



COLORADO
Department of Transportation

Mountain Rail Program

Progress Report

Preliminary Report and Status Update to the Legislature of the
State of Colorado

December 30, 2024

Colorado Department of Transportation



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ACRONYMS

AAR	Association of American Railroads
AC	Alternating Current
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
APA	Area of Potential Action
APE	Area of Potential Effect
ATC	Automatic Train Control
ATOR	Above Top of Rail
BNSF	BNSF Railway
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEO	Colorado Energy Office
CFR	Code of Federal Regulations
CIDP	Corridor Identification and Development Program
CML	Consolidated Mainline
Corridor ID	Corridor Identification and Development Program
CP	Control Point
CPW	Colorado Parks and Wildlife
CRMF	Commuter Rail Maintenance Facility (RTD)
CTC	Centralized Traffic Control
DOLA	Colorado Department of Local Affairs
DRCOG	Denver Regional Council of Governments
DTO	Denver Transit Operators
DTR	CDOT Division of Transit and Rail
DUS	Denver Union Station

ECAR	Environmental Concerns Analysis Report
EJ	Environmental Justice
EPA	US Environmental Protection Agency
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GEC	General Engineering Contract
GIS	Geographic Information System
IAP2	International Association for Public Participation
LEP	Limited English Proficiency
LIG	Local Interest Group
LSEP	Local Stakeholder Engagement Plan
MoW	Maintenance of Way
MP	Milepost
MRC	Mountain Rail Coalition
MTID	Moffat Tunnel Improvement District
NEPA	National Environmental Policy Act
NWES	Northwest Electric Segment
O&M	Operations and Maintenance
OEDIT	Colorado Office of Economic Development and International Trade
OMF	Operations and Maintenance Facility
P&N	Purpose and Need
PAH	Polycyclic Aromatic Hydrocarbons
PEL	Planning and Environmental Linkages
PEP	Public Engagement Plan
PTC	Positive Train Control

RAISE Program	Rebuilding American Infrastructure with Sustainability and Equity
ROM	Rough Order-of-Magnitude
RSEP	Railroad Stakeholder Engagement Plan
RTD	Denver Regional Transportation District
SDP	Service Development Plan
SHPO	State Historic Preservation Office
SI	Special Instruction(s)
SIG	Statewide Nongovernmental Organization (NGO) Group
TAZ	Travel Analysis Zone
TPR	Northwest Transportation Planning Region
TWC	Track Warrant Control
UPRR	Union Pacific Railroad
USFWS	US Fish and Wildlife Service
VOC	Volatile Organic Compounds

DEFINITIONS

Alternative: Transportation solutions that address the Purpose and Need of the project. A final Recommended Alternative, including the following elements, will be detailed at the conclusion of the Service Development Plan (SDP):

- Route
- Stations
- Service
- Infrastructure
- Operations, including rolling stock
- Costs
- Funding/financing strategy
- Phased implementation

Corridor Project Inventory: A list of projects, both to improve existing infrastructure and additions to existing infrastructure, necessary to deliver a given Alternative.

Route Options: Choices of potential routes, which can be existing railroad corridors or entirely new corridors. These are what are studied in the Route Options Analysis.

Service Development Plan (SDP): The document that outlines the details of a proposed rail service, positioning it to move into the Project Development phase of the project lifecycle. The next phase involves preliminary engineering and a formal environmental review process.

Service Options: Choices of potential rail service arrangements, including service level (frequency), service pattern(s), stations, rolling stock, and fares. These are what are studied in the Service Options Analysis.

EXECUTIVE SUMMARY

The Colorado Department of Transportation (CDOT) is exploring new initiatives to enhance transportation options, reduce congestion and emissions on highways, and increase safety in the central Rocky Mountains. The plan being developed by the CDOT Division of Transit and Rail (DTR) involves rapidly developing passenger rail lines that connect both tourists and the workforce with mountain town employment centers and recreational destinations. This coincides with a dramatic shift in the freight rail industry due to declining coal traffic, which has opened opportunities to reintroduce passenger rail service to these freight corridors. Expansion of passenger rail will provide a needed alternative to driving, reducing congestion and emissions, improving safety and providing alternatives when roads may be closed or slowed due to weather, accidents and other impacts.

Additionally, as local mountain communities transition from a coal-based economy, the Mountain Rail project also presents an opportunity to support a Just Transition for the local workforce and economies. Launched in 2023, the Mountain Rail Program aims to use existing rail infrastructure to meet the growing demand for alternative modes of transportation, serving the existing rail corridor between Denver, Winter Park, Steamboat Springs, and Craig. As the Mountain Rail Program is rolled out, the State will consider larger questions such as who will operate the route, how the project will be funded with limited resources, and the timeline for completing the project.

The first step in the eventual deployment of a new passenger rail service for Mountain Rail is the development of a Service Development Plan (“SDP”). The SDP is the blueprint for all phases of the project, defining all aspects of planning, conceptual engineering, and cost estimating:

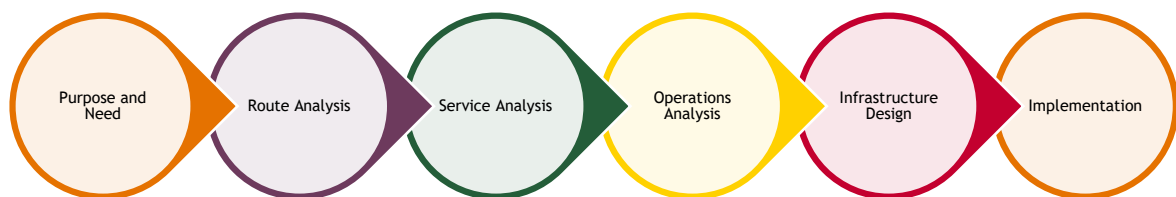


Figure 1: Service Development Planning Process

This report provides a detailed update to policymakers and affected stakeholders on the status of the Mountain Rail SDP. The SDP process began in late-2023 and CDOT has made

significant progress in defining the scope, schedule, and broad cost parameters of the Mountain Rail Project. This Executive Summary outlines these elements in a concise and straightforward manner in the following six parts:

1. Route, Alignment, and Stations
2. Market, Service Patterns, and Ridership
3. Infrastructure Needs and Costs
4. Rolling Stock and Operator
5. Public and Agency Outreach
6. Project Schedule and Next Steps

Route, Alignment, and Stations

As depicted in Figure 2, the preferred Route Option utilizes a 230-mile combination of Union Pacific Railroad (UPRR) and Denver Regional Transportation District (RTD) tracks. The Mountain Rail project seeks to utilize existing tracks allowing for the most cost-effective approach to connecting rural mountain communities of central and northwest Colorado with the Front Range by passenger rail and includes the development of detailed agreements with UPRR and RTD. As of the date of this report, the State has negotiated a framework for accessing UPRR tracks with passenger rail that will be completed in 2025. Based on industry standards of operations, engineering, and land use, the CDOT team has also developed a list of proposed passenger stations. Additional outreach and planning with local partners is required to determine the detailed site location for some of the stations. The location and phasing of stations may evolve and change during the planning and implementation process of this project.

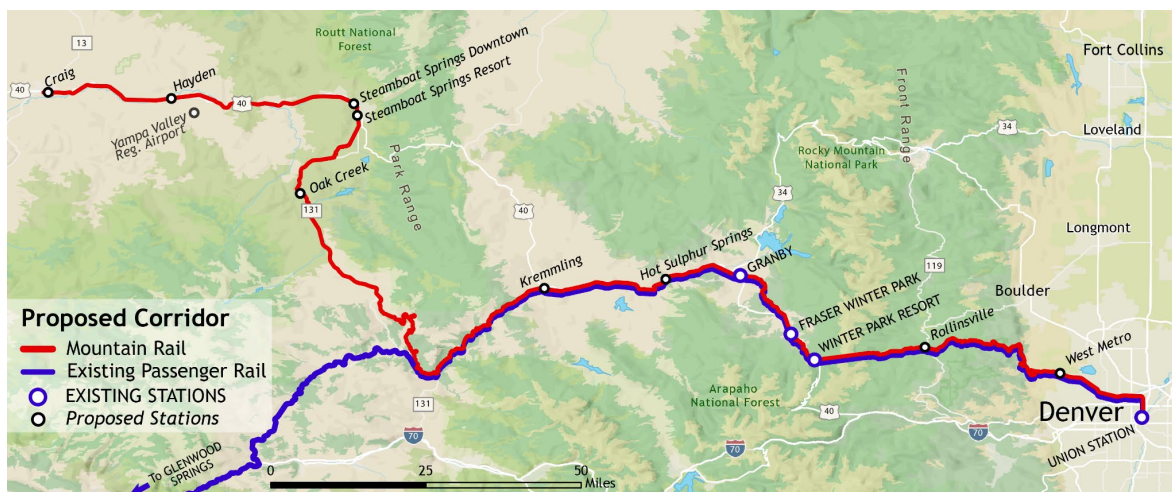


Figure 2: Proposed Mountain Rail Corridor

Market, Service Patterns, and Ridership

There are three overall markets and associated trip types that can be served with the project:

- Short Pattern trips between Denver and Granby
- Long Pattern trips between Denver and Craig
- Local Pattern trips between Oak Creek and Craig, via Steamboat Springs

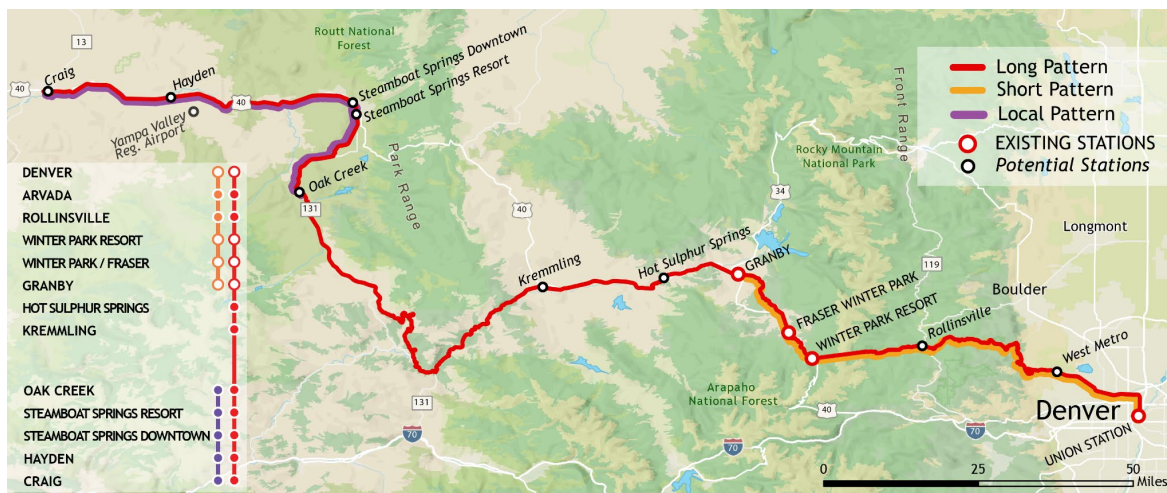


Figure 3: Market and Service Patterns

Each of these patterns are being evaluated in depth for ridership estimates and associated costs. Preliminary data indicates that the market for each of these three trip types is strong enough to support passenger rail service and divert traffic from highways, thereby reducing congestion and increasing safety. Ongoing work related to Mountain Rail service includes the review of integrating this service with existing local transit and Bustang service, which would be likely revised and optimized based on actual deployed train service.

The potential Local Pattern service in the Yampa River Valley is akin to rail transit service in the Denver metro area, serving only local trips. As a result, it would require local participation for funding for operations and maintenance, while the State is negotiating access to the rails with UPRR and evaluating needed capital improvements as part of the intracity Long Pattern. Access agreements and capital improvements made to support the Long Pattern, would also support the Local Pattern.

Infrastructure Needs and Costs

In conjunction with Union Pacific Railroad (“UPRR”), the DTR team is evaluating what modifications are necessary to the existing track, signals, and tunnels along the corridor to meet federal safety parameters to prepare for passenger rail service. Since there is

existing passenger rail service on the line between Denver Union Station (“DUS”) and Bond, it is anticipated that few if any improvements will be needed along that corridor. For the section between Bond and Craig, there are several areas of track and other rail-related infrastructure that will require upgrades, most importantly the signal/train control system. In addition, passenger stations and maintenance/storage facilities will need to be constructed where there are none currently. The team is developing station standards that utilize basic, functional, and cost-effective platform and access architecture, which can be adapted and modified should a local government and its residents provide additional funds for station upgrades. Further track improvements may not be needed to start passenger service but may be beneficial in the future to increase speeds and reliability.



Figure 4: Existing Tunnel 44 with Probable Clearance Issue



Figure 5: Craig Branch near Volcano Siding



Figure 6: Granby Station

Rolling Stock and Operator

The CDOT team is evaluating what types and configurations of rolling stock (trainsets) would be best suited to deploy in the corridor. Since one of the goals of the project is to deploy an initial starter service in late 2026, and it takes the railcar manufacturing industry at least three years to build a new trainset, it is likely that that used equipment will be needed in the short-term for initial service. With the national boom in passenger rail, coupled with Amtrak re-fleeting short and long distance trainsets, combined with a requirement under the Infrastructure Investment and Jobs Act (IIJA), the demand for new trainsets has never been greater, and manufacturers are experiencing a multi-year backlog in design, production, and commissioning of new trainsets, coaches, and locomotives.

For the mid-and long-term, the State will be conducting the procurement of new, state-of-the-art trainsets that will include customer amenities, depending on the type of service. A critical part of new trainset procurement includes flexibility and adaptability, particularly ensuring the opportunity to upgrade trainsets. As future propulsion technologies evolve and become ready for mainline, extended duration service, the CDOT team intends to be ready to make the upgrade and move to these zero emission propulsion options as they become ready.

Additionally, the State will procure an entity, or entities, to operate and maintain trains for the Mountain Rail service using a competitive bidding process of qualified operators to determine what entity or entities can provide the highest value for the State.



Figure 7: Amtrak Winter Park Express Trainset, near the Flatirons



Figure 8: Stadler KISS Bi-Level Multiple Unit Trainset

Public and Agency Outreach

The DTR team has conducted extensive stakeholder outreach and coordination since the project kicked off in 2023. This includes a series of three rounds of public Open Houses held in Q4 of 2024 along the Mountain Rail corridor. As detailed in a subsequent section of this report, comments from over 570 Coloradans, and counting, were logged throughout the past six months; support for the project is strong and pronounced in both the public open houses and surveys submitted. The comments generally follow three main topical areas of feedback:

1. Station locations and associated improvements to access the station areas
2. State versus local responsibility for future costs
3. Schedule of train service and types of passenger amenities

Financial Planning

Financial planning efforts, in concert with procurement planning, are in progress in partnership of CDOT and the Colorado Transportation Investment Office (CTIO).

Financial Planning for the Mountain Rail Project is intended to:

- Analyze potential funding sources and strategies.
- Build a project financial statement showing the proposed service's financial projections over the course of the project, informed by the Phased Implementation Plan.

- Determine operations and maintenance costs for Local Pattern service for local participation in transit-type service.
- Define the direct monetary benefits and other monetized benefits of the project for use in the Economic Evaluation.

Governance

Governance is an explicit component of an SDP per FRA guidance. CDOT and the Colorado Transportation Investment Office (CTIO) will implement and oversee the governance structure for the Mountain Rail intercity service with policy direction, oversight and funding approvals from the Colorado Transportation Commission, CTIO Board and Clean Transit Enterprise (CTE) Board. CTIO and CTE are expected to be primary sources for project funding, with certain investments being supported by local funding sources. CTIO is expected to procure and oversee a third-party contractor to operate trains, maintain equipment and provide other services.

Given the need for local funding of local transit/rail operations and maintenance, Local Pattern rail service in the corridor would potentially be governed and funded under a different type of structure that incorporates and emphasizes more local interests, funding, representatives, and responsibilities, but is outside the scope of this SDP.

Phased Implementation

After a final Corridor Project Inventory is completed for the preferred alternative, CDOT will prepare a phased implementation plan which will identify a priority, sequence, schedule, and duration for each investment to support a phased implementation of service - i.e., partial service levels, extended service levels, and then the final service level. Phasing will allow earlier and less risky project delivery, including early opportunities to divert traffic from highways to reduce congestion and emissions.

The plan will also include considerations for resource and funding stream availability, including local support for operations and maintenance of local service, when building out the schedule for rollout of these infrastructure projects, both to support early start-up of revenue service and the delivery of the project in reasonable phases.

Early consideration of logical phasing of service is part of the evaluation of service options and considerations of feasibility. One conceptual approach to phasing the project looks like this:

1. Implement daily service with one or two round trips from Denver to Granby with existing stops

2. Implement local service between Oak Creek or Steamboat Springs and Craig, assuming local participation on operations and maintenance costs
3. Implement full corridor, interregional service from Denver to Craig

Intermediate phases include increasing frequency of service between steps as ridership or rolling stock permits, adding stops, or following funding availability and finalization of partnerships and similar agreements to operate and maintain operations.

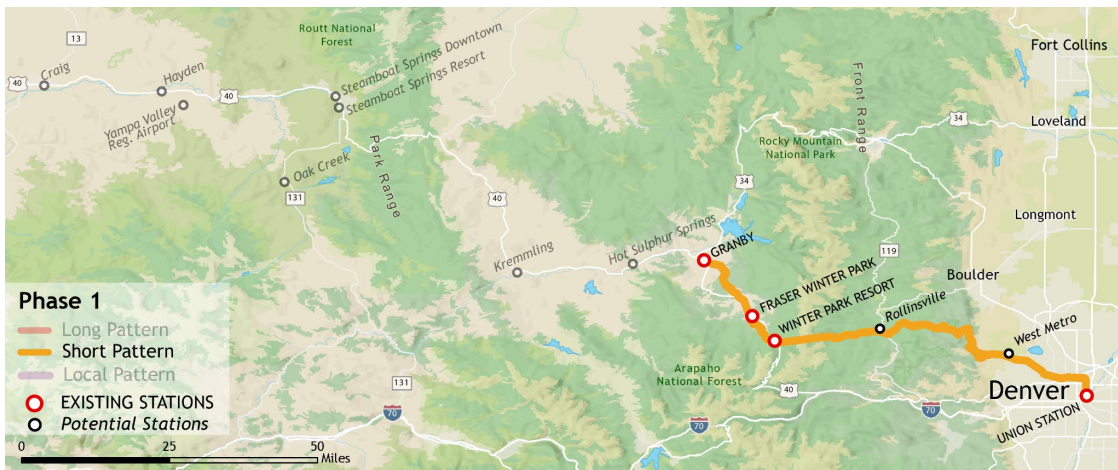


Figure 9: Conceptual Phase One

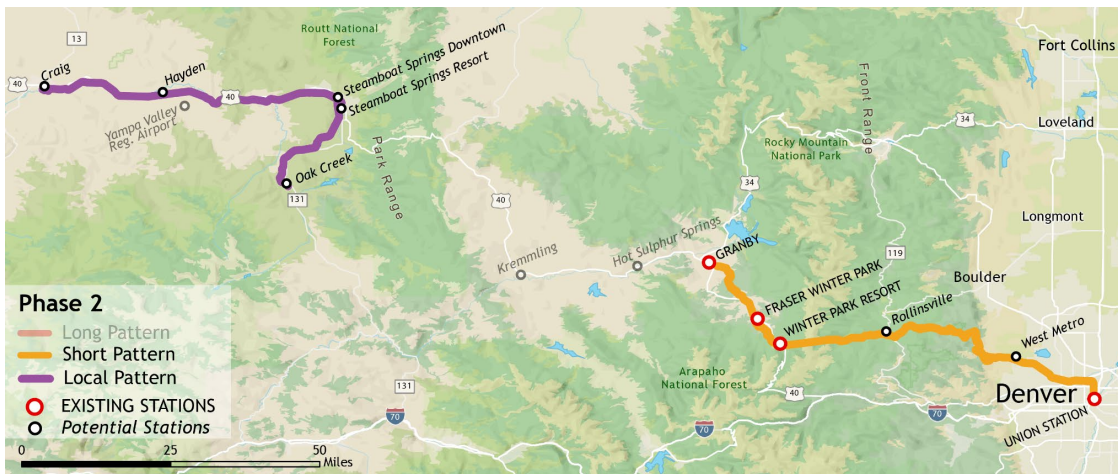


Figure 10: Conceptual Phase Two

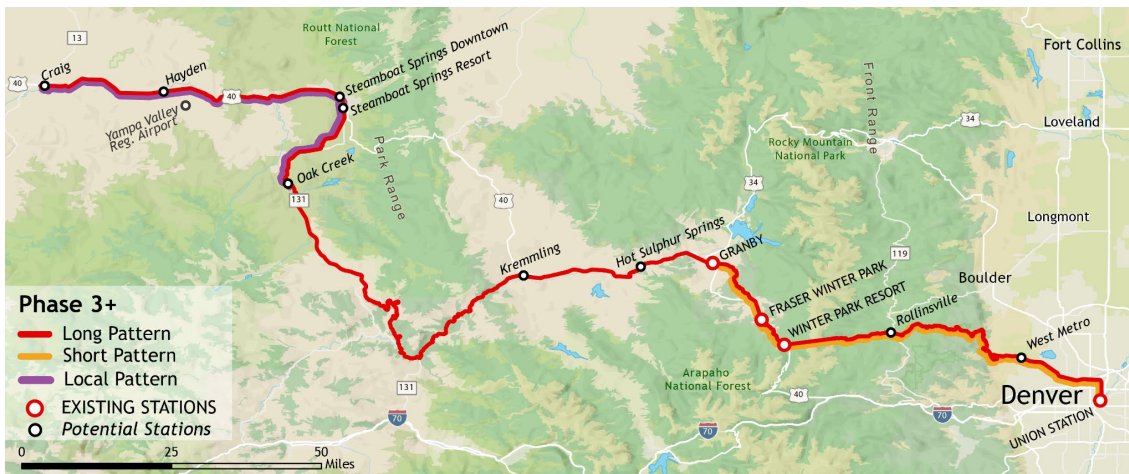


Figure 11: Conceptual Phase Three

Phases can be governed and funded independently; i.e., one phase can be implemented by the State while another can be implemented or funded by a local authority or partnership agreement with the State. In addition, stops that currently do not exist – such as the West Metro station – can be added as funding and approvals are available. As noted above, given the need for local funding of local transit/rail operations and maintenance, the implementation of any local service will depend on steps from local entities.

Project Schedule and Next Steps

The SDP process is on schedule and is collecting extensive data and results to identify a long-term vision for passenger rail in the Mountain Corridor. In 2025, the CDOT team will conduct deeper analysis in the areas of engineering, cost estimating, financial analysis, and procurement of rolling stock and operator(s). This comprehensive look at the total sum of the required components of what passenger rail service will require, as well as how to implement it, becomes the Alternatives Analysis, the core of the Service Development Planning process itself. As this package of required components is defined, refined, and compared with the other means and methods of delivering passenger rail service, this will become a single recommended alternative that the study will focus on and define in depth.

The Recommended Alternative, which will be the top scorer in the Alternatives Analysis process, will be further analyzed to consider a phased implementation of the project. Rarely are large transportation projects completed in one step, and are more often than not, phased in. The initial phase of service is anticipated to start in late 2026 and will likely run between the existing stations from Denver to Granby.

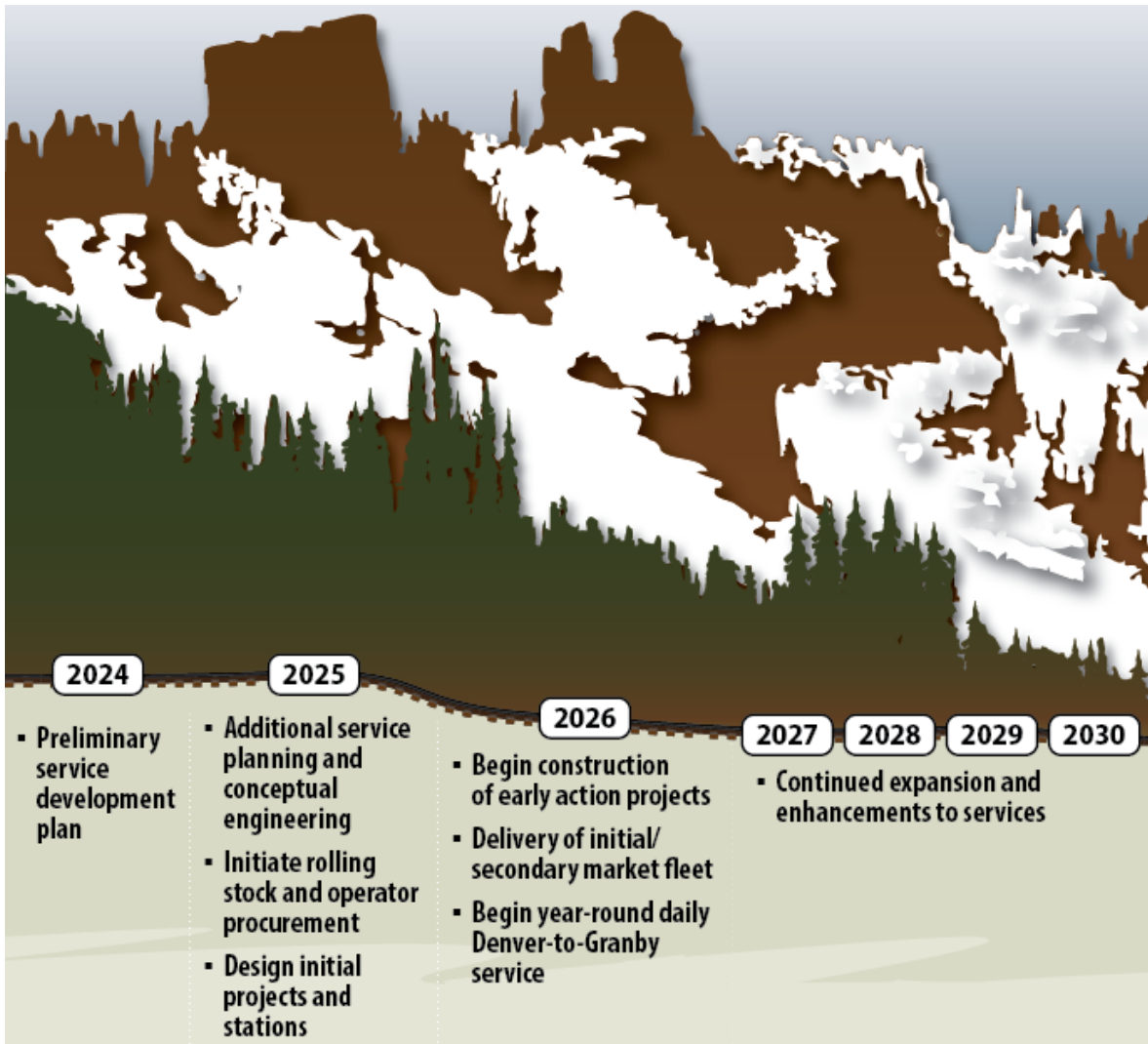


Figure 12: Conceptual Service Implementation Timeline

The CDOT team will also continue to engage with local, regional, and State leadership as the program progresses. Buy-in and collaboration with CDOT’s local partners is one of the keys to success for the program.

DRAFT PURPOSE AND NEED STATEMENT

The Preliminary Purpose and Need (P&N) Statement serves as the foundation for the SDP and the future analysis and planning of a comprehensive plan for passenger rail in the central and northwest mountain communities of Colorado. In this service development planning process, routes, markets, service, and financial options are being assessed and considered with the goal of finding the best path toward the implementation of passenger rail. This P&N Statement also informs criteria, performance metrics, and other factors to support analytical steps for key corridor decisions such as Recommended Alternatives, configurations, and service levels. It also supplies a framework for engaging stakeholders on the scope, goals, needs, benefits, and overall design of the Mountain Rail system.

Project Purpose

The purpose of the Mountain Rail project is to establish a sustainable and efficient rail transportation system that enhances connectivity between Denver, Winter Park, Steamboat Springs, Craig, and points in between. This project will address these key objectives:

- Enhance regional connectivity with reduced congestion
- Induce economic development
- Advance environmental sustainability, including reducing emissions
- Provide multimodal choice and options to reduce congestion
- Leverage existing infrastructure

The project termini are Denver and Craig, Colorado. The selected mode of transportation for this project to evaluate and consider is conventional, standard gauge, intercity passenger rail.

By providing multimodal choice and options with a service that provides enhanced regional connectivity, a reduction in congestion and emissions will occur, both by providing an alternative method of travel to road (particularly in bad weather when crashes can cause substantial congestion), and by providing capacity for travel in a means other than driving.

Project Need

The need for the Mountain Rail project is driven by several pressing issues and challenges, listed here:

- Improve connectivity

- Congestion on mountain highways
- Support economic vitality and our Just Transition communities
- Support statewide environmental sustainability goals, including emissions reduction
- Increase travel options

These needs will be assessed and addressed through the project development and implementation steps to achieve the purpose as stated above.

Market Analysis

Located in this corridor are the following tourist and recreational hotspots: Winter Park Resort, Steamboat Springs Resort, west Rocky Mountain National Park, Eldora Resort, the City of Steamboat Springs, the Town of Winter Park, and several other key travel destinations for visitors from across the State and country. These markets are linked to each other and the Front Range via often congested I-70 and U.S. 40.

Travel patterns across the study region can be grouped into two major focus areas. First, a recreation-based travel pattern, with residents of metro areas either in the Front Range or elsewhere traveling into the area, taking part in outdoor recreation and winter recreation, perhaps remaining overnight one or two nights, and returning to their primary homes after a vacation. The heaviest recreation-based traffic is expected to originate in the Denver Metropolitan Area, traveling between the Metro area and destinations in the Rockies. The second primary pattern is that of the Rocky Mountain residents and employees of the recreational businesses and other secondary market drivers. These follow typical commuter patterns - i.e., leaving residential areas daily in the mornings for their center of employment, and then returning that evening to their home. Typical commuters live outside of the community of employment, as high home prices and other costs of living often prevent service industry employees from living near their workplace. The heaviest commuter traffic is expected within the Yampa and Fraser Valleys.

The economy of the area is heavily dependent on tourism and travel. Analysis of tourism data from the Colorado Office of Economic Development and International Trade (OEDIT) provides additional insights into the tourism market across the corridor. In State House District 26, covering Routt, Moffat, Rio Blanco, and parts of Eagle County (the proposed rail route identifies stations in Routt and Moffat Counties), a robust tourism market exists, resulting in travel-related employment making up 15.8% of all jobs in the district (13,600 jobs). House District 13, covering Grand, Jackson, Lake, Park, Summit, and part of Chaffee County (the proposed rail route identifies stations in Grand County),

had robust tourism spending, contributing to 15,500 jobs, making up 23.5% of employment in the region.

The Yampa Valley (notably Craig) faces economic challenges due to the impending closure of the region’s coal mining and coal-fired power generation facilities in both Hayden and Craig. With these impending closures, Colorado has created an Office of Just Transition to ensure employees of both coal mines and coal-fired power generation facilities can transition to a more diversified and resilient employment base by attracting tourism, fostering trade, and supporting local businesses. Supporting a blossoming tourist and service sector can provide a significant means of enhancing the diversity of business in the area. Continued access to rail service enables the potential for future development and re-development of the region’s industrial and manufacturing sectors. Rail provides the most cost-efficient and sustainable means to move most goods with lower emissions, congestion and safety risks, particularly large or bulk items and commodities. Enabling this transportation mode for businesses can foster growth, development, and employment in the area.



Figure 13: Downtown Steamboat Springs and Craig Subdivision

STAKEHOLDER COORDINATION

To reflect the diverse engagement needs of various stakeholders, coordination was separated into four separate plans: The Railroad Stakeholder Engagement Plan (“RSEP”), the Agency Engagement Plan (“AEP”), the Local Stakeholder Engagement Plan (“LSEP”), and the Public Engagement Plan (“PEP”). These four plans were consolidated into a single Stakeholder and Public Engagement Process to guide stakeholder coordination during the development of the SDP.

Railroad Stakeholder Engagement

The primary railroad stakeholder for this project is Union Pacific Railroad (“UPRR”) as they own, operate, dispatch, and maintain the subdivisions for the entire length of this project and the proposed passenger rail service between Denver and Craig.

As mentioned above, UPRR and the State have agreed upon a framework for providing passenger rail access on the Mountain Rail corridor. Meetings are currently underway with UPRR to workshop the technical requirements and issues of the Mountain Rail service. Meetings will also be conducted in the near future with other stakeholders as the project develops.

Agency Coordination

The Agency Engagement Plan (“AEP”) details the methods for coordination and engagement with agencies (Federal, State, and Regional) and local stakeholders (local and special interest groups) and operates in consultation with the Public Engagement Plan for the Mountain Rail project. It was developed in advance of the study to provide clarity and transparency, promote inclusivity, and build consensus. It is intended to be executed over the life of the study and potentially beyond it.

AGENCY ENGAGEMENT

The purpose of the Agency Engagement Plan is to provide a framework to facilitate information sharing between various public sector agencies in the corridor and the CDOT team. Through this coordination, CDOT will provide all relevant agencies with project updates and outcomes from local stakeholder engagement and public coordination activities.

The Agency Stakeholder group is composed of representative key agencies located in and/or operating in Colorado and represent experts in their respective disciplines. Agencies engaged include:

- Federal Railroad Administration - FRA (Federal)

- Federal Highway Administration - FHWA (Federal)
- Federal Transit Administration - FTA (Federal)
- Department of Local Affairs - DOLA (State)
- Colorado Department of Public Health and Environment - CDPHE (State)
- Denver Regional Council of Governments - DRCOG (Regional)
- Northwest Transportation Planning Region - TPR (Regional)

At the conclusion of the project, agencies at all levels will be engaged and provided with an update of the status of the project and any relevant key findings that emerged over the course of the project. The goal of agency coordination is to provide the highest level of customer service to the future users and stakeholders of the rail service through sharing knowledge across the entire spectrum of Federal, State, and Regional partners. The purpose of these meetings was to provide an overview of stakeholder outreach and study findings.

Note that no decisions have been made regarding whether to seek federal grants, loans or other elements that will require FRA or FTA approvals. CDOT will consider the benefits and costs of doing so as part of the financial analysis and implementation of this project.

LOCAL STAKEHOLDER ENGAGEMENT

The local stakeholder engagement process provided numerous opportunities for feedback and participation from individuals and organizations throughout the corridor. Stakeholder engagement activities sought to:

- Provide an opportunity for public participants to engage in the service planning process and give relevant input to the project
- Focus public input in a structured manner to allow decisions to be informed from public involvement
- Ensure elected officials, agencies, partners, and the public were informed about the project and its implications for their communities to address potential concerns
- Receive feedback from people representing a varied range of perspectives in the corridor

The timeline for stakeholder engagement thus far has spanned from July to December 2024. Table 1 offers a detailed view of the engagement activities across all key stakeholder groups. Public and stakeholder engagement will continue into 2025 as final Service Development Planning documents are completed and localized station area planning efforts begin.

Table 1: Timeline of Local Stakeholder Engagement

Timeframe	Engagement Activity
August 2024	<ul style="list-style-type: none"> ● Meeting with Mountain Rail Coalition (“MRC”) Co-Chairs to discuss coordination ● Mailed Post Card Invites for Public Open House #1
September 2024	<ul style="list-style-type: none"> ● Elected Official Briefings ● LIG and SIG outreach ● Open House Round #1 - Craig, Granby, Arvada ● Surveys available via email distribution list, open houses, mailed post cards, & website
October 2024	<ul style="list-style-type: none"> ● MRC Meeting attendance to provide updates regarding outreach ● Elected Official Briefings ● LIG and SIG briefings and continued outreach ● Mailed Post Card Invites for Public Open House ● Open House Round #2 - Hayden, Fraser, Arvada ● Surveys available via email distribution list, open houses, mailed post cards, & website
November 2024	<ul style="list-style-type: none"> ● MRC Meeting attendance to provide updates on outreach and project ● LIG and SIG Briefing ● Mailed Post Card Invites for Public Open House
December 2024	<ul style="list-style-type: none"> ● MRC Meeting attendance to provide updates regarding outreach ● Open House Round #3 - Steamboat Springs, Winter Park, Arvada ● Comment cards & comments via website

Elected Officials and Local Governments

Local elected officials and other local government representatives were engaged as key stakeholders. This engagement focused on local government officials and staff including County Commissioners, Mayors, and City Councils along the corridor. As representatives of their constituents, elected officials and local government staff shared important insights from their communities and assisted in informing their communities about the project. As such, the DTR team provided information for newsletters, announcements, and places to direct community questions. Over the course of the study, there were several meetings with elected officials including virtual and in-person. In general, there were two types of meetings.

- *High Touch Information Sharing & Gathering:* The Division of Transit and Rail (“DTR”) presented information about the project and highlighted engagement opportunities for the public and stakeholders. Elected officials were asked to provide specific information regarding their community.
- *Project Progress:* Elected officials received updates from the DTR team regarding study progress and feedback from the local government stakeholders was sought.

Local elected official briefings were conducted with officials from the following jurisdictions:

- Arvada
- Steamboat Springs
- Craig
- Hayden
- Kremmling
- Denver
- Fraser
- Winter Park
- Granby
- Yampa
- Jefferson County
- Routt County
- Gilpin County
- Grand County
- Eagle County
- Moffat County

Local Interest Groups and Statewide NGO Groups

Identifying local interest groups (“LIG”) and statewide nongovernmental groups (“SIG”) involved mapping entities potentially interested in the project. Using criteria such as interest and potential impact, the team identified several stakeholders. LIGs were defined as organizations with an interest in the project due to their local, geographic locations. SIGs were identified as those with specific issues and interests relative to the project. Both SIGs and LIGs were then engaged in fall/winter 2024.

In September, communications were sent to LIGs and SIGs inviting them to the public Open Houses in October, as well as an invitation to attend specific issue briefings on economic development, tourism, and environmental/transit. The briefings provided

project information centered on potential benefits as well as constraints and allowed for discussions around each issue topic.

In October, LIGs and SIGs were invited to the November and December Open Houses as well as a virtual specific issue briefing in November. The November virtual meeting was designed to ensure SIGs and LIGs had the same information before the December Open Houses.

The tables below are a list of LIGs and SIGs that were engaged as part of the project.

Table 2: List of Local Interest Groups

Local Interest Groups	
Steamboat Chamber of Commerce	Craig Chamber of Commerce
Jefferson County EDC	Visit Grand
Routt County EDC	Visit Moffat
Yampa Valley Sustainability	Colorado Ski Country
Eldora Ski Resort	Alterra Mountain Company
Mountain Rail Coalition	Winter Park Resort

Table 3: Statewide NGO Groups

Subject Matter Interest Groups	Issue Area
National Resource Defense Fund	Environmental
Colorado Sierra Club	Environmental
Conservation Colorado	Environmental
Green Latinos	Environmental Justice
SWEEP	Transit and Environmental
Colorado Public Interest Group (“CoPIRG”)	Consumer Safety, Environmental, Transit

Identification of Stakeholders

Key stakeholders include civic and business groups, public officials, relevant interest groups, potential riders, service providers, and communities with environmental justice concerns. The process for identifying stakeholders involved mapping all entities potentially impacted by the project and using criteria such as influence, interest, and potential impact to prioritize engagement efforts.

Stakeholder identification has been conducted through various resources that include:

- National reporting sources such as U.S. Census Bureau Data, American Community Survey Data, and GIS shapefiles.

- Local reporting sources such as school systems and local agencies (e.g. Metropolitan Planning Organizations (MPO) to collect additional data demographic information.
- Local resources such as religious organizations, specialty businesses, and public events to identify populations not accurately represented in available data.

Developing community profiles for the corridor and identifying appropriate tactics for meaningful public participation has been important to determine involvement needs and crucial for reaching underserved populations. These profiles provide detailed insights into the demographics, socioeconomic conditions, and specific needs of various community groups. This ensures that the engagement process was inclusive and equitable by allowing the CDOT team to tailor outreach strategies, address and minimize barriers to participation, and ensure that the voices of all community members, particularly those who are often marginalized, are heard and considered in the planning process. This approach fostered a more comprehensive and just development of the rail project, ultimately leading to better outcomes for the entire community.

ENVIRONMENTAL JUSTICE (“EJ”) AND EQUITY

Based on the Environmental Protection Agency’s (EPA) EJ Screen Tool data and the Justice 40 Rail Explorer Tool for Limited English Proficiency (LEP), the team has determined underserved populations are identified within the corridor. Proactive efforts were coordinated with CDOT to ensure meaningful opportunities for public participation, including activities to increase engagement from low-income, minority, multigenerational, and unemployed populations. These public participation efforts reflected language trends in the corridor and accommodated LEP populations. Understanding access to transportation has been crucial to analyze the need for improving regional connectivity along the corridor, especially depending on the need to travel for work and other necessities. The information gathered allowed the CDOT team to conduct focused outreach efforts, disseminating specific materials for these groups to increase awareness and solicit input for future engagement.

In areas where it was determined that underrepresented populations are present, and EJ and LEP applies to the corridor, the CDOT team has employed the following tactics to encourage participation and remove identified barriers to increase participation:

- Outreach materials are translated into relevant languages.
- Interpreters are available at public meetings to facilitate understanding and participation.

- Public meetings are scheduled at convenient times, including evenings.
- Information on employment opportunities and other economic advantages related to the project will be provided.
- Engagement activities will include family-friendly event spaces.
- Outreach events at schools and community centers will be scheduled to involve younger and older generations alike.
- Where possible, hold public meetings near transit.
- Utilize in-person outreach efforts, mailers, and community partnerships if broadband access is limited.

PUBLIC (OPEN HOUSE AND VIRTUAL) MEETINGS

The DTR team held three rounds of public open house meetings during 2024. The meetings were held in alternating towns in each of the three major regions that make up the corridor - the Yampa Valley, the Fraser Valley, and the Denver metro region.

These meetings have been conducted by the DTR team at sites that are Americans with Disabilities Act (“ADA”)-accessible and centrally geographically located in each region. Each round of public meetings thus far has focused on presenting updates on the project’s progress, gathering specific feedback, and addressing community concerns. A virtual pre-recorded presentation is also made available to the public on the project website as a part of each round of public meetings.

The overall strategy for run-of-show of each round of public meetings is detailed below:

Public Open House Meetings Round 1 – Topics and Results

The first round of open houses were held September 10-12, 2024, in Craig, Granby, and Arvada.

Topics covered in this round included:

- Project Benefits:
 - Potential economic benefits for the communities.
 - Environmental advantages of increased rail use.
 - Improvement in accessibility and increased transportation options.
 - Project Purpose and Need
- Touch on Constraints:
 - Technical and logistical challenges of adding new rail stations, including screening criteria for locating stations.
 - Potential impacts on existing rail services and schedules.
 - Financial considerations.
- Gather Input:

- Solicit feedback on how community members might use the new service.
- Understand local transportation needs and preferences.
- Collect suggestions and concerns from residents and stakeholders.
- Collect input on the proposed station location screening process.
- Foster Community Engagement:
 - Build awareness and support for the project.
 - Encourage ongoing participation in the planning process.
 - Provide a platform for open dialogue and information sharing.
- Next Steps:
 - Outline the timeline and future phases of the project.
 - Inform attendees about opportunities for continued involvement and feedback.

The following survey results summarize community input gathered during Open House Round 1. The surveys aimed to understand resident preferences, concerns, and priorities for the proposed rail system, focusing on the process to select stations, onboard features, and the project's broader impact. Feedback was collected via CDOT's Mountain Rail Project website and paper surveys conducted at the meetings.

- **Enhancing Regional Connectivity** - Residents highly value the proposed rail service as a transit option to connect them to larger cities like Denver, recreational destinations, medical appointments, and airports. Avoiding and reducing congested roadways, especially during inclement weather, was a major driver of support.
- **Service Reliability and Frequency** - The reliability and on-time performance of trains and frequent scheduling were critical concerns for commuters and day travelers. More than one round trip throughout the day was deemed essential for work commutes and recreational use.
- **Affordability and Accessibility** - The affordability of tickets is crucial to encourage ridership. There were calls for discounts for students and senior citizens, along with concerns about ensuring that the service remains competitive with the cost of driving.
- **Station Features and Connectivity** - Key station priorities include clean facilities, safe and comfortable waiting areas, clear signage, and integration with other transit options such as buses. Connectivity between rail stations and final destinations is seen as vital; connectivity to a station site without needing to drive was also identified through public comments
- **Environmental and Community Impact** - Concerns were raised about environmental effects, including wildlife hazards, emissions reduction, fire

safety, and maintenance challenges from natural elements like snow and rockslides. Community-specific issues, such as noise and housing impacts near the corridor, also emerged as topics of concern.

Public Open House Meetings Round 2 – Topics and Results

The second round of open houses were held October 28-30, 2024, in the towns/city of Hayden, Fraser, and Arvada.

Topics covered in this round include:

- Community Feedback Summary:
 - Summary of feedback received from surveys, meeting comments from stakeholders and groups
 - Address concerns and suggestions
 - How community input has influenced the refinement of alternatives.
 - Specific changes made based on community feedback.
 - Discussion on how ongoing concerns will be addressed in future phases.
- Discuss Benefits and Constraints:
 - Revisiting economic, environmental, and accessibility benefits in the context of the alternatives under consideration.
 - More detailed look at technical, logistical, and financial constraints for alternatives under consideration.
- Alternatives Analysis and System Planning:
 - Outline the timeline for finalizing alternatives.
 - Present proposed stations for cities along the route.
 - Present Service Option patterns under consideration.
- Next Steps:
 - Information on upcoming meetings and opportunities for further input.
 - Encouraging continued participation and engagement from the community.

The following survey results summarize community input gathered during Open House Round 2. The surveys aimed to understand resident preferences, concerns, and priorities for the proposed rail system, focusing on general station locations and amenities, onboard features, and the project's broader impact. Feedback was collected via the CDOT Mountain Rail Project website and paper surveys conducted at the meetings.

- **Sustainable and Efficient Transit** - Residents appreciated the proposed rail service as a sustainable transportation option, emphasizing its potential to reduce traffic congestion, reduce emissions, and provide efficient connections to ski destinations, airports, and cities for recreation and work commutes.
- **Station Amenities and Integration** - Important station features included restrooms, real-time transit and rail information, parking, seating, shelter areas, and enhanced security measures such as cameras and lighting. Integration with other transit options like buses and sidewalks was also highlighted as essential.
- **Onboard Amenities and Accessibility** - Desired onboard features included restrooms, Wi-Fi, snow sports and bike transportation options, light refreshments, and seating configurations for families and groups. Accessibility features like wheelchair storage and level boarding were noted as priorities.
- **Traffic and Infrastructure Concerns** - A major concern identified in Arvada was the existing traffic congestion, particularly on Indiana Street and Highway 93. Residents stressed their desire for infrastructure improvements, such as widening Indiana Street, before station construction.
- **Community and Environmental Impact** - Some respondents were wary of housing development near stations and raised issues related to crime, pollution, and wildlife disruption, particularly in Arvada.

Public Open House Meetings Round 3

As of the preparation of this status report, this round of meetings were held December 9-11, 2024, in the cities of Steamboat Springs, Winter Park, and Arvada.

The topics for discussion in this round of public meetings were:

- **Community Feedback Summary:**
 - Summary of key feedback and concerns received from the community.
 - Explanation of how community input shaped the alternatives.
 - Specific changes and adjustments made in response to feedback.
- **Proposed Alternatives:**
 - Present final Level 3 Service Options under consideration.
 - Present proposed Mountain Rail station locations, including platform sites to be included in the Service Development Plan (“SDP”).
 - Present draft phasing for sequencing delivery of the project.
 - Present proposed fare structure concepts.

- Present proposed rolling stock and propulsion technologies under consideration.
- Inform the Public on Next Steps:
 - Next steps in the project development phase (preliminary engineering and environmental analysis).
 - Next steps for rolling stock and operations contractor procurement.

After the meeting, comprehensive open house meeting summary reports have been developed. These reports include a detailed account of the meeting's proceedings, including attendee demographics, key points raised, questions asked, and responses provided. It also documents any action items, follow-up tasks, and feedback received from participants. The timely submission of this report allowed CDOT to stay informed of public sentiment, concerns, and suggestions, and to take any necessary actions or adjustments based on the feedback received.

The open house meeting summaries are completed within 15 days after the meeting date. This timely completion allows CDOT to stay informed of public sentiment, concerns, and suggestions, and to take any necessary actions or adjustments based on the feedback received.

COMMUNICATIONS TOOLKIT

The CDOT team has utilized a variety of communication tools to promote the open house meetings and input opportunities, including a dedicated project webpage, social media updates, email newsletters, and post cards. These tools aim to support and increase the public's understanding of the project, enabling stakeholders to engage effectively and provide valuable input. Both PowerPoint presentations and informational display boards (exhibit boards) were utilized at in-person meetings to convey complex, technical information with easily understood language and graphics. Following each public open house, presentation materials were also uploaded to the CDOT Mountain Rail Project website.



Figure 14: Tracks at Volcano Siding, between Bond and Toponas, CO

ALTERNATIVES ANALYSIS

The goal of the Alternatives Analysis process is to identify preliminary alternatives for the proposed infrastructure investments coupled with service plans that satisfy the preliminary P&N statement. The Alternatives Analysis is completed concurrently with and supported by analytical outputs from the System Planning effort (technical analyses necessary to determine the characteristics of the proposed rail service such as Operations Analysis, Ridership Forecasting, Revenue Evaluation Analysis, Conceptual Engineering, Capital Cost Estimation, and Operations and Maintenance Cost Estimation) and Environmental Planning. After completion of the SDP, Final Recommended Alternative may be evaluated further in a subsequent NEPA process.

The Alternatives Analysis consists of four tasks:

1. Route Options Analysis
2. Service Options Analysis
3. Investment Package Options Analysis
4. Design Options Analysis

Taken together, the Route, Service, Investment Package Options, and corresponding Design Options Analyses carried forward will define the preliminary alternatives for the proposed infrastructure investments that will ultimately comprise the Corridor Project Inventory and will inform the phasing and implementation planning for the project.

Route Options Analysis

An engineering and planning evaluation of railroad and other potential rights of way was performed by the DTR team, focusing on providing meaningful and effective passenger rail services that meet the P&N of the project as described earlier in this document. The CDOT team evaluated routes with existing passenger rail, routes with freight trains only, former railroad rights of way, dormant railroads, and other potential rights of way that had been evaluated by other studies. Factors considered included current rail traffic, track and signal system conditions, geometry (horizontal curvature and vertical grades), relative cost to operate, feasibility, as well as access to the target markets of the corridor.

The UPRR Moffat Tunnel, Craig, and Glenwood Springs subdivisions all warrant study and evaluation for potential passenger train operations to serve both regional travel and tourist markets. Feedback from stakeholders has recommended the prioritization of the route between Craig, Steamboat Springs, and Denver, and this direction and prioritization has been echoed by leadership within the State of Colorado. Therefore,

this study selects and prioritizes the route between Denver and Craig, via Winter Park, Steamboat Springs, and other points in between, via the UPRR Moffat Tunnel and Craig Subdivisions, as the route for passenger rail implementation for this study.



Figure 15: Map of Recommended Route

This corridor spans approximately 230 miles of main track including the Moffat Tunnel and key scenic features such as Gore and Byers Canyons on the Colorado River, the Flatirons near Boulder and Arvada, views of the Park Range, Front Range, scenic canyons and valleys between Bond and Steamboat Springs, and the forested mountains of the Front Range.

Service Options Analysis

Following the determination of a recommended route, the DTR team performed an analysis of the different potential options for passenger train operations on the corridor. The options were then evaluated in a three-step process, first to confirm that they meet the P&N, next to examine each’s potential for success using professional judgement against a set of qualitative factors, and last to evaluate against performance criteria. With each evaluation level, some options were removed from consideration while others were advanced, with the goal of proceeding with one option after the third level.

In developing Service Options, the primary objective was to develop a reasonable set of available options for delivering passenger service that follows the Recommended Route from the Route Options Analysis. The key variables for service are geographic extent (endpoints), frequency of trips, and how services of different length or function are combined (for example, a local or regional overlay with an interregional overlay). The CDOT team examined each plausible permutation of those Service Options to define unique and distinct service plans to be evaluated in the Service Options Analysis.

Each Service Option represents a final buildout of passenger rail service; incremental expansion to reach the proposed state (as will be detailed in the Phased Implementation Plan, described earlier in this report) should be expected but what is proposed as an “Option” is an end state.

Service Options grow in detail and definition at each analytical level. At Level 1 and Level 2, Service Options are defined using end points, frequency of trips, target customers, station stops, a rough scheduling goal, and details on if and how plans overlap within that Service Option. For options that pass to Level 3, a more detailed analysis and definition will be performed, including the production of a detailed train schedule, discussion of fleet and rolling stock utilization, and other key parameters to be filled in as they are determined.

A complete evaluation and description of the service options assessed will be published as a part of the final Service Development Plan, and will include the detailed options assessed, scoring criteria, scoring for each option, and narrative discussion of the advantages and drawbacks of each service option. This *Service Options Analysis* is a key part of the overall Alternatives Analysis portfolio of documents, that is foundational to the Service Development Plan.

INITIAL EVALUATION AND SCREENING PROCESS

Level 1

There were thirteen distinct Service Options presented for the Level 1 Service Options Evaluation. These range from a daily version of the existing Winter Park Express (“Ski Train”), to multiple overlapping service patterns targeting each market individually.

At this screening level, conceptual Service Options were screened against the P&N statement for a general level of feasibility and suitability. Options that did not meet all of the P&N statement elements were eliminated.

Three options were eliminated at the Level One stage, as they failed to meet purpose and need as they did not reach target markets by not extending for the entire corridor.

Level 2

After the Level 1 Service Options Evaluation, nine Options were advanced to the Level 2 Evaluation.

Service Options were then evaluated and scored against the defined Level 2 screening criteria (shown below). Options were scored on a 0-5 scale, with 5 being best possible, 1 being least good while still meeting the P&N, and 0 indicating the Option did not meet the requirements of a given criterion.

The top performing options were advanced to the final screening level. These are described below.

Options for Detailed Evaluation

The top three service options were advanced to a detailed quantitative screening Level 3, leveraging promising ideas or good concepts from others as needed. Each option focused on emphasizing different market opportunities on the corridor, while remaining within the constraints of the corridor. Each was optimized within those objectives and constraints to deliver the maximum ridership possible at the lowest potential operating cost.

The three final options for detailed evaluation are titled Option A, Option B, and Option C.

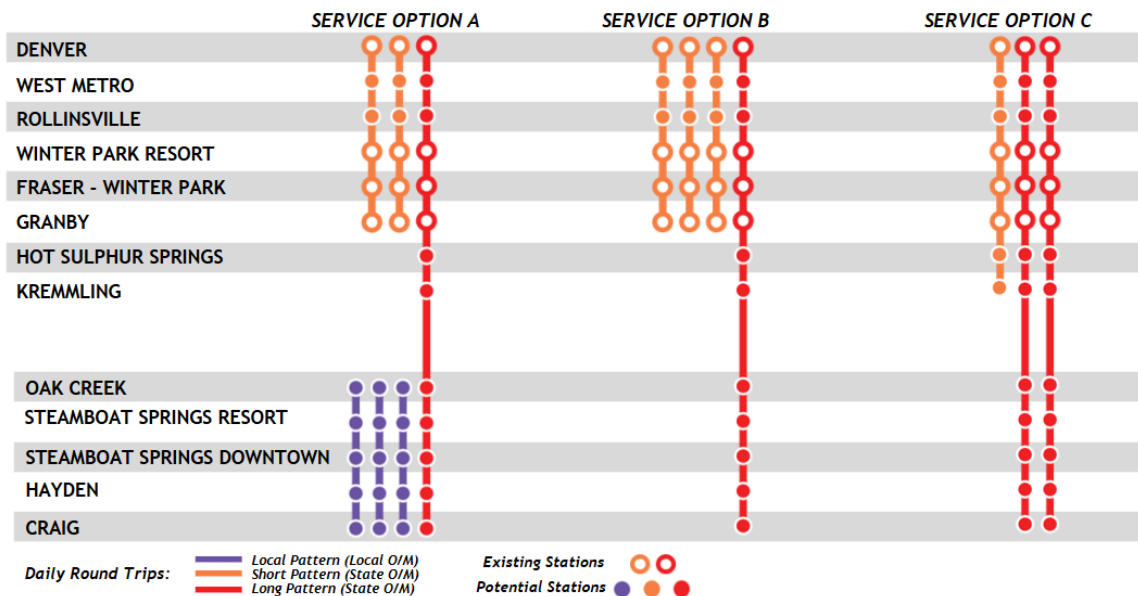


Figure 16: Schematic "Subway" Diagrams of Final Service Options

Option A:

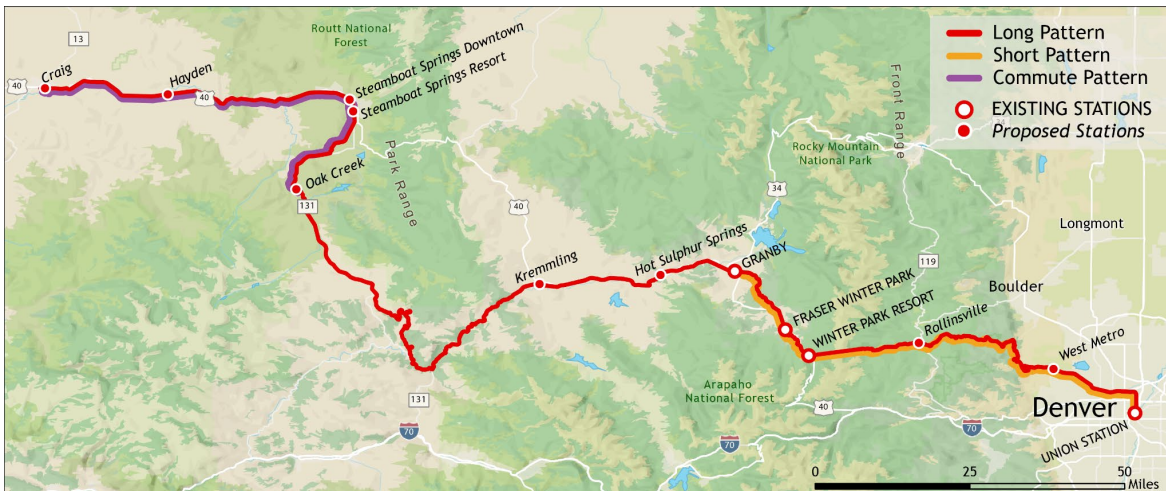


Figure 17: Service Option A

Service Option A is focused on providing interregional service, with additional service emphasizing the Fraser Valley, and a local service overlay in the greater Steamboat Springs area/Yampa Valley. The difference from Option 9 is that Option A extends the short pattern from Winter Park to Granby and extends the Local pattern from Steamboat Springs to Oak Creek. Proposed service includes two daily roundtrips between Denver and Granby, one daily roundtrip between Denver and Craig, and three daily roundtrips between Oak Creek and Craig. Figure 17 shows a map of the proposed service for Option A.

Although Level 3 screening and evaluation are in progress, this service option is a strong contender in the technical analysis done to date. It appears to best match the defined market and satisfy demand efficiently throughout the entire corridor. As noted above, and applicable to all options, the Local Pattern service will depend on local participation for operations and maintenance costs.

Option B:

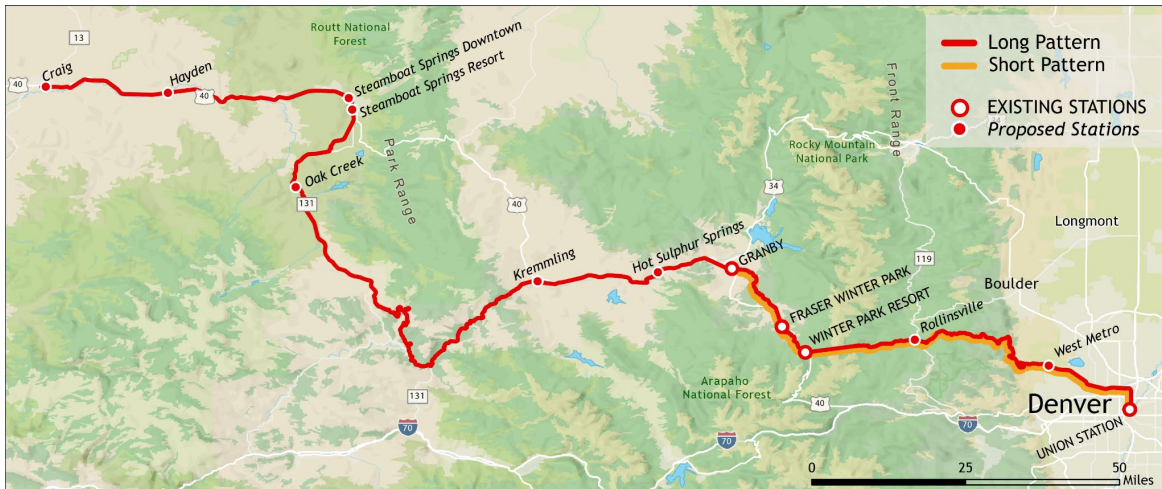


Figure 18: Service Option B

Service Option B is focused on providing interregional service, with additional service emphasizing the Fraser Valley. Service between Denver and Winter Park is increased from one daily roundtrip to three daily roundtrips, which makes the total amount of service more regionally balanced than Option A. Proposed service also includes one daily roundtrip between Denver and Craig. Figure 18 shows a map of the service proposed in Option B.

Option C:

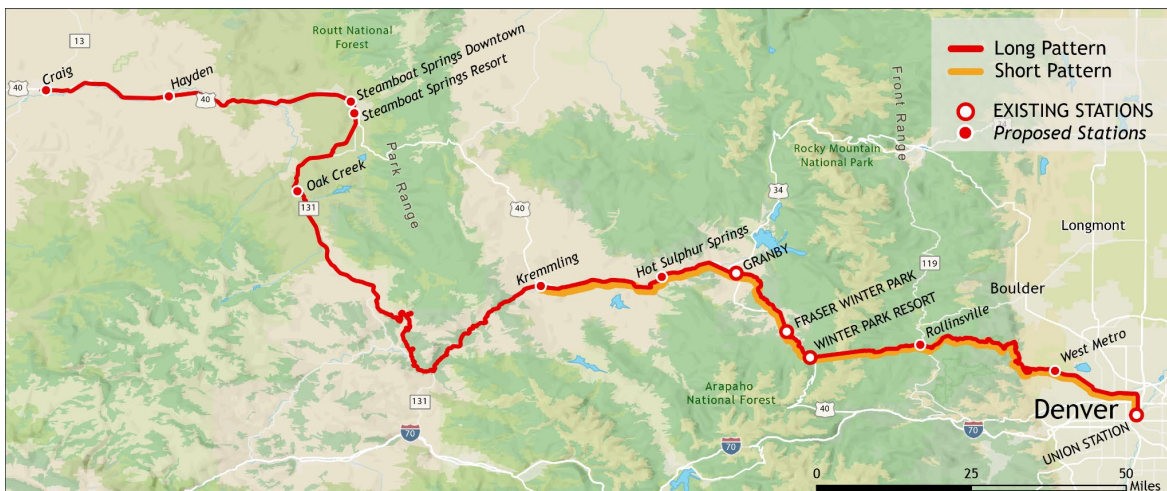


Figure 19: Service Option C

Service Option C provides two daily roundtrips between Denver and Craig. The Short Pattern has a western terminus at Kremmling instead of Granby. The overall amount of service is similar to Options A and B. This option is the only with more than one trip

over the entire corridor in each direction to allow for more options for passengers. Proposed service includes one daily roundtrip between Denver and Kremmling and two daily roundtrips between Denver and Craig. Figure 19 shows a map of the service proposed in Option C.

Evaluation and Results

Detailed evaluation of these three service options remains ongoing, as the DTR team assesses their performance on a quantitative basis for factors such as ridership, fleet utilization, travel times, performance, and other considerations combined with a qualitative assessment of detailed operational feasibility informed by consultation with UPRR.

Service Parameters

In addition to the screening process as outlined above, several other foundational service parameters were evaluated at this stage of planning. While key to understanding the characteristics of service as planned and implemented, none of these differentiate individual Service Options from one another, and therefore are discussed in this section, independent of the balance of the screening process.

FARE STRUCTURE

A distance-based fare system is proposed for the Mountain Rail corridor, which computes fare based on the distance between the origin and destination stations, using a fixed rate per mile (with some variations possible). This can be further modified to “round” station-to-station fares with more user-friendly amounts (e.g., \$20 from station X to station Y), although with credit card-based transactions and a majority of tickets purchased digitally, this is less essential in modern implementation. Fares are calculated at the time of ticket purchase, and passengers in this fare system are limited to only the trip they purchased (they cannot go further without upgrading the ticket). This model is the typical one used in many passenger rail services.

Figure 20 shows the average per-mile fare for comparable state-supported regional and intercity rail services across the nation, including the Capitol Corridor, Keystone Service, and others. The Bustang intrastate bus system uses \$0.17/mile as a base fare for its over-the-road coach service.

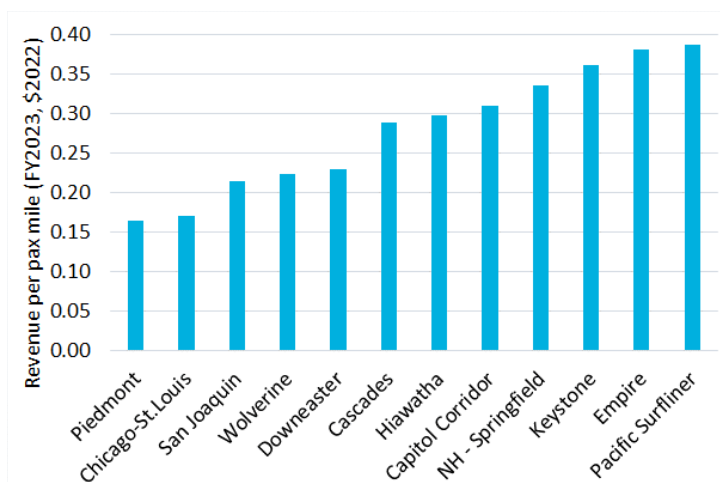


Figure 20: Example Amtrak Regional Service Per-Mile Fares

Further detailed fare analysis includes potential variable fare structures (such as promotional discounts in slower seasons), as well as additional discount programs, passes, multi-ride ticketing, and other alternative and innovative ticketing options. Further consideration includes integration with statewide and other regional ticketing platforms and similar programs as they are stood up. Additional opportunities include package sales of inclusive travel packages (such as bundling resort tickets and train tickets), multi-mode or ‘codeshare’ tickets in partnership with airlines or bus lines, and other innovative concepts.

State policy is to set fares to maximize ridership, equity, congestion reduction and emissions reduction, while also supporting costs of providing the service. This is reflected in existing State support for the 2024-25 Winter Park Express service, which achieved a roughly 46% reduction in fares for the seasonal service, reducing highway congestion, reducing costs for families, and expanding options for travelers. Specific fares will be evaluated during implementation of the project.

ROLLING STOCK

For analytical purposes, the fleet considered is the same as the existing Winter Park Express, consisting of two General Electric P42 GENESIS diesel locomotives with six Superliner cars. The Siemens Venture trainset, consisting of a Siemens SC-44 Charger or ALC-42 locomotive hauling five passenger coaches, with the final coach equipped as a cab car, is a viable option for initial service, as is a multiple-unit solution, i.e., the Stadler KISS trainset, with a preference for lowest emissions possible in this challenging terrain with available technology that meets FRA and UPRR safety requirements. Implementation planning will consider the evaluation of a second-hand fleet of

locomotives and coaches that meet general reliability and corridor constraints to allow operations to begin in the interim before new trains are delivered.

Alternative forms of propulsion are expected for future operations of the project, including battery-electric and hydrogen fuel cells (with appropriate safety measures).

SIGNALING AND TRAIN CONTROL

The Moffat Tunnel Subdivision from Denver to Bond (MP 128.8) operates using Centralized Traffic Control with a Positive Train Control overlay (CTC+PTC), and given present passenger operations, little change or modification to the signal system will be required for the services as proposed in this analysis. CTC is a train control system wherein signals and switches are remotely controlled by a train dispatcher or console operator, and signals convey authority to move. PTC is an overlay system to existing train control systems such as CTC and is designed to prevent train-to-train collisions, over-speed derailments, incursions into established work zones, and movements of trains through switches left in the wrong position.

From Bond to Craig, the route is only under CTC, with no PTC overlay. Federal regulations (49 CFR 236.1019(c)) provide an exception for operations to take place without a PTC system, provided that four or less regularly scheduled passenger trains operate in a day and annual tonnage of the subdivision remains below 15 million gross tons. However, the exception process is not routine or well-favored by FRA, and planning assumptions are that every Service Option will require PTC.

In the area of the Phippsburg Yard (MP 166.61 to 169.40), track is signalized but is not under Centralized Traffic Control. Operations in this territory happen under Yard Limits rules (trains limited to restricted speed, not to exceed 20 MPH and able to stop within half the range of vision). This could create a significant operational impact on train speeds for passenger operations contemplated through the area, and is being considered for remediation as part of the Mountain Rail project.

Additionally, similar Yard Limits restrictions exist in Craig. Beginning at CPDS230/Evans (MP 230.15), the CTC system ends, with all tracks after that under Yard Limits or track warrant control. The probable station location in Craig is beyond this end of CTC, so an upgrade and signalization of a main track and station track(s) in Craig will be needed for that track segment.

While for operations east of Bond, no major changes to the signal system are expected, some minor modifications may be considered in the area of Winter Park Resort Station to improve operations for trains stopped in block at the station, and the addition of any

new sidings or extensions of existing sidings is anticipated to include the installation of new signals and power-operated turnouts.

For operations west of Bond, it is expected that the signal system in place will need to be upgraded to support reliable passenger rail service, in addition to the extension of CTC signalization through the Yard Limits at Phippsburg and Craig.

Investment Package Options Analysis

For the Service Option(s) carried forward from the Service Options Analysis, Investment Packages will be developed and assessed. The Investment Packages include component investments, which are the individual infrastructure investments that together make up an Investment Package. The Investment Package Options Analysis also considers the potential phased implementation of those component investments.

The aim of this analysis is to support the development and comparison of alternatives with conceptual-level designs for the various investment packages under consideration, and also provide data for capital cost estimation.

At the present time, as a preferred service alternative has not been selected, this analysis will take place upon completion of the Alternatives Analysis.

METHODOLOGY

Investment options for the final alternatives will be identified and outlined in the Investment Package Options Analysis. Each option will be supported by conceptual-level engineering. To conduct this analysis, the following information will be developed:

- Specific operational objectives and functional requirements of the component investment.
- The location of the component investment for track designs, a linear scale schematic showing track configurations, turnout sizes and type (power operated, hand thrown, etc.), proposed signal locations, distance between signals, limits of signalization, limits of curves with degree of curvature, and proposed speeds, including a comparison of existing and proposed designs.

Investment options carried forward for the Recommended Alternative will include the following information for each component:

- Physical feasibility of the design.
- Ability of the proposed design to fulfill the operational objectives and functional requirements of the specific component investment.

- General constructability of the design with consideration for construction phasing to maintain freight rail operations during construction.
- Adequacy of the design to support a future detailed site-specific environmental analysis of the component investment. This includes developing an environmental footprint required to construct and operate the proposed investment, and an evaluation of potential environmental permitting, clearances, or NEPA classes of action.
- Scaled drawings of the proposed designs.

Design Options Analysis

For each component investment included in the Investment Package Options carried forward for further analysis, Design Options will be developed and assessed for each.

The primary objective of this task is to develop and assess design options for the component investments identified in the Investment Package Options Analysis. The Design Options Analysis will identify which investments should be carried forward for further analysis and which will be screened out and dismissed based on a set of screening criteria detailed below.

METHODOLOGY

The Design Options Analysis will evaluate necessary infrastructure requirements and high-level environmental considerations along the recommended route for the identified investments, which will be detailed in the Design Options Analysis. Infrastructure improvements could include, but are not necessarily limited to:

- Upgrade, replace, and/or install new turnouts
- Tunnel clearance improvements
- Upgrade signal/train control system, including installation of PTC on the Craig Branch
- Construct new trackwork
- Upgrade existing track to support passenger rail service
- Curve remediation for higher speeds
- Upgrade, replace and/or construct new bridge and drainage structures
- Close, reconstruct, or expand at-grade crossing surfaces and warning devices

Each identified investment will be tabulated with an accompanying set of pros and cons to describe and compare the effectiveness of the Design Options for each component investment. Design Options and/or combinations of options will be evaluated by several criteria in a formal screening process, which will likely include elements such as cost,

environmental effects, constructability, and ability to provide the necessary operational improvement(s).



Figure 21: West Portal of the Moffat Tunnel

TRANSPORTATION PLANNING

Operational Requirements and Existing Conditions

This section summarizes the existing elements of the Mountain Rail corridor. The information presented is from desktop analysis, host railroad-provided track charts and timetables, and public databases.

The route is divided into three segments:

- Denver to Bond on the Moffat Tunnel Subdivision (which has existing passenger and freight service).
- Bond to Phippsburg on the Moffat Tunnel Subdivision (which has existing freight service).
- Phippsburg to Craig on the Craig Subdivision (which has existing freight service).

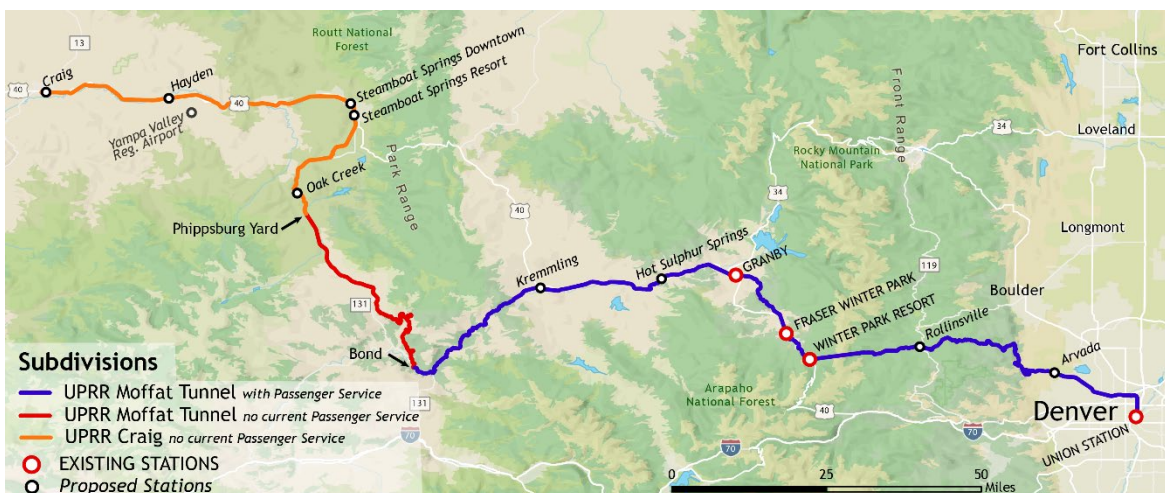


Figure 22: Map of UPRR Subdivisions in Mountain Rail Corridor

While the Denver to Bond segment is significantly longer than the other two, this is a natural division of the corridor because of the existing service and infrastructure configuration. The segment of the Moffat Tunnel Subdivision between Denver and Bond currently has the most rail traffic in the corridor and features existing passenger service with the daily Amtrak California Zephyr and the seasonal Winter Park Express. The Moffat Tunnel Subdivision between Bond and Phippsburg features only freight service with similar conditions to the rest of the Moffat Tunnel Subdivision. The Craig Subdivision between Phippsburg and Craig, similar to the Moffat Tunnel Subdivision between Bond and Phippsburg, has only freight service although with a different signal and train control system, and areas with different track authority methods.

Separate sections are provided here to discuss the RTD G Line and DUS. The Mountain Rail route follows the RTD B and G Line alignment north of DUS and there are opportunities for shared use with the G Line infrastructure and operations in Denver. DUS receives dedicated discussion and treatment due to the high degree of complexity in the access routes and operations of the facility.

MOFFAT TUNNEL SUBDIVISION: DENVER TO BOND

The distance between Denver and Bond is 128.8 miles and includes UPRR infrastructure and operations, plus BNSF Railway operations via trackage rights. The Denver to Bond segment is noteworthy for the 6.2-mile-long Moffat Tunnel, the top of the 40-mile steep climb out of Denver. This corridor is widely regarded as both some of the most scenic and challenging railroad in the United States, with winding complex curves on a climbing grade, overlooking valleys, rivers, the Great Plains, and mountain valleys and peaks.

The route west from Denver travels uphill until it reaches the apex of the Moffat Tunnel at MP 52.85 (about halfway through the tunnel, at the Continental Divide). The mainline run is single track with sidings and some yards and industrial spurs.

Geography, Property Ownership, Track Structure, and Geometry

Track at DUS, including approaches, is owned by RTD and operated by DTO. BNSF owns and operates the track between the DUS approach and Fox Junction to connect with the UPRR Moffat Tunnel Subdivision. All track on the rest of this segment is owned by UPRR.

UPRR right of way is made up of an average 200-foot-wide corridor (100 feet on each side of the track centerline), although variations exist within what is defined in track charts and what's shown on county valuation and property maps.

On the Moffat Tunnel Subdivision between Denver and Bond, there are 37 tunnels, which include Tunnels 1 through 42. Several tunnels have been “daylighted,” which means they were originally designed as tunnels when the mainline was first constructed in 1905-1907 but were later removed. The Moffat Tunnel, built about 20 years after the original construction of the mainline, is not numbered, and replaced Tunnels 31 through 33.

Moffat Tunnel

At the summit of the Moffat Tunnel Subdivision rests the Moffat Tunnel, the fourth-longest railroad tunnel in the United States at 32,797 feet (6.2 miles) and the highest active point on the UPRR system at 9,239 feet above sea level. The tunnel is single tracked with no passing sidings or other provisions within. The tunnel was constructed in 1922-1927, with the first train running in February of 1928. The tunnel was constructed

by the State of Colorado's Moffat Tunnel Improvement District (MTID) and remains the property of the State of Colorado, which leases the tunnel to UPRR. When completed, the tunnel eliminated 23 miles of looping and climbing track over Rollins Pass, reducing grade from 4% to 2% and reducing maximum elevation by 2440 feet.

The initial tunnel, located immediately south of the train tunnel and used for water since 1936, was constructed as a pilot bore, evaluating the geology to inform decisions about tunneling methods. This pilot tunnel was sold to Denver Water in 1996 and is still used today as a cross-divide water diversion tunnel to supply water to the Denver area from the Colorado River.

The tunnel is entirely tangent track, climbing on both sides to an apex at 9,239 feet above sea level, at the Continental Divide (and the Gilpin/Grand County line). From the east, the tunnel rises 86 feet over 4 miles, for a grade of 0.4%; from the west, the tunnel rises 136 feet over 2 miles, for a grade of 1.28%; although grade varies for some lengths within the tunnel.

Signals and Train Control System

The two types of train traffic control systems in service on this segment are CTC and PTC. The current main track authority is CTC in this segment between MP 0.5 and MP 128.8 (Bond). Signals correspond to blocks and include three colors (green, yellow, red in various combinations) to show track occupancy ahead or convey instructions about allowable train speed. PTC is in place between MP 0.8 and MP 128.8.

Existing Stations

Existing stations include:

- **Denver Union Station**, MP 0.0 (passenger only, Amtrak California Zephyr & Winter Park Express and RTD commuter rail service)
- **Winter Park Resort**, MP 56.65 (passenger only, Amtrak Winter Park Express)
- **Fraser-Winter Park**, MP 62.01 (passenger only, Amtrak California Zephyr)
- **Granby**, MP 75.7 (freight and passenger, Amtrak California Zephyr)
- **Kremmling**, MP 103.4 (freight only)

Surviving depots or stations are located in Denver (DUS) and Granby. DUS was renovated and reopened in 2014 to serve as a multimodal transportation center for the Denver region including local bus, light rail, intercity bus, commuter rail, and intercity rail. Granby has separate freight and passenger structures.

In communities where the original depot or station does not exist, newer structures have been built. Fraser-Winter Park has a newer open-air structure for passengers. Winter Park Resort has a newer, heated platform for passengers. Kremmling has a newer structure for freight operations, used principally as a base for the UPRR maintenance of way forces covering the area.

MOFFAT TUNNEL SUBDIVISION: BOND TO PHIPPSBURG

The distance between Bond and Phippsburg is 39.2 miles and is entirely owned by UPRR. The route west from Bond travels uphill until it reaches the crest just west of Toponas at MP 154. The mainline run is single track with sidings and some yards and industrial spurs.

Signals and Train Control System

The current main track authority is CTC in this segment between MP 128.8 and MP 166.6 (Bond). PTC is not present on this segment. Within the limits of Phippsburg Yard, Yard Limit operating rules are in place (i.e., no CTC) which restrict train speeds.

Existing Stations

This segment has no stations noted in the UPRR Employee Timetable, although there is a UPRR yard structure at Phippsburg which also serves as the crew change point for trains to and from Denver that originate or terminate there.

CRAIG SUBDIVISION: PHIPPSBURG TO CRAIG

The distance between Phippsburg and Craig is 63.7 miles, entirely under UPRR ownership. The route west from Phippsburg generally travels downhill. The mainline run is single track with sidings and industrial spurs.

Signals and Train Control System

The current main track authority is CTC in this segment between MP 168.0 and MP 230.1 (Evans). PTC is not in place between MP 168.0 and MP 230.1. Yard Limits rules are in place between MP 230.1 and MP 232.5 on what is known as the Craig Industrial Lead (i.e., no CTC). MP 232.5 is the historical end to the Craig Subdivision although the line was eventually extended to coal mines to the west of Craig. Track Warrant Control (TWC) is in effect on the line which continues on from MP 230.1 to the End of Track at Axial. TWC provides instructions to train dispatchers to authorize specific train movements, in this case in unsignalized territory. Additionally, CTC is in place on the branch from Adams to Energy.

Existing Stations

There are no existing stations in use for railroad purposes. The original Steamboat Springs depot still exists next to the mainline at 13th Street and is currently used as an

art center. The original Hayden depot is still next to the mainline and Pearl Street and is currently used as a heritage center.

DENVER UNION STATION

Denver Union Station (DUS) is a stub-end, multi-platform rail terminal station, used by Amtrak, RTD Commuter trains, Amtrak’s California Zephyr & Winter Park Express, and (potentially) the Rocky Mountaineer. DUS is located at the confluence of the BNSF Front Range, UPRR Moffat Tunnel, BNSF Pikes Peak, UPRR Greeley, BNSF Brush, and UPRR Colorado Springs Subdivisions. For all the lines mentioned above, except for the BNSF Brush Subdivision, DUS serves as the historical “milepost 0”.

Access to DUS utilizes BNSF and RTD infrastructure, such as with the current operations of the Amtrak California Zephyr and Winter Park Express. DTO is the contracted operator of RTD’s commuter rail A, B, and G Lines while RTD directly operates the commuter rail service on the N Line. DTO controls the authority for movement of trains in and around DUS.

Signals and Train Control System

DUS is dispatched by DTO, and CTC and Automatic Train Control (ATC, sometimes known as “cab signals”) track authority/train control is in use for station Tracks 1, 2, 3, 6, 7, and 8. Tracks 4 and 5 are equipped with only CTC. Amtrak trains are permitted to operate at Restricted Speed through the DUS complex, as they lack the ATC/cab signaling and PTC systems employed by DTO.

Operations

Amtrak uses a “wye” maneuver through the BNSF yards to ensure that the locomotives of their trains face outward (north) with each arrival. This type of maneuver is used to turn a train around using an arrangement of tracks shaped like the letter “Y”.

For this wye maneuver, westbound trains arrive via the Brush subdivision, work through the yard, and proceed over a series of hand-operated turnouts onto the BNSF Buck Main (Front Range Subdivision), to face northward. The train then backs down the Buck Main, through the Throat, and into DUS Track 4 or 5, all at Restricted Speed. Eastbound trains follow a similar sequence, with arrivals via the Buck Main which cross over the Platte through the 31st Street Yard via hand operated turnouts to face down the Brush Subdivision, and then shove backward down the Denver Passenger Main into the Throat and Track 4 or 5.

RTD G LINE

The G Line of the RTD Commuter System is a component of the RTD’s FasTracks commuter rail system construction program and consists of both the Northwest Electric Segment (NWES) and the G Line itself, running between DUS and Wheat Ridge.

This analysis only considers the portion potentially relevant to the Mountain Rail project, specifically the territory between the B/G Line route out of DUS and CP Ralston, MP 7.

Existing Stations

Six stations are present in the study area on the G Line. Five serve revenue/passenger boardings and alightings, with the “Employee Platform” at the Commuter Rail Maintenance Facility (CRMF) allowing RTD and DTO employees to use the B/G Line to access the facility. The stations are:

- **Denver Union Station** - MP 0.0
- **41st and Fox** - MP 1.51
- **Employee Platform** - MP 2.63
- **Pecos Junction Station** - MP 3.91
- **Clear Creek/Federal Station** - MP 4.8
- **60th and Sheridan/Arvada Gold Strike Station** - MP 6.39

All existing stations except DUS are built with high (50” ATOR) platforms, spaced 5’-6” from center of track. See the DUS section for details on that station.

Operations Analysis

The primary purpose of the Operations Analysis is to model and evaluate the three Service Options that are in Level 3 screening in the Service Options Analysis within the larger Alternatives Analysis task. In an iterative process, the results from this Operations Analysis will be used to help determine the final recommended Service Option in the Service Options Analysis.

The candidate Level 3 Service Options were modeled and evaluated using Viriato, a rail service planning, timetabling, and operations analysis software package. The Viriato model is used to calculate train performance, produce customer timetables, and determine infrastructure needed for successful passenger operations for each Service Option. Results derived from the operations analysis are then used to substantiate the final Service Options Analysis recommendation for a Recommended Alternative.

The Mountain Rail operations analysis process began by proposing and gaining internal consensus on key operational assumptions. These critical assumptions included speed

limits, train configurations and equipment, and existing and proposed infrastructure projects, among other operational parameters and constraints. The infrastructure model was constructed from existing UPRR and Denver RTD track charts for the Route Option beginning in Denver Union Station, utilizing the RTD B/G Line alignment to then connect to the UPRR Moffat Tunnel Subdivision and finally the UPRR Craig Subdivision. A summation of the operational assumptions is shown in the table below. Note that final operational parameters will be determined through negotiation with UPRR and RTD, procurement of trainsets and operational capacity, construction and other factors.

Table 4: Assumptions for Operations Analysis

PARAMETER	ASSUMPTION
TRAIN CONSIST	All train sets are assumed to consist of two P42 locomotives and six Superliner Bi-level passenger cars (matching current operations on the Winter Park Express service)
RUN TIME RECOVERY	10% buffer is applied to all calculated train run times to provide and operating margin for contingencies
STATION DWELL TIMES	Dwells are customized to each station based on anticipated passenger loading/unloading requirements <ul style="list-style-type: none"> ▪ 15 Min: Winter Park Resort, Steamboat Springs Resort ▪ 10 Min: West Metro, Hayden ▪ 5 Min: Rollinsville, Winter Park-Fraser, Granby, Hot Sulphur Springs, Kremmling, Oak Creek, Steamboat Springs Downtown
SPEEDS & SIGNALIZATION	Speed limits were customized section by section: <ul style="list-style-type: none"> ▪ Denver-Bond: <ul style="list-style-type: none"> ○ Follows published passenger speed limits (max 79 mph) ▪ Bond-Toponas: <ul style="list-style-type: none"> ○ Follows published freight speed (max 20 mph) ▪ Toponas-Craig: <ul style="list-style-type: none"> ○ Approximated from freight speeds with increases on potentially improvable segments (max 79 mph) <p>Signalization: Upgrades to the Winter Park/Moffat Tunnel west signal, PTC installed from Bond to Craig, removal of Yard Limits at Phippsburg Yard and the Craig Industrial Track</p>
DENVER UNION STATION ACCESS	Trains access DUS via the RTD B/G Line route with a new proposed connection to the UPRR Moffat Tunnel Subdivision between the Clear Creek and 60 th & Sheridan RTD stations
MOFFAT TUNNEL	To accommodate worst-case scenario for tunnel ventilation, a minimum 30 min train separation is maintained
AMTRAK CALIFORNIA ZEPHYR	The California Zephyr is included at its current 2024 Amtrak published and scheduled times. No changes to its operation are proposed

RESULTS OF OPERATIONS ANALYSIS OF SERVICE OPTIONS

As detailed in the Service Options Analysis, three Service Options were modeled in this analysis. These three options include combinations of three operational patterns: a long pattern that operates across the entire corridor from Denver to Craig, a short pattern that operates between Denver and Granby (or Kremmling), and a local pattern in the Yampa Valley between Craig and Oak Creek. As noted above, the local pattern will depend on local participation for operations and maintenance costs, which may affect scope, frequency and other factors for any service.

Service Option A

Service Option A includes all three defined service patterns: long, short, and local. In this alternative, a short pattern roundtrip operates in the early morning hours to provide ski/recreation service to Winter Park prior to lift opening times and Denver-bound arrivals by 9:00 am. The second short pattern roundtrip operates in the evening, departing Winter Park Resort eastbound at lift close and in the opposite direction providing service westbound leaving Denver after 5:00 pm. The single long pattern roundtrip departs Denver after the California Zephyr and arrives in Steamboat Springs Resort at approximately 5:00 pm and in Craig at 6:20 pm, while the eastbound to Denver departs Craig shortly before 8:00 am and Steamboat Springs Resort shortly after 9:00 am and arrives in Denver after 4:00 pm. Additionally, the long service pattern provides midday service to and from Grand County Stations. Local service in the Yampa Valley is focused on delivering workers from Craig and Hayden to Steamboat Springs Downtown and Resort stations, with the first arrival before 7:00 am. The service then operates through the remainder of the day, providing a total of 3 round trips daily.

Based on an evaluation of the train schedules and time-distance diagrams, it was determined that additional infrastructure needs beyond the baseline assumptions are limited to a crossover at the Hot Sulphur Springs siding to allow for the long pattern train to meet the opposing direction long pattern train at approximately 1:00 pm. Other passenger-to-passenger train meets are planned to occur at existing sidings (Crescent, Azure, Rocky, and Adams). Assuming a train turn time of 50 minutes or more at Denver Union Station (to account for cleaning, replenishing supplies, and loading specialized luggage such as skis or bicycles), this Service Option would require four total trainsets: one dedicated local set that overnights in Craig, and three sets that rotate through the short and long patterns with one set overnighting in Craig, one in Granby, and one in Denver with appropriate layover facilities in each location. Additionally, there will also be a need to maintain some number of spare cars and locomotives to account for equipment being out of service for inspection and maintenance.

Service Option B

Service Option B retains the same structure and timing as Service Option A, but notably adds another pair of short pattern trains in the midday period and removes the local service in the Yampa Valley. The introduction of the third short pair will require additional station area upgrades at Granby as the Mountain Rail service departs and arrives shortly after the opposite direction California Zephyr. This pattern also adds passenger-to-passenger train meets near Winter Park Resort and Cliff Siding, but it does not add any additional revenue trainsets to this Service Option. Trainsets will need to overnight in Craig, Granby, and Denver as in Service Option A. Additionally, there will also be a need to maintain some number of spare cars and locomotives to account for equipment being out of service for inspection and maintenance.

Service Option C

Much like Service Option B, Service Option C is built on the same general structure of train operating slots as Service Option A. However, instead of an additional pair of short pattern trains as added in Option B, Option C extends two short pattern trains to long patterns and extends the remaining pair of short trains to Kremmling (as opposed to terminating at Granby), utilizing the same operating slots as Service Option A. This option introduces new passenger-to-passenger train meets at CP Bond and Phippsburg Yard but does not add any further infrastructure needs. The conversion of a short pattern to a long pattern with multiple long pattern runs requires an additional trainset, for a total of five. Two trainsets would overnight in Craig, two in Denver, and one in Kremmling. Additionally, there will also be a need to maintain some number of spare cars and locomotives to account for equipment being out of service for inspection and maintenance.

Summary

All three Service Options utilize similar operating slots, but offer varying levels of service, presented in the table below.

Table 5: Service Levels for Each Service Option

	Long Pattern	Short Pattern	Local Pattern	Trainsets Needed	Infrastructure Needed
Option A	Yes, 1	Yes, 2	Yes	3 standard, 1 local	Hot Sulphur Springs Crossover
Option B	Yes, 1	Yes, 3	No	4 Standard	Hot Sulphur Springs Crossover; Granby Station Upgrade
Option C	Yes, 2	Yes, 1	No	4 Standard	Hot Sulphur Springs Crossover

Some reductions in travel times may be possible in the future with additional capital improvements and operations optimization with UPRR, operations partners, and RTD. Proposed customer timetables, as well as detailed time-distance graphs (“stringlines”) will be included in the final Service Options Analysis component of the SDP.



Figure 23: Grade Crossing in Craig, CO

Travel Demand and Ridership Forecasting

Taking input from the Market Analysis, the DTR team is currently studying the ridership potential of the Mountain Rail service. The following sections detail the methodology being used, and some preliminary results.

DEVELOPMENT OF REFINED TOTAL TRAVEL DEMAND TRIP TABLES

The team developed origin-destination trip tables, using LOCUS, a ‘big data’ platform leveraging cell phone data to estimate observed travel flows. The data were developed at a geographic level known as a traffic analysis zone (TAZ) that was derived from StateFocus, the Colorado Statewide Travel Demand Model. When processing the data from LOCUS, special attention was given to long-distance trips within the rail corridor. The rail corridor, developed by assembling ten-mile catchment areas around each station location, was considered the market shed most likely to use rail. LOCUS data provided various filters for the trip tables, including:

- Trip purpose (home-regular, home-other, regular-other, other-other)
- Time of day (morning peak, mid-day, evening peak, nighttime)
- Trip length (0-1 miles, 1-5 miles, 5-10 miles, etc.)
- Day of week (average weekday [Monday - Thursday], Friday, Saturday, Sunday)
- Season (quarters of the year, with Q1 being January - March)
- Equity vs. non-equity travelers
- Residents vs. visitors (non-CO residents)

ANALYSIS OF CURRENT AND FUTURE DEMAND

The LOCUS data and trip tables were then analyzed to develop an understanding of the overall travel demand within the rail corridor shed. The DTR team supplemented the total origins-destinations within the corridor with rail and bus ridership data, to establish a current rail and bus share in the corridor. Additional data including highway travel times and transit schedules, fares and parking costs will be used in forecasting tools developed for this project. The rail and bus shares served as the basis for ridership estimates produced for each rail scenario. Future year trip tables will be developed using available population, employment and visitor forecasts. In addition, the CDOT team will rely on additional project improvements that could impact travel in the region, such as highway and transit projects impacting the corridor.

DEVELOPMENT OF BASE AND FUTURE YEAR NETWORK LEVELS OF SERVICE

The level of Mountain Rail service (travel times and frequency of trips) will be derived from the service plans from the three Service Options at Level 3 screening.

Understanding the existing and projected passenger rail network (including Amtrak and Bustang service and any planned projects), as well as the transit networks available at station areas (including bus systems and shuttles), will provide information on connectivity and how far the range of the Mountain Rail service can be extended to reach key destinations. Bus fares will be based on existing Bustang Outrider service, unless otherwise provided by CDOT. Rail fares will be consistent with the Fare Structure developed in the Service Options Analysis.

DEVELOPMENT OF THE FORECASTING MODEL FRAMEWORK

To estimate rail trips that divert from auto, a set of diversion models by trip purpose will be developed that are sensitive to travel cost, travel time, and frequency of service (i.e., number of trains per day) and applied to the trip tables developed earlier.

In addition to the rail trips diverted from auto travel and reducing highway congestion, there may be induced travel, additional rail trips that would occur as a result of introducing the rail system. These induced trips represent journeys along the corridor that would not have been made if the rail system had not been built. The magnitude of this market would depend on the level of increased accessibility, which depends on the service plans in each of the three Service Options being evaluated and will be assessed qualitatively. After developing the framework and establishing variable parameters for the diversion models, the model will then be calibrated to replicate existing transit ridership within the corridor, including CDOT's Bustang Outrider and Amtrak's Winter Park Express service. The resultant sensitivities and magnitude of forecasted ridership will be benchmarked against available literature and existing ridership for systems that provide similar services to ensure model reasonableness.

RIDERSHIP AND REVENUE FORECASTS FOR ALTERNATIVES ANALYSIS

For each of the final Service Options at Level 3 screening, low, medium, and high forecasts of rail passenger trips will be developed for each forecast year at varying service and fare policy levels. Detailed preliminary ridership results; including station-to-station details, annual estimates, as well as peak ridership figures, will all be provided as a part of the final SDP in spring of 2025.

Revenue Evaluation Analysis

The CDOT team will use the results of the Ridership Forecasting work to perform a Revenue Evaluation Analysis. Since the preferred fare structure is purely distance-based, revenue forecasts from this analysis will be a result of station-to-station fares multiplied by station-to-station ridership. This may be further modified by reducing the total revenue by some percentage to account for the use of discount fares (e.g., multi-ride tickets, passes, senior and other discounts).

Station Area and Access Analysis

The purpose of the Station Area and Access Analysis section of the SDP is to identify the location of the stations to be served by the proposed service, examine how these stations will accommodate the trains and passengers associated with the proposed infrastructure, how passengers will access the stations, and how the stations will be integrated with or connected to other modes of transportation. The assessment of the operations for each location was performed to a level sufficient to identify key characteristics, challenges, or impacts to existing and future passenger rail service. All existing and potential station locations along the Mountain Rail alignment were analyzed as part of this process and this section documents the result of that analysis.

Note that new stations may be added in a phased fashion during implementation, depending on funding, local support, project readiness and other factors. First day service is likely to focus on existing stations that support Amtrak Winter Park Express and California Zephyr service (i.e., DUS, Winter Park Resort, Winter Park/Frasier and Granby), with other stations such as the West Metro station added when possible.

The location screening review primarily consisted of a qualitative analysis of the potential location and its ability to address the project's overall P&N, which includes regional connectivity, economic development, environmental sustainability, multimodal choice, and existing infrastructure. Potential locations were analyzed, issues and opportunities documented and numerically scored on a scale of lowest (1) to highest (5) likelihood to address the P&N for the Mountain Rail project. Findings from the screening process were also summarized to identify opportunities and challenges based on FRA criteria.

Potential locations which contained no fatal flaws or scoring higher than 2.5 (out of 5) were all included in the Service Options for this study.

LOCATIONS FOR EVALUATION

Preliminary Mountain Rail Station Locations Analysis

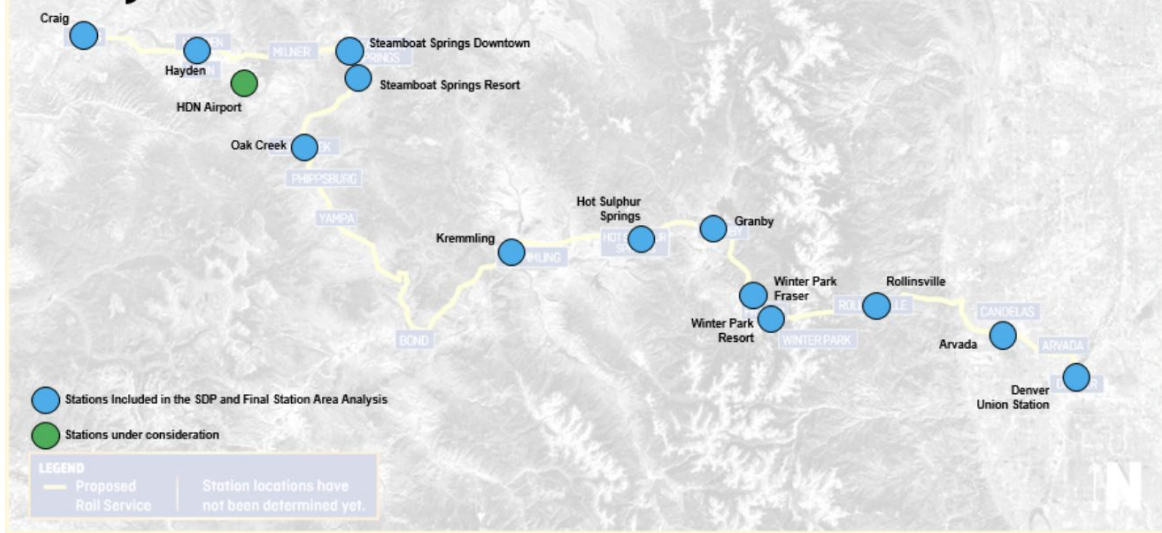


Figure 28: Map of all Existing and Potential Station Locations for Screening

A total of four (4) existing stations and sixteen (16) potential stations underwent a critical defect and location screening review as part of this process. All existing stations along the proposed corridor were assumed to move forward as part of the service planning effort to best leverage existing infrastructure.

Potential stations were assessed through both a fatal flaw review and a location screening review. The existing stations' critical defect review focused on identifying operational challenges, environmental considerations, and potential modifications to enhance functionality, performance, connectivity, and service quality for future passenger rail service. The location screening analysis evaluated how each station would interact with proposed infrastructure, accommodate trains and passengers, facilitate passenger access, and integrate with other transportation modes. Each potential station was also reviewed against the project's goals, identifying key issues and challenges for the next stages of design and engineering.

The station locations identified will advance to the next phases of development. This next stage will include a comprehensive station area analysis, recommendations for station infrastructure and connectivity improvements, identification of opportunities and potential amenities, and preliminary design and engineering up to 30% completion for station infrastructure.

Proposed stations with a single platform location option can proceed directly to final station area analysis and conceptual design and layout, requiring coordination between CDOT, UPRR, and local stakeholders to finalize station details and explore potential funding opportunities and partnerships for implementation.

Several potential station locations have multiple platform options under consideration. In these cases, close collaboration with local communities will be critical to refine and finalize site selection before advancing to the 30% design and engineering phase. For instance, the West Metro Station will require extensive coordination and tailored local planning efforts to determine the optimal site to be included in final planning documents. This process will involve community engagement, selecting a preferred location, identifying impacts such as traffic and land use, advancing the design, and addressing necessary infrastructure improvements and policy updates to support the future station effectively.

Connectivity to and from the Yampa Valley Regional Airport (Hayden) is under additional and detailed study, both to identify the recommended short-term connectivity and access to the airport, as well as to identify potential long-term solutions such as direct rail connections or other direct modes of connectivity such as, shuttles, people movers or gondolas. This localized engineering and planning study will require a detailed look at all the key factors and developing a local planning and technical consensus and detailed plans.

Similarly, both potential Steamboat Springs station locations, a downtown location and resort-oriented location, would benefit from detailed localized planning due to multiple site options and the need for complex coordination with existing projects. Customizing these localized efforts will be key to building consensus on the final site selection and advancing to the 30% design and engineering phase.

Conceptual and Early Preliminary Engineering

INTRODUCTION

The objective of this task is to identify and classify the list of capital projects needed to construct and operate the proposed service. Conceptual engineering converts the required infrastructure identified in the other planning elements into discrete capital projects. These capital projects will be accompanied by a set of conceptual engineering drawings, once developed. These capital projects may be identified from the development and screening of alternatives that has taken place in Task 3, Alternatives Analysis, or Task 4, Transportation Planning, to support the various Investment and Design Options identified for further consideration. The Investment Options Analysis will be supported by conceptual-level engineering for each component investment which

will address, at a minimum, the specific operation objective and functional requirement along with the location of the component investment. The Design Options Analysis will be supported by early preliminary level engineering which will address the physical feasibility of the design, constructability, and provide adequate details to determine if the operational objectives of the design can be met and support future environmental analysis.

ENGINEERING METHODOLOGY

The engineering methodology completed to date has focused on identifying the critical design criteria that would be applicable both to the rail corridor improvement projects and to projects for the station locations that serve the corridor. The engineering criteria controls and helps define the feasibility and spatial requirements of certain design elements.

Design Criteria

The Rail Corridor Design Criteria table below is compiled based on UPRR Mainline Design Criteria, CDOT-supplied criteria, Existing Conditions of the Corridor, and Industry Standards. The goal of the criteria is to allow the addition of the passenger rail service to existing UPRR and RTD mainline tracks by leveraging the existing infrastructure and identifying projects that may either be mutually beneficial or reduce potential impacts to UPRR operations with the additional service. All corridor-specific projects shall follow UPRR Mainline Design Criteria with deviations for passenger rail specific items at station locations.

Table 6: Summary of Rail Corridor Design Criteria

Rail Corridor Design Criteria	Description
Vertical Profile	Maximum of 2% grade on any track shared with UPRR operations.
Siding Requirements	Any potential station location with a grade steeper than 1% requires a new, separate siding/station track and use of existing right-of-way (if available) to provide a level area for the platform.
Horizontal Alignment	Desired Minimum is 1,200' tangent track to accommodate a 1000' platform with 100' clear space at both ends. Less than desired minimums must account for vehicle swing at the platform.

Siding Turnouts	All connections between new siding infrastructure and the existing UPRR mainline track must connect on horizontally tangent and vertically tangent track. Typical turnout number to be #15 or greater, all power operated.
Platform Length	1,000' long platform. CDOT identified dimensions based on a typical 85' North American passenger rail coach, and a six- to ten-car train to accommodate service at the platform.
Platform Width	18' wide platform. Required dimension to accommodate passengers on a single-sided platform.
Right-of-Way	No indication of major barriers within the existing railroad right-of-way that would impact required new infrastructure or existing operations.
Existing Stations	Up to a maximum of 6 degree curve and 1% vertical grade, per existing.

Passenger Station Basic Platform Design Criteria has been developed to address the design criteria and key assumptions that form the design intent for proposed passenger stations and related facilities outside of the rail corridor. All passenger station facilities will be designed in compliance with ADA accessibility requirements. More extensive Station facilities may be developed by local or private entities as part of station-area development, including Transit Oriented Development (TOD). However, such Station-area development is beyond the scope of the SDP.

The key assumptions for basic station platform and access amenities and site-specific configurations will continue to be reviewed and refined during later stages of design as ridership and connecting mode projections become available. The key elements that may be refined include the size and quantities of transit berths, parking requirements, and passenger waiting areas. Site-specific configurations and details for the stations and facilities will be developed into concept and preliminary engineering plans after site selection has been finalized and available right-of-way identified. An outline of general station characteristics is provided below.

General Station Characteristics:

Types and quantities of facilities and amenities are expected to vary by site and projected station patronage. It is expected that two broad categories of station facility will be developed for new proposed stations:

- **Large Stations** are intended to be provided at the highest patronage stations. These stations would be likely to provide dedicated parking for Mountain Rail riders, transit/micromobility facilities, and a station depot building with enclosed seated waiting. These will likely rely on private or local contributions as base investments will be focus on standard safety needs for operational purposes. (see Figure 24 below)
- **Standard Stations** are intended to be provided at locations other than those classified as Large Stations. Such stations will have minimal or no dedicated passenger parking. Passenger waiting would be in a station building as for a Large Station, or in shelters located along the platform. (see Figure 25 below)

It is anticipated that existing stations served by other passenger rail services today would remain with supplemental projects to address specific Mountain Rail service needs. These existing stations would not be categorized in the same manner as proposed stations given the reduced expected projects. Please refer to the Station Area and Access Analysis section of this report for additional information about station characteristics and amenities.

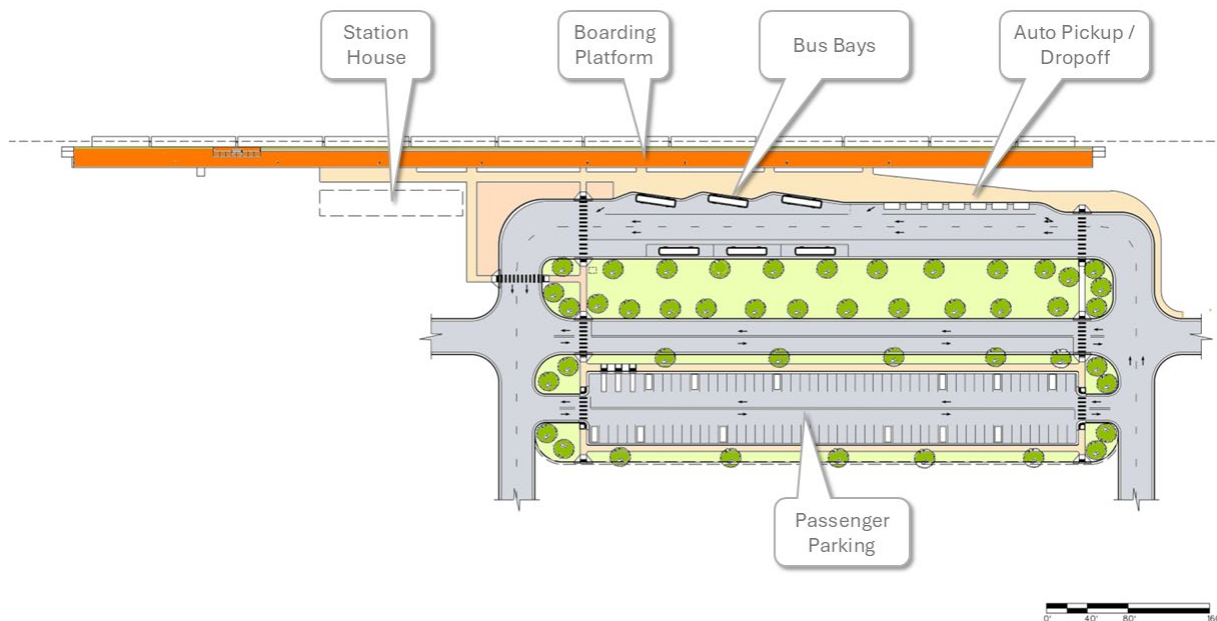


Figure 24: Large Station Prototype Site Plan

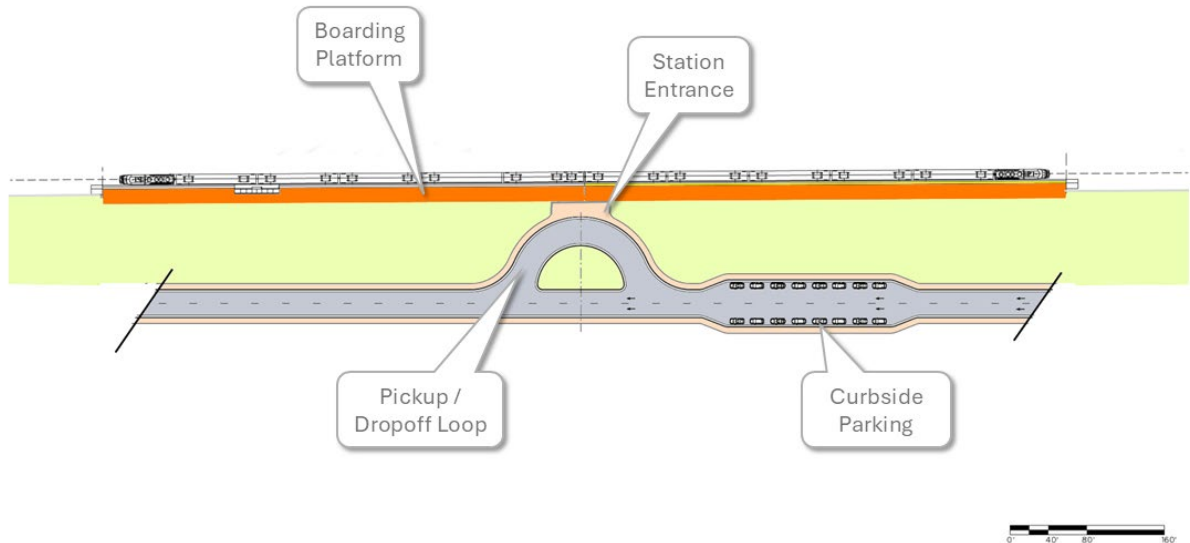


Figure 25: Standard Station Prototype Site Plan

SUMMARY OF ENGINEERING WORK COMPLETED

Conceptual and early preliminary engineering specific to the Investment Options Analysis and Design Options Analysis has not commenced, as the Recommended Alternative has not been selected.

Support for alternatives and planning analytical efforts has occurred to help inform potential alternatives using conceptual layouts. All work products completed in support of these tasks are found under those respective sections and not as standalone engineering plan sets at this time.

Once the concept and early engineering plans are developed to support the Investment Options and Design Options Analyses then a comprehensive list of capital projects will be completed to allow for capital cost estimation.

Capital Cost Estimation

At this point in the study, sufficient detail has not been determined to allow the CDOT team to provide an accurate assessment of the capital costs of the project. This will be subject to discussions with the host freight railroad (UPRR), the results of the Operations Analysis, and the results of the Investment Options and Design Options Analyses.

The major components of the Capital Cost Estimate are:

- Right-of-Way acquisition costs
- Mainline track improvements and sidings/new tracks
- Upgrades to existing infrastructure and systems

- Stations
- Operations and maintenance facility (OMF)
- Layover and cleaning facility

Rolling stock acquisition is also normally considered as part of the overall capital cost of a rail project.

Pending the completion of the Investment Options and Design Options Analyses, the CDOT team will estimate capital costs for all component investments required to deliver the preferred service alternative. These costs will also inform the Phased Implementation Plan, to provide interim capital cost estimates to deliver each phase of the project. These preliminary cost estimates will be included in the final SDP when it is released in spring of 2025.

Operations and Maintenance Cost Estimation

Operations and maintenance (O&M) costs have several drivers, including:

- Labor costs
- Materials costs
- Utilities costs
- Administrative costs
- Contracted services (e.g., planning, engineering)

For the Mountain Rail project, the operations and maintenance team used a “ground up” model, which takes as input specific operating statistics, including elements such as:

- Rolling stock fleet size
- Track miles
- Train miles
- Train hours
- Total number of stations

With those inputs, the team utilized productivity ratios to determine the number of employees of each class, the total materials, and total utility costs correlated with the operating statistics, in addition to other costs.

For each of the three models, diesel fuel costs were derived from the U.S. Energy Information Administration (EIA), Gasoline and Diesel Fuel Update 11/25/24, Petroleum Administration for Defense District (PADD) 4 for the Rocky Mountain area, which is estimated at \$3.45 per gallon. The models also assume the trainsets use 2.6 gallons of diesel fuel per mile.

For labor costs, the models use the *U.S. Bureau of Labor Statistics (BLS), May 2023 - NAICS 482100 - Rail Transportation* salary tables to determine salary rates, plus an additional 35% to account for fringe benefits and 3% escalation to bring it to 2024 dollars. Labor assumptions include positions for Train Operations, Train Maintenance, Yard Operations, Station Operations and Maintenance, and Others.

While costs for Maintenance of Way (MoW) are calculated in the model, it is assumed that UPRR and RTD will continue to perform the maintenance on their segments of the corridor, and charge CDOT some portion of the total cost, which is yet to be determined. For estimation purposes, each of the three models assumed a percentage of total MoW costs correlating to relative train volumes by segment (i.e., the number of Mountain Rail trains versus trains from other operators such as UPRR, BNSF, and RTD). The final cost may be more or less, depending upon the outcome of negotiations with UPRR and RTD.

Material cost estimates use 2011 material cost data escalated at 3% annually to 2024 dollars. Materials include items needed for maintaining rolling stock, track and structures, signals, communications, and stations.

The models also include additional cost assumptions - 15% for contingency, utilities at \$30 per train hour, professional service contracts at \$50 per train hour, 2% administrative costs, 12% insurance costs, 1% marketing costs, 2% legal and real estate services costs, and a calculation for a set-aside for Capital Equipment Replacement. The final output from each model will be a rough order-of-magnitude (ROM) O&M cost estimate in 2024 dollars that is escalated at three percent annually to the horizon years of 2026, 2031, and 2036.

As noted above, the expectation is that local participation will be needed to cover operations and maintenance costs for Local Pattern service.



Figure 26: Passenger Train along the Colorado River

ENVIRONMENTAL PLANNING

As part of the service development planning process, a high-level evaluation of environmental considerations was incorporated as part of the project alternatives analysis development and screening process, focusing on resources that may influence future schedule and/or decision-making, and strategies for addressing them. Environmental screening criteria were included in the Station Area and Access Analysis and Service Option Analysis, as discussed in the sections above. The following summarizes the evaluation methodology and high-level findings of the environmental resources evaluations completed to date, which, along with recommendations for future phases of the Project, will be documented in an Environmental Concerns Analysis Report upon completion of the Service Development Plan.

Environmental Resources Evaluation

An evaluation of environmental considerations focused on several key resources: biological resources; historic resources; environmental justice; hazardous materials; and parks and recreational facilities including non-historic Section 4(f) and Section 6(f) resources; additional resources including greenhouse gases and sustainability and resilience are being evaluated qualitatively and therefore not included within this status report. Resources were evaluated by desktop review of readily available Geographic Information Systems (GIS) data, aerial imagery, and public records.

For the purpose of the environmental resources evaluation, a 200-foot buffer from the existing railroad centerline (Project study area) was developed to accommodate a range of potential alternatives. A high-level evaluation of environmental resources was then conducted within the Project study area at locations where ground disturbance and/or right-of-way acquisition or easements may be required as a result of proposed station platforms, track alignment or other infrastructure; the 200-foot buffer around these locations was used as the boundary of the evaluation. This evaluation considered conceptual design elements at the proposed station areas (Table 12), generally consisting of a 1000-foot platform and associated track alignment (defined as the “station area locations”) as developed in coordination with the Station Area and Access Analysis, or other infrastructure (i.e., crossover at the Hot Sulphur Springs Station, upgrades to the existing Granby Station) identified during the Service Option Analysis (note: at the time of this status report, infrastructure needs required as a result of the Service Options Analysis and Design Options Analysis are still under development; additional infrastructure needs may be identified and reviewed for environmental consideration as the Service Development Plan is refined and finalized).

To date, the environmental evaluation has been completed in alignment with the FRA Corridor Identification and Development Program (CIDP) Step 2 - Service Development Plan Framework (Task 5), and generally follows the methodology of a concurrent rail alignment study, in which the Front Range Passenger Rail District is working with CDOT to advance the Front Range Passenger Rail project through the FRA CIDP process to obtain federal funding. Further, the environmental evaluation is being performed at a level and manner consistent with current CDOT Planning and Environmental Linkage (PEL) practice.

BIOLOGICAL RESOURCES

Several of the station area locations contain known or potential Waters of the U.S. (WOTUS) or waters of the State that may be impacted as a result of Project activities. If impacts to jurisdictional wetlands and non-wetland waters cannot be avoided, permitting under Section 404 of the Clean Water Act or the developing State Dredge and Fill Program may be required. Regardless of jurisdictional status, CDOT requires that impacts to wetlands be mitigated at a 1:1 ratio. Field surveys during the future design and/or NEPA phase would be required to further delineate wetlands and non-wetland waters to inform avoidance, minimization, permitting and/or mitigation needs.

Stations with a moderate and high potential for wetland and non-wetland waters have a higher likelihood for permitting, and depending on impacts, may impact future project budget or schedule (i.e., greater than 0.5 acres to jurisdictional wetlands may result in the need for a Section 404 Individual Permit). Station area locations which were identified during preliminary review as having a moderate or high potential for wetlands and non-wetland waters include: Rollinsville; Hot Sulphur Springs; and Steamboat Springs Resort.

Potential habitat for sensitive species, including federally listed species, state-listed species, state species of concern, and species protected under the Migratory Bird Treaty Act is present throughout the Project study area. Site surveys during the future design and/or NEPA phase would be required to further identify suitable habitat to inform avoidance, minimization, permitting and/or mitigation needs. Potential impacts to federally listed species would require Section 7 or Section 10 consultation with the U.S. Fish and Wildlife Service (USFWS). Further, coordination with Colorado Parks and Wildlife (CPW) may be required for state-listed species and impacts to prairie dog colonies must comply with CDOT's Black-tailed Prairie Dog Policy. Based on preliminary review, one of the West Metro station area locations may impact or is located within close proximity to prairie dog colonies (state species of concern) and may provide suitable habitat for burrowing owls (state-listed as threatened). Further, nearby infrastructure (i.e., bridges), may provide suitable habitat for the tri-colored bat

(proposed for federal listing as endangered). Within the mountain areas, potential habitat for Canada Lynx (federally listed as threatened and state-listed as endangered) may occur within proximity to the proposed station area locations, and suitable habitat for the Bald Eagle (state species of concern and protected under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act) and the Yellow-billed Cuckoo (federally listed as threatened and state species of concern) may be present along large river corridors such as the Colorado River and Yampa River.

ENVIRONMENTAL JUSTICE

Environmental justice (EJ) populations, including minority, low-income, and Limited English Proficiency (LEP) populations, were identified within the Project study area. It is anticipated the project would result in potential benefits such as enhanced public transportation systems and increased multimodal connectivity, safety, and job creation. Design refinements in future phases will determine opportunities for enhanced access and overall connectivity.

HAZARDOUS MATERIALS

Rail corridors have the potential to contain soil, track ballast and fill impacted with volatile organic compounds, polycyclic aromatic hydrocarbons, metals, pesticides, and/or polychlorinated biphenyls due to former and current use as a rail facility. The full study will show areas with potential for soil and groundwater impacts.

RECREATIONAL FACILITIES, INCLUDING NON-HISTORIC SECTION 4(F) AND SECTION 6(F)

Recreational facilities, including community parks and trails, were identified within the Project study area as well.

As the alternatives analysis progresses and design is refined, the Project would conduct Section 4(f) and Section 6(f) evaluations in conjunction with the NEPA process to identify potential impacts as well as avoidance, minimization and mitigation measures. Analysis and mitigation strategies may vary depending on the types of use (actual use, constructive use, or de minimis), property type and owner, and may be refined as the design is advanced; however, impacts to these features generally require support and agreement from the Official with Jurisdiction of the property.

If Section 6(f) impacts are identified and determined to be unavoidable, coordination with CPW would be required to clarify property boundaries, propose mitigation that equitably counteracts impacts to the property, and achieve concurrence from CPW on the evaluation. Conversions of Section 6(f) property to anything other than recreational use require coordination with the National Park Service and identification of replacement land of at least fair market value and equivalent usefulness.

LAND USE, INCLUDING FARMLANDS

Land uses within the Project study area generally consist of mixed use, light industry, suburban, planned unit development, and parks and open space classifications within the Front Range. In the mountain communities, land uses generally consist of business/commercial, multi-family residential, mixed use, industrial, open space and recreation, and agricultural. Land designated as Prime Farmland (if irrigated) is present within the station area locations of West Metro with Farmland of Statewide Importance noted within the Fraser-Winter Park, Granby, Hot Sulphur Springs, Kremmling, Oak Creek and Steamboat Springs Downtown station area locations (note: several of these locations are currently developed and although farmlands are identified, lands have since been developed and thus no impacts to farmlands are anticipated).

At most station area locations, preliminary review indicates implementation of the proposed Project is anticipated to be compatible with the Comprehensive Plans of nearby cities and counties, and direct impacts to land use are anticipated to be minor. Detailed analysis of land use would be completed during future design and NEPA process. Further, the Project is unlikely to substantially impact Prime Farmlands; however, impacts and potential mitigation would be coordinated with the Natural Resources Conservation Service (NRCS) during NEPA.

Recommendations and Next Steps

Findings of the high-level environmental resources evaluation will be documented in an Environmental Concerns Analysis Report (ECAR), which will serve as a baseline for environmental conditions to streamline future NEPA clearance, agency coordination and permitting. As the SDP is further refined and a Recommended Alternative is identified (including potential Design Options), the ECAR will document resource evaluation methodology; existing environmental conditions and potential affected environment of key resources; and recommendations/strategies for mitigation, agency coordination, environmental clearance (i.e., anticipated NEPA class of action), and permitting considerations during future phases of the Project. It is anticipated that Project implementation, phasing, funding and timing will be defined, informing potential strategies for future NEPA clearance. A guiding principle of the project is to ensure, to the maximum extent, that the lowest reasonable NEPA class of action is applied by making critical strategic decisions about infrastructure needs and placement during this planning phase.

Therefore, project elements (e.g., phases with independent utility) or Investment Package Options may be evaluated separately within the ECAR to enhance opportunities for future NEPA clearance. Further, key environmental issues that may influence future

schedule or decision making will be emphasized as requiring avoidance or minimization where practicable (i.e., Section 404 Individual Permit; Adverse Effects to Section 106 resources; Individual Evaluations for Section 4(f) resources), and applicable permits and/or agency coordination requirements will be further identified.



Figure 27: Main Track through Kremmling, CO

FINANCIAL PLANNING AND ECONOMIC EVALUATION

Financial Planning

At this time, neither a Corridor Project Inventory nor the Phased Implementation Plan are complete, so some aspects of the Financial Planning task will necessarily have to wait until those are detailed.

Financial Planning for the Mountain Rail Project is intended to:

- Analyze potential funding sources and strategies.
- Build a project financial statement showing the proposed service's financial projections over the course of the project, informed by the Phased Implementation Plan.
- Support discussions with local entities regarding operations and maintenance costs for Local Pattern service.
- Define the direct monetary benefits and other monetized benefits of the project for use in the Economic Evaluation.

Economic Evaluation

In much the same way, since neither a Corridor Project Inventory nor the Phased Implementation Plan are complete, some aspects of the Economic Evaluation task will necessarily have to wait until those are detailed.

Economic Evaluation for the Mountain Rail Project is intended to:

- Compare the capital and operating costs of the project against a future 'No Build' condition.
- Build a financial impact model that incorporates capital and operations costs over the life of the project.
- Detail the projected benefits associated with the project, including:
 - Operational benefits
 - Travel time savings
 - Safety benefits
 - Improved reliability
 - Reduced congestion for multiple modes
 - Air quality impacts
 - Community and economic development
 - Other user and non-user economic benefits.

NEXT STEPS

The following tasks still to be completed in the SDP process:

- Level 3 screening of final Service Options.
- Determination of the preferred Alternative.
- Environmental Concerns Analysis Report (ECAR).
- Conceptual and early preliminary engineering for Investment Options Analysis and Design Options Analysis, to create the Corridor Project Inventory.
- Ridership and Revenue Analysis
- Governance Analysis

It is estimated that these tasks will be finished, and the SDP complete at a draft level, in the first quarter of 2025.



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