, orange temporary fence and sediment-control measures will be placed to protect existing wetlands that are outside the planned area of disturbance. The location and design of stormwater ponds will be coordinated with the USACE.
Sedimentation and Erosion of Wetlands and Other Water Features	Construction	<ul style="list-style-type: none"> BMPs will be implemented during all phases of construction to reduce impacts from sedimentation and erosion, including the use of berms, brush barriers, check dams, erosion control blankets, filter strips, sandbag barriers, sediment basins, silt fences, straw-bale barriers, surface roughening, and/or diversion channels. When practicable, construction in waterways will occur during low-flow or dry periods. Flowing water will be diverted around active construction areas. No fill material will be stored in wetlands or other water features. No unpermitted discharges will be allowed.
Contamination of Wetlands and Other Water Features	Construction and Operations	<ul style="list-style-type: none"> There will be no equipment staging, materials storage, chemical use (e.g., soil stabilizers, dust inhibitors, and fertilizers), or equipment refueling within 50 feet of wetlands or other water features. Any new or modified bridges will be designed to minimize direct discharge of stormwater runoff into wetlands.
Floodplains, Drainage, and Hydrology		
Floodplain Impacts	Design	<ul style="list-style-type: none"> Floodplain management will be coordinated with local jurisdictions and the UDFCD.
Construction Activities within Floodplain	Construction	<ul style="list-style-type: none"> Construction activities will adhere to local jurisdiction and UDFCD requirements.
Hazardous Materials		
Potential Impact to Remediation System at Suncor Energy (U.S.A.) Inc.	Construction (Temporary)	<ul style="list-style-type: none"> Impacts to the slurry wall and groundwater barrier system at Suncor Energy (U.S.A.) Inc. will be avoided.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Contaminated Soil and/or Groundwater at Hazardous Material Sites within or Adjacent to Areas for Acquisition or Excavation	Construction (Temporary)	<ul style="list-style-type: none"> • A Phase I ESA for sites acquired, and a Phase II ESA for sites that may have contamination or are impacted (as documented in the Phase I ESA) will be completed. • A site investigation plan for sampling and analysis will be developed where excavation or property acquisition occurs. • A materials handling plan will be developed to address contaminated soil and groundwater. • Engineering controls will be determined to minimize quantity of contaminated materials. • Responsible parties will be determined for the design, building, and operation of remediation systems. • Cost recovery of hazardous material sites where removal actions and long-term maintenance is required will be determined. • A heavy-metal-based paint survey will be prepared for bridges and buildings in the project impact area. • An asbestos survey will be prepared in the event of building and structure acquisition or demolition, or if asbestos is known to be present. • Soil characterization and management plans will be prepared according to National Fire Academy and HMWMD if construction debris is encountered during activities and is suspected to contain asbestos.
Water Quality Protection	Construction (Temporary)	<ul style="list-style-type: none"> • Construction BMPs will be implemented in accordance with a Stormwater Pollution Prevention Plan. BMPs may include secondary containment areas for refueling construction equipment, berms or ponds to control runoff, and a monitoring program to test stormwater for contaminants prior to discharge from the construction site.
Protection of Construction Workers	Construction (Temporary)	<ul style="list-style-type: none"> • Construction practices in compliance with OSHA requirements will be used for construction workers who may be exposed to hazardous materials. Health and safety, emergency response, and air monitoring (if necessary) plans will be prepared, and provisions for personal protective equipment will be provided.
Safety and Security		
Potential Impact to Emergency Response Times During Construction	Construction	<ul style="list-style-type: none"> • Traffic control plans for construction will be developed by the contractor.
Security Hazards at Construction Site	Construction	<ul style="list-style-type: none"> • Construction areas will be secured.
Safety and Security of Patrons	Operations	<ul style="list-style-type: none"> • The RTD design guidelines and <i>Safety and Security Manual</i> will be adhered to. • Coordination with the Fire and Life Safety Committee to prepare emergency plans will continue. • Fencing or barriers along the alignment and station areas will be installed to help prevent trespassing on the trackway.
Utilities		
Adjustment or Relocation of Irrigation Ditches	Construction	<ul style="list-style-type: none"> • Construction will be scheduled during periods of non-use or low-use (November to March). • Design will be modified to avoid/minimize conflict.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Relocation of Electric Transmission Towers	Construction	<ul style="list-style-type: none"> • Construction will be scheduled during periods of low use (October to April). • Design will be modified to avoid/minimize conflict. • Protect in place.
Adjustment or Relocation of High-Pressure Gas Line(s)	Construction	<ul style="list-style-type: none"> • Construction will be scheduled during periods of low use (May to September). • Design will be modified to avoid/minimize conflict.
Adjustment or Relocation of Buried Fiber Optic	Construction	<ul style="list-style-type: none"> • Early coordination with utility owners will be completed. • Design will be modified to avoid/minimize conflict. • Protect in place.
Adjustment or Relocation of Water Lines, Sanitary Sewers	Construction	<ul style="list-style-type: none"> • Variance to minimum depth requirement will be obtained. • Design will be modified to avoid conflict. • Disruption of service for low-use period (October to April) will be scheduled. • Disruption of service with wet tie-in will be minimized.
Relocation of Storm Sewers	Construction	<ul style="list-style-type: none"> • Design will be modified to avoid/minimize conflict.
New Roadway, Retaining Walls, or Additional/Reduced Cover on Buried Utilities	Construction	<ul style="list-style-type: none"> • An encasement or protective cover will be added over utilities (protect in place).
Relocation of Overhead Telephone and Electric Distribution Lines	Construction	<ul style="list-style-type: none"> • Early coordination with utility owners will be completed.
Section 4(f)		
ARCHAEOLOGICAL AND HISTORIC RESOURCES		
<ul style="list-style-type: none"> • See mitigation listed under Chapter 7, Archaeological and Historic. 		
PARKLANDS AND RECREATIONAL RESOURCES		
<ul style="list-style-type: none"> • See mitigation listed under Chapter 7, Parklands and Recreation Areas. 		
Section 6(f)		
<ul style="list-style-type: none"> • South Platte River Trail (First Crossing): No Section 6(f) Conversion Due to New Bridge Pier in Greenway 		
Transit Service and Operations		
<ul style="list-style-type: none"> • No adverse impacts. 		

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Station Area Roadway and Intersection	Impact	Impact Type	Mitigation Measures
The Preferred Station Options Would Require Signalization and the Addition of Turn Lanes at Some Adjacent Station Area Intersections to Address Traffic Impacts	Construction and Operations	Station National Western Stock Show (Denver)	<ul style="list-style-type: none"> • No station-related mitigation measures required.
		72 nd Avenue (Commerce City)	<ul style="list-style-type: none"> • 72nd Avenue/Colorado Boulevard (Station Access): <ul style="list-style-type: none"> - Signalize the intersection (2020 opening day). • US 6-85/74th Avenue: <ul style="list-style-type: none"> - Restripe both eastbound lanes into left-turn lanes and construct a free right-turn lane on the south side of 74th Avenue (2035 or sooner, when critical movement becomes LOS F).
		88 th Avenue (Thornton)	<ul style="list-style-type: none"> • 88th Avenue/Devonshire Boulevard <ul style="list-style-type: none"> - Reconstruct the northbound approach with one northbound right- and two northbound left-turn lanes. Start the taper into the added turn lanes just north of Devonshire Court. Improvements would be within the existing right-of-way (2020 opening day). • Welby Road/Station Access: <ul style="list-style-type: none"> - Reconstruct with a northbound left-turn lane and signalize the intersection (2035 or sooner, when critical movement becomes LOS F).
		104 th Avenue (Thornton)	<ul style="list-style-type: none"> • 104th Avenue/Fox Run Parkway: <ul style="list-style-type: none"> - Construct a second northbound left-turn lane. Shift southbound right-turn lane to the west so that the through lanes align (2020 opening day) • Colorado Boulevard/104th Avenue: <ul style="list-style-type: none"> - Construct a northbound right-turn lane (2020 opening day).
		112 th Avenue (Northglenn)	<ul style="list-style-type: none"> • Colorado Boulevard/Service Road (East Station Access): <ul style="list-style-type: none"> - Reconstruct the current right-in/right-out intersection to provide a signalized full movement three-leg intersection with an eastbound left-turn lane and a northbound left-turn lane (2020 opening day). • Colorado Boulevard/South Station Access: <ul style="list-style-type: none"> - Construct a new unsignalized three-quarter movement intersection, with northbound left-in turns allowed (2020 opening day). • 112th Avenue/York Street: <ul style="list-style-type: none"> - Reconstruct the eastbound left-turn lane to provide more storage length and construct a southbound right-turn lane (2035 or sooner, when critical movement becomes LOS F).

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
The Preferred Station Options Would Require Signalization and the Addition of Turn Lanes at Some Adjacent Station Area Intersections to Address Traffic Impacts (continued)	Construction and Operations (continued)	<p>124th Avenue/Eastlake (Thornton)</p> <ul style="list-style-type: none"> • Relocated north leg of Claude Court: <ul style="list-style-type: none"> - Relocate approximately 1,000 feet of Claude Court as part of the station design. - Construct a two-lane road that ties into the existing Claude Court on the north side of the station area (2020 opening day). • 124th Avenue/Claude Court (relocated north leg): <ul style="list-style-type: none"> - Construct an unsignalized three-leg intersection with stop control for the southbound approach, eastbound and southbound left-turn lanes and a westbound right-turn lane (2020 opening day). • 124th Avenue/Claude Court (existing south leg): <ul style="list-style-type: none"> - Provide an unsignalized intersection with stop control for the northbound approach (2020 opening day). It is assumed that the intersection would be signalized by others by 2035, as part of the City of Thornton proposed reconstruction of 124th Avenue. • 144th Avenue/Station Access Road: <ul style="list-style-type: none"> - Construct a new unsignalized intersection, with northbound stop control and a westbound left-turn lane (2020 opening day). - Signalize the intersection (2035 or sooner, when critical movement becomes LOS F).
SH 7/162 nd Avenue (Thornton)		<p>• 160th Avenue (SH 7)/Colorado Boulevard (existing north leg)</p> <ul style="list-style-type: none"> - Reconstruct the eastbound left-turn lane to provide more storage length and construct a southbound right-turn lane (2020 opening day). <p>• 160th Avenue (SH 7)/East Station Access Road</p> <ul style="list-style-type: none"> - Construct a new signalized intersection with an eastbound left-turn lane and a westbound right-turn lane. Construct a two-lane southbound approach, with the following configuration: left-turn lane and shared left-/right-turn lane. Construct an eastbound receiving lane for the double southbound left-turn movement (2020 opening day). - Reconstruct the southbound left-turn lane to provide more storage length (2035 or sooner, when queue lengths exceed the available storage). Reconstruct the eastbound left-turn lane to provide more storage length (2035 or sooner, to be done in conjunction with the SH 7 widening project). <p>• 160th Avenue (SH 7)/Colorado Boulevard (relocated south leg)</p> <ul style="list-style-type: none"> - Restripe the No Action two-lane northbound approach to the following configuration: left-turn lane and shared left-/right-turn lane. Construct a westbound receiving lane for the double northbound left-turn movement (2020 opening day).

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures	
The Preferred Station Options Would Require Signalization and the Addition of Turn Lanes at Some Adjacent Station Area Intersections to Address Traffic Impacts (continued)	Construction and Operations (continued)	SH 7/162 nd Avenue (Thornton) (continued)	<ul style="list-style-type: none"> • 160th Avenue (SH 7)/Colorado Boulevard (relocated) - On the east side of the intersection, construct a second through-traffic lane in the eastbound and westbound for about 500 feet (2035 or sooner, to be done in conjunction with the SH 7 widening project).
At-grade Crossing Roadway and Intersection			
The Preferred Alignment Would Require the Modification of Existing Turn Lanes and Addition of New Turn Lanes associated with At-grade Crossings to Address Traffic Impacts	Construction and Operations	Roadway Crossings	<p>Mitigation</p> <ul style="list-style-type: none"> 112th Avenue <ul style="list-style-type: none"> • 112th Avenue and Irma Drive: <ul style="list-style-type: none"> - Restripe the westbound, southbound, and northbound left-turn lanes to provide more storage length (2020 opening day). Operate with eastbound/westbound left-turn movements protected by green arrows during the AM peak period. Operate with left-turn movements protected by green arrows in all four directions during the PM peak period. • 112th Avenue and York Street: <ul style="list-style-type: none"> - No mitigation measures required (see station mitigation). 136th Avenue and York Street <ul style="list-style-type: none"> • 136th Avenue and York Street: <ul style="list-style-type: none"> - Construct double southbound left-turn lanes (2020 opening day).
Construction Impacts		Traffic, bicycle, and pedestrian impacts during construction	<ul style="list-style-type: none"> • Traffic management plans will be developed in coordination with local agencies.
Rail Freight Movements			
BNSF Railway 23 rd Street Railyard Tracks Impacted	Pre-Construction		<ul style="list-style-type: none"> • The BNSF Railway tracks will be relocated within the railyard.
Pedestrian and Bicycle Facilities			
At-grade Sidewalk, Trail, and Bike Lane or Route Crossings at Streets	Operations		<ul style="list-style-type: none"> • Street crossing arms will be provided. The implementation of a Quiet Zone may alter the type of mitigation measures necessary. • Provide additional safety measures for crossings that are detached from the road and are part of a regional trail or where students are likely to cross (88th Avenue, 112th Avenue, 124th Avenue, 128th Avenue, York Street, and 136th Avenue). These measures may include fencing of sidewalks at crossings, swing gates, and active pedestrian-scale warning signs.
Trail Crossings	Construction and Operations		<ul style="list-style-type: none"> • See Section 3.6, Parklands and Recreation Areas, for mitigation specific to recreational trail crossings.

TABLE ES-10. PROPOSED MITIGATION MEASURES – ELEMENTS OF THE PREFERRED ALTERNATIVE

Impact	Impact Type	Mitigation Measures
Temporary Sidewalk and Bike Lane or Route Closures	Construction	<ul style="list-style-type: none"> Sidewalk closures for construction will be kept to a minimum and temporary detours will be provided. Specific details about closures including duration and detour routes will be determined during final design. The contractor will be required to publicly announce any closures and will be expected to provide clearly marked detours.
Regional and Local Transportation Plans		
NWSS station layout conflicts with two options for an I-70 East DE/S alternative	Pre-construction	<ul style="list-style-type: none"> Continue coordination with CDOT as an I-70 East EIS preferred alternative is identified and modify NWSS station layout if needed.

Source: North Metro Corridor Project Team, 2010.

Notes:

Construction impacts are temporary. Operations impacts are more permanent and result from the completed, operating project.

¹Although this resource was recorded with the name “UP Railroad Dent Branch,” the rail line is commonly referred to as the UP Boulder Branch.

APE	= Area of Potential Effects	HMWMD = Hazardous Materials and Waste Management Division	SH = State Highway
BMP	= best management practice	Interstate #	Suncor = Suncor Energy (U.S.A.) Inc.
CCD	= City and County of Denver	LED = light-emitting diode	T&E = threatened and endangered
CDNR	= Colorado Department of Natural Resources	LOS = Level of Service	UDFCD = Urban Drainage and Flood Control District
CDOT	= Colorado Department of Transportation	MBTA = Migratory Bird Treaty Act	Uniform Act = Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended
CDOW	= Colorado Division of Wildlife	MOA = Memorandum of Agreement	UP = Union Pacific
CDPHE	= Colorado Department of Public Health and Environment	NWSS = National Western Stock Show	US = United States
CWA	= Clean Water Act	OSHA = Occupational Safety and Health Administration	US# = United States Highway Number
DEIS	= Draft Environmental Impact Statement	PM ₁₀ = particulate matter less than 10 microns in diameter	USACE = United States Army Corps of Engineers
EMU	= electric multiple unit	ROW = right-of-way	USEPA = United States Environmental Protection Agency
ESA	= Environmental Site Assessment	RTD = Regional Transportation District	USFWS = United States Fish and Wildlife Service
FEIS	= Final Environmental Impact Statement		VMT = vehicle miles traveled