October

2019

I-25 Planning and Environmental Linkages Study

Colorado Springs Denver South Connection

CDOT Project No. **NHPP 0252-450**
CDOT Project Code **21102**

COLORADO
Department of Transportation

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Prepared For:
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Addendum

The PEL Project: The Colorado Department of Transportation (CDOT), in cooperation with the Federal Highway Administration (FHWA), conducted a Planning and Environmental Linkages (PEL) study to establish a long-term vision and strategic plan for future transportation improvements between Colorado Springs and the Denver metropolitan area. This PEL Study provided a framework for CDOT to engage with local corridor communities, regional travelers, and other interested stakeholders to understand their concerns and ideas for immediate and longer-term improvements. Improvements are proposed to the I-25 corridor between the Town of Monument (SH 105) north to the C/E-470 Interchange.

Project Evaluation Required: All planned CDOT projects, including any alternative recommendations from this or any other planning document, should be evaluated based on current existing conditions, current regulations, and current purpose and needs for the project area before a project can be put into the STIP for funding and then proceeding on with the NEPA process.

The Relevant PEL Recommendation: This PEL study recommended adding capacity to the I-25 corridor by extending the Express Lanes built by "The Gap Project" between Monument and Castle Rock north to the C/E-470 interchange and the subsequent addition of an additional travel lane (operations undefined) the entire length of the corridor between SH 105 and C/E-470. This proposed additional roadway capacity merits particular scrutiny for reanalysis prior to being selected for funding due to recent legislation and a change in CDOT policies. Specifically, Senate Bill (SB) 21-260 and the resulting Colorado Revised Statute 43-1-128, and the Greenhouse Gas (GHG) Rule CCR 601-22, have been adopted and implemented since the completion of this PEL which requires further scrutiny on regionally significant transportation capacity projects being considered for construction funding.

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Figures

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Acronyms and Abbreviations

AADT	annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
a.m.	morning
APNR	automatic plate number recognition
ATDM	Active Transportation Demand Management
AVI	automatic vehicle identification
BNSF	Burlington Northern Santa Fe
BRT	Bus Rapid Transit
C-470	Colorado Highway 470
CCTV	closed circuit television
CDOT	Colorado Department of Transportation
CE	Categorical Exclusion
CEO	Chief Executive Officer
CFR	*Code of Federal Regulations*
CMCA	Colorado Motor Carriers Association
CO	Colorado
CPW	Colorado Parks and Wildlife
CSP	Colorado State Patrol
dBA	A-weighted decibel(s)
DRCOG	Denver Regional Council of Governments
DSRC	dedicated short-range communications
DTC	Denver Tech Center
DTR	Division of Transit and Rail (CDOT)
E-470	Highway E-470
EA	Environmental Assessment
EIS	Environmental Impact Statement
EL	Express Lane
EPB	Environmental Programs Branch (CDOT)
EOC	Executive Oversight Committee
FAST	Fixing America's Surface Transportation [Act]
FASTER	Funding Advancements for Surface Transportation and Economic Recovery [Act]
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration

FIRM	flood insurance rate maps
FONSI	Finding of No Significant Impact
GIS	geographic information system
GP	general purpose (lanes)
HPTE	High Performance Transportation Enterprise
HUTF	Highway Users Tax Fund
I-25	Interstate 25
ICA	initial corridor assessment
ICS	Interregional Connectivity Study
INFRA	Infrastructure for Rebuilding America
ITS	Intelligent Transportation System
LOSS	Level of Service of Safety
LRP	long-range planning
MAP-21	Moving Ahead for Progress in the 21st Century Act
MBTA	Migratory Bird Treaty Act
MP	mile post
mph	miles(s) per hour
MVRTP	Metro Vision Regional Transportation Plan
N/A	not applicable
NEPA	National Environmental Policy Act
NHPP	National Highway Performance Program
NHS	National Highway System
OP	operational elements(s)
OTIS	Online Transportation Information Systems
PEL	Planning and Environmental Linkages
p.m.	afternoon
PM_{10}	particulate matter 10 micrometers or less in diameter
PMJM	Preble's meadow jumping mouse
PMT	Project Management Team
PPACG	Pikes Peak Area Council of Governments
PPSL	peak period shoulder lane
RAG	Resource Agency Group
RCZ	riparian conservation zone
ROW	right of way
RTD	Regional Transportation District
RTMS	remote traffic microwave sensor

RWIS	roadway weather information systems
SAR	Safety Assessment Report
SB	Senate Bill
SC	Steering Committee
SH	State Highway
SHPO	State Historic Preservation Officer
TBD	to be determined
TL	travel lane
TM	technical memorandum
TMC	traffic message channel
TSP	transit signal priority
TTI	Travel Time Indicators
TWG	Technical Working Group
UPRR	Union Pacific Railroad
US	United States [highway]
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
VHT	vehicle hours traveled
VMS	variable message sign

Acknowledgements

The PEL Study was prepared with the contributions of many individuals. The public agencies listed here were engaged in the preparation of the I-25 Planning and Environmental Linkages (PEL) Study for the Interstate 25 (I-25) corridor between Monument (State Highway [SH] 105) and the Colorado Highway 470/E-470 (C/E-470) interchange.

- The Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) agree that this study fits the criteria for the FHWA PEL planning process. Through this process, the evaluation and findings of the PEL Study can be readily applied to subsequent National Environmental Policy Act (NEPA) evaluations where required.
- While not all agencies endorse each potential improvement evaluated in the PEL Study, the agencies will work to complete the NEPA environmental evaluation requirements for the improvements identified in this PEL Study. Based on the NEPA analysis and process, the agencies will work cooperatively to fund and implement the improvements that benefit their communities.
- The agencies will develop collaborative transportation partnerships to support mutually agreed upon corridor recommendations through the Denver Regional Council of Governments (DRCOG) and Pikes Peak Area Council of Governments (PPACG) planning processes to help facilitate transportation improvements along the I-25 corridor.

Agency letters of support can be found in Appendix Q.

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1.0 Introduction

The Colorado Department of Transportation (CDOT), in cooperation with Federal Highway Administration (FHWA), conducted a Planning and Environmental Linkages (PEL) study to establish a long-term vision and strategic plan for future transportation improvements on the Interstate 25 (I-25) corridor between Monument (State Highway [SH] 105) north to the interchange with Colorado Highway 470 (C-470) and E-470 (C/E-470). This approximately 34-mile interstate corridor is a critical link for regional and statewide travel between the metropolitan areas of Colorado Springs and Denver.

This PEL Study aims to identify transportation priorities in advance of secured construction funding, positioning CDOT to accelerate the environmental analyses and save time in implementing projects when construction funds are identified. This PEL Study lays the groundwork for future improvements on I-25 by doing the following:

- Defining and prioritizing projects in the corridor
- Determining project costs, funding, financing, and delivery options
- Engaging with local corridor communities, regional travelers, and other interested stakeholders about corridor issues and priorities
- Identifying significant environmental constraints that may influence design options and/or delay project development with lengthy environmental reviews
- Supporting an efficient transition to National Environmental Policy Act (NEPA) processes, final design, and construction once funding is identified

The PEL Study followed FHWA and CDOT PEL guidance (CDOT 2016) regarding the integration of transportation planning and the NEPA process; this guidance encourages the use of planning studies to provide information for incorporation into future NEPA documents (23 *Code of Federal Regulations* [CFR] 450). FHWA promotes the use of PELs, largely to integrate environmental issues and public involvement with project planning and shorten the time required to take projects from planning to implementation.

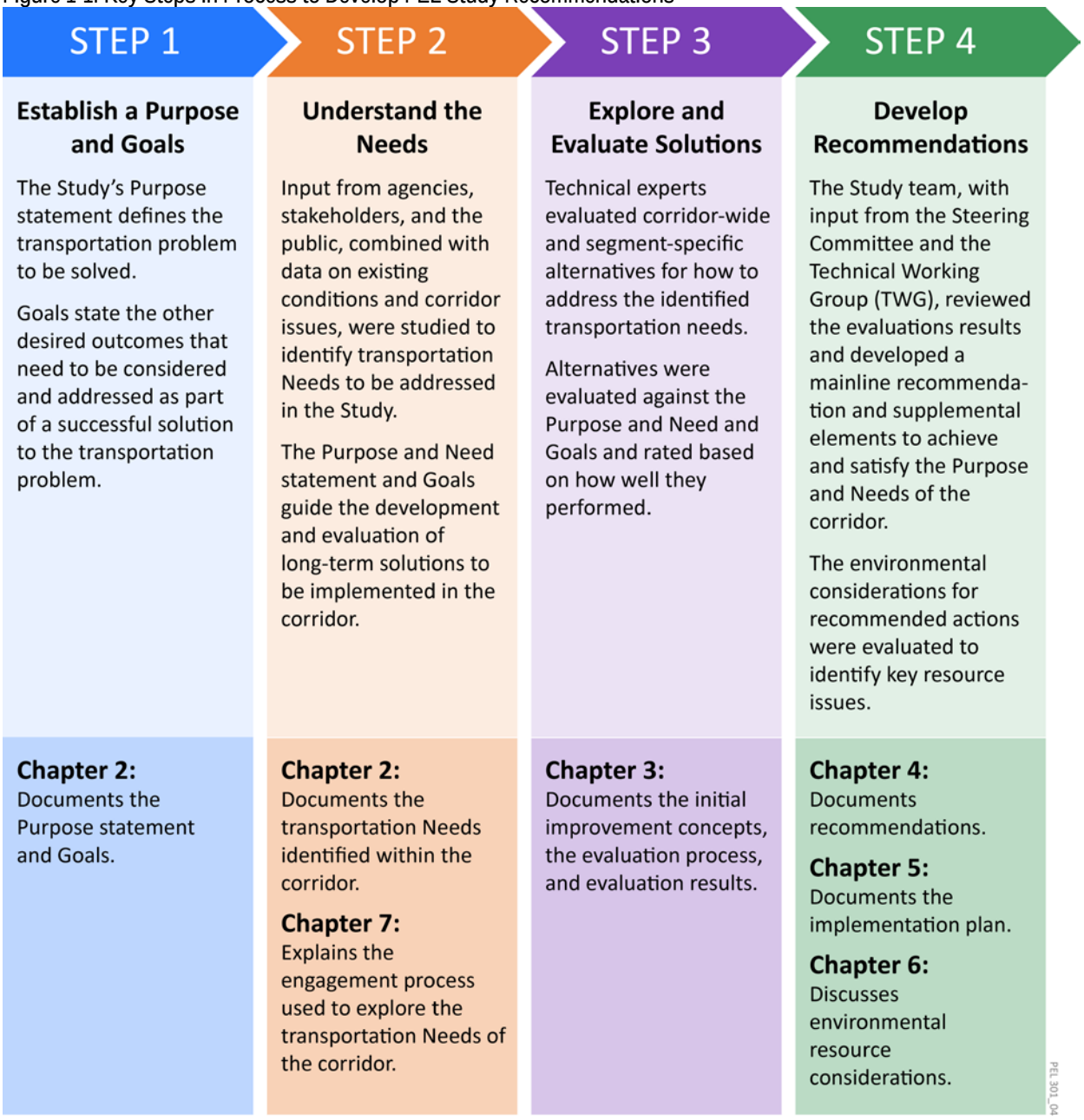
The information presented in this PEL report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL report, with more detailed information available in report appendices. Chapter 1 is supported by the following appendix content:

- **Initial Corridor Assessment: Appendix B**

The four key steps in the PEL Study process, as well as references to the chapters of this PEL Study where those steps are discussed, are described on Figure 1-1. Through early scoping and data collection activities of the PEL Study in 2017, it was apparent that some of the most pressing issues in the Study Area were in the 4-lane segment of the corridor between the Town of Monument and the Town of Castle Rock referred to as “the Gap.” High-priority improvements in this section of the corridor were advanced as an early action project. CDOT progressed design for the I-25 South Gap Project based on conceptual improvements identified in the PEL Study, completed an Environmental Assessment (EA) with FHWA approval of the Finding of No Significant Impact (FONSI) in June 2018, and began construction of the project in August 2018. Because the I-25

South Gap Project was under construction prior to completion of this PEL Study, it is part of the No Action Alternative described in Section 3.1.

Figure 1-1. Key Steps in Process to Develop PEL Study Recommendations



1.1 Study Area

I-25 is the primary north-south route through Colorado. I-25 between SH 105 and C/E-470 provides the main travel link for residents, visitors, commuters, and military personnel between the City of Colorado Springs and the City of Denver. The Study Area is primarily within Douglas County and extends slightly into El Paso County at the southern terminus. While approximately three-quarters of the trips on this corridor are pass-through trips, I-25 also serves as the backbone for several communities, including Monument, Larkspur, Castle Rock, Castle Pines and Lone Tree.

The Study Area (Figure 1-2) extends on the southern end from the I-25 and SH 105 interchange near the northern limits of Monument (mile post [MP] 161) north to the I-25/C/E-470 interchange (MP 194). The segment of I-25 within the Study Area is referred to as “the corridor.” The Study Area generally encompasses the existing CDOT right of way (ROW) and adjacent areas between MP 161 and MP 194. The study area limits of specific resources and topics evaluated in this PEL varied based on the data collection and evaluation methods for those items, such as those documented in the technical appendices for environmental resources, safety, and travel demand.

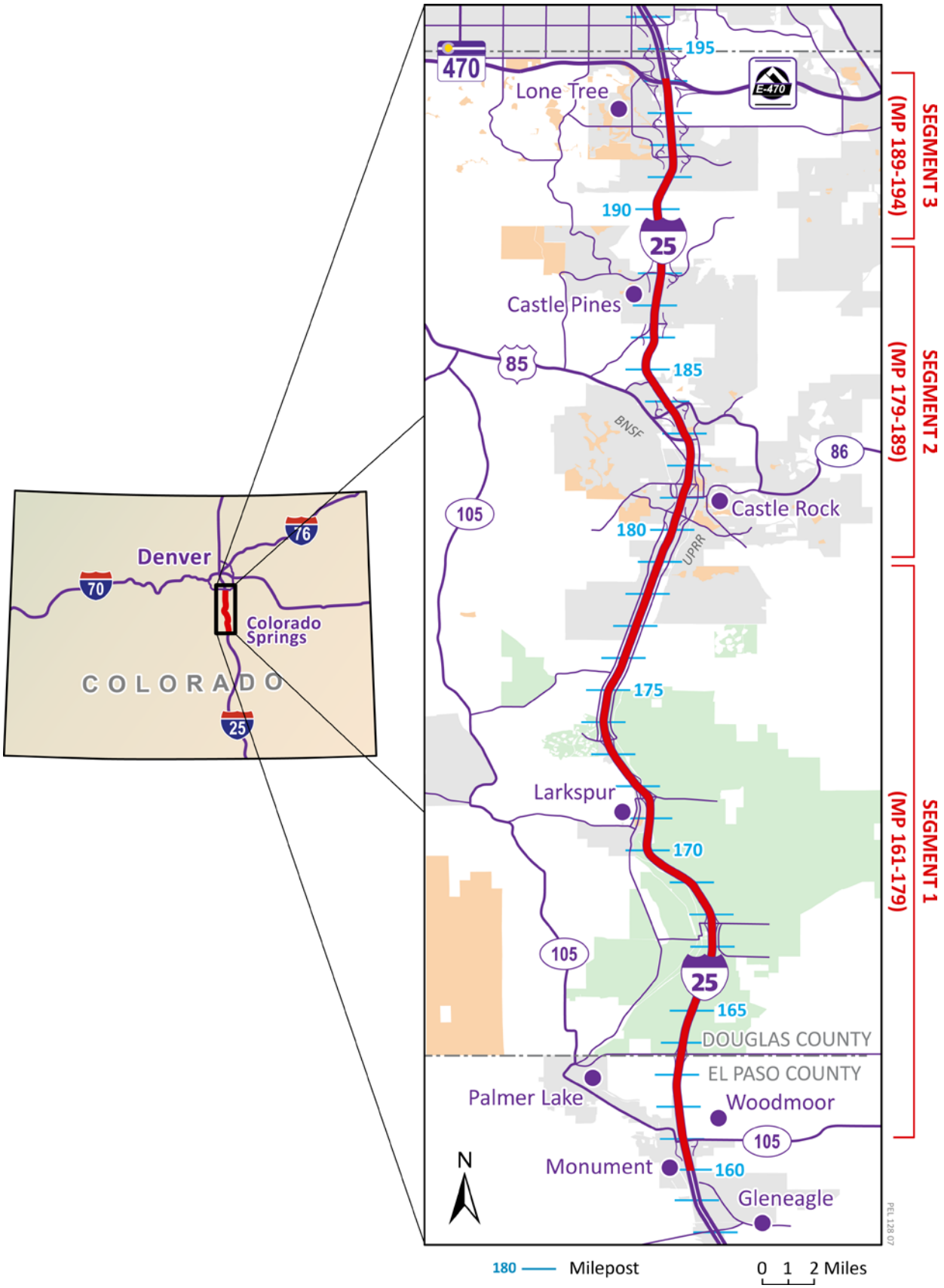
The southern Study Area limit, at SH 105, was the northern limit of the I-25 design-build widening project completed in 2014. The northern limit of the Study Area, at the I-25/C/E-470 interchange, is the location where existing heavy local and regional traffic volumes disperse, including traffic destined for locations within the Denver metropolitan area, Denver International Airport, and the I-70 mountain corridor.

I-25 through the Study Area is a high-speed interstate facility with varying lane configurations and topography, and land use ranging from undeveloped rural to urban. Recognizing the distinct land use and travel characteristics along the corridor that frame existing and future transportation needs, the I-25 corridor was divided into three segments from south to north (Figure 1-2):

- Segment 1 – SH 105 (Monument) to Castle Rock (the Gap), MP 161 to MP 179
- Segment 2 – Castle Rock to Castle Pines, MP 179 to MP 189
- Segment 3 – Castle Pines to C/E-470, MP 189 to MP 194

These segments were used during initial scoping, data collection efforts, and the first two levels of alternatives development and evaluation. However, subsequent traffic modeling performed for the third level of alternatives evaluation used slightly different breakpoints in the corridor based on lane configurations and operational characteristics of the No Action Alternative, which includes the I-25 South Gap Project improvements. For this reason, reference to these segments is only used in Chapter 1, Chapter 2, and the Level 1 and Level 2 discussions in Chapter 3. Subsequent sections in Chapter 3 and subsequent chapters of this PEL Study report do not reference these segments. The names of intersecting routes and MP ranges are used throughout this PEL Study to clarify the portion of the corridor being discussed.

Figure 1-2. Study Area



The attributes of the corridor are summarized in Table 1-1, with the existing I-25 typical sections demonstrated in Figure 1-3. More detailed information regarding the characteristics of the interstate and surrounding land in the corridor is available in the Initial Corridor Assessment (ICA) (Appendix B) (CDOT 2018a). The ICA documents the extensive data gathered to understand the existing conditions in the corridor at the outset of this PEL Study.

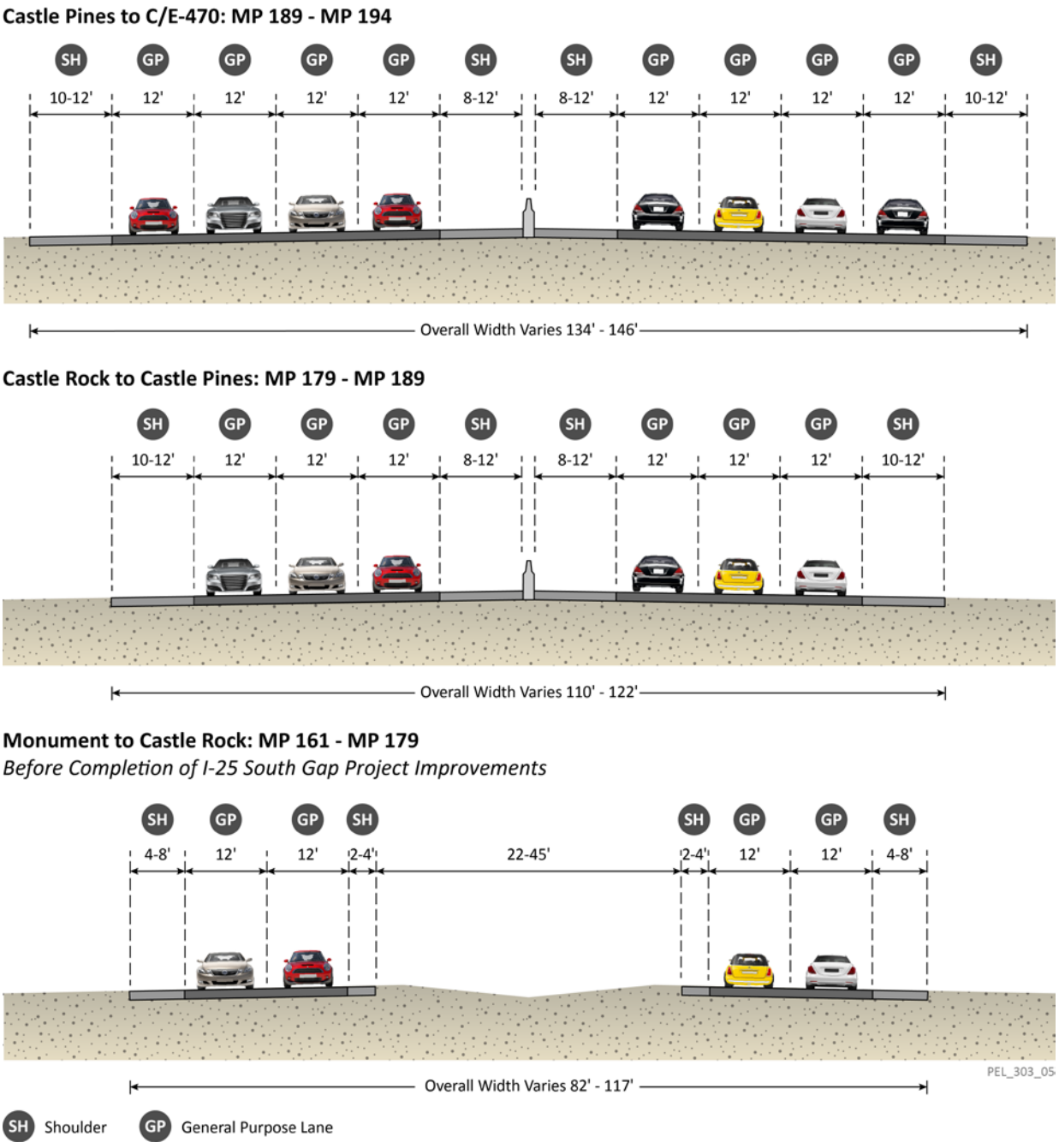
Table 1-1. Study Area Description by Segment

Characteristic	Segment 1 (the Gap)[a]	Segment 2	Segment 3
Segment Location	• SH 105 (Monument) to Castle Rock • MP 161 to MP 179	• Castle Rock to Castle Pines • MP 179 to MP 189	• Castle Pines to C/E-470 • MP 189 to MP 194
Existing Transportation Infrastructure	• 4-lane rural highway with narrow shoulders. • Posted speed limit: 75 (mph; 65 mph minimum speed. • Existing (2017) AADT: 77,000 to 86,000. • Trucks make up 8.4% of traffic. • Bustang stop at the Monument park-n-ride near Woodmoor Drive and I-25 (Exit 161).	• 6-lane urban highway with narrow shoulders. • Posted speed limit: 65 mph; 60 mph minimum speed. • Existing (2017) AADT: 99,000 to 133,000. Trucks make up 6.7% of traffic.	• 8-lane urban highway. • Posted speed limit: 75 mph; 65 mph minimum speed. • Existing (2017) AADT: 133,000 to 150,000. • Trucks make up 5.3% of traffic. • RTD's Southeast Rail Line extension, along I-25, to Lone Tree (currently under construction), providing three new stations: Sky Ridge, Lone Tree Town Center and RidgeGate Parkway Stations.
Main Connecting Routes	• SH 105, County Line (Palmer Divide Road), East Greenland Road, Upper Lake Gulch Road, Spruce Mountain Road, Tomah Road (Sky View Lane).	• West Plum Creek Parkway, West Wolfensberger Road, Meadows/Founders Parkway, Castle Rock Parkway, East Happy Canyon Road, Castle Pines Parkway.	• RidgeGate Parkway, Lincoln Avenue, C/E-470
Primary Land Use	• Protected open spaces and conservation easements with pockets of commercial and residential properties.	• Commercial (primarily retail/trade) and residential in developed and growing communities.	• Commercial (primarily professional services and lodging, with some retail/trade) in rapidly developing south Denver Metro area; low density residential and agricultural south of MP 191.
Municipalities and Other Major Destinations	• Towns of Monument and Larkspur • Colorado Renaissance Festival	• Castle Rock and Castle Pines • Factory outlet mall and big box retail	• City of Lone Tree • Office parks • Regional mall

[a] The transportation infrastructure characteristics described in the table reflect the existing conditions in 2017 during the scoping and data collection phase of this PEL Study. The I-25 South Gap Project improvements, which started construction in August 2018, are an early action project resulting from this PEL Study and are considered part of the No Action Alternative described in Section 3.1.

AADT – Annual Average Daily Traffic
Bustang – CDOT regional bus service
GP – general purpose
mph – mile(s) per hour
RTD – Regional Transportation District

Figure 1-3. Exitisting I-25 Typical Cross-Sections in the Study Area



1.2 Planning Context

Federal regulations and planning and transportation studies at the state, regional, and local level create the planning context for this PEL Study. Maintaining infrastructure while improving safety, mode choice, and overall operational efficiency of the transportation system are common goals across all levels of transportation planning in the state. Through engagement with federal, state, and local representatives during the process of this PEL Study, these goals collectively aided in the development of the Purpose and Need (refer to Chapter 2).

1.2.1 Federal Requirements

The *Moving Ahead for Progress in the 21st Century Act* (MAP-21) and the *Fixing America's Surface Transportation* [FAST] *Act* put forth requirements for a performance-based planning process. As part of this performance-based approach, recipients of federal transportation dollars are required to demonstrate how investment priorities from their Statewide Transportation Improvement Program and Transportation Improvement Program achieve performance targets. Metropolitan Planning Organizations must adopt state performance targets or develop their own. The goal of the performance-based approach is to achieve the most efficient investment of federal transportation funds.

1.2.2 State Planning

CDOT's Statewide Transportation Plan 2040 (CDOT 2015) outlines statewide multimodal transportation needs and strategies over a 25-year planning horizon. Through the planning process, CDOT identified four basic goals for Colorado's transportation system: safety, mobility, economic vitality, and system maintenance. The plan documents the funding challenge CDOT faces with projected revenues covering approximately 46 percent of estimated transportation needs. To optimize limited funding, safety and system maintenance are priorities. To focus on the mobility goal, operational strategies are considered (for example, ramp metering, travel demand management, and intelligent transportation systems) before more costly capacity expansions. Investments in capacity expansions will adhere to CDOT's Managed Lane Policy (CDOT 2013), which requires consideration of managed lanes such as high occupancy vehicle lanes and Express Lanes (ELs)[1] during the planning process for state highways. The plan also commits to continued investment in a multimodal transportation system to enhance mobility options.

1.2.3 Regional Planning

The Denver Region Council of Governments (DRCOG) adopted the Metro Vision Regional Transportation Plan (MVRTP) for the Denver region in 2018. The DRCOG region includes Douglas County, which covers most of the Study Area. The plan highlights how population growth and the distribution of households and jobs drive traffic congestion in the Denver region. Similar to the statewide transportation plan, the MVRTP recognizes the need to operate, maintain, and expand the transportation system with limited funding. The MVRTP describes the overall goals for the region to build multimodal systems and integrate communities while being fiscally responsible.

The Pikes Peak Area Council of Governments (PPACG) identifies transportation needs and goals in their *2040 Long Range Transportation Plan,* approved in 2015. The PPACG region includes El Paso County, which covers the southern end of the Study Area. Transportation needs in the region within the 2040 planning horizon are estimated to be approximately 400 percent higher than forecasted revenues. With funding limitations in mind, strategies in the

[1] ELs increase roadway capacity and help manage congestion on the highways. ELs are built in addition to any existing GP lanes and offer choice by allowing drivers to ride the bus, carpool, or pay a toll and use as a solo driver as an alternative to the free GP lanes. Toll prices are set to manage traffic and have just the right amount of vehicles in the lane to provide a reliable, shorter travel time.

plan focus on maintaining the existing transportation system; system management to preserve the capacity of the roadways; and demand management to reduce vehicle miles traveled.

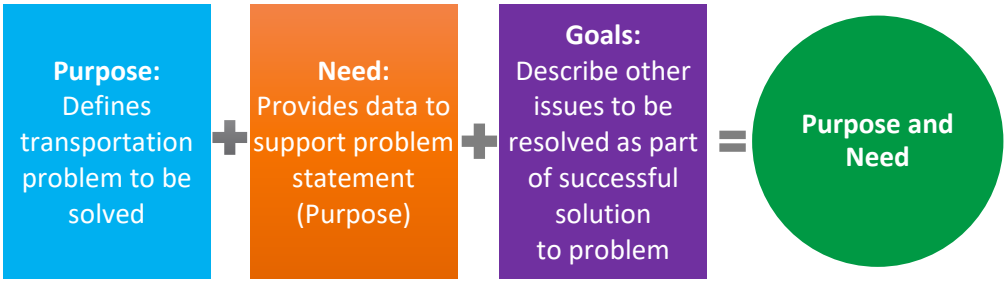
1.2.4 County Planning Commissions

Douglas and El Paso Counties both echoed common goals as those identified at the statewide and regional level. Douglas County through the *Comprehensive Master Plan 2035* and *2030 Transportation Plan* expresses a desire to improve multimodal travel choices and reduce road network demands, vehicle miles traveled, and travel duration. El Paso County's *2040 Major Transportation Corridors Plan* and 2016 update identifies community interest in developing a safe and efficient transportation system, reducing environmental impacts, and increasing multimodal opportunities.

2.0 Purpose and Need

A Purpose and Need statement is used in PEL and NEPA studies to articulate and focus on the specific problems to be addressed. The Purpose and Need is the foundation of the alternatives process, as alternatives are developed and evaluated based on their ability to meet the Purpose and Need. The Purpose and Need statement is not mode-specific or partial to a specific solution. It typically has three important parts: the Purpose, the Need, and the Goals. The Purpose defines the transportation problem to be solved. The Need provides data to support the problem statement (Purpose). The Goals describe other issues that need to be resolved as part of a successful solution to the problem.

Figure 2-1. Purpose and Need Components



To understand transportation needs in the Study Area, CDOT gathered data and information on existing conditions and local planning efforts relevant to the Study Area. The Purpose and Need developed for this PEL Study reflect input obtained through extensive coordination with local jurisdictions, communities, stakeholders, agencies, and members of the public (refer to Chapter 7.0 for details). The transportation needs assessment for the Study Area is based on a 2040 planning horizon and relies on the DRCOG and PPACG long range transportation plans.

2.1 Purpose

The Purpose and Need statement for this PEL Study is to enhance safety and improve incident management, improve travel time reliability, and improve mobility on I-25 between Monument and C/E-470. The basis for this Purpose and Need statement is summarized in Section 2.2 and the Goals are explained in Section 2.3. The I-25 PEL: Colorado Springs Denver South Connection Purpose and Need technical memorandum (TM) (Appendix E) provides more details.

2.2 I-25 Needs

Transportation improvements are required to address the following needs identified in the Study Area:

- Enhance safety and improve incident management.
- Improve travel time reliability.
- Improve mobility.

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report, with more detailed information available in TMs included as report appendices. Chapter 2 is supported by the following appendix content:

- **Purpose and Need: Appendix E**
- **Initial Corridor Assessment: Appendix B**
- **Safety Assessment Report: Appendix A**
- **I-25 South PEL Travel Demand Forecasting: Appendix G**

This summary of the needs assessment explains the primary issues identified throughout the Study Area, some of which are addressed by the I-25 South Gap Project between Monument and Castle Rock.

2.2.1 Enhance Safety and Improve Incident Management

CDOT evaluated safety issues on I-25 in the Study Area by reviewing the existing infrastructure in the corridor and analyzing crash data over the most recent 5-year period for which data are available (2011 through 2015). A total of 4,710 crashes were reported between MP 160[2] and MP 194 during the period analyzed. Details of this evaluation are documented in the ICA (Appendix B). A Safety Assessment Report (SAR) was produced later that looked at the magnitude of safety problems on the corridor using Safety Performance Functions[3] and Level of Service of Safety (LOSS)[4] (Appendix A). These evaluations indicated that safety issues on I-25 were primarily related to congestion, physical roadway conditions, and incident management. CDOT determined there is a moderate to high potential to reduce crashes and improve safety along a majority of the corridor length.

Safety Issues Associated with Congestion

Based on the common types of crashes in the corridor and when they typically occur, traffic congestion and traffic stream variability are substantial factors affecting safety in the Study Area. Rear-end and sideswipe same-direction crashes are two of the three most common crash types in the corridor. These crash types involve multiple vehicles and are indicative of congested corridors with variable speeds. The frequency of crashes in this corridor correlates strongly to the times when traffic volumes are highest from 7 a.m. to 8 a.m. and 3 p.m. to 5 p.m. In addition, crash frequency within the Gap portion of the corridor strongly correlates to the higher volumes experienced during summer months and on Fridays and Saturdays (Saturday being the most common day for crashes). The prevalence of Saturday crashes and higher traffic volumes, along with the higher crash frequencies in the summer months, suggests a higher number of recreational/non-commuting drivers unfamiliar with the corridor conditions (grades and mix of traffic), or the variation in the traffic stream induced by recreational vehicles (whether standalone vehicles or travelers pulling campers/trailers/boats), could be contributing factors to the crashes. These crash data indicate a need to improve driver expectation and reduce turbulence in the corridor.

Safety Issues Associated with Physical Roadway Conditions

Corridor geometry and physical characteristics of the corridor were evaluated in 2017 as part of this PEL Study and are documented in the ICA (Appendix B). Corridor geometry was ranked as good, fair, or poor based on adherence to current American Association of State Highway and

[2] While the southern limit of the Study Area for this PEL Study is defined as MP 161, the safety assessment in the ICA extended to MP 160.

[3] The SAR (Appendix A) states that Safety Performance Functions "…reflect the complex relationship between traffic exposure measured in Average Daily Traffic (ADT), and crash count measured in crashes per year. The Safety Performance Functions model provide [sic] an estimate of the normal or expected crash frequency and severity for a range of ADT among similar facilities."

[4] The SAR (Appendix A) states that "LOSS reflects how the roadway or intersection is performing in regard to its expected crash frequency at a specific level of ADT (major and minor)."

Transportation Officials (AASHTO 2011) and CDOT (2018) design guides. Notable conditions contributing to safety issues in the corridor are as follows:

- At the time of the geometric evaluation, shoulders in the corridor were below standard widths in several areas. Narrow shoulders can contribute to fixed object crashes, which were the second most common crash type in the corridor. The most commonly struck objects in this corridor were concrete barrier, guardrail, and cable rail, all of which are adjacent to the narrow shoulders present along much of the corridor.
- Approximately one-third of total crashes in the corridor occurred in low-light conditions. Darkness was also a factor in half of the fatal crashes. Dark, unlit roadway conditions were also noted as factors in many of the wildlife-vehicle collisions. These low-light conditions were identified as a potential safety issue primarily between Monument and Castle Rock and south of the I-25 interchange at Happy Canyon Road.
- Other geometric factors that were ranked poor in several locations in the corridor included stopping sight distance (primarily north of Castle Rock between MP 183 and MP 190), onramp and exit design (primarily between SH 105 and Tomah Road [MP 161 to MP 174]), and lane balance at exits and entrances (primarily through Castle Rock and Castle Pines [MP 180 to MP 189]). These issues can contribute to a variety of crash types, particularly rear-end crashes, which are the most common crash type in the corridor.
- Vehicles frequently collide with animals along the corridor. Deer represent the majority of the animals struck on I-25 in the Study Area, followed by elk, black bears, mountain lions, coyotes, and other small animals. Between 2011 and 2015, 785 wildlife-vehicle crashes were reported in the Study Area, representing 6 percent of the total crashes. The highest concentrations of wildlife-vehicle conflicts were documented from Monument to north of Larkspur (MP 162 to 176), at Plum Creek Parkway (MP 181), at Castle Rock Parkway (MP 185), and south of RidgeGate Parkway (MP 190 to 192).
- Wet or snowy roadway surfaces are noted as a contributing factor to many crashes, particularly run-off-road crashes, along the length of the corridor. Specific concentrations of these types of crashes occurred at four locations: in both directions at the Greenland Road interchange, in the southbound direction near the SH 105 interchange, in the northbound direction at MP 189.0, and in the southbound direction at MP 190.5. A driver's ability to brake and control the direction of their vehicle can be compromised if tire contact with the pavement is reduced because of moisture on the roadway. Beginning in September and lasting until the end of May, Colorado's chain law requires "all vehicles to be prepared to have adequate tires and equipment." Chain up stations for commercial vehicles are located on northbound I-25 at MP 158.1, south of Baptist Road, and southbound I-25 near Upper Lake Gulch Road at MP 172. During Technical Working Group (TWG) meetings, the Colorado Motor Carriers Association (CMCA) reported that both locations are difficult for truckers because trucks are entering and exiting in areas that are uphill, thereby taking trucks longer to get up to speed and merge with I-25 mainline traffic. In addition, the chain up stations are not ideally located in relation to common weather patterns. For northbound traffic, the MP 158.1 location is too far south of where bad weather and road conditions typically begin, which is north of Monument Hill. Truckers often do not yet realize that they need chains and bypass this location, causing them to chain up in undesignated areas. The

opposite situation is reported on the southbound lanes of I-25. Weather and road conditions often deteriorate before drivers reach the chain up station at MP 172.

Incident Management Issues

Roadway incidents that impede normal traffic flow include crashes, planned special events, maintenance activities, and weather events. Incident management relates to the ability to respond to and recover from incidents that contribute to secondary crashes, long travel delays, and dangerous conditions for emergency responders and highway workers. I-25 in the Study Area has limited alternate routes, discontinuous frontage roads, narrow shoulders, and limited crossover opportunities. As a result, incidents that substantially delay travel through the corridor occur regularly. This challenges emergency responders to reach incidents efficiently and safely. When drivers are diverted to local roads, they often travel circuitous roads through local communities that are not designed for highway volumes or vehicle mix, such as heavy trucks. Further, dynamic message signs between Monument and Castle Rock do not provide adequate coverage for drivers to get necessary information in a timely manner to make informed travel decisions.

2.2.2 Improve Travel Time Reliability

FHWA (2006) defines travel time reliability as "the consistency or dependability of travel times, as measured from day to day and across different times of the day." CDOT evaluated travel time reliability in the corridor to understand the level of congestion, changing traffic conditions, and factors contributing to travel delay. For the purposes of evaluating travel time, corridor was divided into two segments based on corridor context. South of US 85, the corridor traverses primarily rural areas and has relatively few exits. North of US 85, the corridor is more suburban in nature. Details of this evaluation are presented in the Travel Reliability – Existing Conditions Assessment included in the ICA (Appendix B).

While travel through the corridor takes approximately 30 minutes under free-flow conditions, travel times of 120 minutes or more are periodically recorded. Data from 2016 show instances where travel times were at least 38 percent longer than free-flow conditions on 243 days (north of US 85) and 256 days (south of US 85). Incidents, weather, and special events were factors in approximately half of the instances where travelers experienced these delays. In the portion of the corridor south of US 85, these travel delays occurred most commonly on the weekends during summer months. In the portion of the corridor north of US 85, these delays occurred primarily on weekdays during morning and evening peak commuting travel periods. Travel time reliability is especially important in this regional corridor, where motorists and freight that need to arrive at destinations on time traverse longer distances without viable parallel routes.

2.2.3 Improve Mobility

FHWA (2017) defines mobility as the ability to move or be moved from place to place. This includes the ability to reach destinations and access goods and services. The interstate system

is a vital means of mobility for people and freight within, and between, metropolitan areas. For those without access to automobiles, alternate modes of transportation are essential to mobility.

Providing mobility within and through the corridor is vital to the region's ability to serve and support projected employment growth and to sustain important freight movements, the military sector, and tourism. I-25 is the only continuous north-south interstate through Colorado and serves as the backbone for vehicular travel across Colorado's Front Range. Within the Study Area, I-25 serves as the primary travel corridor between Colorado Springs and Denver, the two most populous metropolitan areas in the state. Other north-south routes near the Study Area primarily serve shorter-distance, sub-regional trips among rural areas and only function as alternate routes to I-25 when serious incidents close or substantially delay travel on the interstate.

Mobility for all vehicular modes using the corridor (including passenger vehicles, buses, and freight) is substantially impacted by traffic congestion, which is primarily a result of traffic volumes, crashes or other incidents, and physical conditions in the corridor. The current level of transit service in the corridor also limits mobility, especially for transit-dependent populations. Safety-related factors are discussed in Section 2.2.1; other factors impacting mobility are documented in the subsections that follow.

Traffic Volumes

Although the ICA relied on the 2015 traffic data available at the time, as part of this PEL Study, CDOT collected additional traffic counts and data on travel times and patterns relevant to the corridor. Using the data, CDOT developed a travel demand model to project 2040 volumes and travel times in the corridor. Traffic counts in 2017 indicate that traffic volumes on I-25 range from 76,780 vehicles per day at the south end of the corridor to 196,260 vehicles per day at the north end. Travel times through the corridor during peak periods are approximately 32 minutes southbound and 36 minutes northbound, with speeds averaging 55 to 56 miles per hour (mph). With no changes beyond the committed projects identified in Section 3.1, traffic volumes are anticipated to increase nearly 50 percent on average by 2040, and travel times are expected to double. More detailed data, analysis, and results of the traffic analysis completed for this PEL Study are documented in the I-25 South PEL travel demand forecasting (Appendix G).

Physical Conditions

Corridor geometry and physical characteristics of the corridor were evaluated as part of this PEL Study and are documented in the ICA (Appendix B). The primary physical attributes leading to congestion-related issues identified during this PEL Study were as follows:

- Poor interchange geometrics impact mainline traffic by reducing speeds. Interchange deficiencies include short exit ramps, tight horizontal curves, narrow ramp shoulders, or steep vertical grades. Vehicles exiting the interstate are forced to slow down in the travel lanes to safely navigate the exit ramps. Ramp exit design was ranked as poor at the following locations:
  - SH 105
  - Palmer Divide Road
  - East Greenland Road
  - Upper Lake Gulch Road
  - Tomah Road/Sky View Lane
  - Plum Creek Parkway
  - Meadows/Founders Parkway
- Lane balance refers to "the proper arrangement of traffic lanes on the freeway and ramps in order to realize efficient traffic operation by minimizing the required lane shifts" (FHWA 2009). Poor lane balance at and between interchanges disrupts traffic flow on the interstate by increasing the need for lane changes. Lane balance at interstate entrances and exits on I-25 in the Study Area was ranked as poor at Palmer Divide Road and the areas from West Plum Creek Parkway to Castle Rock Parkway and Castle Pines Parkway to RidgeGate Parkway.
- Port of Entry stations encourage and promote the safe operation of commercial vehicles while protecting transportation infrastructure and the public. Two existing Port of Entry stations are located within the Study Area, near the northern limits of Monument, around MP 161.3. Because of the location of the Port of Entry stations, trucks exiting the stations must enter mainline traffic while trying to climb grades, thereby creating turbulence to mainline traffic.
- Vertical grades (uphill sections of road) can create speed differentials when commercial trucks and vehicles pulling trailers have difficulty maintaining highway speeds. This typically results from a combination of the steepness and the length of the grade. The segment of I-25 between MP 164.7 and MP 166.1 (south of the Greenland Road interchange) was ranked as poor because it results in a speed reduction on I-25 of more than 15 mph. As traffic volumes increase, steepness and length of grades may create issues at the following two additional locations :
  - Northbound I-25 between MP 185.3 and MP 186.0 (north of Castle Rock Parkway)
  - Southbound I-25 between MP 190.0 and MP 188.0 (north of Castle Pines Parkway at Surrey Ridge)

Transit and Modal Choices

Local and regional transit service can improve mobility options and is essential for populations without access to an automobile. The corridor connects the two most populous metropolitan areas in Colorado (Denver and Colorado Springs), both of which are projected to experience substantial population growth through 2040. Existing transit service in the corridor is not anticipated to meet the future demand given population projections. DRCOG, PPACG, Regional Transportation District (RTD), and Mountain Metro Transit report high demand for regional

transit and vanpool choices statewide. Public input received for this PEL Study indicates a high interest and demand for transit options to improve overall mobility choices in the region.

Rail service in the corridor is very limited; the RTD currently operates light rail north of RidgeGate Parkway in Lone Tree. South of RidgeGate Parkway, rail service is not available within the Study Area; however, CDOT has conducted several studies to advance passenger rail along the Front Range, and the Colorado State Freight and Passenger Rail Plan identifies Front Range passenger rail as an important component of CDOT's future multimodal transportation system. In 2012, CDOT, with funding from the Federal Railroad Administration, conducted the Interregional Connectivity Study (ICS), which was completed in 2014 and evaluated if and how high-speed transit could be deployed to connect communities and destinations for interregional business and tourism travel along the Front Range. The ICS concluded that high-speed transit would provide many benefits to the state. The recommended rail alignment from the ICS is available in Attachment B of the Transit TM (Appendix H).

Intercity bus service between Colorado Springs and Denver was offered intermittently beginning in 2004 and ending in 2012. In 2015, CDOT began providing Bustang interregional express bus service between Colorado Springs and Denver. The popularity of the service and growth in demand resulted in CDOT adding service between Colorado Springs and the Denver Tech Center (DTC) in 2019. Bustang service currently operates seven round trips per day between Colorado Springs and Denver and one round trip (on weekdays only) between Colorado Springs and DTC. This bus service currently operates in GP lanes on I-25 and is subject to the same congestion issues that impact overall mobility in the corridor.

2.3 Goals

Goals for this project were identified in coordination with stakeholders including local, state, and federal agencies and are consistent with local, state, and federal transportation goals (as discussed in Section 1.2). These Goals need to be considered and addressed as part of a successful solution to the transportation needs identified in Section 2.2. To this end, they were integrated into the alternatives evaluation process for this PEL Study. Alternatives were evaluated based on their ability to achieve the following Goals:

- Be compatible with the built and natural environment.
- Support corridor communities' land use, development, and economic goals.
- Integrate and leverage technological innovations and advanced transportation system management strategies.

3.0 Alternatives Development and Evaluation

This chapter explains how the various transportation concepts and elements for achieving the Purpose and Need were identified and evaluated to develop recommendations for the PEL Study. The goal of alternatives analysis for the PEL Study was to generate potential solutions for the identified transportation needs and develop a menu of feasible actions that could be advanced into future NEPA processes as funding becomes available.

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report, with more detailed information available in report appendices. Chapter 3 is supported by the following appendix content:

- **I-25 South PEL Travel Demand Forecasting: Appendix G**
- **Initial Corridor Assessment: Appendix B**
- **Alternatives Evaluation: Appendix F**
- **Alternate Routes Evaluation TM: Appendix I**

The PEL process differs from the traditional NEPA project development process of narrowing alternatives to a single preferred alternative that can be advanced into design and construction. Not knowing the timeframe or level of funding for improvements, the PEL process is intended to yield an array of options that could be effective, allowing agencies to be nimble in response to changing priorities or needs.

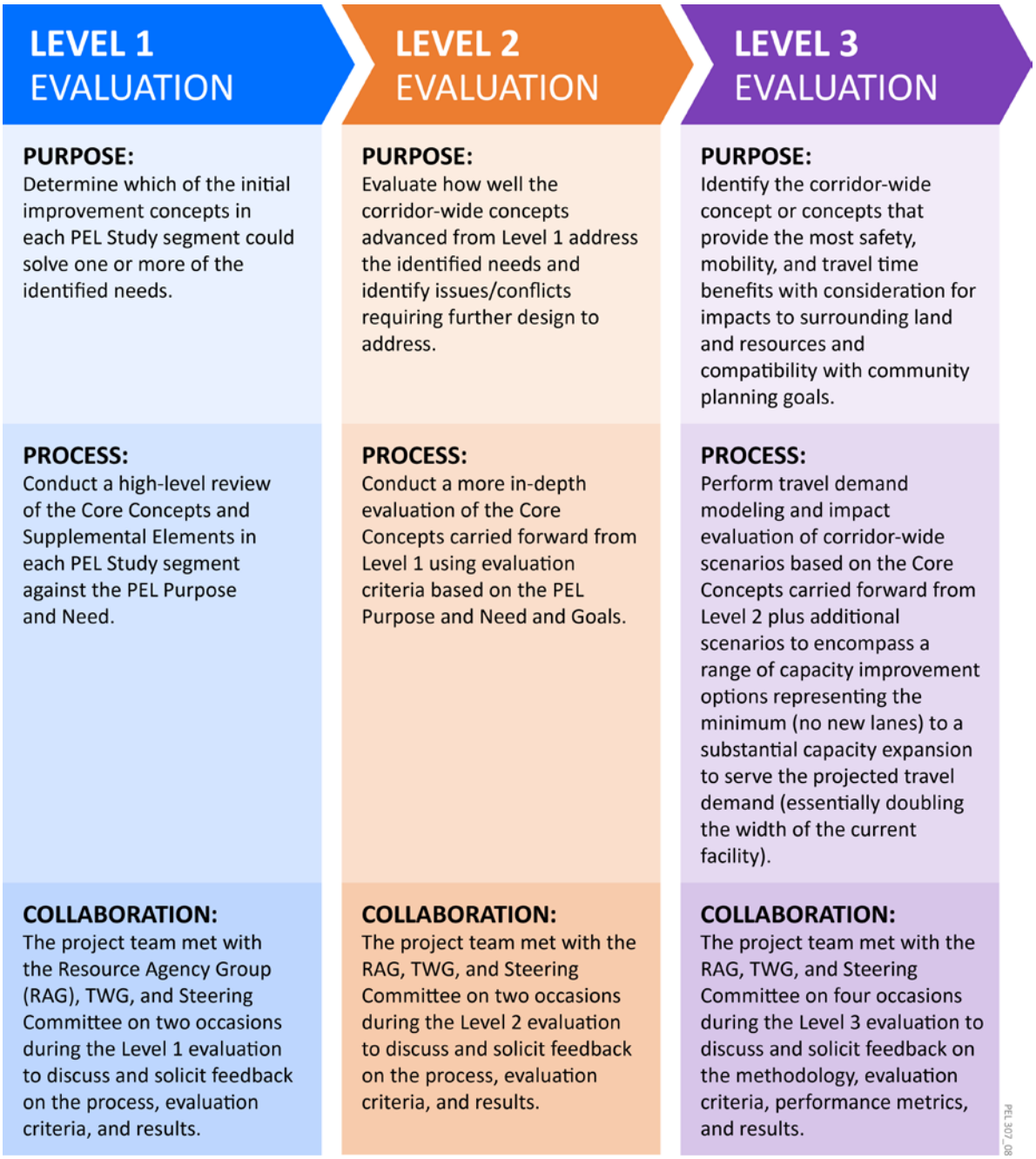
The process is intended to provide a framework for CDOT to engage with local corridor communities, regional travelers, and other interested stakeholders, to understand their concerns and ideas for immediate and longer-term improvements. The process and outcomes support an efficient transition to NEPA processes, final design, and construction advertisement once funding is identified.

A broad set of initial improvement concepts was identified by the project team, based on corridor data and public input and in coordination with the TWG. These concepts included various I-25 lane configurations, other physical improvements to the interstate, viability of alternate route improvements to solve I-25 needs, multimodal elements, and operational improvements. This menu of feasible actions was categorized into Core Concepts and Supplemental Elements, as follows:

- Core Concepts are standalone improvements that directly meet the PEL Study's Purpose and Need.
- Supplemental Elements are additional improvements that do not fully meet the Purpose and Need on their own, but improve the Core Concepts.

The PEL Study included three levels of evaluation to explore the initial concepts and ultimately develop recommendations. This process is summarized on Figure 3-1 and described in more detail in Section 3.2, Section 3.3, and Section 3.4. A 2040 No Action Alternative was established as a baseline from which to evaluate the effectiveness of alternatives. This alternative is described in Section 3.1.

Figure 3-1. Alternatives Development and Evaluation Process



3.1 No Action Alternative

The No Action Alternative serves as a baseline comparison for mobility, safety, travel time reliability, and environmental analysis purposes. The No Action Alternative consists of transportation infrastructure projects in the Study Area that are reasonably foreseeable or in progress. Reasonably foreseeable projects include those with identified or committed funding that would be constructed whether any improvements or recommendations cited in this PEL Study are implemented.

Table 3-1 lists transportation infrastructure projects included in the No Action Alternative. Projects in Table 3-1 have been modeled as a part of this PEL Study's Travel Demand Forecasting (Appendix G) and identified in regional transportation plans. The projects are organized by MP from south to north.

Because the No Action Alternative includes the I-25 South Gap Project, which is an early action project coming out of this PEL Study, the No Action Alternative partially addresses the Purpose and Need.

Table 3-1. No Action Alternative Transportation Infrastructure Projects

Project Name	Project Description	Project Milepost Range	Project Location
Highway 105 Widening, Lake Woodmoor Drive to Roller Coaster Road	Widening from 2 to 4 lanes	MP 160.8	Monument/Woodmoor
I-25 South Gap Project	Adding an EL, climbing lane, wildlife underpasses/fencing, and safety improvements	MP 161 to MP 179	Monument/Larkspur/ Castle Rock
Crystal Valley Parkway Interchange (including frontage road relocation)	New interchange	MP 179.0	Castle Rock
Valley Road Extension, Plum Creek Parkway to Fifth Street	New 2-lane extension	MP 181.2 to MP 182.2	Castle Rock
Plum Creek Parkway Widening, Wolfensberger Road to I-25	Widening from 2 to 4 lanes	MP 181.3	Castle Rock
Wolfensberger Road Widening, Coachline Road to Prairie Hawk Drive	Widening from 2 to 4 lanes	MP 182.2	Castle Rock
Southwest Ring Road Widening, Wolfensberger Road to I-25	Widening from 2 to 4 lanes	MP 182.2	Castle Rock
Ridge Road Widening, Plum Creek Parkway to Fifth Street	Widening from 2 to 4 lanes	MP 182.2 to MP 183.7	Castle Rock
Prairie Hawk Drive Widening, Wolfensberger Road to Meadows/Founders Parkway	Widening from 2 to 4 lanes	MP 182.2 to MP 83.7	Castle Rock
Liggett Road Widening, I-25 to Santa Fe Drive	Widening from 2 to 4 lanes	MP 182.8 to MP 183.7	Castle Rock
Woodlands Boulevard. Extension, Scott Boulevard to Black Feather Trail Connection	New 2-lane extension	MP 183.0 to MP 183.4	Castle Rock
Crowfoot Valley Road Widening, Meadows/Founders Parkway to Stroh Road	Widening from 2 to 4 lanes	MP 184.6	Castle Rock/Parker
US 85 Widening, Meadows/Founders Parkway to Louviers Avenue	Widening from 2 to 4 lanes	MP 186.4	Castle Rock/Sedalia
Canyonside Boulevard, Crowfoot Valley Road to Hess Road	New 4-lane road	MP 184.4 to MP 189.0	Castle Pines

Project Name	Project Description	Project Milepost Range	Project Location
Happy Canyon Road Extension, I-25 East along Newlin Gulch	New 2-lane extension	MP 187.4	Castle Pines
Hess Road Widening, I-25 to Chambers Road	Widening from 2 to 4 lanes	MP 189.0	Castle Pines/Parker
Havana Street Extension North to Lincoln Avenue	New 2-lane extension	MP 192.0 to MP 193.0	Lone Tree
RidgeGate Parkway Widening, Havana Street to Lone Tree East City Limit	Widening from 2 to 4 lanes	MP 192.6	Lone Tree/Unincorporated Douglas County
Peoria Street Widening, Sky Ridge Avenue to Belford Avenue	Widening from 2 to 4 lanes	MP 192.6 to MP 193.5	Lone Tree/Unincorporated Douglas County
I-25 Widening, RidgeGate Parkway to County Line Road South Ramps	Widening from 6 to 8 lanes	MP 192.6 to MP 195.8	Lone Tree/ Centennial
Sky Ridge Avenue Extension to Peoria Street	New 4-lane extension	MP 193.2	Lone Tree
Lincoln Avenue Interchange Improvements	Interchange Improvement	MP 193.5	Lone Tree
E-470 Widening, I-25 to Parker Road	Widening from 6 to 8 lanes	MP 194.0	Lone Tree/ Unincorporated Douglas County/Parker
C-470 Managed Lanes, Wadsworth Boulevard to I-25	Widening from 4 to 6 lanes	MP 194.0	Lone Tree/Highlands Ranch/Littleton

3.2 Development of Initial Corridor Concepts

The project team conducted an ICA (Appendix B) that included traffic, safety, and geometric analysis of corridor deficiencies through review of data, field conditions, considerations from previous studies, and input from planning, engineering, and maintenance staff at CDOT and corridor communities. The ICA provided a foundation for the initial assessment of transportation needs in the corridor. The corridor data were supplemented by public input sought during the January 2017 public meetings, which were attended by more than 350 people. Common themes from public input included addressing congestion and safety issues, improving travel time reliability, improving multimodal transportation options, and numerous location-specific suggestions ranging from noise barriers to drainage and truck stops.

The public input and data gathered through the ICA review process were used to conduct the Innovations Workshop in February 2017, which was an all-day workshop with the TWG to develop an initial range of alternatives (Figure 3-2). The workshop focused on alternative concepts to address engineering (geometric elements), operations (technology), funding and financing, and project delivery opportunities of potential alternatives. The potential improvement options throughout the corridor were categorized by I-25 mainline lane configurations, interchange and bridge improvements, other infrastructure improvements, alternative/parallel routes, multimodal elements, and operational elements.

Figure 3-2. Technical Working Group February 2017 Alternatives Workshop

More details on the input received, the initial list of alternatives generated at this workshop, and a range of concepts further developed after the workshop are included in the Level 1 and 2 Alternatives Analysis (Appendix F).

3.3 Level 1 Evaluation

The Level 1 evaluation was a high-level review of the initial list of alternatives to determine which concepts might solve one or more of the identified Needs to enhance safety and improve incident management, improve travel time reliability, and improve mobility on I-25. Any concept that addressed a Need was carried forward for further evaluation. The Level 1 evaluation resulted in concepts being classified as follows:

- **Carried forward as a Core Concept** – Standalone improvement that directly meets the PEL Study's Purpose and Need
- **Carried forward as a Supplemental Element** – Additional improvement that does not fully meet the Purpose and Need on its own, but improves the Core Concepts
- **Not Recommended** – Element that will not be evaluated further in the PEL Study because of comparatively negligible benefits or higher impacts than other concepts/elements
- **Eliminated** – Element that does not meet the Purpose and Need identified for the PEL Study

Core Concepts developed were initially envisioned as various lane and shoulder configurations, transit, and alternate routes. Supplemental Elements consisted of localized improvements, such as interchanges, wildlife crossings, truck facilities, and intelligent transportation system (ITS) elements such as ramp metering. Through the Level 1 evaluation, only the lane configuration alternatives were carried forward as Core Concepts; shoulder configurations, transit, and frontage road improvements were carried forward as Supplement Elements. Improvements to alternate routes and other local roads were either not recommended for further evaluation or eliminated through the Level 1 evaluation because they would not address conditions on I-25 contributing to safety, mobility, and reliability issues and the modest potential for traffic diversion to these routes would do little to improve travel times on I-25.

3.3.1 Lane Configurations

The options for lane configurations on I-25 were specific to the existing conditions and needs in each segment of the corridor, but generally included the following:

- Add one or more GP lanes each direction
- Add one or more EL each direction
- Add combination of GP lanes and ELs
- Convert one or more GP lanes to ELs
- Add one reversible lane
- Add/convert peak period shoulder lane (PPSL)
- New elevated travelway each direction
- Add auxiliary lanes
- Add climbing lanes

The only lane configuration that was not carried forward as a Core Concept was adding a reversible lane in Segment 1 (MP 161 to MP 179). This option was not recommended for further evaluation in this segment because the volume of northbound and southbound traffic is fairly even and the option would only serve to address traffic congestion for one direction of traffic at a time.

3.3.2 Interchanges

Data on the age and geometrics of existing interchanges collected for the ICA were reviewed throughout the corridor to identify locations where interchange improvements may serve to address safety, mobility, or reliability needs. Interchange improvements might include reconfiguring individual ramps or an entire interchange to improve safety and/or traffic flow. New interchange locations were also considered. However, no specific interchange concepts or improvements could be evaluated because the traffic information available at the time of the ICA was not sufficient to determine operational efficiency. Of the 16 interchanges and new interchange locations considered, four locations for potential interchange improvements (shown in orange shading in Table 3-2) were eliminated because they were constructed recently and/or had no identified ramp deficiencies at that time.[5] Improvements at the rest of the interchanges listed in Table 3-2 were carried forward as Supplemental Elements.

Table 3-2. Level 1 Interchange Evaluation Summary

Segment 1 Interchanges MP 161 to MP 179	Segment 2 Interchanges MP 179 to MP 189	Segment 3 Interchanges MP 189 to MP 194
Improve County Line Road/I-25	Improve Plum Creek Parkway/I-25	Improve RidgeGate Parkway/I-25
Improve Greenland Road/I-25	Improve Wilcox Street/ Wolfensberger Road/I-25	Improve Lincoln Avenue/I-25 (by others)
Improve Upper Lake Gulch/I-25	Restore US 85/I-25 Connection (at Black Feather [by others])	Add new direct EL connection to E-470 and C-470 (if EL is implemented on I-25)

[5] Because the Level 1 evaluation of interchanges was not based on traffic data, future NEPA-level studies may identify the need for improvements at interchanges that were not carried forward from Level 1.

Segment 1 Interchanges MP 161 to MP 179	Segment 2 Interchanges MP 179 to MP 189	Segment 3 Interchanges MP 189 to MP 194
Improve Spruce Mountain Road/I-25	Improve Meadows/Founders Parkway/I-25	
Improve Sky View Lane (Tomah Road)/I-25	Improve Castle Rock Parkway/I-25	
Add new Crystal Valley Parkway/ I-25 (planned by others)	Add new Happy Canyon Road/I-25 (widened by others)	
	Improve Castle Pines Parkway/I-25	

Denotes interchanges that were eliminated in the Level 1 evaluation.

3.3.3 Bridges and Structures

The Level 1 evaluation included replacement/rehabilitation of structurally deficient and/or narrow bridges and structures and adding new bridges or structures in the corridor. Of the 30 bridges/structures evaluated, all but three were eliminated from further consideration for one of three reasons: improvements were already planned by others, the bridge/structure was deemed to be in acceptable condition, or the bridge/structure does not carry I-25 and improvements would not directly improve I-25. The three bridges/structures that were carried forward as Supplemental Elements included Greenland Road box culvert (MP 167.5) and the I-25 northbound and southbound bridges at Upper Lake Gulch Road (MP 171.8). All three of these structures are being replaced as part of the I-25 South Gap Project.

3.3.4 Alternate Routes

Within the Study Area, CDOT considered the potential to serve travel demand between the metropolitan areas of Denver and Colorado Springs through improvements to alternate routes parallel to I-25 and other local routes connecting between I-25 and routes parallel to I-25. The routes considered are listed in Table 3-3.

Table 3-3. Level 1 Alternate Route Evaluation Summary

Routes in Segment 1 MP 161 to MP 179	Routes in Segment 2 MP 179 to MP 189	Routes in Segment 3 MP 189 to MP 194
Improve SH 83	Improve US 85	Improve RidgeGate Parkway
Improve SH 105	Improve SH 83	Improve Lincoln Avenue
Improve Noe Road	Other Local Road Improvements	Other Local Road Improvements
Improve South Andrews Road		
Improve Spruce Mountain Road		
Improve East Best Road		
Improve East Greenland Road		

The local roads do not provide continuous north-south routes and could not serve interstate traffic needs. Therefore, local road improvements were eliminated in Level 1. SH 83, SH 105, and US 85 provide continuous north-south connections between the Denver and Colorado Springs metropolitan areas. For the reasons summarized here, these routes were not recommended for further evaluation in the PEL Study. Details on the evaluation of these routes

is documented in the Alternate Routes TM (Appendix I) and the Level 1 and Level 2 Alternatives Analysis (Appendix F).

- Safety: Improvements to SH 83 or SH 105/US 85 would not directly improve the safety of I-25. Substandard shoulders, stopping sight distance, and lane balance at exits/entrances on I-25 that contribute to safety concerns in the Study Area would persist.
- Mobility: Improving SH 83 or SH 105/US 85 to carry more traffic would not address the mobility needs on I-25 because the roadways serve different travel markets. While they can serve as emergency detours in instances of major incidents that close I-25 for long periods of time, they are located too far from the I-25 corridor to serve daily interstate travel demand. More than 75 percent of trips on I-25 in the Study Area are between the Denver Metro area and Colorado Springs, Monument, or Larkspur. Another 20 percent of trips are between Castle Rock and Colorado Springs, Monument, or Larkspur.
- Travel-time reliability: For the reasons described under mobility, improving SH 83 or SH 105/US 85 to carry more traffic would not address the travel-time reliability needs on I-25 because these routes would do little to address congestion on the interstate. In addition, any reduction in congestion would be eroded over time as overall volumes on the transportation network increase. Long-term travel time reliability on I-25 can only be provided through designated lanes on the interstate specifically managed to provide consistent speeds and reliable trip times (e.g., ELs and PPSLs).

3.3.5 Frontage Roads

A frontage road is a type of service road that parallels a major road or freeway and is located between the road and building sites abutting the road. Along I-25 in the Study Area, frontage roads are a part of the interstate system intended to provide local access. New or improved frontage roads were evaluated in Level 1 as a means of addressing the Purpose and Need, primarily mobility, and incident management. The following options were evaluated:

- Extend I-25 frontage roads (east and west of I-25) south from Sky View Lane to Spruce Mountain Road.
- Add an I-25 frontage road from Meadows/Founders Parkway north to Castle Pines Parkway.

Both of these options were carried forward as Supplemental Elements because they are integral to the interstate system providing local access and could assist in offloading I-25 traffic in the event of an interstate closure.

3.3.6 Other Physical Elements

Other physical elements along the I-25 corridor that were explored in Level 1 include the following:

- Widen inside and outside shoulders
- Add chain up/chain down stations
- Add commercial truck emergency parking/refuge
- Add emergency median crossovers
- Add wildlife crossings/fencing
- Add/improve lighting
- Add park-n-ride facilities

While none of these elements fully meets the Purpose and Need on their own, they address safety and, to a lesser extent, mobility needs in the Study Area. All options were carried forward as Supplemental Elements.

3.3.7 Multimodal Elements

Multimodal elements, including transit and bicycle/pedestrian solutions, were explored as a means of improving mobility in the Study Area. The transit options evaluated in Level 1 and the results of the evaluation are summarized in Table 3-4.

Table 3-4. Level 1 Transit Evaluation

Multimodal Elements	Evaluation Results	Explanation
Add Passenger Rail Along I-25 (High Speed Rail or Commuter Rail)	Carried Forward as Supplemental Element	Potentially viable solution to improve mobility in the Study Area.
Add Commuter Rail Along Existing BNSF/UPRR Corridor	Not Recommended for Further Evaluation	BNSF/UPRR alignments diverge from I-25 in the Palmer Lake area and would not serve regional or local trips in much of the Study Area.
Extend Light Rail South Along I-25	Not Recommended for Further Evaluation	Light rail is not an appropriate technology because of the overall distance of the corridor and the grades in the corridor.
Add BRT on Dedicated Facility	Not Recommended for Further Evaluation	Dedicated BRT offers little advantage over enhanced regional bus service, and would be more costly.
Expand Bustang Service	Carried Forward as Supplemental Element	Potentially viable solution to improve mobility in the Study Area.

BNSF – Burlington Northern Santa Fe
BRT – Bus Rapid Transit
UPRR – Union Pacific Railroad

Trail improvements were also explored in Level 1. All identified options were carried forward as Supplemental Elements, as follows:

- Add trail underpass at Upper Lake Gulch Road
- Add trail underpass at SH 105
- Add continuous bicycle/pedestrian path between Monument and Castle Rock
- Add Front Range Trail connection to Castle Pines Parkway
- Add trail underpass at Lone Tree southern corporate limits (construction completed and identified as the East/West Regional Trail)
- Add bicycle connectivity to Centennial Trail (C/E-470 Bikeway)

3.3.8 Operations Elements

The following operations elements were evaluated in Level 1 and carried forward as Supplemental Elements:

- Consider EL fee structure
- Update incident management plan
- Accommodate autonomous vehicles
- Add queue warning
- Add ramp metering
- Add wildlife detection and alert system

- Enhance ITS infrastructure
- Add variable message sign (VMS) signage
- Enhance lane markings (e.g., solar lights)
- Implement variable speed limits
- Implement automated speed enforcement
- Implement changes to speed limits
- Add commercial truck emergency parking/refuge
- Add or relocate weigh in motion devices
- Improve special event traffic control coordination
- Add/improve lighting

3.4 Level 2 Evaluation

The Level 2 evaluation was a more in-depth evaluation of the Core Concepts carried forward from Level 1. These concepts are listed in Table 3-5. Evaluation criteria were based on the Purpose and Need (improving safety, incident management, mobility, and travel-time reliability) and Goals, including compatibility with community planning goals and minimizing environmental impacts. Performance metrics were identified for each of these criteria and used to determine how well each of the Core Concepts addressed the Needs and Goals. The Level 2 criteria and performance metrics are listed in Table 3-6. During this evaluation, the team also identified issues and conflicts requiring more design to address.

3.4.1 Core Concepts Evaluated in Level 2

Table 3-5. Core Concepts Evaluated in Level 2

MP 161 to MP 179[6]	MP 179 to MP 189	MP 189 to MP 194
Add one GP lane each direction (three lanes)	Add one GP lane each direction south of Meadows/Founders Parkway	Not applicable
Add one EL each direction (three lanes)	Add one EL each direction south of Meadows/Founders Parkway	Add one EL each direction (five lanes)
Add two GP lanes each direction (four lanes)	Add two GP lanes each direction South of Meadows/Founders Parkway and one GP lane each direction north of Meadows/Founders Parkway	Not applicable
Add one GP lane and one EL each direction (four lanes)	Add one GP lane and one EL each direction south of Meadows/Founders Parkway and one EL or GP lane each direction north of Meadows/Founders Parkway	Not applicable
Add two ELs each direction (four lanes)	Add two EL each direction south of Meadows/Founders Parkway and one EL north of Meadows/Founders Parkway	Not applicable
Add two ELs each direction (four lanes)	Add one reversible lane (one new lane, operating in the northbound direction in the morning and southbound in the afternoon)	Add one reversible lane (one new lane, operating in the northbound direction in the morning and southbound in the afternoon)
Add new elevated travelway each direction (three lanes)	Add new elevated travelway each direction	Add new elevated travelway each direction (five lanes)

[6] Core Concepts for Level 2 were developed and evaluated prior to advancing the I-25 South Gap Project as an early action project from this PEL Study. The number of lanes noted in parentheses indicates the existing condition prior to these improvements in the Gap.

MP 161 to MP 179[6]	MP 179 to MP 189	MP 189 to MP 194
Add new elevated travelway each direction (three lanes)	Convert one GP lane to an EL	Convert one GP lane to an EL (four lanes)
Add an EL and convert existing GP lanes to ELs (three lanes)	Convert all GP lanes to EL	Convert all GP lanes to ELs (four lanes)
Add/convert peak period shoulder	Add/convert peak period shoulder	Add/convert peak period shoulder
Add auxiliary lanes between Tomah Exit and Spruce Mountain Road	Add auxiliary lanes	Add auxiliary lanes
Add southbound truck climbing lane(s) or passing lane(s) at Monument Hill	Not applicable	Add a new truck climbing lane at Surrey Ridge

3.4.2 Level 2 Evaluation Criteria and Performance Metrics

Table 3-6. Level 2 Evaluation Criteria and Performance Metrics

Category	Criteria	Performance Metrics
Safety	• Reduces crashes • Improves infrastructure/address deficiencies	• Potential for crash reduction (qualitative) • Potential to address safety concerns overall (qualitative assessment of improvements at specific locations of LOSS III or IV)[a]
Travel-Time Reliability	• Improves travel times • Improves predictability of travel times • Reduces delays on I-25	• Improvement in non-recurring congestion (qualitative assessment of incident management, weather, special event management)
Mobility	• Provides additional travel options • Serves regional trip demand on I-25 • Reduces I-25 traffic diversions to local roads • Promotes multimodal options • Supports CDOT network goals for operations • Supports CDOT network goals for asset management	• Discourages cut-through traffic on local roads (qualitative; improves I-25 operations) • Ability to improve existing transit operations (qualitative) • Ability to not preclude/support new transit options (potential ROW conflicts) – BRT – Commuter rail – Interregional Connectivity Study (ICS) • Provides additional travel choices (options for multiple modes and travel choices) • Compatible with CDOT operational strategies for I-25 (e.g., managed lane policy) • Compatible with CDOT asset management goals (e.g., lifecycle costs)
Incident Management	• Reduces delays related to incident management • Improves safety for drivers and responders during incidents • Improves driver communication/coordination • Improves emergency responder communication/coordination	• Improved time to respond to incidents (qualitative) • Potential for crash reduction (qualitative) • Ability to provide emergency detours/alternate routes (qualitative)

Category	Criteria	Performance Metrics
Compatibility with Community Planning Goals	• Is compatible with Conservation Easements • Does not preclude community land use or transportation goals/projects in Master Plans • Capitalizes on opportunities for economic development/attracting businesses	• Compatible with Conservation Easements • Conceptually does not preclude planned local transportation projects (e.g., Happy Canyon interchange reconstruction or Crystal Valley/Douglas Lanes new interchange) (qualitative) • Attractive to economic development (qualitative)
Environmental Impacts	• Has relative environmental effect/level of significance that fits a category of action that has been demonstrated to have limited environmental impacts (CE), potential for significant effects (EA), likely significant effects (EIS)	• Good (CE or limited), Fair (EA or some effects but mitigated), Poor (EIS or hard to mitigate or significant)

[a] LOSS stands for Level of Service Safety. LOSS III indicates a moderate to high potential for crash reduction. LOSS IV indicates a high potential for crash reduction (SAR [Appendix A]).

CE – Categorical Exclusion

EA – Environmental Assessment

EIS – Environmental Impact Statement

3.4.3 Level 2 Evaluation Results

The Level 2 evaluation recommended all but one Core Concept (the elevated travelway between MP 161 and MP 179) be carried forward for additional evaluation. While this level of evaluation did not substantially reduce the number of concepts for further consideration, it identified common factors and differences in the benefits and impacts among the alternative concepts, as summarized in Table 3-7.

Table 3-7. Summary of Level 2 Evaluation Results for Core Concepts

Criteria Category	Common Factors in Benefits and Impacts Among Concepts	Differences in Benefits and Impacts Among Concepts
Safety	• Additional lane would reduce congestion-related crashes. • Additional lanes increase potential for lane changing crashes. • Additional lanes increase weaves at interchanges. • Supplemental Elements will be necessary to address safety needs.	• Travel speed differential varies depending on whether new capacity is EL (higher) or GP lane (lower). • Lane reduction influence areas may persist, perpetuating bottlenecks and potential for crashes in these areas. • PPSL would eliminate the use of a shoulder for emergency situations such as a broken-down vehicle.
Reliability	• Increased capacity would reduce traffic delay from non-recurring events. • Improved travel times and likely reliability because of increased capacity. • Supplemental Elements for emergency response will be necessary to address incident-related delays.	• ELs promote more reliable travel times.
Mobility	• Supplemental Elements will be necessary to address mode choices.	• ELs provide more travel choices and operational flexibility.

Criteria Category	Common Factors in Benefits and Impacts Among Concepts	Differences in Benefits and Impacts Among Concepts
	• There is reduced pressure on local roads and alternative routes with additional capacity on I-25. • Increased lane capacity does not directly support alternative travel choices (e.g., BRT, light rail transit, and bikes) but could indirectly improve conditions because of reduced pressure on local roads and improved bus operations. • Work zone flexibility is improved. • Commercial vehicle travel is improved with reduced congestion on I-25; reduced turbulence in traffic stream with additional passing opportunities.	• ELs are consistent with CDOT's goals for adding capacity and managing congestion. • All toll concepts (i.e., converting all GP lanes to ELs) could increase traffic on local roads for I-25 drivers avoiding tolls, especially in Segments 2 and 3 (MP 179 to MP 194) where alternate routes are available. • ELs are less preferable to the CMCA because of a perceived increase in trip costs and disproportionate cost sharing of new capacity to commercial vehicle companies.
Incident Management	• Space is provided for emergency responders and disabled vehicles during incidents. • Delays are reduced during incidents. • Incident response times are improved because of better maneuverability. • There is potential to reduce secondary crashes because of additional room to move incidents from traffic. • Supplemental Elements will be necessary to address emergency response and maintenance needs.	• Access to ELs (or elevated section or reversible lane) may affect incident management. • PPSLs would eliminate the use of a shoulder for incident management.
Compatibility with Community Planning Goals	• Improved traffic operations and travel times/reliability supports economic development regionally and locally. • Concept is compatible with Castle Rock and Castle Pines goals and plans (Segment 2 [MP 179 to MP 189]), except converting all lanes.	• ELs provide more reliability, which is important for economic development. • Stays within ROW or not – tied to conservation easement compatibility (Segment 1 [MP 161 to MP 179]) or planned parks (Segment 2 [MP 179 to MP 189]).
Environmental Impacts	• Some level of environmental mitigation is required because of the presence of sensitive resources. The environmental mitigation required will depend on the degree of impact.	• There is a higher impact for walls or signs, or introduction of new vertical elements. • There is a lower impact for truck climbing lane and PPSL.

3.5 Level 3 Evaluation

The Level 3 evaluation compared 11 traffic modeling scenarios and the No Action scenario (which includes the I-25 South Gap Project as being constructed) to assess additional highway capacity and operational needs for the I-25 mainline.

Each scenario represents an option for operating the existing number of lanes or adding lanes to improve mobility and travel reliability in the corridor. Some of these scenarios, which are explained in Table 3-8, are based on the Core Concepts from each of the three study

segments[7] that were carried forward from the Level 2 evaluation. Additional scenarios were identified to encompass a range of capacity improvement options representing the minimum (no new lanes) to the maximum expansion (double the width of the existing facility).

The Level 3 evaluation focused on corridor-wide scenarios primarily for the purpose of travel demand modeling. The travel performance of each scenario was measured as an indicator of relative safety, reliability, and mobility benefits. Consistent with the Level 1 and Level 2 evaluations, additional criteria were included to further assess safety benefits, consistency with local and regional community planning goals, and the potential for impacts to the built and natural environment. The collective assessment of these criteria helped to gauge overall alignment of scenarios with the PEL Purpose, Needs, and Goals.

The modeling scenarios evaluated, evaluation criteria and process, and results are summarized in this section, with more detail available in Alternatives Evaluation (Appendix F).

3.5.1 Level 3 Evaluation Modeling Scenarios

The scenarios in Table 3-8 were evaluated to represent a broad range of highway capacity improvement options for mainline I-25 between Monument and C/E-470. Scenarios were not intended to serve as preliminary design alternatives; they were intended purely to inform decision-making regarding highway capacity and operational needs on I-25.

Table 3-8. Modeling Scenarios

Scenario	Scenario Description
No Action	2040 Regional Transportation Plan network, which includes existing plus committed projects and those improvements being constructed with the I-25 South Gap Project.
Scenario A	Adds one GP lane in each direction between Plum Creek Parkway and C/E-470.
Scenario B	Adds one EL in each direction between Plum Creek Parkway and C/E-470.
Scenario C	Adds one PPSL in each direction between Plum Creek Parkway and C/E-470. This scenario was not modeled. Results were inferred from Scenario B for peak period conditions.
Scenario D	Converts one GP lane in each direction to an EL between Plum Creek Parkway and C/E-470.
Scenario E	Converts all GP lanes in each direction to ELs for the entire length of the corridor (SH 105 to C/E-470).
Scenario F	Adds one reversible lane, between Plum Creek Parkway and C/E-470. This scenario was not modeled. Results were inferred from Scenario A for peak period conditions.
Scenario G	Adds one GP lane in each direction between SH 105 and Plum Creek Parkway and two GP lanes in each direction between Plum Creek Parkway and C/E-470.
Scenario H	Adds two GP lanes between SH 105 and Meadows/Founders Parkway and three GP lanes from Meadows/Founders Parkway to C/E-470. The number of lanes was determined based on the point at which peak hour traffic does not experience substantial congestion (volume to capacity ratios on I-25 below 0.85).

[7] It should be noted that the traffic modeling performed for the Level 3 evaluation used segments that were slightly different than the PEL Study segments defined in Chapter 1 and used in the Level 1 and 2 evaluations. The segments evaluated for traffic modeling were based on lane configurations and operational characteristics of the No Action Alternative, which includes the I-25 South Gap Project improvements. For this reason, the names of intersecting routes or MPs are used in the remainder of the PEL Report in lieu of reference to segments.

Scenario	Scenario Description
Scenario I	Adds one GP lane in each direction between SH 105 and Plum Creek Parkway and one EL in each direction between Plum Creek Parkway and C/E-470.
Scenario J	Adds one GP lane each direction between SH 105 and C/E-470.
Scenario K	Adds one EL in each direction between Palmer Divide Road and Plum Creek Parkway and two ELs in each direction between Plum Creek Parkway and C/E-470.

3.5.2 Level 3 Evaluation Criteria and Process

The Level 3 evaluation was intended to identify the capacity and operation of lanes necessary to meet the Purpose and Need of the mainline highway elements of this project. The impacts associated with each scenario and a rough order of magnitude cost were also considered for comparison purposes between scenarios. Specific performance metrics were identified for each criterion to evaluate the scenarios qualitatively or quantitatively depending on the nature of the metric. Based on the evaluation results for each criterion, scenarios were assigned ratings to generally indicate how the scenario performed relative to the No Action scenario and other scenarios. The evaluation process, methodology, rating system, and rationale of the rating system for each performance metric are explained in Table 3-9.

3.5.3 Level 3 Evaluation Results

This section identifies the key takeaways from the Level 3 evaluation, with ratings for each scenario included in Table 3-10. Detailed evaluation results are available in the Alternatives Evaluation (Appendix F).

- During typical peak period conditions (barring any incidents), drivers can currently expect to traverse I-25 from Monument to C/E-470 in about 35 minutes on average. The traffic volume on I-25 is expected to increase 50 percent from 2017 to 2040; without improvements beyond the No Action scenario, the corridor travel time will almost double.
- The traffic modeling conducted for the Level 3 evaluation indicates traffic congestion would persist under any of the scenarios evaluated.
- The scenarios with the greatest increases in capacity (Scenarios G, H, I, and K) have the best traffic performance relative to other scenarios evaluated. Under these scenarios, 2040 travel times on I-25 between Monument and C/E-470 would be between 11 and 40 minutes faster (depending on the scenario and direction of peak period travel) than if no additional improvements beyond the No Action scenario were implemented.
- Scenarios proposing to increase capacity with no managed lane (Scenarios A, G, H, and J) would not meet long-term travel time reliability needs. They could improve reliability near-term by reducing congestion and congestion-related incidents that impact travel time reliability, but these benefits erode over time as traffic volumes rise and congestion increases.
- Of the scenarios with the best traffic performance (Scenarios G, H, I, and K), only those proposing to add one or more managed lanes (Scenarios I and K) would offer long-term travel time reliability. These scenarios would provide one or more lanes that are operated specifically to provide reliable travel times even during peak period congestion. Scenarios I

and K offer 2040 travel time benefits on I-25 between Monument and C/E-470 of between 11 and 31 minutes (depending on the scenario and direction of peak period travel) compared with the No Action scenario.

- The magnitude of cost and impact associated with each scenario is primarily a product of the additional width needed for each scenario. For this reason, Scenarios G, H, I, and K have higher costs and more impact than other scenarios evaluated. However, the travel time benefits of scenarios with lower costs and impacts are modest at best. For example, Scenarios A and B, which propose one additional lane north of the Gap only, would offer between 3 and 16 minutes of travel time savings (depending on the scenario and direction of peak period travel) versus Scenarios G, H, I, and K, which offer 11 to 40 minutes of travel time savings.

Table 3-9. Level 3 Rating Methodology and Evaluation Criteria

Evaluation Criteria	Performance Metric	Relevance of Performance Metrics	Evaluation Method	Rating System
Traffic Performance/Mobility	2040 Study Area Vehicle Hours Traveled (VHT)	This criterion is a fundamental measure of how well each scenario meets the project Purpose and Need. Congestion was identified as a key contributor to safety, reliability, and mobility issues in the corridor.	Quantitative	• Good: VHT decrease of 2% or more. • Fair: VHT decrease between -2% and +2%. • Poor: VHT increase of 2% or more.
	2040 Peak Period Travel Time		Quantitative	• Good: Travel time was above one standard deviation of the mean. • Fair: Travel time was within one standard deviation of the mean. • Poor: Travel time was below one standard deviation of the mean.
	2040 Travel Demand		Quantitative	The amount of traffic projected to use the interstate under each scenario as compared with the No Action scenario is an indicator of the effectiveness of the scenario in accommodating future travel demand. The portion of each scenario's total volume captured by managed lanes indicates the effectiveness of the managed lane strategy. These two metrics were used to determine the good, fair, or poor ratings.
Safety	Potential for crash reduction on I-25	This criterion is a fundamental measure of how well each scenario meets the project Purpose and Need by enhancing safety.	Qualitative	Scenarios were assigned a rating of good, fair, or poor based on the ability of each scenario to reduce the potential for existing predominant crash types.
Travel Time Reliability	Minimize impacts from recurring peak-hour and non-recurring incident and event-related congestion on I-25	This criterion is a fundamental measure of how well each scenario meets the project Purpose and Need. Accounts for operational differences between managed lanes and GP lanes.	Qualitative (summarized from Level 2)	• Good: Scenario would provide one or more lanes that could be managed to promote reliable travel times. • Fair: Scenario would reduce congestion and improve safety in the near-term. • Poor: Scenario would not increase capacity or expand managed lane options.
Incident Management	Reduce incident-related delays on I-25 and improve safety during incidents	Reduce incident-related delays and improve safety during incidents (Relevant factors/benefits include: enabling incidents to be cleared more quickly, providing a lane that can be managed for use by emergency responders, level of congestion relief allowing quicker emergency response)	Qualitative (summarized from Level 2)	• Good: Scenario would provide two or more of these benefits, including more substantial congestion relief. • Fair: Scenario would provide one of these benefits and some degree of congestion relief. • Poor: Scenario would not provide any measurable benefit.
Infrastructure Considerations	Impacts RTD light rail track, freight railroad track, local frontage roads, bridge structures, and major culverts.	Assesses how well each scenario addresses the project goal to be compatible with the built environment.	Quantitative	Scenarios were rated as good, fair, or poor based on the magnitude of potential impacts to No Action scenario infrastructure, and the rough order of magnitude cost of each scenario.
	Order of magnitude capital cost for scenarios	Provides understanding of the relative cost of implementing each scenario.	Qualitative	Scenarios were rated as good, fair, or poor based on the magnitude of potential impacts to No Action scenario infrastructure, and the rough order of magnitude cost of each scenario.
Environmental Resource Impacts	Avoids/minimizes impacts to economic, community, and natural resources	Consideration of natural resources, adjacent communities, and economic goals early in the planning stage of transportation projects is a primary function of PEL studies to aid in decision-making. Compatibility with the natural and built environment is also a goal of the project.	Quantitative	Scenarios were rated as having good, fair, or poor impacts based on the nature and magnitude of potential impacts including increases in traffic noise, exposure to hazardous materials, and impacts to public/private property, community and recreation resources, historic resources, and natural resources.
Compatibility with Community Planning Goals	Does not preclude community land use or transportation goals, projects in master plans, or opportunities for economic development.	Assesses how well each scenario addresses the project goal of providing transportation solutions to support corridor communities' land use, development, and economic goals.	Qualitative (summarized from Level 2)	• Good: Scenario would highly support goals and planned projects. • Fair: Scenario would be generally compatible with goals or would not preclude planned projects • Poor: Scenario may be incompatible with goals or preclude planned projects.

Table 3-10. Level 3 Evaluation Summary

Evaluation Category	Evaluation Criteria	Modeling Scenarios											
		No Action Scenario	Scenario A: Add 1 GP Lane	Scenario B: Add 1 EL	Scenario C: Add 1 PPSL	Scenario D: Convert 1 GP to EL	Scenario E: Convert all GP to EL	Scenario F: Add Reversible Lane	Scenario G: Add 2 GP Lanes	Scenario H: Add Max GP Lanes	Scenario I: "B" plus 1 GP in Gap	Scenario J: "A" plus 1 GP in Gap	Scenario K: Add 2 EL
Traffic Performance/Mobility on I-25	Traffic Performance/Mobility on I-25 2040 Study Area VHT (Change from No Action)	Not Applicable	◒	◒	◒	◒	○	◒	●	●	●	●	●
	2040 Peak Period Travel Times (AM Northbound Weekday)	○	○	◒	◒	○	◒	◒	●	●	●	◒	●
	2040 Peak Period Travel Times (PM Southbound Weekday)	○	○	◒	◒	◒	◒	◒	●	●	●	◒	●
	2040 Travel Demand Rating	Not Applicable	◒	◒	◒	◒	○	◒	◒	◒	◒	◒	◒
Safety on I-25	Potential for Crash Reduction on I-25	○	◒	◒	◒	◒	●	◒	◒	◒	◒	◒	◒
Travel Time Reliability on I-25	Improvement in providing reliable travel time through corridor, minimizing impacts from recurring peak hour and non-recurring incident-related congestion	○	◒	●	●	●	●	●	◒	◒	●	◒	●
Incident Management on I-25[a]	Reduced incident-related delays and improve safety during incidents	○	◒	●	◒	◒	●	◒	●	●	●	●	●
Infrastructure Considerations (Impacts and Cost)	Cost of I-25 mainline infrastructure and impacts to other infrastructure including RTD light rail track, freight railroad track, frontage roads, bridge structures, and major culverts	Not Applicable	◒	◒	●	●	●	◒	○	○	○	◒	○
Environmental Impacts	Impacts to economic, community, and natural resources	○	●	●	●	●	○	●	◒	○	◒	◒	◒
Compatibility with Community Planning Goals[a]	Does not preclude community land use goals, transportation planning goals, or projects in master plans	○	◒	◒	◒	◒	○	◒	◒	○	◒	◒	◒

[a] Results summarized from Level 2 Evaluation; Scenarios not specifically evaluated in Level 2, were inferred based on Level 2 results.

● Good

◒ Fair

○ Poor

4.0 PEL Study Recommendations

In collaboration with the Steering Committee (SC), TWG, and Resource Agency Group (RAG), the study team developed recommendations to achieve a long-term vision for I-25 in the Study Area. PEL Study recommendations include the following:

- Configuration and operation of future travel lanes on I-25 mainline to enhance safety and improve travel time reliability and mobility of I-25 between Monument and C/E-470
- Supplemental Elements including multimodal, trucking facilities, and other highway improvements that further improve mobility and safety in the corridor

These PEL Study recommendations are intended to augment the early action project currently being implemented in the Study Area between Monument and Castle Rock (I-25 South Gap Project). Improvements made as part of the I-25 South Gap Project are the first actions coming out of this PEL Study that address the identified Needs.

The I-25 South Gap Project includes the following improvements:

- Add a new 12-foot EL and 4-foot buffer northbound and southbound.
- Widen inside and outside shoulders to allow room for disabled vehicle recovery, enforcement zones, maintenance, and detours around incidents.
- Perform interchange improvements at Palmer Divide Road and I-25.
- Rehabilitate structures and pavement, including replacing the I-25 bridges over East Plum Creek, Greenland Road, and Upper Lake Gulch Road, and replacing the Spruce Mountain Road structure over I-25.
- Provide four new wildlife underpasses and expand the existing underpass at East Plum Creek.
- Install retaining walls throughout the corridor.
- Add southbound auxiliary lane between Sky View Lane and Spruce Mountain Road.
- Add southbound truck climbing lane between MP 162.0 and MP 166.9.
- Improve drainage and add other features such as lighting, signage, fencing, and water quality treatment.
- Open southbound rest area for truck chain up in inclement weather; provide longer acceleration and deceleration lanes for entering and exiting the chain up location.

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report with more detailed information available in report appendices. Chapter 4 is supported by the following appendix content:

- **I-25 South PEL Travel Demand Forecasting: Appendix G**
- **Mapbook: Appendix C**
- **Initial Corridor Assessment: Appendix B**
- **Transit TM: Appendix H**
- **Agency and Public Coordination: Appendix D**
- **Wildlife TM: Appendix J**
- **Technology and System Management Tools TM: Appendix K**

4.1 I-25 Mainline Recommendations

4.1.1 Lane Configuration and Operation

In the long term, CDOT recommends extending the northbound and southbound ELs being constructed as part of the I-25 South Gap Project north to C/E 470 and adding one additional travel lane in each direction between SH 105 and C/E-470 (Figure 4-1). This recommendation would ultimately result in four travel lanes in each direction between SH 105 and Plum Creek Parkway, five travel lanes in each direction between Plum Creek Parkway and Meadows/Founders Parkway, and six travel lanes in each direction between Meadows/Founders Parkway and C/E-470.

A continuous EL from Monument to C/E-470 is critical to meeting the Purpose and Need because managed lanes provide long-term travel time reliability in the corridor. The EL also provides a faster, more reliable trip for bus service in the corridor, which, combined with complementary investments such as additional trips per day and service in additional markets, provides improved mobility for transit users, particularly transit dependent populations.

The operation of the second travel lane to be added between SH 105 and C/E-470 would be determined when funding for those improvements is identified and they advanced into NEPA and design. This additional travel lane would further improve mobility in the corridor as traffic volumes continue to increase over time. The additional lane could allow for better maneuverability to pass slower vehicles or avoid incidents. As the vehicle fleet transitions to increasingly autonomous vehicles, the availability of this lane for dedicated autonomous vehicle use could improve the viability of the corridor for this emerging technology. The best use for this additional lane should be a primary consideration during future studies.

4.1.2 Traffic Evaluation

Because the recommended lane configuration and operation for the I-25 mainline was not specifically modelled in the Level 3 evaluation, additional modeling was completed to confirm the mobility and reliability benefits of CDOT's recommendation. This analysis is documented in *Technical Note - I-25 South PEL Travel Demand Forecasting* (Appendix G). Modeling indicates the recommended lane configuration (Figure 4-1) would provide substantial traffic benefits as compared with the No Action Alternative, reducing regional VHT between 2.2 and 2.8 percent and reducing travel times during peak travel periods by 16 to 34 minutes in GP lanes and 16 to 19 minutes in ELs.

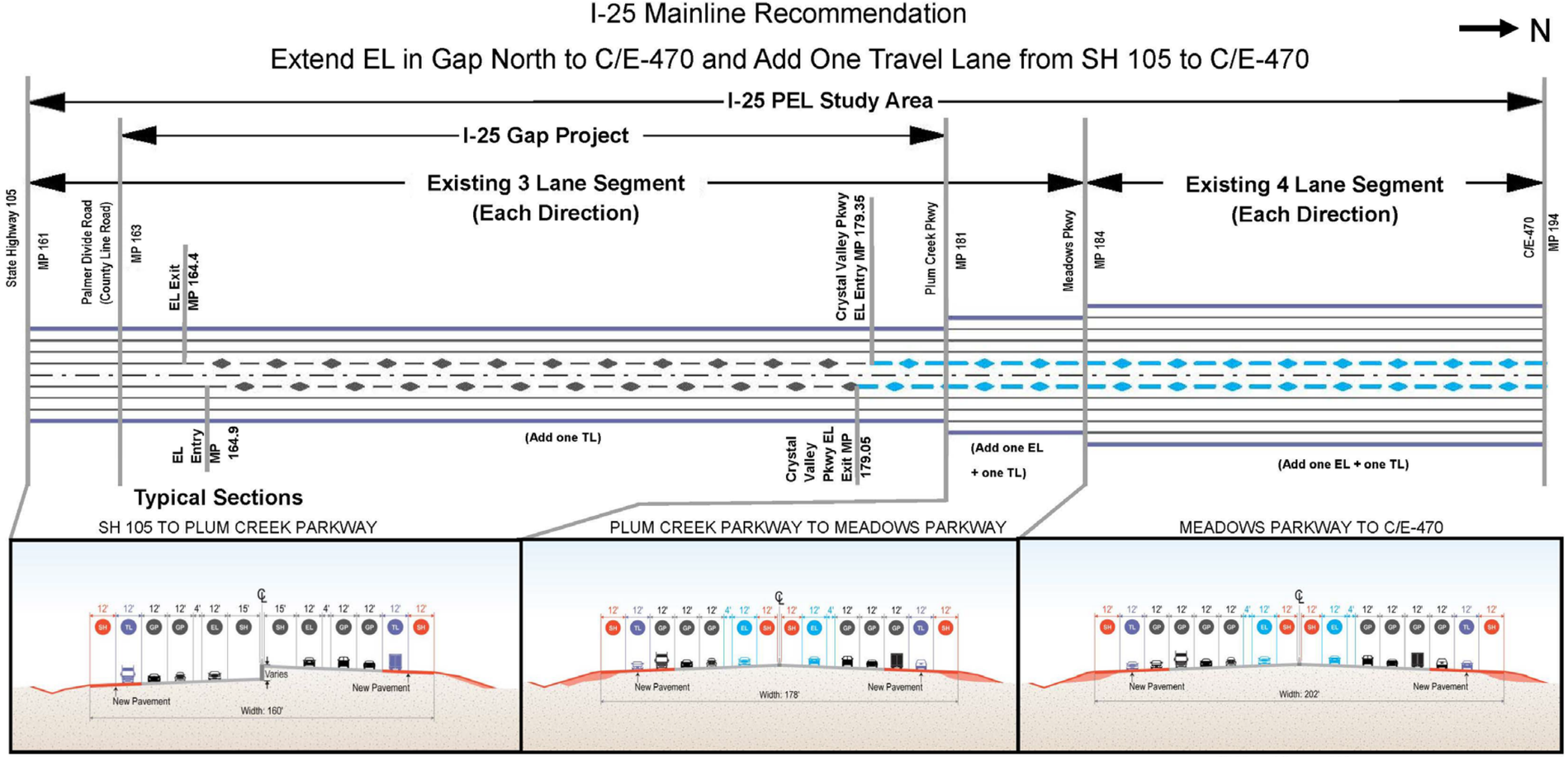
Conceptual design of the I-25 mainline recommendation (Appendix C) built off the initial I-25 lane configuration layouts developed for the Level 3 evaluation. The conceptual design was used to inform planning level cost estimates (Section 4.1.4) and evaluate potential environmental impacts and mitigation (Chapter 6). The design includes the

Figure 4-1. I-25 Mainline Recommendation

I-25 PEL: Colorado Springs Denver South Connection

I-25 Mainline Recommendation

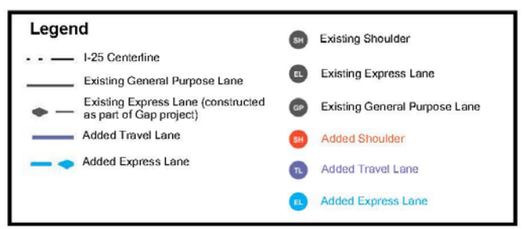
Extend EL in Gap North to C/E-470 and Add One Travel Lane from SH 105 to C/E-470



Notes:

- I-25 Gap project includes one southbound auxiliary lane between (Sky View Lane and Spruce Mountain Road), and one southbound truck climbing lane between MP 165.8 and 166.9.
- I-25 Mainline Recommendation north of the Gap Project includes one auxiliary lane between: Crystal Valley Parkway and Plum Creek Parkway, Plum Creek Parkway to Wolfensberger Road, and Wolfensberger Road to Meadows Parkway (both directions).
- New pavement width may require a full reconstruction of existing shoulders to accept new travel lane traffic.
- Lane configuration diagram does not show lane drops needed for transition to existing number of lanes at each end of the Study Area.

Number of Lanes	GP	EL	TL	Total
North of Meadows/Founders Parkway	4	1	1	6
Plum Creek Parkway to Meadows/ Founders Parkway	3	1	1	5
Palmer Divide Road to Plum Creek Parkway (Gap)	2	1	1	4
SH 105 to Palmer Creek Road (Gap)	3	0	1	4



lane configurations discussed in Section 4.1.1 and on Figure 4-1, median barriers, ditch sections, retaining walls, and the following Supplemental Elements:

- Standard width shoulders[8]
- Auxiliary lanes[9] deemed necessary for proper function of the recommended lane configuration including (northbound and southbound) from Crystal Valley Parkway to Plum Creek Parkway and Plum Creek Parkway to Wolfensberger Road, and from Wolfensberger Road to Meadows/Founders Parkway
- Widening of I-25 structures needed to accommodate the recommended typical sections

Other Supplemental Elements such as interchange improvements, additional auxiliary lanes, climbing lanes, chain up stations, and Port of Entry facilities either warrant further evaluation by CDOT before specific recommendations can be made or would be implemented by others. Therefore, these elements are discussed further in Section 4.2 but were not included in the conceptual design.

Design Optimization of I-25 Mainline

The PEL Study team evaluated opportunities to optimize the design of the I-25 mainline to avoid or minimize unnecessary costs and impacts, primarily using retaining walls and centerline shifts. In the conceptual design, the I-25 concrete median barrier centerline remains in place from the southern end of the Study Area at SH 105 (MP 161.0) to just north of Castle Pines Parkway (MP 188.5). North of Castle Pines Parkway, there are three locations where design optimizations are proposed to avoid or minimize the impacts of widening the interstate. The proposed optimizations and rationale for each are as follows:

- Shift the I-25 centerline to the east between MP 189.5 and MP 190.2 to avoid impacts to the Journey Church and North Clydesdale Road, which is a local collector road that intersects with Oak Lane providing a vital emergency access to Havana Street. This shift to the east could be accommodated within the undeveloped space between the interstate and Havana Street, which is more than 200 feet wide. Douglas County has a 40-foot-wide transit easement in this area. Avoiding and minimizing impacts on the west side of the interstate would require coordination with Douglas County to confirm the location of the transit easement and how an interstate alignment shift at this location could be accomplished without impeding the transit easement.

[8] Interior shoulders for the I-25 South Gap Project are 15 feet wide, which is beyond the standard 12-foot shoulders recommended in the remainder of the project corridor. Wider shoulders were recommended for the I-25 South Gap Project as a result of the unique conditions of that portion of the interstate. At 7,352 feet, Monument Hill is the crest of the Palmer Divide and is the high point on I-25 between New Mexico and Wyoming. The hill creates its own micro-scale weather patterns, often resulting in significantly more precipitation/snow than the Denver or Colorado Springs areas. The 15-foot interior shoulders provide more room for snow accumulation/removal, emergency truck parking, and incident management.

[9] Auxiliary lanes and climbing lanes were carried forward as Core Concepts from Level 1 and 2. Subsequent analyses indicate these improvements were more accurately classified as Supplemental Elements because they would not fully meet the Purpose and Need on their own, but would enhance the performance of the recommended lane configuration.

- Shift the I-25 concrete median barrier centerline to the west between MP 190.5 and MP 192.0 to avoid impacts to the light rail tracks and the RidgeGate Parkway Station. Because of the hilly terrain in this area, shifting the interstate west would require retaining walls up to 20 feet in height between North Surrey Drive and the I-25 interchange at RidgeGate Parkway. Slope stability issues encountered during previous I-25 expansion in this area would need to be evaluated. It is also anticipated that the existing one-lane box culvert underneath I-25 to access Surrey Ridge Drive would have to be replaced, along with some realignment of North Surrey Ridge Drive and potentially some portion of the Douglas County East/West Trail within this area.
- Shift the I-25 centerline to the east between MP 192.6 and the northern limit of the Study Area at MP 194.0 to avoid impacts to the light rail tracks and the Lincoln Station. This shift to the east would begin at the location of the light rail bridge crossing of I-25 between RidgeGate Parkway and Lincoln Avenue. Traffic lanes at this point of the interstate would redirect to the east to accommodate the additional I-25 mainline lanes and dedicated manage lane connections to C/E-470. It is anticipated that the Lincoln Avenue interchange would need to be reconstructed to accommodate this shift to the east and additional width of I-25. These improvements would also require replacement of the pedestrian overpass bridge structure connecting to the Lincoln Station and more than likely require a relocation of the shared-use path and Bierstadt Way that exists just north of Lincoln Avenue.

4.1.3 Cost

Based on conceptual design completed for this study, as described in Section 4.1 and in the mapbook (Appendix C), estimates of probable cost for the I-25 mainline recommendation range between $1.4 and $1.8 billion.[10] This estimate of probable cost includes core construction items such as removal of existing pavement, earthwork, retaining walls, road base, pavement, ITS infrastructure for the EL, and widening or replacing I-25 bridge structures as needed to accommodate the new I-25 typical section.[11]

Additional construction item allowances were added to the core construction items to account for unforeseen items, storm water management, drainage and water quality, utilities, final signing and striping, construction signing and traffic control, mobilization, and construction force accounts. Other high-level allowances were also added to account for design, construction, and ROW for the I-25 mainline recommendation. The following items are not included in this estimate:

- Interchange improvements above and beyond the widening or reconstruction of bridges necessary to accommodate the wider I-25 typical section
- Improvements to local roads that access the interstate
- Improvements to frontage roads impacted by the interstate widening

[10] This estimate is based on 2018 costs. During project development, costs estimates will be refined based on preliminary and final design and will be escalated to account for increased costs in the projected construction year(s).

[11] It is assumed that existing shoulders would need to be reconstructed to accommodate future travel lanes and this cost is included in the estimate.

- New wildlife underpass and overpass structures (in addition to those being implemented in the Gap)

4.2 Supplemental Element Recommendations

In discussions with the SC, TWG, and RAG, the study team developed various Supplemental Element recommendations as part of the PEL Study. Recommendations for Supplemental Elements are summarized in Table 4-1 and further discussed within this chapter. While these Supplemental Elements alone do not fully satisfy the Needs identified for the I-25 mainline, they will provide improved performance of I-25 and are worthy of consideration as standalone projects or in combination with I-25 mainline improvements. Many of the Supplemental Elements represent opportunities to combine local efforts with those of CDOT. Chapter 5 lays out potential funding sources and briefly describes the steps to develop these elements into projects.

Table 4-1. Summary of Supplemental Element Recommendations

Category	Supplemental Element	Recommendation
Multimodal	Trails	• Consider accommodating Colorado Front Range Trail crossing on future overpasses over I-25 (trail depicted on Figures 6-1 through 6-3 in Chapter 6) • Coordinate with local municipalities on future structures over I-25 or larger culverts crossing under I-25 to accommodate regional trails • Coordinate with local jurisdiction on new trail underpass at Spring Gulch in Castle Pines
	Bus	• Expand Bustang service and facilities
	Passenger Rail	• Add passenger rail along I-25
Truck Facilities	Climbing Lanes	• Future consideration for additional climbing lanes at: – Southbound between MP 188.0 and 190.0 – Northbound between MP 185.3 and 186.0
	Port of Entry	• Relocate northbound and southbound facilities to more accommodating locations (for example the Larkspur Rest Area as suggested by stakeholders)
	Chain Up Stations	• Relocate to better suited locations along I-25 before vertical grades steepen
Other Highway	Interchanges	• Further analyze: – Interchange improvements timed with I-25 mainline improvements – I-25 and US 85 direct connect ramps (northbound I-25 to northbound US 85 and southbound US 85 to southbound I-25 for GPs or ELs) – I-25 and C/E-470 direct connect ramps for ELs to and from the south
	Auxiliary Lanes	• Maintain existing auxiliary lanes in the corridor • Further evaluate additional auxiliary lanes at these locations: – Northbound and Southbound between Baptist Road and SH 105 (just south of the Study Area) – Northbound and Southbound between Crystal Valley Parkway and Plum Creek Parkway – Northbound and Southbound between Wolfensberger Road and Meadows/Founders Parkway

Category	Supplemental Element	Recommendation
		– Northbound and Southbound between Meadows/Founders Parkway and Castle Rock Parkway – analysis during the PEL Study indicates that the proximity of Castle Rock Parkway interchange to Meadows/Founders Parkway interchange created short weave lengths. Coordination between the local jurisdiction and CDOT may be needed to resolve this issue.
	Wildlife Crossings	• Construct wildlife overpass at MP 166.3 • Evaluate upsizing culverts and constructing new underpasses at locations near Larkspur and near the Sky View Lane interchange area. • Further evaluate the need for crossings (deer-sized or smaller) between Castle Rock and C/E-470 and fencing at the I-25/Happy Canyon Creek bridge.
	Technology and System Management	• Continue to consider upgrades of existing technologies • Evaluate additional technologies that may be applicable as standalone projects or elements of future projects
	Frontage Roads	• Coordinate between CDOT and local jurisdictions regarding anticipated impacts to frontage roads

4.2.1 Multimodal

Improving mode choice for regional travel between Colorado Springs and Denver is an integral part of meeting mobility needs in the Study Area. The transit evaluation completed for this PEL Study is documented in the Transit TM (Appendix H) and summarized here. Evaluation of alternatives in Level 1 resulted in two transit alternatives being carried forward for further evaluation: Expand Bustang Service and Add Passenger Rail along I-25. DRCOG, PPACG, RTD, and Mountain Metro Transit report high demand for regional transit statewide and public input received during this PEL Study indicates a high interest and demand for transit options to improve overall mobility choices in the region. Given the substantial population growth projected in the Denver and Colorado Springs metropolitan areas, demand for transit is anticipated to continue rising.

Bus

CDOT's regional bus service (Bustang), which has been operating in the Study Area since 2015, was expanded in 2017 and 2018 to meet increasing demand.

The I-25 mainline recommendation discussed in Section 4.1 supports expansion of Bustang service by extending the EL currently being constructed in the Gap north to C/E-470. Bustang currently operates in GP lanes on I-25 and is subject to traffic congestion, travel delay, and unpredictable trip times. The EL will provide a faster, more reliable trip for bus service in the corridor, which, combined with complementary investments such as increased trips per day and service in additional markets, can lead to increased transit ridership. CDOT will continue to evaluate service increases based on ridership demand.

Throughout the PEL Study (and prior), CDOT has been discussing Bustang service with Castle Rock and Castle Pines. Officials and residents of both municipalities have expressed interest in bus service. If an appropriate location can be identified for a transit station, CDOT will pursue adding the Castle Rock market to its service. Three locations for transit stations in Castle Rock are being evaluated by CDOT: the I-25/Wolfensberger Road Interchange, Douglas County

Administrative Building/3rd Street, and Walker/Pine Canyon property. Each of the locations has benefits and are considered potentially viable for future station development. More details regarding the advantages and disadvantages of each site are available in the Transit TM (Appendix H). The PEL Study is not recommending a specific station location. Future transit project development efforts by CDOT's Division of Transit and Rail (DTR) will determine a specific location and conduct additional analysis on station configuration, parking, required interchange modifications, access changes, ability to connect to future passenger rail service, and ability to phase station development.

Recommendations for Bus

Through coordination with CDOT's DTR and input from local jurisdictions during this PEL Study, CDOT recommends expanding Bustang service as a near-term solution for improving mobility in the Study Area. The following activities are recommended to expand Bustang service in the Study Area:

- Continue to increase Bustang service to meet ridership demand
- Add the Castle Rock market to Bustang service
- Continue the evaluation of a Transit Station in Castle Rock

Passenger Rail

In 2012, CDOT, with funding from the Federal Railroad Administration, conducted the ICS, which was completed in 2014 and evaluated if and how high-speed transit could be deployed to connect communities and destinations for interregional business and tourism travel along the Front Range. Within the Study Area, the ICS alignment was located along the east side of I-25, generally adjacent to (but outside of) CDOT ROW, except through the towns of Monument and Castle Rock, where the ICS alignment was planned within CDOT's ROW for approximately 3 miles from SH 105 to north of County Line Road in the Monument area and approximately 8 miles from north of Tomah Road to Meadows/Founders Parkway in Castle Rock. Within the PEL corridor, the ICS recommended stations in Monument (south of County Line/Palmer Divide Road), Castle Rock (south of Plum Creek Parkway), and Lone Tree (at the RTD RidgeGate Parkway station). The ICS conceptual rail alignment and stations between Briargate Boulevard in Colorado Springs and C/E-470 are available in the Transit TM (Appendix H).

In 2017, CDOT established the Southwest Chief & Front Range Passenger Rail Commission to facilitate the development of a Front Range passenger rail system. Although the ICS evaluated and recommended high-speed technologies (consistent with Federal Railroad Administration guidance) for passenger rail in the Front Range, the Commission is evaluating both high speed and commuter rail technologies. Both technologies are consistent with CDOT's vision for providing passenger rail along the Front Range, and CDOT is working with the Commission to further a service development plan for Front Range passenger rail that defines alignment/route, station locations, service levels, technology, and estimated capital and operating costs.

Recommendations for Passenger Rail

The PEL Study supports the conclusion from the ICS Study and the Commission charter that passenger rail would provide many benefits to Colorado and that service between the state's largest urban areas of Colorado Springs and Denver is a high priority. CDOT recognizes the public support and mobility benefits of regional transit between Colorado Springs and Denver.

This PEL Study recommends passenger rail as a long-term improvement in the I-25 corridor, in conjunction with highway capacity improvements and more immediate transit solutions such as expanded Bustang service in the corridor. CDOT and FHWA will continue to coordinate with the Commission as the Front Range passenger rail study progresses to determine how best to implement recommended highway and rail improvements in the I-25 corridor.

Trails

Conflicts and opportunities to accommodate existing and planned trail facilities that intersect or fall adjacent to the corridor were identified within the Study Area. Most trails run parallel to I-25 and will not be affected by the I-25 mainline recommendation. The Colorado Front Range Trail, however, has a planned crossing within the Study Area, and Castle Pines indicated that the Spring Gulch drainage is an ideal location for a future trail crossing under I-25.

Recommendations for Trails

Any future structure designed to carry the Colorado Front Range Trail across I-25 should consider the full buildout of the I-25 mainline recommendation. To avoid the high costs of a standalone structure, trail planners should coordinate with CDOT and the local municipalities to see if the trail could be accommodated on one of the future interchange structures over I-25. Alternately, any mainline improvements within Castle Pines should consider accommodation of a trail underpass at the location of Spring Gulch.

4.2.2 Truck Facilities

Climbing Lanes

Climbing lanes are a means of minimizing conflicts in operating speeds that can occur as trucks and vehicles pulling trailers navigate steep grades. Climbing lanes serve to separate slower moving vehicles from faster traffic, allowing passenger vehicles in the primary travel lanes to maintain speed on steep and/or long grades.

Two climbing lanes currently exist in the Study Area in areas where trucks must navigate steep grades in high volume traffic:

- Northbound between MP 162.0 (existing Port of Entry) and MP 163.4

Southbound between MP 166.9 and MP 162.0 (existing Port of Entry) (constructed as part of the I-25 South Gap Project)New climbing lanes were also discussed with the PEL Study stakeholders based on percent and length of grade at the following two locations:

- Southbound between MP 190.0 and MP 188.0
- Northbound between MP 185.3 and MP 186.0

Existing traffic operations at these two locations were evaluated by the study team, and it was determined that these locations are not currently impacted by slow-moving vehicles. A speed

reduction for heavy trucks of 10 mph or more is a condition that warrants consideration for climbing lanes but is not occurring in these locations.

Recommendations for Climbing Lanes
CDOT recommends monitoring travel conditions for heavy trucks southbound between MP 190.0 and MP 188.0 and northbound between MP 185.3 and MP 186.0 to identify conditions that would warrant consideration for climbing lanes.

Port of Entry
Port of Entry stations encourage and promote the safe operation of commercial vehicles while protecting transportation infrastructure and the public. Two existing Port of Entry stations are located within the Study Area, near the northern limits of Monument. Both northbound and southbound Port of Entries are located at MP 161.3. At their current locations, inspectors work under difficult conditions, with limited space to operate, and are exposed to the elements during inclement weather. Relocating the facilities provides an additional opportunity to update the facilities to desirable safety standards, which could include covered inspection bays, improved separation for inspectors, restrooms, lighting, and possibly truck electrification.

Recommendations for Port of Entry
CDOT recommends that both Port of Entry facilities be relocated, potentially as an early action project, to locations within the corridor that allow for safer conditions and improved mobility for both the I-25 mainline and Port of Entry operations. Chapter 5 discusses potential Port of Entry locations that were identified during discussions with stakeholders during the PEL Study.

Chain Up Stations
Beginning in September and lasting until the end of May, Colorado's chain law requires "all vehicles to be prepared to have adequate tires and equipment." While at times all vehicles, commercial and non-commercial, are required to use proper traction devices, most often this applies to commercial vehicles.

Existing chain up stations are located on northbound I-25 at MP 158.1 (south of Baptist Road and south of the Study Area), and southbound I-25 at MP 170.8. In addition to CMCA statements that both locations are difficult to enter and exit, the chain up stations are not ideally located in relation to common weather patterns, which cause the most concern. For northbound traffic, the MP 158.1 location is too far south of where bad weather typically begins, which is north of Monument Hill. Truckers often don't realize that they need chains and bypass this location, causing chain ups to occur in undesignated areas. The opposite experience is reported on the southbound lanes of I-25, as traffic must drive through snowy and icy conditions before reaching a designated chain up area. If weather conditions start deteriorating further north first, as is typical, freight operators cannot use the southbound chain up station at MP 170.8 and therefore use undesignated areas.

Recommendations for Chain Up Stations
It is recommended that both the northbound and southbound chain up stations be relocated to better-suited locations along I-25. Chapter 5 identifies potential locations for the chain up stations that were recommended during discussions with the stakeholders as part of the PEL Study.

4.2.3 Other Highway Infrastructure

Interchanges

The traffic analysis for the PEL evaluated the I-25 corridor at a macro level using DRCOG and PPACG's regional travel demand model. The traffic evaluation focused on regional travel between the southern part of the Denver metropolitan area and Colorado Springs via the primary north-south serving facilities in the corridor, such as I-25 and US 85. Early in the alternative evaluation process, it was determined that improving the interchanges and cross-streets in and of themselves would not address the I-25 mainline needs identified in the PEL Study. As a result, refined traffic analysis and design was not performed on existing and planned interchange ramps, except for two system-level connections; C/E-470 in Lone Tree and US 85 in Castle Rock.

While traffic and engineering analysis was not completed to identify problems with interchanges or improvements recommended to interchanges in the Study Area, preliminary analysis indicates many existing interchanges will be unable to accommodate the width of the interstate proposed in the I-25 mainline recommendation. As indicated in Table 4-2, some interchanges will require modifications or replacement during either the construction of the EL (initial phase), or the additional travel lane (subsequent phase). Anticipated impacts to interchanges in the Study Area are as follows:

- Interchange access ramps and mainline gore areas will require reconstruction, along with adjustments to I-25 mainline auxiliary lanes and acceleration/deceleration lengths, to achieve safe merge, diverge, and weaving functionality.
- Overpass/underpass bridge structure crossings will either be impacted to such an extent that a full replacement will be required or the existing structure will need to be altered to accommodate the I-25 widening.
- The interchange type may need to be reevaluated altogether to meet the regional/local forecasted travel demand and traffic operations of I-25 and the local network.
- Drainage facilities within interchange areas will require modification or expansion.

Planned and future interchange design and improvements in the corridor should be coordinated between CDOT and local jurisdiction(s) to determine if and how accommodations for the I-25 mainline should be incorporated. Three examples where such coordination would be needed are as follows:

- Douglas County and Castle Pines are currently preparing an interchange modification request for the Happy Canyon Road Interchange.
- A new interchange is planned for Crystal Valley and would also relocate the western frontage road to the west side of the railroad track from Plum Creek Parkway to Tomah Road.

Table 4 -2. Existing and Future Interchanges Within the PEL Study Area

Interchange Location	Cross Street	Interchange Type	Underpass or Overpass	Existing, New, or Future Interchange	Construction or Planned Construction Year	Anticipated Improvement to accommodate the I-25 Mainline Recommendation
Exit 161	SH 105	Partial Cloverleaf	Not Applicable	Existing	2004	No impacts anticipated to structure
Exit 163	County Line Road/ Palmer Divide Road	Diamond	Overpass	Existing	1964	Replace structure
Exit 167	East Greenland Road	Diamond	Underpass	New[a]	2021	Widen structure
Exit 172	Upper Lake Gulch Road	Diamond	Underpass	New[a]	2021	Widen structure
Exit 173	Spruce Mountain Road	Northbound Overpass Entrance Ramp/Southbound Diagonal Exit Ramp	Overpass	New Ramps[a]	1964	No impacts anticipated to structure
Exit 174	Tomah Road (Sky View Lane)	Diamond with Frontage Roads	Overpass	Existing	1965	Replace structure
Exit 179	Crystal Valley Parkway	Diamond	Overpass	Future[b]	2022	No impacts anticipated to structure
Exit 181	West Plum Creek Parkway	Tight Diamond	Underpass	Existing	2010	Widen structure
Exit 182	West Wolfensberger Road	Diamond	Overpass	Existing	2003	Replace structure
Not applicable	US 85/Black Feather Trail	TBD	Overpass	Existing Overpass and Potential Future Interchange[b]	2002	Slope paving with wall
Exit 184	Meadows/Founders Parkway	Diamond	Overpass	Existing	1999	No impacts anticipated to structure
Exit 185	Castle Rock Parkway	Partial Cloverleaf	Underpass	Existing	2015	Widen structure
Exit 187	East Happy Canyon Road	Diamond	Overpass	Future[b]	1965	Replace interchange
Exit 188	Castle Pines Parkway/Hess Road	Partial Cloverleaf	Overpass	Existing	2005	Replace structure

Interchange Location	Cross Street	Interchange Type	Underpass or Overpass	Existing, New, or Future Interchange	Construction or Planned Construction Year	Anticipated Improvement to accommodate the I-25 Mainline Recommendation
Exit 192	RidgeGate Parkway	Partial Cloverleaf	Underpass	Existing	2008	Widen structure
Exit 193	Lincoln Avenue	Partial Cloverleaf	Overpass	Future[b]	1990	Replace interchange
Exit 194	C/E-470	Direct Connect	Not applicable	Existing Interchange with Potential Future Direct Connects	Not applicable	Not evaluated

[a] Currently under construction as part of the I-25 South Gap Project. The vertical clearance of these new structures is sufficient to allow for future widening of the structures to accommodate the I-25 mainline recommendation.

[b] Future interchanges in various stages of planning will accommodate the I-25 mainline recommendation.

Castle Pines is developing recommendations to improve wayfinding at interchanges and distinguish the city from other municipalities within the corridor. Close coordination between CDOT and Castle Pines will ensure that any walls, towers, or other character-defining treatments placed by Castle Pines adjacent to CDOT ROW will not conflict with the mainline design. For example, if the mainline improvements require retaining walls on I-25, then Castle Pines may want to locate their landscape wall and sign further back to accommodate the I-25 future improvements.

System-to-System Evaluation

US 85 in Castle Rock was modeled with new northbound-off and southbound-on direct ramp connections to I-25 to determine if this connection would provide traffic improvement on mainline I-25. The analysis showed the new ramp connections did not yield significant improvements to traffic volumes or travel times on I-25 north of Castle Rock.

It should be noted, however, that US 85 was modeled as a system-to-system connection with at-grade ramps and this scenario does not attract traffic onto US 85 because of the number of potential controlled-stop conditions. Revisiting this connection and modeling the I-25 mainline recommendation with a system-to-system connection with grade-separated ramps could yield beneficial results to traffic volumes and/or travel times on I-25.

At the C/E-470 interchange, direct ramp connections between the recommended I-25 EL and existing ELs on C/E-470 were modeled based on previous concepts from the C/E-470 Express Lanes Design-Build project. This connection would provide major traffic improvements to the I-25 corridor south of C/E-470, because a sizable percentage of traffic in this portion of the corridor is destined to or from C/E-470. Vehicles would be able to travel within the EL on I-25 and straight through the C/E-470 interchange without needing to maneuver in or out of the GP lanes.

Interchange Considerations between RidgeGate Parkway and C/E-470

Regarding the I-25 interchanges at RidgeGate Parkway, Lincoln Avenue, and C/E-470, further analysis of traffic operations is needed to determine the best solutions to accommodate the I-25 mainline recommendation given existing constraints and proposed projects in this portion of the Study Area. Some of the considerations and options discussed as part of the PEL Study include the following:

- Beginning at the C/E-470 interchange and continuing north, there are currently three travel lanes in each direction on I-25. The I-25 mainline recommendation is for six lanes in each direction between Meadows/Founders Parkway and C/E-470. Future studies will need to determine where lane drops would occur approaching C/E/470, based on existing conditions and planned improvements at that time.
- The RTD light rail tracks crossing over I-25 between RidgeGate Parkway and Lincoln Avenue and the stretch of light rail tracks on the west side of I-25 up to the C/E-470 interchange complex are a constraint. Future widening of the I-25 mainline and connection to C/E-470 will need to look at preserving the light rail ballast wall on the west and widening to the east.
- Future studies should explore opportunities to separate I-25 regional through traffic from local interchange access to RidgeGate Parkway, Lincoln Avenue, and C/E-470. A

recommendation that came out of the April 2019 TWG/RAG workshop includes the consideration of a new collector-distributor road system for northbound and southbound directions of travel that begins and ends just south of RidgeGate Parkway and C/E-470. This design option has the potential to reduce I-25 mainline turbulence and provide a safer and more reliable means to access these three closely spaced interchanges.

- To eliminate the need for new dedicated direct connect ramps to C/E-470, future studies should consider constructing an I-25 managed-lane braided-ramp configuration and mix with general purpose traffic on the existing C/E-470 ramps.
- Based on the most recent DRCOG TIP, a new EA will analyze how the I-25/Lincoln interchange will need to be reconfigured to account for the City Center and Havana Street extension of the light rail to RidgeGate Parkway.
- Discussions during the April 2019 TWG/RAG workshop indicate the Front Range Passenger Rail Team needs to consider connections with RTD's end of line RidgeGate Parkway Station. The meeting materials and summary can be found in Agency and Public Involvement Coordination information (Appendix D).

Recommendations for Interchanges

For the interchanges identified in Table 4-2 as requiring replacement or widening to accommodate the I-25 mainline recommendations, CDOT should coordinate with the local jurisdictions to identify opportunities to coordinate construction timing and funding. For example, interchange improvements could be timed in conjunction with the EL or auxiliary lane construction to improve performance on the I-25 mainline as well as local street networks. In addition, both the I-25/C/E-470 and the I-25/US 85 connections will require further analysis to better identify methods to improve performance entering and exiting I-25. Future analysis should consider future and planned actions to the north and south of the project corridor, some of which are discussed in Chapter 5.

Auxiliary Lanes

Auxiliary lanes aid traffic flow by allowing appropriate distances for lane changing near freeway entrance and exit ramps. Continuous auxiliary lanes between interchanges provide a greater distance to achieve speeds matching freeway traffic and position vehicles to enter or exit a freeway removed from the through lanes. Not only do continuous auxiliary lanes increase functionality of the overall system, they can also increase safety by reducing the frequency of vehicle collisions.

The following auxiliary lanes exist along I-25 within the Study Area, because of the high traffic volumes and heavy weaving patterns observed at these locations:

- Southbound between Sky View Lane and Spruce Mountain Road (currently under construction as part of the I-25 South Gap Project)
- Northbound and southbound between Plum Creek Parkway and Wolfensberger Road
- Northbound and southbound between RidgeGate Parkway and Lincoln Avenue
- Northbound and southbound between Lincoln Avenue and C/E-470

Existing auxiliary lanes are denoted in the mapbook (Appendix C).

Recommendations for Auxiliary Lanes

To maintain system functionality on I-25, existing and planned auxiliary lanes should be maintained during and after any future widening that occurs as part of the I-25 mainline recommendation or with any early action project that may develop. In addition to these existing and planned auxiliary lanes, 2040 peak hour volumes at I-25 entrance and exit ramps indicate the I-25 mainline recommendation would also benefit from additional auxiliary lanes at the following locations, which are displayed in the mapbook (Appendix C):

- Northbound and southbound between Baptist Road and SH 105 (just south of the Study Area)
- Northbound and southbound between Crystal Valley Parkway and Plum Creek Parkway
- Northbound and southbound between Wolfensberger Road and Meadows/Founders Parkway
- Northbound and southbound between Meadows/Founders Parkway and Castle Rock Parkway – analysis during the PEL Study indicates that proximity of Castle Rock Parkway interchange to Meadows/Founders Parkway interchange created short weave lengths. Coordination between the local jurisdiction and CDOT may be needed to resolve this issue.

Wildlife Crossings

The Study Area covers a unique stretch of I-25 between the southern part of the Denver metropolitan area and Colorado Springs. Deer and elk are common, and the Study Area also supports habitat for pronghorn, mountain lions, bobcats, black bears, and many species of reptiles and amphibians. Collisions with animals are frequent; deer are struck most often, followed by elk, black bears, mountain lions, coyotes, and other small animals. Between 2011 and 2015, 785 wildlife-vehicle crashes were reported along I-25 in the Study Area.

To improve the ability of animals to move safely across I-25 and decrease the number of wildlife-vehicle collisions, the I-25 South Gap Project includes four new wildlife underpasses (MP 162.5, MP 164.0, MP 167.7, and MP 170.6) and one improved bridge, combined with wildlife fencing, deer guards, and jumpouts, to create a system of improvements anticipated to significantly reduce the number of wildlife-vehicle collisions in the highest frequency conflict areas between the towns of Monument and Castle Rock.

Wildlife-vehicle collisions remain a vehicle and wildlife safety concern along I-25 between Castle Rock and the C/E-470 interchange. Lone Tree and Castle Pines are currently undergoing aggressive residential and commercial expansion that will double their incorporated land areas and populations in the next 20 years. Castle Rock is also anticipated to double in population, rapidly expanding while simultaneously increasing the density of its existing semi-developed areas. As large swaths of grassland habitat in the Study Area are developed, the resident populations of animals will be displaced to the surrounding areas, potentially compelling wildlife to cross an interstate that will be carrying an increasing volume of vehicles between Denver and Colorado Springs.

Recommendations for Wildlife Crossings
Recommended improvements include the following:

- Construct a wildlife overpass at MP 166.3. Although no funding is currently identified to construct this facility, it was studied and conceptually designed during this PEL Study. This location is suitable for an overpass because of the elevated land, adjacent land uses, and proximity to wildlife underpasses at MP 164.0 and MP 167.7. In addition, the largest elk herds in the corridor exist in this vicinity, and elk prefer overpasses to underpasses.
- Evaluate upsizing culverts and constructing new underpasses at locations near Larkspur and near the Sky View Lane interchange area.. The area north of Larkspur near the Sky View Lane interchange was identified as a high frequency wildlife-vehicle collision area during this Study. However, site conditions present challenging constraints for an underpass, including the flat natural topography, railroads on both sides of the interstate, the frontage roads on both sides of the interstate, and the East Plum Creek floodplain. The effects of the wildlife improvements being implemented as part of the I-25 South Gap Project should be considered when evaluating additional investments in this area.
- Further evaluate the need for crossings (deer-sized or smaller) between Castle Rock and C/E-470 and fencing at the I-25/Happy Canyon Creek bridge.
- Future I-25 and local road improvements within the Study Area should be coordinated with CPW as appropriate and evaluate wildlife movement as a core environmental issue throughout the public involvement, environmental, and design processes of projects.
- The core groups engaged in the biology team for this PEL Study should continue to be engaged in CDOT and local planning processes to advise on the location and design of wildlife fencing, jumpouts, deer guards, overpasses, and underpasses to ensure they operate as intended and as an effective and comprehensive system.

More details on the evaluation of wildlife crossings can be found in the Wildlife TM (Appendix J).

Technology and System Management
Although implementing roadway technology and system management tools would not fully meet the Needs of the corridor, they were identified as elements to supplement the I-25 mainline recommendation. Existing roadway technology in the Study Area was inventoried and is documented in the Technology and System Management Tool and Definitions TM (Appendix K). Numerous technologies currently exist in the Study Area, connected by fiber optic lines along the entire length of the corridor. Fiber optic lines are the foundation for implementing ITS and other technologies to improve safety and maximize the efficiency of the transportation system.

Recommendations for Technology and System Management Tools
Based on existing conditions and characteristics of the Study Area, various technologies and system management tools were evaluated to identify applicability in the Study Area. The following technology and system management tools address the needs of the corridor and support the I-25 mainline recommendation. Definitions of these tools and their applicability to the I-25 corridor are explained in the Technology and System Management Tool Definitions TM (Appendix K).

- Variable speed limits
- Dynamic lanes

- Transit Signal Priority and Queue Jump at interchanges
- Connected and autonomous vehicle lanes
- VMS and variable toll message signs
- Enhanced lane markings
- Roadway weather information systems
- Ramp metering
- Wildlife detection and alert systems
- Fiber optic lines
- Closed circuit televisions
- Dedicated short range communications
- Vehicle detection methods

Although several of the tools listed already exist in the corridor, they should continue to be considered for upgrades and applied as standalone projects or complements to future projects. For example, CDOT has implemented variable speed limits during the construction of the I-25 South Gap Project and will monitor the effectiveness on traffic to determine if it is beneficial to continue with this approach after construction is complete. Based on a May 10, 2019, workshop with FHWA and Douglas County, early indications suggest that this technology would improve I-25 performance both during and after construction.

Frontage Roads

A frontage road (also known as an access road, service road, or parallel road) is a local road running parallel to a higher-speed, limited-access highway. A frontage road is often used to provide access to private properties. Existing frontage roads may be impacted by the I-25 mainline recommendation and need to be relocated. Impacted frontage roads could be relocated and redesigned to improve local access and travel patterns and potentially alleviate some congestion at various locations on I-25 within the corridor. Existing frontage roads and those that will be impacted by the I-25 mainline recommendation are denoted in the mapbook (Appendix C).

The frontage road between Sky View Lane and Plum Creek Parkway on the eastside of I-25 would remain after the build-out of the I-25 mainline recommendation. On the west side of I-25, the planned Crystal Valley Parkway interchange includes the relocation of the western frontage road to the west side of the railroad track from Tomah Road to Plum Creek Parkway. In this same area, the replacement of the Sky View Lane Interchange will directly impact the existing frontage road and would also need to accommodate the I-25 mainline recommendation.

Discussions with Lone Tree stakeholders identified the desire to construct a collector distributor or frontage road that connects Lincoln Avenue and C/E-470. CDOT and local jurisdictions should use these opportunities to design new local roadway networks that consider both the I-25 mainline recommendation and future development.

Recommendations for Frontage Roads

It is recommended that CDOT coordinate with local jurisdiction(s) regarding anticipated impacts to frontage roads and identify opportunities to relocate them prior to I-25 mainline improvements or determine where improvements to local access from the frontage roads could be made.

5.0 Implementation Plan

This PEL Study has been prepared in accordance with FHWA and CDOT PEL guidance (CDOT 2016), which encourages the use of planning studies to provide information for incorporation into future NEPA documents. Once FHWA has provided a letter of acceptance for this PEL Study, the planning products from this PEL Study can be used in future NEPA studies to advance projects along the I-25 corridor in the Study Area.

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report, with more detailed information available in report appendices. Chapter 5 is supported by the following appendix content:

- **Agency and Public Coordination: Appendix D**
- **Mapbook: Appendix C**
- **Peak Period Shoulder Lane TM: Appendix L**

5.1 Transportation Project Development

As future projects within the Study Area are developed and programmed and funding is secured, NEPA and preliminary design activities can be initiated. Following the series of project development steps detailed in Table 5-1, projects can build on the existing conditions information, public and stakeholder outreach, transportation analyses, and recommendations contained in this PEL Study.

Table 5-1. Steps in Transportation Project Development

Stage	Description of Activity	Example Documents
Planning (LRP/PEL)	State Departments of Transportation, Metropolitan Planning Organizations, and local governments identify transportation needs and program projects to be built within financial constraints.	Long-Range Transportation Plans (Statewide/Regional Transportation Plans) Short-Term Transportation Improvement Programs PEL studies
Project Development (PEL/NEPA/Preliminary Engineering)	The transportation project is more clearly defined. Alternative locations and features are developed, and an alternative is selected.	PEL studies NEPA EAs NEPA EISs Conceptual to Preliminary Engineering
Final Design	The design team develops detailed plans, specifications, and estimates.	30% plans, 60% plans, 90% plans, final design, project specification
Right of Way	Additional land needed for the project is purchased.	ROW plans, acquisitions, and negotiations
Construction	The state or local governments selects the contractor, who then builds the project.	Request for proposals, contracting

Source: FHWA 1997

LRP – long-range planning

5.1.1 Logical Termini and Independent Utility

To advance improvement projects through the stages of environmental analysis, design, and construction, CDOT must demonstrate that each project has logical termini and independent

utility. To have independent utility, the improvement project cannot depend on any other projects – it must be able to be completed and function properly without other improvements. If an improvement project has independent utility, that singular project can be considered. This ensures each improvement project can operate independently of other projects and I-25 will operate acceptably at the conclusion of each project. The traffic and design analyses performed as part of this PEL Study will help identify and support the independent utility of future projects in the corridor.

The term “logical termini” is related to independent utility and is defined as the rational end points for a transportation improvement (the project limits) and the rational end points for assessing environmental impacts. The intent of establishing logical termini is to ensure that proposed transportation improvements satisfy an identified need and avoid unexpected side effects, and that environmental considerations can be sufficiently evaluated. CDOT must demonstrate to FHWA that an improvement project has logical termini, and FHWA makes the final determination. The traffic, design, and environmental analyses performed as part of this PEL Study will help identify the logical termini of future projects in the corridor.

5.1.2 NEPA Requirements

There are three classes of action that prescribe the level of documentation required in the NEPA process for individual projects, as follows (refer to FHWA regulations [23 CFR 771.115 and 23 CFR 771.117] for details):

- Class I (EIS): Actions that significantly affect the environment require an EIS (40 CFR 1508.27). An EIS is a full disclosure document that details the process through which a transportation project was developed, includes consideration of a range of reasonable alternatives, analyzes the potential impacts resulting from the alternatives, and demonstrates compliance with other applicable environmental laws and executive orders.
- Class II (CE): Actions that do not individually or cumulatively have a significant environmental effect are excluded from the requirement to prepare an EA or EIS. A list of CEs is provided in 23 CFR 771.117.
- Class III (EA): Actions in which the significance of the environmental impacts is not clearly established require preparation of an EA to determine the appropriate environmental document required. All actions that are not Class I or II are Class III.

Although future projects have not been sufficiently identified in this PEL Study to offer likely NEPA class of action assumptions, the information and analyses contained in this study, especially the ICA, provide substantial and valuable information to inform discussions on the NEPA classes of action for future projects.

5.1.3 Purpose and Need

Achieving the vision for the study corridor relies not only on developing and advancing projects based on the recommendations of this PEL Study, but also making sure that all projects in the Study Area consider and incorporate measures to support mode options, new technologies, and commerce and provide connections that have a positive effect on surrounding transportation networks. Future projects should be evaluated to ensure they achieve the Purpose and Need of the corridor to enhance safety and improve incident management, travel time reliability, and mobility.

5.1.4 Consideration of Corridor Goals

In addition to supporting the Purpose and Need, future corridor projects should also be evaluated based on their ability to achieve the following Goals developed for the PEL Study:

- Be compatible with the built and natural environment.
- Support corridor communities' land use, development, and economic goals.
- Integrate and leverage technological innovations and advanced transportation system management strategies.

5.2 Phasing of Recommendations

Currently, no funding has been identified for development of future projects in the Study Area. With rapid growth anticipated in the communities surrounding the Study Area, it is critical for CDOT, FHWA, and the SC, TWG, and RAG to build off the momentum of this PEL Study and the I-25 South Gap Project improvements currently being implemented. The CDOT High Performance Transportation Enterprise (HPTE) is currently conducting an intermediate (Level 2) traffic and revenue study to evaluate the feasibility of tolling the corridor using the lane configuration and connections recommended in this PEL Study. In addition, a workshop was held with the TWG/RAG to gather input regarding the phasing and implementation of the I-25 mainline and supplemental recommendations and identify potential impacts to communities, resources, and future projects throughout the corridor. Detailed results of the workshop can be found in the Agency and Public Involvement Coordination information (Appendix D). Using input from this workshop, the PEL Study team developed a phasing strategy to guide project development and provide a framework for long-term implementation.

With the Study Area spanning two Metropolitan Planning Organizations and five municipalities, coordination is essential to the successful implementation of the PEL Study recommendations. The PEL Study team recognized that widening I-25 will affect existing infrastructure along the interstate and disrupt local transportation networks, and that planned projects in and adjacent to the Study Area could influence the phasing of the I-25 mainline recommendation. This implementation plan recognizes that some structures over I-25 are currently programmed for replacement or widening and provides guidance on how the ultimate recommendation for I-25 may be implemented, including any auxiliary lanes or lane balancing efforts. Continued coordination among CDOT regions and local municipalities is necessary throughout project development for phasing of the I-25 mainline recommendation.

5.2.1 Initial Phase of the I-25 Mainline Recommendation – Extension of I-25 South Gap Project ELs North to C/E-470

I-25 through the Study Area is a critical link for regional and statewide travel between the metropolitan areas of Colorado Springs and Denver. Approximately three-quarters of the trips in this corridor are pass-through trips, with origins and destinations outside the Study Area. For this reason, providing a reliable travel time throughout the corridor is the top priority. Extending the ELs being constructed as part of the South I-25 South Gap Project north to C/E-470 is the primary means of achieving this objective; it creates continuity throughout the corridor, maximizes effectiveness of the ELs, and allows for a potential direct connect to the C/E-470 managed lanes.

Estimated Cost of the Initial Phase

Based on conceptual design completed for this Study, as shown in the Initial Phase Mapbook (Appendix C-2), estimates of probable cost of the extending the ELs range between $900 million and $1.2 billion.[12] This estimate of probable cost includes core construction items such as removal of existing pavement, earthwork, retaining walls, road base, pavement, ITS infrastructure for the EL, and widening or replacing I-25 bridge structures as needed to accommodate the new I-25 typical section.[13]

Additional construction item allowances were added to the core construction items to account for unforeseen items, storm water management, drainage and water quality, utilities, final signing and striping, construction signing and traffic control, mobilization, and construction force accounts. Other high-level allowances were also added to account for design, construction, and ROW for the I-25 mainline recommendation. The following items are not included in this estimate:

- Interchange improvements above and beyond the widening or reconstruction of bridges necessary to accommodate the wider I-25 typical section
- Improvements to local roads that access the interstate
- Improvements to frontage roads impacted by the interstate widening
- New wildlife underpass and overpass structures

Design optimization opportunities to lower the cost should be considered during future project development. Strategies may include:

- Reducing or eliminating retaining walls
- Reducing the amount of earthwork required
- Minimizing or avoiding full-depth pavement reconstruction
- Conducting a Value Engineering session to explore efficient system-to-system interchange configurations for the segment between Lincoln Avenue and the C/E-470 interchange complex

Achieving Lane Balance Through Castle Rock Area

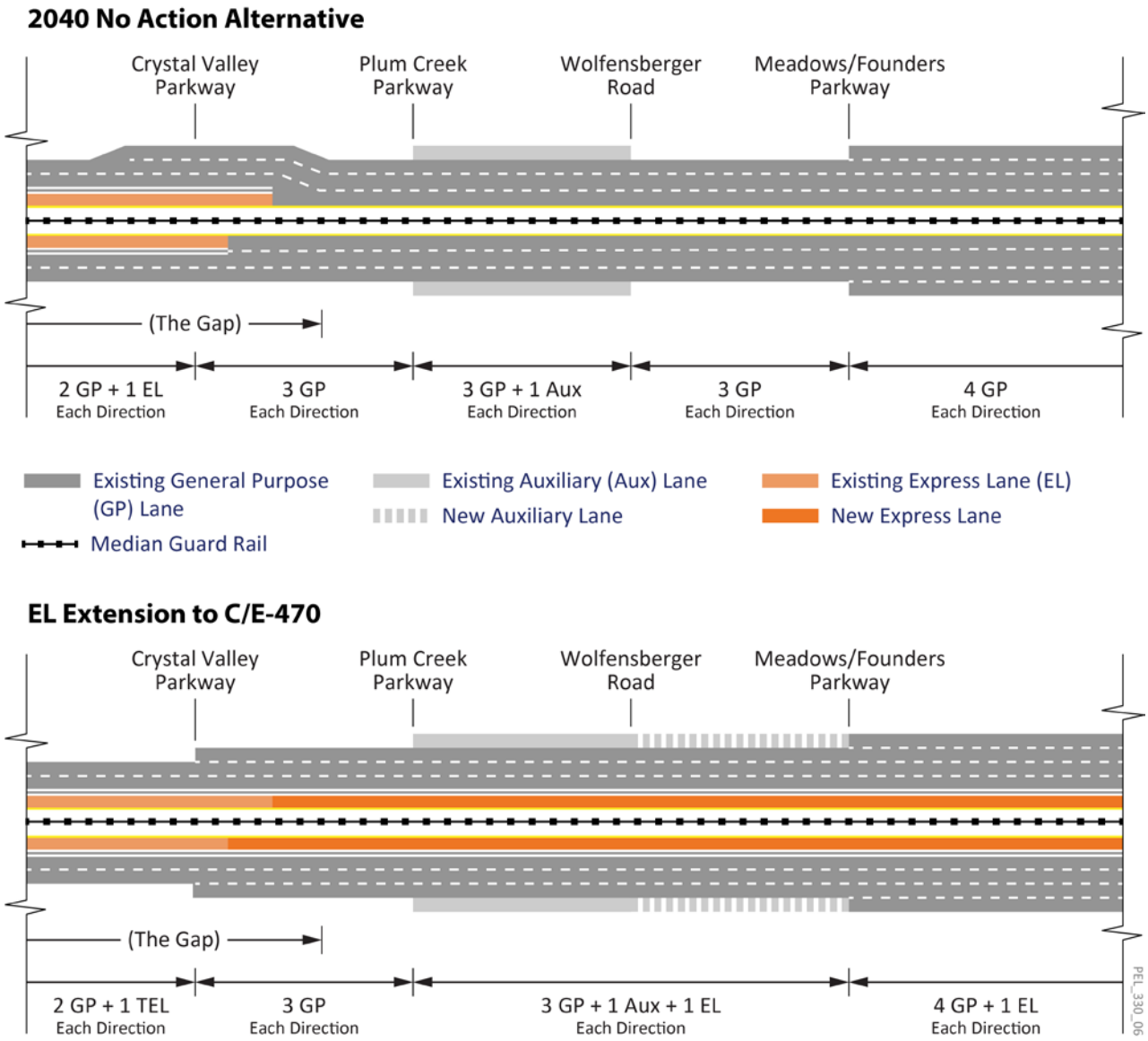
As the recommended lane configuration is implemented, maintaining proper lane balance is critical to efficient traffic operations and overall mobility throughout the corridor. Initial analysis by the PEL Study team suggests that reconfiguring I-25 mainline operations through the Castle Rock area would be needed to achieve this objective. The EL extension will ideally match the lane assignments constructed under the I-25 South Gap Project, which includes two GP lanes and one EL in each direction south of the planned interchange at Crystal Valley Parkway. Figure 5-1 depicts the proposed mainline operations through the Castle Rock area. The figure's 2040 No Action Alternative detail shows the conditions that will exist when construction of the

[12] This estimate is based on 2018 costs. During project development, costs estimates will be refined based on preliminary and final design and will be escalated to account for increased costs in the projected construction year(s).

[13] It is assumed that existing shoulders would need to be reconstructed to accommodate future travel lanes and this cost is included in the estimate.

I-25 South Gap Project is completed. The EL Extension to C/E-470 detail shows the lane assignments included in the conceptual design for the I-25 mainline recommendation. These improvements are anticipated to reduce turbulence, increase travel time reliability and, improve overall safety along this segment of the I-25 corridor. Details of this conceptual design are available in the mapbook (Appendix C) and summarized here.

Figure 5-1. I-25 Mainline Operations Through Castle Rock - 2040 No-Action Alternative Initial Phase



Crystal Valley Parkway to Meadows/Founders Parkway

Based on traffic volumes and lane balance requirements, the EL extension would begin at the end of the I-25 South Gap Project and continue north, widening to the outside to provide the needed space for the EL. To achieve this, the ELs would take the place of the inside GP lanes north of Crystal Valley Parkway and additional width to replace the GP lanes would be added on the outside of the interstate north of Crystal Valley Parkway. This would ensure the existing GP lanes are maintained throughout this segment of the interstate and also incorporates the new

Crystal Valley Parkway interchange providing two GP lanes south of the interchange and three GP lanes north of the interchange. In addition, the existing auxiliary lanes are maintained between Plum Creek Parkway and Wolfensberger Road and new auxiliary lanes are recommended for future evaluations between Wolfensberger Road and Meadows/Founders Parkway. As a result, the total cross section of I-25 north of Crystal Valley interchange would consist of one EL, three GP lanes, and one auxiliary lane in each direction (refer to Figure 5-1).

Meadows/Founders Parkway to C/E-470
The EL extension continues north through this segment by widening to the outside to provide the needed space for the EL. As a result, the total cross section of I-25 would consist of one EL, four GP lanes, and one auxiliary lane in each direction.

Interim Options
In recognition that funding constraints may be a factor in advancing construction of the EL extension, the PEL Study team identified potential interim options to extend a managed lane from Plum Creek Parkway to C/E-470. While the following options are anticipated to be lower-cost options to the full EL, more engineering would be needed to better quantify impacts and estimate the cost of construction. Although neither of the options are long-term solutions, they do offer some combination of safety, mobility, or reliability benefits and could function as an interim component in the initial phase of the I-25 mainline recommendation.

Convert an Existing General Purpose Lane to an Express Lane
Converting an existing GP lane to an EL in each direction could be completed relatively quickly when compared to constructing a new lane to extend the EL. While this conversion could result in diversion of traffic to local road networks, the potential impacts to the local road network are anticipated to be minimal, and extending the EL would provide a more reliable travel option north of the Gap to C/E-470. However, this option is not expected to improve travel times within the remaining GP lanes and will accommodate less traffic than the 2040 No Action Alternative. The potential for crash reductions in GP lanes is dependent on the effectiveness of the EL reducing congestion within those lanes. The conversion is estimated to decrease EL travel times by as much as 17 minutes during peak period travel times, but GP lanes are expected to experience an increase in peak period travel times by up to 7 minutes.

Create Peak Period Shoulder Lanes
Adding a PPSL in each direction between Plum Creek Parkway and C/E-470 was also evaluated as an interim option to meet the travel time reliability need (more information is available in the PPSL TM [Appendix L]). Although anticipated to be a low-cost option for providing a continuous managed lane in the corridor, further analysis of the existing shoulder conditions would be needed to look at pavement thickness, drainage, and safety and incident management. In addition, it would be necessary to determine if converting the existing shoulders to a travel lane is cost-effective. It is expected the PPSLs would result in minor economic, community, and natural resource impacts associated with the minor widening beyond existing ROW needed to accommodate the PPSL. Using a PPSL would improve overall highway capacity and create the opportunity for reliable travel time during peak periods. This option decreases peak period travel times by 3 to 6 minutes in the GP lanes and by 12 to 14 minutes for PPSL users.

5.2.2 Subsequent Phases of the I-25 Mainline Recommendation – One Additional Lane

Following the initial phase of the EL extension to C/E-470, it is recommended that one additional travel lane in each direction be constructed throughout the length of the corridor from SH 105 to C/E-470. In locations where there are existing climbing lanes (southbound between MP 166.9 and MP 162.0 and northbound between MP 162.0 and 163.4), the climbing lane will become the additional travel lane. The additional travel lane will generate substantial travel time benefits for GP lanes and reduce regional VHT. The additional travel lane will also improve mobility, safety and incident management by allowing better maneuverability to pass slower vehicles and avoid incidents. Following the implementation of the EL extension between Plum Creek Parkway and C/E-470, this additional travel lane offers substantial time saving in the GP lanes: 11 minutes in the AM northbound direction and 31 minutes in the PM southbound direction, as compared to the 2040 No Action Alternative.

5.3 Future Project Funding and Partnerships

Currently, no funding has been identified for either study or design of the recommendations in this PEL study. However, the following sections outline potential sources of funding and likely partnerships to implement the PEL Study recommendations.

5.3.1 Funding and Partnership Plan

A key component of the PEL Study's vision is to build partnerships to create a roadmap to improve safety, travel time reliability, and mobility on this vital stretch of I-25. Federal, state and local funding contributions should all be considered. Local support is especially important as it helps make funding applications competitive when compared to other projects nationally. Preservation of ROW for the PEL Study recommendations is another valuable form of local support that can reduce projects costs and avoid property impacts. Although Colorado Springs, Monument, Larkspur, Castle Rock and Arapahoe County, Colorado Parks and Wildlife (CPW), and private landowners are not identified here as funding sources, they should also be considered for potential partnering opportunities.

5.3.2 Project Funding Sources and Partnerships

Federal: USDOT INFRA Grant Program. On June 29, 2017, the United States Department of Transportation (USDOT) announced the Infrastructure for Rebuilding America (INFRA) discretionary grant program. The first round of the INFRA program awarded nearly $1.5 billion to projects that are in line with the Administration's principles to help rebuild America's crumbling infrastructure. In June 2018, $65 million was awarded to the I-25 South Gap Project. The USDOT announced a second round of INFRA, making $900 million available to projects that submitted applications by March 2019. The INFRA program tends to award funding to projects that can demonstrate funding partnerships. Partnerships include funding and participation from other federal, state, local, and private partners. The PEL fostered a high level of stakeholder coordination and participation in the 33-mile corridor. Based on the results of the April 2019 TWG/RAG workshop and subsequent SC meetings, these partnerships remain strong and there is consensus among the towns, cities, and counties from Colorado Springs to South Denver on keeping the momentum in the corridor going after the I-25 South Gap Project

is constructed. For this reason, recommended projects outlined in the PEL remain attractive candidates for future INFRA funding.

Federal: Federal-aid. The National Highway Performance Program (NHPP) was established under MAP-21 and continued under the FAST Act. The NHPP provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and for ensuring that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS. The I-25 South Gap Project received over $20 million in NHPP funding for NEPA, pre-construction, and surface treatment.

Federal: National Highway Freight Program/Freight Improvement Program. $2.5 million of Colorado Freight Program funds were provided to the I-25 South Gap Project to construct a truck climbing lane on the southbound ascent of Monument Hill. The I-25 corridor in the PEL Study Area passes $60 billion worth of freight annually. This source of funding remains a viable option to extend the truck climbing lane over the top of Monument Hill, relocate the Port of Entry to the old Larkspur rest area and construct or improve chain up stations at the Larkspur rest area north of Baptist Road, along the west side frontage road (Tomah Road to Plum Creek Parkway), or both.

State: CDOT Highway Users Tax Fund. The major source of state revenue for CDOT is the Highway Users Tax Fund (HUTF). The HUTF is funded through Colorado's motor fuel tax, motor vehicle registration fees, surcharges, license fees, and traffic citation fines. Under the HUTF, transportation revenue is split between CDOT, Colorado State Patrol (CSP), counties, and cities. Over $7 million was committed to the I-25 South Gap Project for pre-construction and surface treatment. HUTF funds could be used to relocate the Port of Entry and weigh stations.

State: CDOT Senate Bill (SB) 17-267. SB 17-267, also known as "Concerning the Sustainability of Rural Colorado," provides funding for capital construction, education, and transportation. SB 17-267 authorizes the execution of lease-purchase agreements on state facilities totaling $2 billion to be issued in equal amounts over 4 years, beginning in Fiscal Year 2018-19. CDOT will be the recipient of over $1 billion of those proceeds to help address high priority needs of more than $6 billion over the next 10 years. Approximately $150 million was committed to the I-25 South Gap Project. Performance metrics would need to be developed as well as benefit/cost arguments that demonstrate urgent needs for improvements in the PEL Study corridor to compete for funds.

State: CDOT SB 18-001. SB 18-001 authorized additional Colorado General Funds to CDOT and transportation projects. The Transportation Commission authorized $92 million of SB 18-001 funds for the I-25 South Gap Project construction. Performance metrics would need to be developed as well as benefit/cost arguments that demonstrate urgent needs for improvements in the corridor to compete for funds.

State: FASTER Safety (SB 09-108). In 2009, the Colorado legislature passed the FASTER [Funding Advancements for Surface Transportation and Economic Recovery] Act of 2009 (Senate Bill 09-108). The bill provided additional funding for transportation through vehicle registration fees. FASTER Safety funding is intended to specifically address safety performance design. Approximately $10 million was used on the I-25 South Gap Project to improve and enhance critical safety related design features, including striping and wildlife fence.

State: FASTER Bridge Enterprise (SB 09-108). Bridge Enterprise funding under FASTER is controlled by Bridge Enterprise and is intended to replace existing aging and deficient bridges using performance-based criteria. Approximately $5 million in Bridge Enterprise funding was used on the I-25 South Gap Project to fund the Upper Lake Gulch bridges. The County Line Road/Palmer Divide Road Bridge is eligible for Bridge Enterprise funds, and adding it to the I-25 South Gap Project is being considered. Other bridges currently eligible for Bridge Enterprise funding on the corridor include the Liggett Road Bridge and Happy Canyon Road Bridge.

State: FASTER Transit (SB 09-108). FASTER Transit funding is intended to specifically address strategic mobility and multimodal choice, the support of urban and rural mass transit, and the reduction of greenhouse gas emissions. This funding source was to assist with improvements along the I-25 South Gap Project corridor, including improvements to the Monument park-n-ride and funding the construction of the Troy Hill Garage Bustang Maintenance facility in Colorado Springs. This funding source remains a viable funding option for the PEL Study-recommended transit improvements that include a new mobility hub in the Castle Rock area, improvements to Bustang service and operations, bus and rail connections to RTD's RidgeGate Parkway Station, and any future rail improvements in the PEL corridor.

State: CDOT's High Performance Transportation Enterprise. HPTE operates as a government-owned business within CDOT to pursue innovative means of more efficiently financing important surface transportation infrastructure projects that will improve the safety, capacity, and accessibility of the surface transportation system. HPTE funded the stated preference survey and traffic and revenue study that analyzed toll revenue generation within the PEL corridor. HPTE was also responsible for the purchase and installation of tolling equipment, software, and integration costs for the I-25 South Gap Project. HPTE's traffic and revenue study was not completed in time to include the results in this PEL Study. However, the PEL Study team remains optimistic that projected toll revenues in the study corridor could be leveraged to construct the initial phase of the I-25 mainline improvements which includes extension of the EL in each direction from the I-25 South Gap Project to C/E-470 and a system-to-system EL direct connection between I-25 and C/E-470.

Local: Pikes Peak Rural Transportation Authority. Voters approved a ballot measure $5 billion in November 2017, providing up to $10 million in funds for the I-25 South Gap Project. This ballot measure asked for the voters' permission to add the widening to the Pikes Peak Rural Transportation Authority's list of capital improvement projects that voters had approved in 2012.

Local: Douglas County. Douglas County has committed $250,000 in funding for the completion of the PEL Study and $10 million to the I-25 South Gap Project. In addition, Douglas County has designated ROW east of I-25 between Castle Pines Parkway and RidgeGate Parkway as a future transit corridor. This ROW would support the PEL Study recommendations related to transit.

Local: City of Castle Pines. The City of Castle Pines has designated a 100-foot strip of land along the east side of I-25 between Happy Canyon Road and Castle Pines Parkway for transit. This ROW would support the PEL Study recommendations related to transit.

Local: City of Lone Tree. In partnership with RTD, the City of Lone Tree has made significant transit investments (i.e., extension of the Southeast Light Rail Line and three new light rail

transit stations). As part of the April 2019 TWG/RAG workshop, a Lone Tree representative suggested that CDOT bus and rail connections could be made at the end-of-line RidgeGate Parkway Station. Currently, RTD light rail transit serves the station, but the site could become a mobility hub by connecting CDOT bus and rail services with RTD light rail transit services. This site has tremendous potential to build on already strong partnerships and advance the PEL Study-recommended transit improvements.

Local: El Paso County: El Paso County allocated $15 million to the I-25 South Gap Project. This funding was allocated to the project when El Paso County residents voted (in 2017) to direct their Tax Payer Bill of Rights savings toward the project. This funding source remains a viable funding option for the PEL Study-recommended improvements.

6.0 Environmental Considerations

This chapter provides an overview of potential environmental considerations in each segment of the Study Area, focusing on key resources with the highest potential to influence decision making for recommended transportation improvements. It summarizes the setting and context of the Study Area and discusses the types of potential mitigation activities that may be required.

6.1 Study Area Resources

The environmental resources studied were identified based on Study Area characteristics and are consistent with NEPA, FHWA, and CDOT guidelines. The PEL Study also considered resources with additional regulatory requirements, such as the Endangered Species Act, the Clean Water Act, and the National Historic Preservation Act (Section 106), as well as resources that typically are of concern for the general public, such as traffic noise. A detailed description of Study Area resources in the built and natural environment and the regulations pertaining to each resource can be found in the ICA (Appendix B). The information on Study Area existing conditions was compiled and mapped using readily available data from local, regional, state, and federal agencies, aerial imagery, and United States Geological Survey topographic maps. The ICA also includes the I-25 South Gap EA, which has more detailed project-level resource information.

The planning-level environmental research and analysis conducted for this PEL Study was used to inform the evaluation of potential transportation improvements in the Study Area. Consideration of environmental resource impacts began with the Level 2 and Level 3 alternative evaluations presented in Chapter 3. Additional analysis presented in this chapter regarding potential impacts and mitigation is based on the conceptual design for the I-25 mainline recommendation. Table 6-1 summarizes the context and consideration of NEPA resources in this PEL Study. Resources marked with an asterisk are discussed further in this chapter. Key resources in the Study Area with the highest potential to influence decision making for recommended transportation improvements are shown on Figures 6-1, 6-2, and 6-3. Additional resource maps with data collected during the ICA and for the I-25 South Gap EA are available in the ICA (Appendix B).

As CDOT identifies projects to advance in the Study Area, it will work with FHWA to determine the environmental clearances required under NEPA. Future NEPA studies will involve a more detailed analysis for environmental resources potentially impacted by the transportation improvement projects.

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report, with more detailed information available in report appendices. Chapter 6 is supported by the following appendix content:

- **Initial Corridor Assessment: Appendix B**
- **Mapbook: Appendix C**
- **Wildlife TM: Appendix J**
- **I-25 South Aesthetic Guidelines: Appendix P**

Table 6-1. Summary of NEPA Resources

Resource	Context	Evaluation Approach	Future NEPA-Phase Data Needs[a]	Future NEPA-Phase Impact and Mitigation Considerations
Air Quality*	Maintenance area for carbon monoxide and PM_{10}; non-attainment area for ozone.	Assessed in ICA. Evaluate in future NEPA phases.	For proposed managed lanes, modeling inputs including the operations, toll rate, and access points.	Regional and project-level conformity must be achieved.[14]
Farmland*	Prime, unique, or farmlands of statewide importance are present in Study Area.	Assessed in ICA. Soils with characteristics of prime or unique farmland, farmland of statewide importance, or farmland of local importance were evaluated against the conceptual design construction limits.	Updated soil data should be obtained to make an accurate determination of impacts to protected farmlands.	Identify the amount of farmland potentially converted and conduct consultation with the Natural Resources Conservation Service as needed. Based on minor impacts anticipated, consultation beyond completion of a Farmland Conversion Impact Rating form is not expected.
Geologic Resources and Soils	30 different soil types resent in Study Area.	Evaluate in future NEPA phases	Ground conditions as identified in geotechnical study.	Evaluate in future NEPA phases.
Water Quality	51 water ways traverse the Study Area; 5 are listed on the Colorado Department of Public Health and Environment 303(d) list of impaired streams	Assessed in ICA. Evaluate in future NEPA phases	Current 303(d) list.	Assess impacts and identify permanent features for the protection of water quality.
Floodplains*	Present in numerous locations along the Study Area.	Assessed in ICA. Evaluated the GIS data and hard-copy FIRM data from FEMA were used to identify potential for floodplain encroachment.	Current FIRM data.	Floodplain modeling likely required to assess impacts at floodplain crossings.
Wetlands/ Waters of the US*	Streams and associated wetlands parallel and cross under I-25 throughout the Study Area.	Assessed in ICA. The National Hydrology dataset, National Wetland Inventory, and Colorado Wetland Inventory were reviewed to identify potential impacts to wetlands and other waters of the U.S.	Delineation and functional assessment.	Perform delineation, functional assessment, and impact assessment; avoid, minimize, and mitigate impacts in accordance with the current USACE mitigation policies and Section 404 Permit conditions.
Vegetation and Noxious Weeds	Not inventoried; present in Study Area.	Evaluate in future NEPA phases.	General habitat assessment.	Evaluate in future NEPA phases.
Fish	Not inventoried; habitat present in Study Area.	Evaluate in future NEPA phases.	General habitat assessment.	Evaluate in future NEPA phases.
Wildlife*	High-quality habitat present in Study Area.	Assessed in ICA. Potential for impediment to wildlife movement considered.	General habitat assessment.	Evaluate wildlife movement as a core environmental issue and consider throughout the design processes of projects; consult with CPW as appropriate.
Threatened/ Endangered Species (MBTA)*	10 federal and 10 state listed species have the potential to occur within or downstream of the Study Area. Suitable habitat for migratory birds exists throughout the Study Area.	Assessed in ICA. Occupied and designated critical habitat for Preble's meadow jumping mouse evaluated against the construction limits of the conceptual design.	Current species list and general habitat assessment.	Consult with the USFWS to determine effect to listed and eligible resources
Historic Resources*	Numerous known and potentially historic resources present in Study Area including railroad ROW, interstate structures, properties, and a canal.	Assessed in ICA. Identified properties listed and eligible for listing on the National Register of Historic Places and supplemented this information with county assessor's data to identify buildings of historic age, Evaluated potential for resource impacts against the construction limits of the conceptual design.	COMPASS search and field survey.	Conduct Section 106 review and consultation with the SHPO and appropriate consulting parties
Archaeological Resources	Not evaluated	Evaluate in future NEPA phases	COMPASS search and field survey.	Evaluate in future NEPA phases.
Paleontological Resources	Not evaluated	Evaluate in future NEPA phases	Field assessment.	Evaluate in future NEPA phases.

[14] Transportation conformity requirements in the Study Area for carbon monoxide and PM_{10} apply through the following dates: October 25, 2019 for the Colorado Springs carbon monoxide maintenance area; January 14, 2022 for the Denver-Boulder carbon monoxide maintenance area; and October 16, 2022 for the Denver Metro PM_{10} maintenance area. Consultation with EPA to determine if/how conformity for carbon monoxide and PM_{10} should be address will be necessary for future NEPA projects that commence while these conformity requirements still apply.

Resource	Context	Evaluation Approach	Future NEPA-Phase Data Needs[a]	Future NEPA-Phase Impact and Mitigation Considerations
Land Use (including conservation easements)*	Commercial, residential, and large tracts of preserved open space (conservation easements)	Assessed in ICA. Considered compatibility with local plans and development. Evaluated conservation easement boundaries against the estimated ROW of the conceptual design.	Current data for existing and planned land use.	Evaluate compliance with local land use plans, master plans, and other overarching community guidance documents; coordinate with Douglas County Land Conservancy, The Conservancy Fund, and Douglas County Open Space regarding unavoidable impacts to conservation easements.
Socio-economic Resources	School, churches, businesses, and other resources present in Study Area	Potential for impact considered through ROW evaluation	Current inventory of resources and socio-economic data.	Evaluate in future NEPA phases.
Environmental Justice (EJ)*	EJ populations present in Study Area	Assessed in ICA. Potential for impact considered	Current socio-economic data.	Reengage local communities, identify potential for disproportionately high and adverse effects.
Right of Way*	Existing ROW varies; additional ROW will be needed	Assessed in ICA. Evaluated parcel data from El Paso and Douglas counties against estimated ROW of the conceptual design.	Current parcel data.	For unavoidable impacts, acquisition of property must conform with state and federal requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act).
Transportation Resources*	Frontage roads, parallel local roads, bridges over I-25, and railroads	Assessed in ICA. Potential for impact considered	Current inventory of infrastructure.	Coordinate with local jurisdictions and BNSF regarding ROW needs and potential realignment or relocation of infrastructure.
Utilities	Not inventoried; present in Study Area	Evaluate in future NEPA phases	Current inventory of infrastructure.	Evaluate in future NEPA phases.
Parks/ Recreational Resources*	Open space and trails present in Study Area	Assessed in ICA. Evaluated resource boundaries against estimated ROW of conceptual design.	Current parks and recreation data.	Assess potential for impact; resume communication and outreach with entities involved during the PEL Study including Douglas County Open Space and El Paso County Trails and Open Space.
Noise*	Numerous noise-sensitive land uses exist in the Study Area	Assessed in ICA. Developed 66-dBA and 71-dBA noise contours to evaluate potentially impacted land uses.	Data inputs necessary for a noise impact analysis compliant with CDOT's Noise Analysis and Abatement Guidelines (if project is a Type 1 project in accordance with 23 CFR 772)	Determine if noise impact analysis is required based on the specific project being advanced.
Visual Resources/ Aesthetics*	Protection of views from the I-25 corridor is a consistent theme in local plans and aesthetic guidelines were established through the South I-25 Corridor EA and US 85 EIS	Assessed in ICA. Potential for impact considered	Validate existing inventory of visual setting.	Prepare a visual impact analysis consistent with current FHWA guidance and apply aesthetic guidelines to the design as appropriate.
Hazardous Materials/ Waste*	No sites representing a high level of risk to future projects were identified	Assessed in ICA. Resource locations evaluated against the construction limits of the conceptual design.	Geosearch.	Complete and initial site assessment to determine if additional investigations are warranted.
Cumulative Impacts*	Evaluate in future NEPA phases	Evaluate in future NEPA phases	Project-level impact and mitigation information.	Identify cumulative impacts during project development based on the direct and indirect impacts.
Section 6(f)*	Hangman's Gulch Trail	Assessed in ICA. Resource locations evaluated against the estimated ROW of the conceptual design.	Current LWCF resource data.	Evaluate for potential conversion.
Section 4(f)*	Numerous historic and recreation resources present in Study Area	Assessed in ICA. Resource locations evaluated against the estimated ROW of the conceptual design.	Current resource data.	Existing and planned park and recreational facilities that could be impacted should be evaluated for Section 4(f) applicability and use.

[a] Project-level information collected and evaluated as part of the I-25 South Gap EA is available in the ICA (Appendix B). Resources marked with an asterisk are discussed further in this chapter.

dBA – A-weighted-decibel

FEMA – Federal Emergency Management Agency

FIRM – flood insurance rate maps

GIS – geographic information system

LWCF – land and water conservation fund

MBTA – Migratory Bird Treaty Act

PM_{10} – particulate matter 10 micrometers or less in diameter

SHPO – State Historic Preservation Officer

USACE – U.S. Army Corps of Engineers

USFWS – United States Fish and Wildlife Service

Figure 6-1. Environmental Resources, MP 195 - MP 186

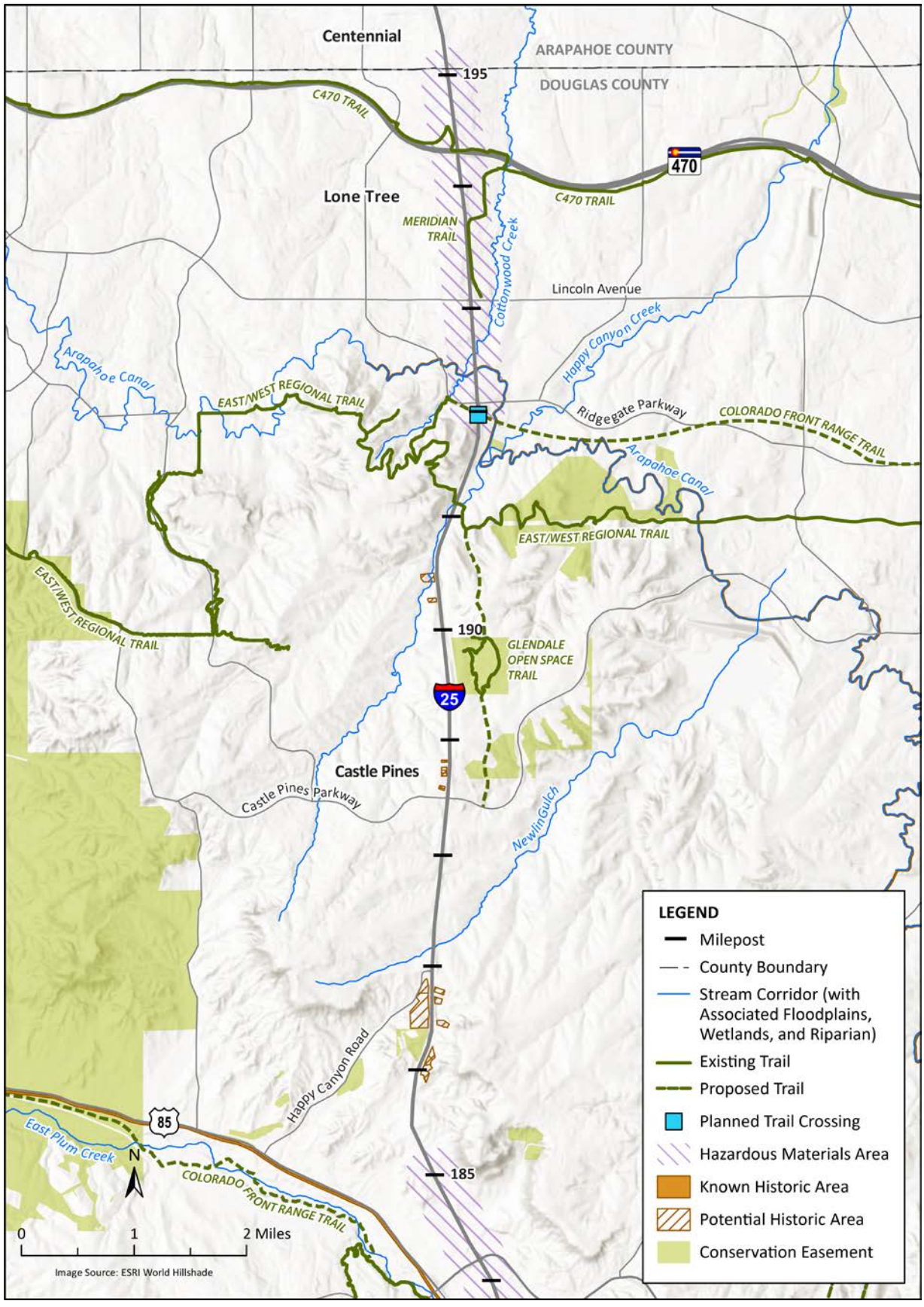


Figure 6-2. Environmental Resources, MP 186 – MP 172

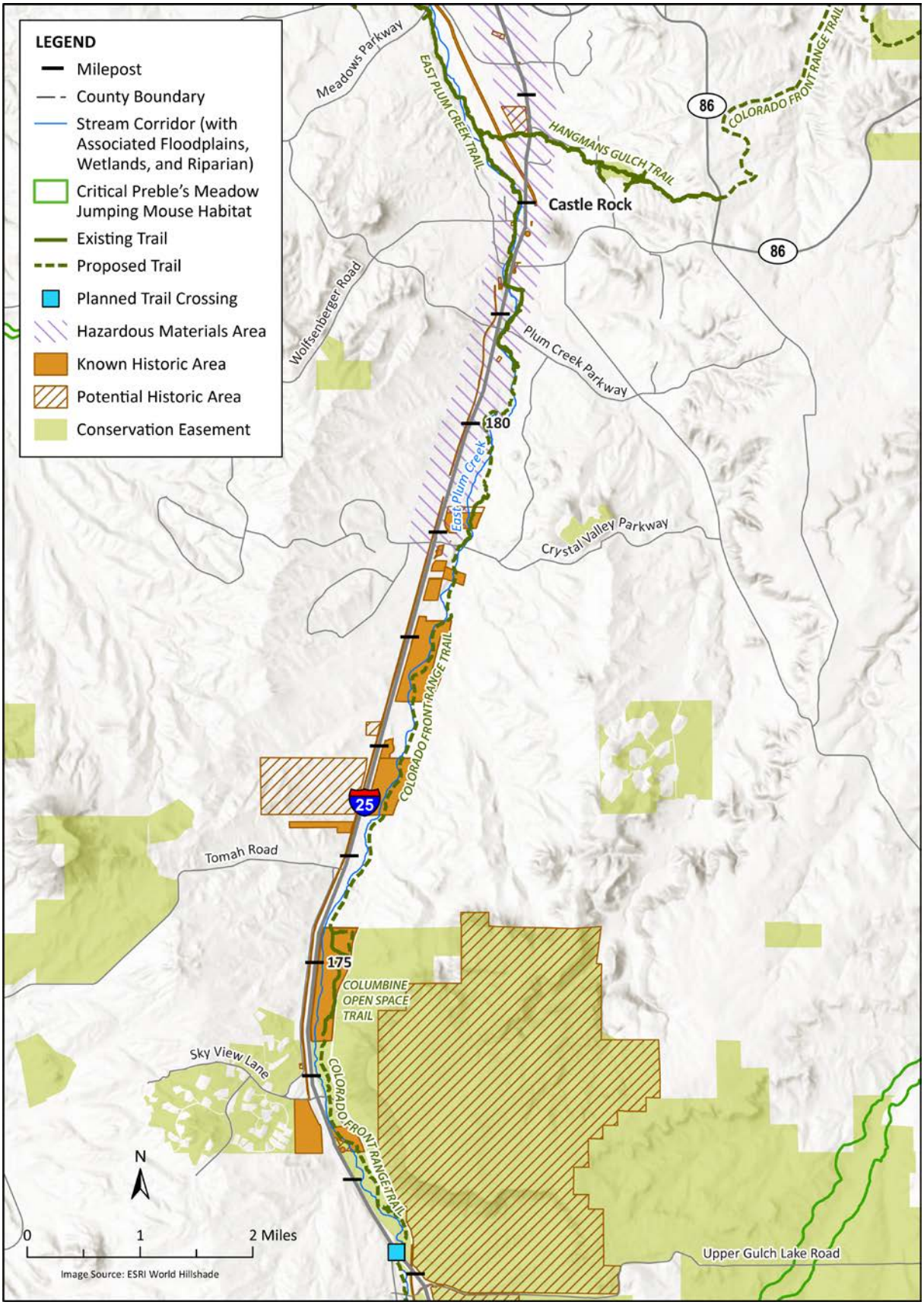
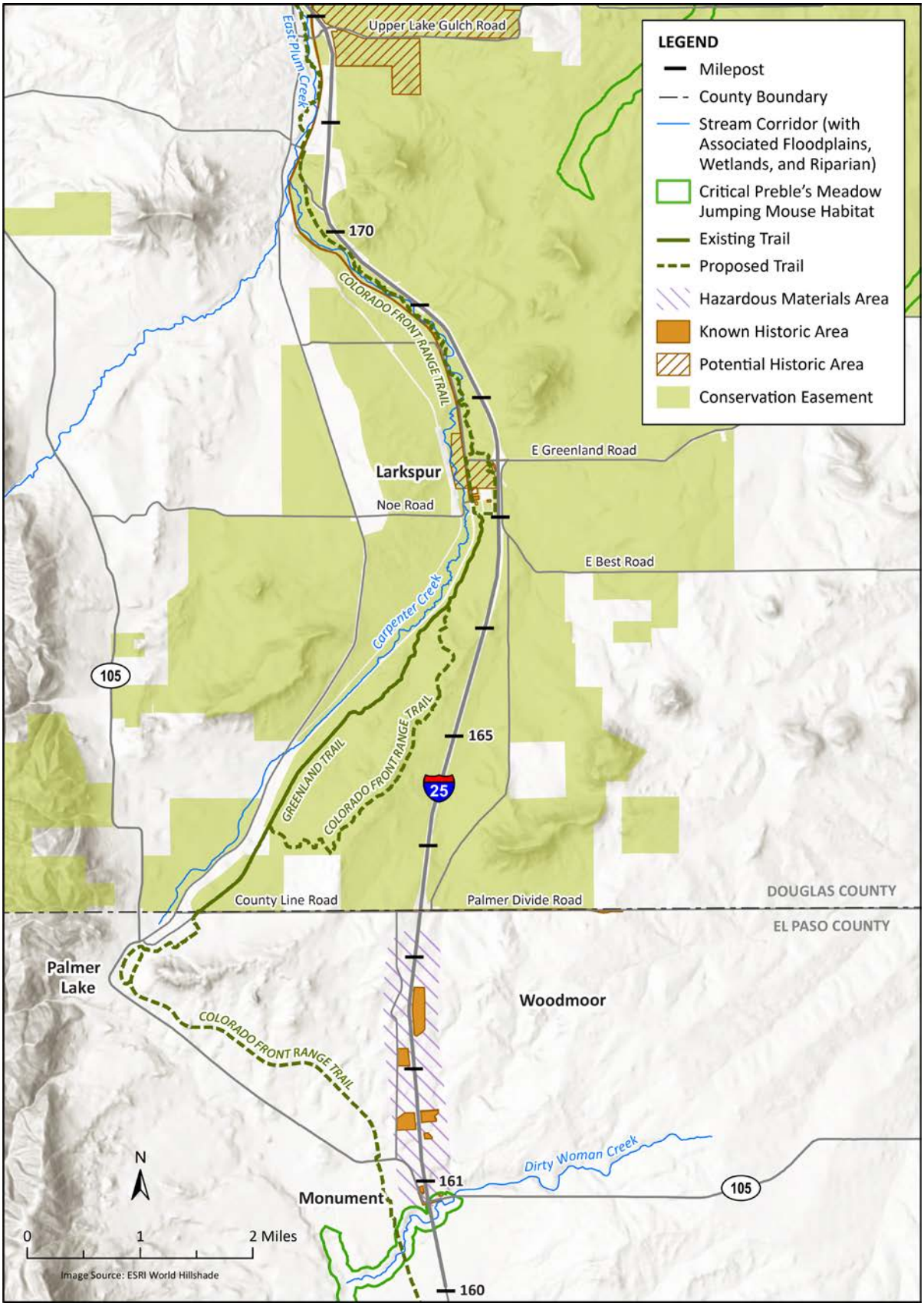


Figure 6-3. Environmental Resources, MP 172 – MP 160



6.1.1 Monument to Castle Rock

Large tracts of Douglas County open space and private conservation easements abut the I-25 ROW in this section, in many cases on both sides of the interstate. The remarkable views from I-25 between Monument and Castle Rock are accentuated by extensive conservation easements and open space lands along the interstate. Carpenter Creek and East Plum Creek parallel I-25 for most of this segment; these creeks and numerous tributaries cross under the interstate. Associated floodplain, wetlands, and riparian conservation zones frequently abut or cross under the interstate. Occupied habitat for the federally threatened Preble's meadow jumping mouse (PMJM) is widespread, but there is only one area of designated critical habitat along Dirty Woman Creek at the southern terminus of the Study Area. This segment of I-25 between Monument and Castle Rock also has the highest concentration of wildlife conflict locations in the Study Area. Other resource considerations include existing and planned segments of the Colorado Front Range Trail that parallels and crosses I-25 and several hazardous material sites in Monument.

6.1.2 Castle Rock to Castle Pines

This section of the Study Area includes the growing communities of Castle Rock and Castle Pines, where much of the land abutting the interstate is either developed or zoned for planned development. Most of the historic resources in the Study Area are located in and around Castle Rock. A comparison of historic records and assessor's data indicates the presence of 96 historic and potentially historic resources in this segment. The resources are primarily buildings, but also include bridges and linear resources. The majority of the hazardous material facilities identified in the Study Area are also located in Castle Rock. Despite the urban nature of much of this segment, natural resources are present. East Plum Creek roughly parallels I-25 between MP 179 to MP 182 before crossing under the interstate north of MP 181 and then veering west and away from it near MP 182. Several tributaries also cross under I-25 in this area. Associated floodplain, wetlands, and riparian conservation zones frequently abut or cross under the interstate between MP 179 and MP 183. The East Plum Creek Trail and the Colorado Front Range Trail, which generally follow East Plum Creek, parallel and cross the interstate in this area.

6.1.3 Castle Pines to C/E-470

Between MP 189 and MP 191, the land abutting I-25 is low-density residential in Castle Pines and undeveloped agricultural. Happy Canyon Creek and its associated wetlands and floodplain parallel the west side of the interstate before crossing under near MP 191 and veering east and away from the interstate. North of MP 191, I-25 passes through the City of Lone Tree and is either developed or zoned for planned development. Castlewood Creek and its associated wetlands and floodplain cross the interstate between RidgeGate Parkway and Lincoln Avenue. There is one area of designated open space, Glendale Farm Open Space, along the east side of I-25 just south of MP 190. In late summer 2019, Douglas County completed improvements to the East/West Regional Trail at the Happy Canyon Creek bridge (MP 191.1) with a future planned trail connection to Glendale Farm Open Space. Additionally, a planned segment of the Colorado Front Range Trail will cross under I-25 near RidgeGate Parkway at MP 192.

6.2 Potential Impacts and Mitigation Measures

The following sections summarize potential resource impacts and mitigation measures that will need to be considered in future NEPA processes. Mitigation measures identify a proposed method or mechanism to minimize, rectify, reduce, or compensate for adverse impacts expected from federally funded actions.

Impacts identified in this section are based on the conceptual design discussed in Section 4.1.3 and presented in the mapbook (Appendix C). The impact assessment focuses on resources with the highest potential to influence decision-making during future NEPA and design phases of transportation improvements recommended in this PEL Study. Impacts to other resources included in the table are expected to be negligible or could likely be mitigated without substantial design changes or design variances.

Construction limits for the conceptual design of the I-25 mainline recommendation were estimated by modeling the limits of cut or fill necessary to implement the paved width of the recommended interstate improvements without design exceptions. The ROW was estimated by applying a 15-foot-buffer to the construction limits. Depending on the nature of the resource, impacts were calculated either from the edge of construction limits or from ROW limits. Construction limits were used for natural resources such as wetlands. ROW limits were used for resources and adjacent land outside of CDOT's existing ROW that would be affected if incorporated into CDOT ROW to implement the PEL Study recommendations, such as parks and private property.

6.2.1 Resources with the Highest Potential to Influence Design and Implementation

Wetlands and Other Waters of the U.S.

The National Hydrology dataset, National Wetland Inventory, and Colorado Wetland Inventory were reviewed to identify potential impacts to wetlands and other waters of the U.S. Because East Plum Creek and Carpenter Creek cross I-25 and flow parallel to the interstate for a good portion of the Study Area (between MP 167 and 182), impacts to the streams and associated wetlands are likely from implementation of recommended improvements along this portion of I--25. Localized impacts are also expected where other streams and associated wetlands cross I-25 in the Study Area (Newlin Gulch, Happy Canyon Creek, Arapahoe Canal, Cottonwood Creek, and numerous other intermittent and ephemeral streams).

Delineations and functional assessments will be conducted during future NEPA studies to establish the boundaries of wetlands and other waters of the U.S. and determine affected wetland types and functional values. Per Section 404 of the Clean Water Act, impacts to wetlands and other waters of the U.S. must be avoided, minimized, or mitigated. All impacted wetlands will be mitigated in accordance with current USACE mitigation policies and Section 404 Permit conditions.

Floodplains

GIS and hard-copy FEMA FIRM data were used to identify regulated floodplains and floodways in the Study Area and potential for floodplain encroachment.

The most substantial impacts to regulated floodplains in the Study Area are anticipated primarily along East Plum Creek between Upper Lake Gulch Road and Tomah Road and near downtown Castle Rock. Minor impacts to regulated floodplains from construction are also anticipated where perennial streams cross the interstate between Hess Road and Lincoln Avenue. Another area of flood concern noted during the scoping phase of the PEL Study is the Surrey Ridge/Happy Canyon area.

Within the Study Area, federal floodplain regulations are enforced by Douglas County and the Pikes Peak Regional Building Department through floodplain development permits. The Southeast Metro Stormwater Authority, Urban Drainage and Flood Control District, and Colorado Water Conservation Board are consulted in this process. Coordination with these agencies will be conducted throughout the design process regarding potential impacts and permitting of work within floodplains and floodways.

Floodplain modeling would likely be required to assess impacts at floodplain crossings. Construction within floodplains could result in a change in current floodplain and floodway boundaries. In addition to floodplain development permits, these impacts may require a Conditional Letter of Map Revision and Letter of Map Revision to be approved by FEMA.

Threatened and Endangered Species

A desktop review of readily available data for threatened and endangered species was completed and included review of USFWS planning and conservation (Information for Planning and Consultation [database]) decision support system, CPW threatened and endangered list, and Colorado Natural Heritage Program tracking list. The following 15 special status species with potential to occur in the Study Area were identified:

- PMJM
- Northern Pocket Gopher
- Mexican Spotted Owl
- Burrowing Owl
- Plains Sharp-tailed Grouse
- Northern Leopard Frog
- Greenback Cutthroat Trout
- Northern Redbelly Dace
- Iowa Darter
- Mountain Sucker
- Orangethroat Darter
- Plains Minnow
- Colorado Butterfly Plant
- Ute Ladies'-tresses orchid

One area of designated critical habitat for the federally and state-listed threatened PMJM is mapped at the southern end of the Study Area along Dirty Woman Creek. Occupied PMJM range extends along the majority of East Plum Creek and Carpenter Creek through the Study Area. Trappings for PMJM have confirmed the presence of PMJM in many areas of the occupied range.

Additional sensitive areas include riparian conservation zones (RCZs) established by Douglas County, along with the towns of Castle Rock and Parker, through a Habitat Conservation Plan and EA to comply with the Endangered Species Act. The RCZs are areas of potential habitat for PMJM, including the active channel, alluvial floor, upland side slopes adjacent to the channel or alluvial floor, and a component of the upland vegetation adjacent to the upland side slopes.

Impacts to RCZs are likely and may require formal Section 7 Consultation with the USFWS. The Douglas County Habitat Conservation Plan requires all temporary impacts to RCZs to be

restored after construction. Permanent impacts need to be mitigated by creation and protection of new RCZs. Requirements would likely be met through the Endangered Species Act Section 7 process administered by the USFWS.

During project development in future NEPA phases, additional desktop and field studies are needed to determine the presence or absence of suitable habitat for special status species with potential to occur in the Study Area. Specifically, surveys for northern leopard frog, Colorado butterfly plant, and Ute ladies'-tresses orchid may be necessary. Consultation with USFWS and CPW is anticipated given the likelihood of suitable habitat for threatened and endangered species along I-25 through the Study Area.

Five threatened or endangered species exist downstream of the Study Area, including the least tern, piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid. These species could be impacted if water depletions to the South Platte River and its tributaries take place. Future projects should evaluate the potential for water depletions and the applicability of FHWA's Programmatic Biological Assessment. Effects to species not addressed in the Programmatic Biological Assessment or affected by causes other than water depletions to the South Platte will be analyzed separately.

Historic Resources

Properties that are listed or eligible for listing on the National Register of Historic Places were identified in the Study Area through file searches of the Office of Archaeology and Historic Preservation, History Colorado, and COMPASS database. The COMPASS database is an online cultural resource database administered by the Office of Archaeology and Historic Preservation (OAHP). This information was supplemented by identifying potentially National Register of Historic Places-eligible historic resources using Douglas County and El Paso County assessor's data regarding the age of buildings on parcels in each jurisdiction. The Historic Resources Study Area was defined by creating a 50-foot buffer from the edge of interstate ROW through the study corridor to accommodate consideration of adjacent resources.

Known historic resources in the Study Area potentially impacted by the I-25 mainline recommendation include railroad ROW, interstate structures, and historic downtown Castle Rock properties, as follows:

- Roadway bridge structures crossing I-25 at SH 105, County Line Road/Palmer Divide Road, Greenland Road, Upper Lake Gulch Road, Santa Fe Drive/Black Feather Trail
- Railroads, including the UPRR underpass north of Upper Lake Gulch Road (MP 172.1), BNSF alignment just south of Crystal Valley Parkway (MP 178.7) west of I-25, BNSF alignment 0.5 mile north of Crystal Valley Parkway (179.6-180) west of I-25, and the UPRR alignment crossing I-25 north of Ligget Road (MP 182.2)
- East Plum Creek underpass crossing I-25 at MP 172.3
- Properties in the Castle Rock downtown area adjacent to I-25 near Fifth Street (MP 181) and Wolfensberger Road (MP 181.4)
- A linear resource (Arapahoe Canal) crossing I-25 just north of RidgeGate Parkway (MP 192.3)

Impacts to potential historic resources in the Study Area may include residential properties in the Castle Pines area, historic downtown Castle Rock properties, linear roadway resources throughout the corridor, and rural residential properties between Monument and Castle Rock. Conservation easements on both sides of I-25 in Douglas County between Castle Rock and Monument are also potentially eligible.

As part of future project-level NEPA studies, Section 106 review and consultation with the SHPO and other appropriate consulting parties will be required. This may include coordination with local jurisdictions to consider impacts on historic properties within their jurisdiction. Future projects will also need to revisit the area of potential effect, as proper boundaries may differ from those identified for the purposes of this PEL Study. This may require the following:

- Expand analysis of historic properties to include landmarks, agricultural properties, and other historic resource categories
- Conduct bridge evaluations/survey forms
- Perform a new COMPASS search and county assessors search for areas of potential effect outside the Study Area
- Perform the following:
  - Intensive-level surveys to identify potential resources outside the Study Area
  - Intensive-level surveys to resurvey previously identified resources with no assessment or field determination
  - Revisitation survey for resources with official determinations made more than 5 years ago

Right of Way

GIS parcel data from El Paso and Douglas counties were evaluated against the conceptual design to understand the potential level of impacts to adjacent property from implementation of the I-25 mainline recommendation.

Existing CDOT I-25 ROW along the interstate between Monument and the southern part of Castle Rock would be sufficient in most locations to implement the I-25 mainline recommendation. Several areas of partial acquisitions are anticipated for vacant properties, rural residential properties, and conservation easements.

In Castle Rock and Castle Pines, implementation of the I-25 mainline recommendation would have more substantial impacts. Partial acquisitions of residential and commercial property are expected and full acquisitions of commercial properties near downtown Castle Rock are likely.

The I-25 mainline recommendation can be implemented mostly within existing CDOT ROW through the Lone Tree area. Partial acquisitions of commercial properties east of I-25 north of Lincoln Avenue are anticipated.

While the conceptual design included design optimization to avoid major impacts to adjacent property and infrastructure, additional measures will likely be explored during project development in future NEPA phases to avoid and minimize impacts to adjacent property. These measures may include alignment shifts, retaining walls, or design variances. For unavoidable impacts, acquisition of property must conform with state and federal requirements, including the

Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act). The Uniform Act is a federally mandated program that applies to all acquisitions of real property or displacements of persons resulting from federal or federally assisted programs or projects.

Recreation Resources

During the initial data collection for the ICA, recreation resources were identified as being of high importance to the surrounding communities along the I-25 corridor. Recreation resources in the Study Area were identified using local plans and GIS data from local jurisdictions combined with a desktop survey of aerial imagery. The I-25 mainline recommendation is expected to result in temporary or permanent impacts to five existing trails and one planned trail.

Anticipated Impacts to Recreation Resources

- Four trails that cross under I-25 in the Study Area could be impacted: the East Plum Creek Trail at Fifth Street (MP 181.4), Hangman's Gulch Trail north of Ligget Road (MP 182.6), the East/West Regional Trail (MP 191.1), and the C/E-470 Trail (MP 194). Hangman's Gulch Trail was constructed with a Land and Water Conservation Fund grant and is subject to Section 6(f) requirements.
- The Meridian Business Park Trail paralleling the east side of I-25 between Lincoln Avenue and San Luis Street (MP 193 to MP 193.6) would be completely removed as result of the I-25 mainline recommendation.

Anticipated Impacts to Planned Recreation Resources

- A planned segment of the Colorado Front Range Trail between the west side of I-25 and Carpenter Creek (near MP 170) may be impacted by widening and require changes to the planned alignment.
- Planned segments of the Colorado Front Range Trail would cross under I-25 near MP 173 and MP 192.

For locations of planned trail crossings, CPW suggested consideration for wildlife to maximize crossing opportunities, noting that while trails are used by people during the day, wildlife can use the trails at night, provided the trails are not lighted. Existing and planned park and recreational facilities that could be impacted should be evaluated for Section 4(f) applicability and use.

During project development in future NEPA phases, communication and outreach should resume with entities involved during the PEL Study, including Douglas County Open Space and El Paso County Trails and Open Space.

Conservation Easements

Much of the rural area of the corridor abuts conservation easements. During the RAG meeting in December 2016, The Conservation Fund's main concern was protecting the scenic integrity of the corridor, noting the importance of honoring the more than $120 million in public investment. The absence of lighting through the open space areas was also noted as a positive attribute to the character of the corridor. The I-25 mainline recommendation is expected to result

in temporary or permanent impacts to five conservation easements. Currently none of the properties are considered Section 4(f) because they do not allow public access.

Anticipated Impacts to Conservation Easements

- Snortland property east of I-25 from MP 173.2 to MP 173.4; I-25 construction limits are anticipated to encroach into the conservation easement.
- Antlers Ridge property at MP 186.3 west of I-25; I-25 construction limits are anticipated to encroach into the conservation easement.
- Greenland Ranch property east I-25 from Palmer Divide Road (MP 163.3) to Upper Lake Gulch Road (MP 171.8); potential ROW impacts.
- J.A. Ranch property east I-25 at Upper Lake Gulch Road (MP 171.8); potential ROW impacts.
- Ramsour property east of I-25 from MP 173.8 to MP 174.3; potential ROW impacts.

If impacts are unavoidable, coordination should occur as soon as possible to determine whether any agreement could be made with the owner/managers of the easements. Much of this coordination is likely to occur with Douglas County Land Conservancy, The Conservancy Fund, and Douglas County Open Space.

Noise-sensitive Land Uses

A desktop evaluation of aerial imagery was used to identify and map noise-sensitive land uses in the Study Area. Posted speed limits and existing I-25 cross sections were used in a straight-line noise model to develop 66-dBA and 71-dBA noise contours.

Potentially impacted land uses include hotels in Castle Rock and Lone Tree; high to medium density residential along the interstate in Monument, Castle Rock, and Lone Tree; lower density rural residential south of Plum Creek Parkway near Greenland Road, Sky View Lane, and Crystal Valley Parkway; and other noise-sensitive land uses such as parks, outdoor recreational facilities, churches, and schools concentrated in the Castle Rock area and occurring sporadically throughout the Study Area.

During project development in future NEPA phases, determination should be made whether the project is a Type 1 project in accordance with 23 CFR 772 and if a noise impact analysis is required. Applicable activities requiring noise analysis would include adding through-travel lanes, adding auxiliary lanes greater than 2,500 feet in length, adding new interchanges or altering existing interchanges, changing the vertical profile of the road of 5 feet or more, road realignments that would halve the distance between the edge of a travel lane and a noise sensitive receptor, and addition or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza. These activities may trigger the need for noise impact assessment in accordance with CDOT's Noise Analysis and Abatement Guidelines.

Visual

An inventory of the visual setting was prepared using site visits and review of aerial imagery. Local comprehensive and master plans were reviewed to establish the context of planning for visual resources in the Study Area. High value is placed on the natural beauty of the area, including the mountains, unique rock formations, and open space. Protection of views from the

I-25 corridor is a consistent theme, and aesthetic guidelines (Appendix P) were established through the I-25 South Gap EA. These guidelines, which apply to the entire I-25 PEL corridor from Monument to Lone Tree, include design standards for wall textures, colors, slopes, guardrail types, sound wall design, lighting standards, sign types, and landscaping.

During project development in future NEPA phases, a visual impact analysis consistent with current FHWA guidance should be prepared and the aesthetic guidelines developed as part of the I-25 South Gap EA applied to the design as appropriate.

Transportation Infrastructure

Widening along I-25 to implement recommendations from this PEL Study would require reconstruction and realignment of existing infrastructure in the Study Area, including adjacent frontage roads, bridges over I-25, and railroads.

Frontage and Local Road Impacts

- East side of I-25 from SH 105 (MP 161.5) to County Line Road (MP 163.3)
- East side of I-25 along Best Road from MP 166.9 to Greenland Road (MP 167.4)
- Both sides of I-25 from Sky View Lane (MP 174.0) to Plum Creek Parkway (MP 180.8)
- East of I-25 north of Ligget Road from MP 182.4 to MP 183.0
- East side of I-25 from Santa Fe Drive/Black Feather Trail (MP 183.4) to MP 183.8 south of Meadows/Founders Parkway
- West side of I-25 at MP 189.8 along North Clydesdale Road
- East side of I-25 at MP 193.6 along San Luis Court

I-25 Bridges/Structures

- Replacement of existing interchange likely needed at Happy Canyon Road and Lincoln Avenue
- Replacement of structure likely needed at County Line Road/Palmer Divide Road, West Wolfensberger Road, and Castle Pines Parkway/Hess Road, and Tomah Road/Sky View Lane
- Widening of structure likely needed at East Greenland Road, Upper Lake Gulch Road, West Plum Creek Parkway, Castle Rock Parkway, RidgeGate Parkway
- Slope paving with wall likely needed at US 85/Black Feather Trail
- C/E-470 interchange not evaluated (refer to System-to-System Evaluation in Section 4.2.3)

BNSF Railroad

- Potential ROW impacts west of I-25 between MP 172.3 and MP 173.6
- Potential ROW and track alignment impacts west of I-25 between MP 173. 2 and MP 173.5
- Potential ROW impacts west of I-25 between MP 177.7 and MP 180.2
- Potential ROW and track alignment impacts at MP 178.6, MP 197.1, and MP 181 just north of Plum Creek Parkway

During project development in future NEPA phases, coordination with local jurisdictions and BNSF regarding ROW needs and potential realignment or relocation of infrastructure will inform design decisions for I-25 improvements.

6.2.2 Resources with Low Potential to Influence Design and Implementation

Air Quality

Current attainment status of criteria pollutants for the Study Area were gathered from the Colorado Department of Public Health and Environment website. The Douglas County portion of the Study Area falls within carbon monoxide and PM_{10} maintenance areas and an ozone nonattainment area. The El Paso County portion of the Study Area falls within a carbon monoxide maintenance area.

During project development in future NEPA phases, regional and project-level conformity must be achieved. To meet the requirements of the federal conformity regulation and Colorado's conformity regulation, the project must be included in the appropriate Transportation Improvement Programs, including fiscal constraint and the latest planning assumptions. A quantitative analysis for carbon monoxide would be triggered if any of the four conditions listed under 40 CFR 93.123(a)(1) apply. While not anticipated, a PM_{10} analysis would be required should any of the five conditions under 40 CFR 93.123(b)(1) be triggered.

DRCOG also noted the following information relevant to future project development:

- Modeling inputs include the type of lane proposed to be built, toll rate, and access points.
- If the type of lane operation (e.g., GP lane or EL) is changed after the DRCOG submittal, the model process will need to start over.

Land Use

Comprehensive plans and GIS data from local jurisdictions were used to understand the broad land use patterns along the interstate corridor with a focus on current and proposed land uses in the Study Area.

In general, the PEL Study recommendations would complement community plans in the Study Area by improving mobility and long-term travel time reliability to better accommodate anticipated population and employment growth. As identified in the ROW discussion, localized impacts could occur for properties directly adjacent to the interstate.

During project development in future NEPA phases, continued coordination with local jurisdictions will be needed to promote consistency with land use plans and mitigate unavoidable impacts.

Environmental Justice (Low-income, Minority, and Limited English Proficiency)

U.S. census data, data from the U.S. Department of Housing and Urban Development, and outreach with stakeholders from local communities were used to identify populations protected by Title VI of the Civil Rights Act of 1964 and Executive Order 12898, Federal Actions to address Environmental Justice in Minority and Low-Income Populations. The project Study Area intersects several census block groups where low-income populations, limited English proficiency populations, and minority populations exceed the county average. These block

groups occur predominantly in the portion of the Study Area north of Plum Creek Parkway, primarily in the urbanized areas within Castle Rock, Castle Pines, and Lone Tree.

Impacts from general widening of the interstate would likely affect all adjacent communities in a similar manner and therefore, disproportionately high and adverse effects to environmental justice populations are not anticipated.

During project development in future NEPA phases, current socio-economic data should be collected and local communities reengaged to identify low-income, minority, and limited English proficiency populations. Once ROW requirements and other impacts can be quantified and associated mitigation measures reviewed, the distribution of impacts should be evaluated to identify whether project activities have the potential to cause disproportionately high and adverse effects to minority and low-income populations. If disproportionately high and adverse effects are identified, additional mitigation measures would need to be considered.

Farmland

Soils with characteristics of prime or unique farmland, farmland of statewide importance, or farmland of local importance were identified through desktop research of data sources including the Natural Resources Conservation Service soil survey and the Northwest Corridor Transportation and Environmental Planning Study.

Minor or temporary impacts to farmlands protected under the Farmland Protection Policy Act of 1981 are anticipated at Palmer Divide Road, Greenland Road between Tomah Road and Crystal Valley Parkway, and between Liggett Road and Santa Fe Drive/Black Feather Trail.

During project development in future NEPA phases, updated soil data should be obtained to make an accurate determination of impacts to protected farmlands. Mitigation needs can be determined in coordination with the Natural Resources Conservation Service based on results of the Farmland Conversion Impact Rating form.

Hazardous Material Sites

An environmental records search, including federal and state environmental resources, was conducted to identify potentially hazardous materials such as asbestos, lead-based paint, heavy metals, dry-cleaning solvents, and fuels. These data were supplemented with stakeholder input to identify proposed maintenance, fueling, and de-icing facilities in the Study Area.

No sites representing a high level of risk to future projects were identified and no direct impacts or encroachment to these sites from construction are anticipated.

During project development in future NEPA phases, a CDOT initial site assessment should be completed. The result would determine whether additional investigations are warranted. Depending on risks identified, a materials management plan may be recommended and implemented to specify management practices in areas where contaminated soil and groundwater may be encountered during construction. In addition, structures planned for modification or demolition must be evaluated for regulated materials, specifically, asbestos-containing material and lead-based paint.

Impediments to Wildlife Movement

Movement of wildlife throughout the Study Area was evaluated using a desktop assessment of readily available data on wildlife conflicts, wildlife habitat, protected lands, and wildlife movement corridors from CPW, CDOT, CSP, Douglas County, El Paso County, and the United States Geological Survey. More information regarding this assessment is available in the ICA (Appendix B).

I-25 traverses and bisects an interconnected system of high-quality wildlife habitat in the Study Area. Widening the interstate, construction of retaining walls, and placement of barriers all serve to further impede wildlife movement and increase the likelihood of vehicle-wildlife conflicts. More information is available in the Wildlife TM (Appendix J).

The I-25 South Gap Project implements four new wildlife crossing and expands an existing wildlife underpass combined with wildlife fencing, deer guards, and escape ramps to create a system of improvements anticipated to significantly reduce the number of wildlife-vehicle collisions in the highest frequency conflict areas between Monument and Castle Rock. However, wildlife movement and wildlife conflicts continue to be a concern in this area and the segment of I-25 between Castle Rock and Lone Tree.

During project development in future NEPA phases, wildlife movement should be evaluated as a core environmental issue and considered throughout the design processes of projects. The core CDOT/CPW biology team involved in the PEL Study should continue to be engaged in CDOT and local planning processes to advise on the location and design of wildlife fencing, escape ramps, deer guards, overpasses, and underpasses to ensure they operate as intended and as an effective and comprehensive wildlife movement system.

Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes these actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts will be identified during project development in future NEPA phases based on the direct and indirect impacts of each project. Resources that are adversely impacted by the proposed action or resources currently in poor/declining health or at risk will be analyzed for cumulative impacts even if the anticipated project impacts are relatively small. Cumulative impacts are expected to result from infrastructure alterations, replacements, and realignments necessitated by implementation of the wider I-25 cross section recommended in this PEL Study, as discussed in the Transportation Infrastructure section of this chapter. These improvements are likely to impact sensitive resources beyond the Study Area of this PEL.

During project development in future NEPA phases, additional coordination with resource agencies will be conducted to determine the appropriate geographical study area for each of the affected resources and to assist with the development of measures to avoid, minimize, or mitigate anticipated impacts.

7.0 Agency Coordination and Public Involvement

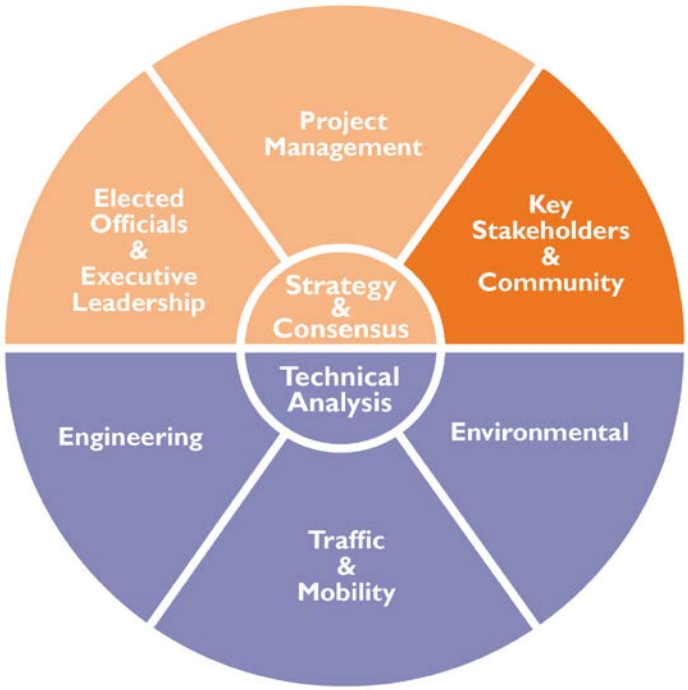
The PEL Study was shaped by a robust agency and public involvement effort responding to significant public and agency interest in efficient travel and improved safety along the I-25 corridor between Colorado Springs and Denver. Highly engaged stakeholders, including the public, were critical to characterizing transportation needs, identifying priorities, and fulfilling the PEL Study goal of successfully advancing the I-25 South Gap Project as an early action. The PEL Study was guided by an integrated approach to technical analysis and consensus building; project teams were developed to support both aims (Figure 7-1).

The information presented in this PEL Study report is based on extensive analyses completed as part of this PEL Study. The analyses are summarized in this PEL Study report, with more detailed information available in report appendices. Chapter 7 is supported by the following appendix content:

- **Agency and Public Coordination: Appendix D**

An initial public and agency involvement plan was developed in December 2016. The plan was informed by key stakeholder interviews, a corridor bus tour, and chartering of the TWG and SC. A communications team comprised of CDOT communications and consultant project staff was established in March 2017 in response to increased stakeholder interest. That team continued to guide public outreach and communication throughout the PEL Study and employed a mix of traditional outreach methods alongside innovative methods to keep agencies and the public informed and involved.

Figure 7-1. PEL Study Coordination Approach



The tenets of agency coordination and public involvement are described in Sections 7.1 and 7.2. Agency Coordination and Public Involvement Coordination (Appendix D) contains meeting agendas, notes, presentations, and other materials.

7.1 Agency Coordination

Three primary groups were engaged in regular meetings to advise on the PEL Study progress, findings, and recommendations: the TWG, RAG, and SC. In addition to external agencies, CDOT and FHWA management and specialty staff participated in the TWG, RAG, and SC and met regularly throughout the PEL Study, working as a blended team with consultants to

streamline and accelerate the study. The coordinated effort was especially important as CDOT committed to developing the I-25 South Gap Project concurrently with the PEL Study and eventually advancing NEPA and engineering for that project on a fast-tracked timeline.

7.1.1 Technical Working Group and Resource Agency Group

The TWG provided technical input and guidance on the PEL Study and included corridor jurisdictional representatives from Public Works and Open Space staffs, key CDOT technical staff, and consultant technical experts. The TWG also advised on SC agendas and engaged and informed executive leadership on the SC of the study's technical progress. The TWG was closely engaged in the same roles with the NEPA process and design for the I-25 South Gap Project. The TWG first met and was chartered in November 2016 and continued to meet monthly through April 2019.

The RAG, which included representatives of state and federal resource and regulatory agencies, first met in February 2017. Because many of the RAG members also participated on the TWG, the two groups met on the same day. In February 2018, the TWG and RAG combined as one TWG/RAG because of their similar interests and participation. A subset of the RAG also formed a wildlife advisory group that worked to identify wildlife mitigation throughout the corridor and provide technical expertise to the design and implementation of wildlife crossings for the I-25 South Gap Project.

The following organizations were represented in the TWG and RAG:

- City of Castle Pines
- City of Colorado Springs
- City of Lone Tree
- Colorado Department of Public Health and Environment
- CDOT
- CMCA
- CPW
- Colorado SHPO
- DRCOG
- Douglas County
- Douglas County Land Conservancy
- E-470 Public Highway Authority
- El Paso County
- FHWA
- Perry Park Metropolitan District
- PPACG
- The Conservation Fund
- Town of Castle Rock
- Town of Larkspur
- Town of Monument
- USACE
- U.S. Environmental Protection Agency
- USFWS

The majority of organizations were represented by multiple departments staff members from each department. In addition, a large consultant team that included Jacobs (formerly CH2M HILL), Apex Engineering, ArLand Land Use Economics, BluePrint Strategies, OV Consulting, Peak Consulting Group, Pinyon Environmental, Steer Group, and WSP Global Inc. participated in the TWG/RAG, supporting project management, design and environmental surveys, and the development and evaluation of technical concepts. As the I-25 South Gap

Project advanced, additional consultants and CDOT staff participated in the TWG/RAG to support design, survey, construction, and construction management.

More than 150 people participated in at least some of the TWG/RAG meetings, with most meetings averaging 70 or more participants. Sign-in sheets included in the meeting notes in Agency and Public Involvement Coordination (Appendix D) indicate the individual staff members participating from the represented organizations.

Throughout the course of the PEL Study, the TWG/RAG provided substantial input and guidance regarding issues, constraints, and requirements in their jurisdictions and participated collaboratively to listen to, understand, and resolve differences with other organizations. The TWG/RAG meetings followed a workshop format where CDOT summarized the study progress or analysis in a presentation with interactive group discussions. Several longer workshops were held with the TWG/RAG to confirm the study scope and success factors (November 2016), develop a range of PEL alternatives (February 2017), review alternatives evaluation (June 2017), kick off the NEPA phase of the I-25 South Gap Project (November 2017), and review the recommendations and implementation plan (March 2019). At each meeting, CDOT provided updates to the project schedule, outreach, and technical analyses (e.g., engineering, traffic, and environmental). Table 7-1 summarizes the meeting schedule and topics. References to NEPA and the EA in Table 7-1 apply to the I-25 South Gap Project only.

Table 7-1. TWG and RAG Meetings

Meeting	Date	Topics
TWG #1	11/4/2016	• Chartering workshop to confirm PEL scope, establish study vision, and discuss critical success factors, risks, and best practices for the PEL Study
TWG #2	12/6/2016	• Initial corridor assessment • PEL travel demand modeling and data collection approach • Resource agency scoping input
RAG #1	12/6/2016	• PEL scoping • Review of environmental data and issues
TWG #3	1/6/2017	• Corridor assessment results, including infrastructure deficiencies, safety and crash analyses, and reliability analyses • CDOT announced that the schedule for widening the Gap would be accelerated and a concurrent PEL and NEPA process will be conducted.
TWG #4	2/3/2017	• Innovations Workshop to develop range of engineering and operational improvements to be evaluated in the PEL Study and discuss funding/financing and project delivery opportunities.
TWG #5	3/3/2017	• PEL Purpose and Need • Recap of the Innovations Workshop • Discussion of long-term and immediate (initial action) corridor alternatives
RAG #2	3/3/2017	• Recap of public scoping input • Discussion of agency involvement and RAG role moving forward
TWG #6	5/5/2017	• PEL alternatives and screening criteria • Schedule, environmental, communications, and traffic updates

Meeting	Date	Topics
RAG #3	5/5/2017	• PEL Purpose and Need • Environmental data collection, including installation of wildlife monitoring cameras • Plan for early action field work
TWG #7	6/2/2017	• PEL alternatives evaluation process and criteria • PEL Level 1 alternatives evaluation results
TWG #8	6/14/2017	• Workshop to review and confirm PEL Level 1 and Level 2 evaluation results
TWG #9	7/7/2017	• PEL Level 2 alternatives evaluation
RAG #4	7/7/2017	• PEL alternatives evaluation process and progress • Environmental surveys to support NEPA • Wildlife monitoring updates
TWG #10	8/4/2017	• PEL Level 2 alternatives evaluation
TWG #11	10/6/2017	• NEPA scoping meeting planning and content • Traffic and Revenue Study
RAG #5	10/6/2017	• Environmental issues for NEPA • Wildlife crossing design
TWG #12	11/3/2017	• The I-25 South Gap Project INFRA grant application • The Gap project construction manager general contractor procurement schedule
RAG #6	11/3/2017	• NEPA scoping • The Gap project permitting
TWG #13	12/1/2017	• EA Proposed Action • EA public scoping meeting review
RAG #7	12/1/2017	• Scoping meetings
TWG #14	1/12/2018	• EA scoping comments • EA alternatives • 2040 traffic projections
RAG #8	1/12/2018	• Pubic scoping comments • Environmental issues/themes in comments
TWG #15/ RAG #9	2/23/2018	• I-25 South Gap Project 30% design review
EA Review Meeting	3/29/2018	• I-25 South Gap Project EA draft document review
TWG #16/RAG #10	5/4/2018	• TWG/RAG comments on EA • EA release • EA public hearing
TWG #17/RAG #11	6/1/2018	• Aesthetics guidance • NEPA decision document • I-25 South Gap Project mitigation tracking

Meeting	Date	Topics
TWG #18/RAG #12	9/7/2018	• I-25 South Gap Project groundbreaking • NEPA Lessons Learned survey and discussion • PEL Study restart
TWG #19/RAG #13	11/2/2018	• PEL Level 3 evaluation approach
TWG #20/RAG #14	12/7/2018	• PEL Level 3 evaluation review
TWG #21/RAG #15	2/1/2019	• PEL Level 3 evaluation • CDOT's PEL recommendation for I-25 mainline
TWG #22/RAG #16	4/5/2019	• PEL Study recommendations • PEL phasing and Implementation

The engaged participation of the TWG/RAG in the PEL Study milestones facilitated consensus on the corridor problems and priorities and was instrumental in streamlining the NEPA process for the I-25 South Gap Project.

7.1.2 Steering Committee

The SC was a group of elected officials and executive leadership (or their staff) from local, state, and federal agencies. Officials representing the following organizations participated in the SC:

- CDOT
- CDOT HPTE
- City of Castle Pines
- City of Colorado Springs
- City of Lone Tree
- Colorado House of Representatives
- Colorado Senate
- Colorado Transportation Commission
- DRCOG
- Douglas County
- El Paso County
- FHWA
- PPACG
- Southwest Chief & Front Range Passenger Rail Commission
- Tri-Lakes Chamber of Commerce
- Town of Castle Rock
- Town of Larkspur
- Town of Monument
- Town of Palmer Lake
- U.S. House of Representatives
- U.S. Senate

The SC's role was to work with CDOT to identify priorities and funding opportunities and advocate for agency interests, while cooperatively working to advance projects and coordinate public involvement and messaging. From the onset, SC members identified improvements along the I-25 corridor as among their highest and most urgent priorities. The group also noted the high level of interest in the corridor from their constituents and committed to regular involvement throughout the PEL Study.

The SC toured the corridor on Bustang in October 2016, identifying transportation and community issues along the route. The first SC meeting was held in November 2016, and the

SC met 21 times between January 2017 and April 2019. SC members also attended and participated in public meetings throughout the course of the PEL Study and invited the project team to present at their agencies' regular meetings or study sessions.

The SC meetings followed a week after the TWG/RAG meetings and focused largely on policy and process-related discussions, including broad discussions of CDOT's planning and project development processes, PEL and NEPA practices, managed lane policy, budget and funding opportunities, and project delivery selection for construction projects. SC members also provided legislative updates, relayed input from their constituents, and advised on public meeting materials and outreach and communication techniques. At all meetings, CDOT provided high-level updates of needs, alternatives considered, cost estimates for improvements, and recap of public input. CDOT's decision-making related to managed lanes (such as ELs) was of high interest and a regular topic of discussion at the meetings. SC members engaged with the project team and CDOT's Executive Oversight Committee (EOC) as needed between meetings.

In April 2017, members of the SC also formed a separate I-25 Gap Coalition to proactively advocate for accelerating transportation improvements on I-25 between Denver and Colorado Springs. The Coalition met monthly until July 2018, when the I-25 South Gap Project was approved and funded for construction. The SC and Coalition were instrumental in securing local funding, advocating for funding at the state level, and applying and lobbying for federal funding through the INFRA grant for the I-25 South Gap Project.

7.1.3 Other Agency Coordination

At the project level, CDOT formed the Project Management Team (PMT) to support coordination among CDOT, FHWA, and consultant staff. The PMT was led by CDOT's Region 1 South Program. Because of the length of the corridor and interest in the PEL Study throughout CDOT, the PMT included members from across CDOT departments and disciplines in Region 1, Region 2, and Headquarters Divisions. The PMT met at least monthly, and a smaller group of PMT members met weekly to discuss study progress and maintain schedule momentum. In addition, numerous discipline- or topic-specific meetings for traffic, safety, communications, environmental, design, incident management, technology (RoadX), maintenance, transit, ITS, managed lanes (i.e., HPTE), funding and cost estimates, program risk review, and project delivery selection were held throughout the PEL Study, often weekly, to enable consultant and CDOT coordination and support the accelerated schedule.

At the executive level, CDOT formed an EOC to facilitate project approvals, direct resources to the PEL Study, and support timely decision-making for the accelerated schedule. The EOC included the CDOT Executive Director and Chief Engineer as project sponsors, with the following committee members:

- FHWA Division Administrator
- CDOT Regional Transportation Directors for Regions 1 and 2
- CDOT Division Directors for Transportation Development, Transit and Rail, Communications, Accounting and Finance, and Policy and Government Relations
- CDOT and FHWA project leadership staff

Members of the EOC participated in the SC, conducted one-on-one meetings with elected officials, and supported other project meetings as needed to emphasize the project importance and manage priority.

Other external agency coordination included meetings with the USACE, DRCOG, PPACG, and Colorado SHPO and wildlife coordination workshops with CPW, USFWS, and Douglas County. Agencies provided technical guidance for the project team, input to the importance of environmental or planning issues, and suggestions for best practices to streamline project approvals and permitting.

A biology-focused working group consisting of CPW law enforcement and regional land use coordinators, nationally renowned wildlife movement experts, CDOT biologists, Douglas County environmental management, and consultant design and environmental staff was formed in November 2017. Three wildlife movement workshops were held between November 2017 and December 2018 to evaluate wildlife-vehicle conflicts in the corridor, work with the design staff to develop key wildlife movement improvements to be included in the I-25 South Gap Project and provide recommendations for future improvements in the PEL Study. The biology team continues to meet every 3 weeks to support the I-25 South Gap Project construction and permitting processes.

Project presentations or briefings were also provided at SC request to the Castle Pines City Council, Castle Rock Town Council, DRCOG Board, Monument Board of Trustees, Colorado Transportation Commission, PPACG Board, and the Gap Coalition. Stakeholder outreach for other community and economic development organizations is described in Section 7.2.3. These briefings provided an opportunity to answer questions and receive project or study input. Questions generally centered around schedule and funding for improvements and alternatives involving ELs. Stakeholder input was supportive of the accelerated schedule and focus on the early action I-25 South Gap Project and improved safety, while largely skeptical or unsupportive of tolling concepts.

7.2 Public and Stakeholder Involvement

The success of the PEL Study, including advancing an early action project in the Gap, hinged on building support among stakeholders for the transportation vision for the corridor and building and maintaining consensus on corridor priorities and funding commitments. The PEL Study sought to establish and maintain an active, informed, and influential stakeholder base for the duration of the study. A robust communication plan was established with the following goals:

- **Be Proactive**: Ensure that stakeholders and members of the media receive relevant information and updates, before they ask for it. The aim was to keep the PEL Study in the public consciousness and continue to inspire and invite public participation.
- **Be Responsive**: Work closely with stakeholders and members of the media throughout the PEL Study and the I-25 South GAP EA to provide information and answer questions as quickly and as efficiently as possible.
- **Provide Multiple Tools**: Cater to the different ways people like to receive project information and provide updates in a variety of forms and different platforms.

- **Be Innovative and Creative**: Seek opportunities and ideas to improve communication and take advantage of current events, new media, and stakeholder suggestions.

The PEL Study engaged regional and local community leaders, residents, businesses, organizations, and interested members of the public to understand transportation and other needs and priorities along the corridor and build support for the type and phasing of improvements that should be implemented. A communications team made up of CDOT and consultant staff coordinated stakeholder communications and relayed stakeholder input, comments, and questions to the project teams for action. Stakeholder coordination involved a range of methods, including meetings, telephone town halls, media outreach, social media and networking, project updates and frequently asked questions, informational mini-campaigns, and collateral materials.

7.2.1 Key Stakeholder Interviews and Focus Groups

The initial stakeholder outreach was informed by individual interviews and focus groups with key stakeholders, comprising a range of community leaders who have an investment in the outcome of the PEL Study and had expressed keen interest in corridor transportation improvements. Individual interviews were conducted with the following stakeholders:

- Castle Rock Economic Development Council President Frank Gray
- CMCA Director of State Issues Tracy Sakaguchi
- Colorado Representative Paul Lundeen
- Colorado Representative Terri Carver
- Colorado Springs Chamber and Economic Development Corporation CEO Dirk Draper
- Colorado Transportation Commissioner Rocky Scott
- Douglas County Open Space and Natural Resources Director Cheryl Matthews

Interviewees were asked about their priorities for transportation improvements, observations about issues to be addressed, input on community values and issues, and recommendations for how to engage and communicate with stakeholders effectively, including how to make planned meetings most productive. Common themes among the interviews were the need to act quickly to add highway capacity and improve safety, the economic impacts of congestion and unreliable travel on I-25, and the need to identify near-term actions to demonstrate progress and responsiveness to public pressure. Other input included suggestions for specific improvements and priorities other than adding highway capacity.

A focus group recommended by Frank Gray was held in Castle Rock to center around development issues in Castle Rock. The focus group included the Castle Rock town manager and public works director, president of the Castle Rock Chamber and Economic Development Council, and several large developers in the region. This group supported capacity and safety improvements on I-25 but expressed concerns about the equity of paying for the improvements and emphasized that funding should come from the state and not local residents (through taxes or tolls). The Castle Rock group noted that building the Crystal Valley interchange with I-25 and moving the frontage road in that location were high priority improvements to support the Town's transportation and development goals.

Another focus group was held with CSP and Port of Entry staff to gather their observations and recommendations, and understand the challenges of working in the corridor. This group

emphasized the need for safe areas for pull-offs and turnarounds for patrol, emergency response, and truck operations (chain up, parking, and access to the weigh station). Because of the narrow shoulders lined with cable rail barrier combined with no emergency turnarounds in the median, the group noted there are no safe places to move cars out of traffic for patrol or crash response, or to access disabled vehicles. They identified Monument Hill northbound as the most dangerous place in the region for patrol and for drivers because of weather and visibility, interactions with the weigh station, the 3- to 2-lane drop, speeding, and aggressive and impaired driving.

Two stakeholder groups were convened in conjunction with the January 2017 public meetings. These groups were formed to provide an opportunity for stakeholders that regularly used or more closely depended on I-25 to be more actively engaged, beyond the public meetings. Groups invited included the chambers of commerce of the jurisdictions involved, media representatives, homeowners' associations, and environmental groups. The following organizations participated in the stakeholder meetings:

- Alberta Development Partners
- Castle Rock Chamber
- Castle Rock Development Council
- Colorado Springs Chamber and Economic Development Council
- Craig Realty Group
- Crystal Valley Ranch Developer
- Heights at Jackson Creek (Monument) homeowner's association
- I-25 and Plum Creek Development Council
- Land Title Company
- Meadows Development
- Medved Autoplex of Castle Rock
- Multi-Family Group
- Northern El Paso County Coalition of Community Associations
- Outlets at Castle Rock
- P3 Advisors, LLC
- U.S. Air Force Academy

The stakeholder groups provided focused feedback regarding the corridor issues, including the important observation that traffic patterns in the corridor vary greatly between weekdays and weekends. These groups emphasized the urgency for improving safety and reducing delays through the corridor, were generally more informed of transportation project costs and funding challenges, and stressed that I-25 improvements should be a statewide priority.

Feedback from the stakeholder meetings suggested that participants preferred to receive project updates through other means (e.g., through email or website) and participate in public meetings or project team meetings with broader attendance. Based on this feedback, a separate Stakeholder Committee was not established, but a robust program of presentations and participation in community meetings was implemented as described in Sections 7.2.2 and 7.2.3.

After the PEL Study was resumed in the summer of 2018, the communications team conducted one-on-one check-ins with elected officials and key stakeholders in the corridor to explain the next steps and purpose of the PEL Study after the I-25 South Gap Project, especially because

of the turnover in some elected officials since the PEL Study began in 2016. In general, the stakeholders were appreciative to receive information about the remaining steps in the PEL Study process and the difference between it and the ongoing construction project in the Gap. They expressed general support for alternatives that consider an additional lane in each direction in the corridor. An anti-EL sentiment was voiced by some stakeholders, in many cases born out of a lack of familiarity with ELs. One-on-one conversations as well as media stories in the corridor helped explain EL operations. With better understanding, many came to understand the need to address mobility and trip reliability in the corridor.

Those stakeholders who continue to voice opposition to the application of an EL have been consistent in their views that this is a form of double taxation. Many of these stakeholders represent the southern end of the corridor study in El Paso County and continue to voice the same concerns that arose during the I-25 South Gap Project EA. However, that sentiment does not appear to be as strong as it was during the EA. Stakeholders in the northern segment of the Study Area do not have the same level of concerns and have shared that they see the benefit to mobility and trip reliability. Many of these stakeholders have had direct experience with ELs in the Denver Metro region and think they have value.

Some stakeholders also expressed in one-on-one meetings an interest in transit options along the corridor, including additional park-n-ride stations for the Bustang service in the Castle Rock and Castle Pines areas.

7.2.2 Public Meetings

Five sets of public meetings were held for the PEL Study. Meetings were held in Douglas and El Paso counties as described in Table 7-2. Approximately 800 people attended one or more of the PEL meetings, with the highest attendance at the January 2017 meetings. Those meetings followed the January 6, 2017, press conference by CDOT, FHWA, and local officials announcing the acceleration of design and environmental review for improvements through the Gap and potential construction of a project by November 2019 if funding could be secured. A public hearing specific to the I-25 South Gap Project EA was held in June 2018 and is described in the EA document.

Table 7-2. PEL Study Public Meetings

Date	Location	Purpose
January 24, 2017	Library 21c, Colorado Springs	• Introducing the PEL Study and gathering input on its purpose and vision • Input on transportation problems • Input on important community and environmental resources
January 26, 2017	Douglas County Fairgrounds Kirk Hall, Castle Rock	• Introducing the PEL Study and gathering input on its purpose and vision • Input on transportation problems • Input on important community and environmental resources
April 25, 2017	Douglas County Fairgrounds Kirk Hall, Castle Rock	• Input on Purpose and Need • Input on range of alternatives • Input on results of PEL Level 1 alternatives evaluation

Date	Location	Purpose
April 27, 2017	Library 21c, Colorado Springs	• Input on Purpose and Need • Input on range of alternatives • Input on results of PEL Level 1 alternatives evaluation
December 5, 2017	Douglas County Fairgrounds Kirk Hall, Castle Rock	• EA scoping meeting for I-25 South Gap Project • Input on transportation priorities in the PEL corridor after the Gap
December 7, 2017	El Paso County Office of Emergency Management Colorado Springs	• EA scoping meeting for I-25 South Gap Project • Input on transportation priorities in the PEL corridor after the Gap
January 15, 2019	Douglas County Fairgrounds Kirk Hall, Castle Rock	• Reintroducing the PEL Study • Providing and seeking input on CDOT's long-term recommendation for mainline I-25 improvements
January 17, 2019	El Paso County Department of Public Works, Colorado Springs	• Reintroducing the PEL Study • Providing and seeking input on CDOT's long-term recommendation for mainline I-25 improvements
May 14, 2019	Lewis-Palmer Middle School, Monument	• Input on PEL Study recommendations • Describing potential phasing • Input on implementation priorities
May 16, 2019	Douglas County Fairgrounds Kirk Hall, Castle Rock	• Input on PEL Study recommendations • Describing potential phasing • Input on implementation priorities

One-page flyers describing the meetings were produced and distributed through project email lists and by public information officers in the corridor jurisdictions. Meetings were also promoted through traditional and social media, and notices were posted on the project website, SC members' websites, and social media platforms.

The meetings followed an open-house format, and except for the January 2019 meetings, included informational presentations. Each meeting included large roll plots of the corridor where participants could identify specific issues or learn more about the identified needs and potential improvements. Other common information presented at the meetings included background and progress on the PEL Study, traffic and safety data, environmental resource data and constraints, and funding. Comment stations were established for attendees to write or type comments or fill out surveys at laptop computers. The comment stations and roll plot areas also included summaries of input received from previous meetings or comment channels.

The first three sets of meetings were dominated by concerns with the Gap segment and efforts to accelerate a construction project in that area. After the I-25 South Gap Project was advanced and the PEL Study resumed in the summer of 2018, interest shifted north to the Castle Rock area and needed improvements for that section of the interstate. Interest in the Castle Rock segment focused on highway capacity and not creating a new bottleneck through the Castle Rock area and on how interchange and other local road improvements in the Castle Rock area would fit within the recommendations for the I-25 mainline. However, interest in the Gap

segment continued. Input for the Gap focused on how the fourth lane between Monument and Castle Rock would be prioritized in the overall I-25 mainline recommendation. There was some continued concern about ELs, although much less than heard during the I-25 South Gap EA, and issues and interest in the construction of the I-25 South Gap Project. The I-25 mainline and transit recommendations were generally supported, although with questions about how much the improvements would cost and how they would be funded.

Additional information on the public meetings, including the sign-in sheets, materials presented, and comments received, is included in Agency and Public Involvement Coordination (Appendix D).

7.2.3 Small Group Meetings and Presentations

As public interest in the PEL Study and potential I-25 South Gap Project grew, project updates through presentations at community meetings and industry events were important methods of outreach for the PEL Study. The team developed a standard presentation that included a high-level project overview and status, with additional information tailored to the event or requested by the organization. These presentations were often an agenda item as part of a larger, regularly scheduled meeting. Table 7-3 summarizes these community presentations and the input received. Numerous meetings occurred between January and July 2018 but are not included in Table 7-3 because that period was focused on the I-25 South Gap Project EA; those meetings are described in the EA. Project update presentations for elected or appointed councils, boards, and commissions are described in Section 7.1.3.

Table 7-3. Community Meetings, Presentations, and Events

Organization/Group	Date	Input received
Training for Colorado Transportation and Environmental Professionals (American Council of Engineering Companies of Colorado/CDOT)	3/1/2017	• Interest in how I-25 improvements across the Front Range relate to one another • Interest in how the I-25 South Gap Project might be advanced through the regional planning process
CSP	3/15/2017	• Suggestions for improved incident management • Observations about corridor issues and operations
Denver South Economic Development Partnership	4/17/2017	• Support for study and accelerated schedule for I-25 South Gap Project
Colorado Springs Chamber and Economic Development Corporation	5/5/2017	• Support for study and accelerated schedule for I-25 South Gap Project • Travel and safety issues affect Colorado Springs businesses and ability to recruit new businesses and employees to the region
Infrastructure Week Event (Colorado Springs)	5/16/2017	• Presentation of the schedule and funding needs for the I-25 South Gap Project as a statewide priority.
Infrastructure Week Event (Castle Rock)	5/17/2017	• Presentation of the schedule and funding needs for the I-25 South Gap Project as a statewide priority.
Renaissance Festival	5/22/2017	• Suggestions for improved communications and coordination of event/incident management during the Renaissance Festival (weekends in June and July)

Organization/Group	Date	Input received
Tri Lakes Chamber Board of Directors	6/13/2017	• Support for prioritizing I-25 South Gap Project • Concerns about tolling options for new capacity
PPACG Technical Advisory Committee	6/15/2017	• Discussion of Purpose and Need, corridor travel characteristics, and coordination of planning processes between PPACG and DRCOG
Castle Rock Chamber of Commerce Board of Directors	6/22/2017	• Support for study and accelerated schedule for I-25 South Gap Project
PPACG Citizen Advisory Committee	6/28/2017	• Timing of the PEL Study and Gap project • Overview of transit options and CDOT studies
I-25 Gap Coalition	6/29/2017	• Questions and answers with CDOT HPTE Director David Spector regarding ELs • Concern about the applicability of ELs compared to GP lanes for the Gap
CMCA	8/17/2017	• Need for truck climbing lanes, parking, and chain up areas • Concern that trucks would not benefit from ELs
I-25 Gap Coalition	8/24/2017	• Discussion of funding strategies and opportunities with SB 267, INFRA, and local measures • Preview of the Mind the Gap communication campaign
South Metro Chamber of Commerce Board of Directors	8/25/2017	• Support for study and accelerated schedule for Gap Project
Denver South Economic Development Partnership	9/12/2017	• Support for study and accelerated schedule for Gap project
I-25 Gap Coalition	10/26/2017	• Support for INFRA application and process
Douglas County Business Alliance Board of Directors	10/30/2017	• Support for study and accelerated schedule for Gap Project
Castle Rock Chamber of Commerce	11/17/2017	• Support for study and accelerated schedule for Gap project
Wyoming/Colorado Institute of Transportation Engineers holiday luncheon	12/8/2017	• Interest in the process for identifying and accelerating the I-25 South Gap Project
Freight Advisory Council	1/4/2018	• Discussion and support for a southbound climbing lane

7.2.4 Telephone Town Halls

In June 2017, CDOT hosted regional telephone town halls to seek input about a variety of transportation issues. The town halls included CDOT's Executive Director, Chief Engineer, and Transportation Commissioners and included discussion about the Together We Go initiative to discuss the state's transportation needs, important projects or initiatives, and funding. Telephone townhalls provided bi-directional communication for participants. Questions were answered and general input was offered.

Potential improvements from the PEL Study were highlighted as a priority project in the Denver area town halls on June 5 and 6, 2017, and for the southeast Colorado town hall that included El Paso County, on June 12, 2017. Participants in these town halls were mainly interested in the timeframe and funding of the I-25 South Gap Project. Recordings of these events are available on the CDOT website.

CDOT also hosted telephone town halls for the I-25 South Gap Project EA to support announcement of and scoping for the Gap EA (November 2017) and to promote the EA comment period (April 2018). These are described in the EA document, and transcripts are included in Agency and Public Involvement Coordination (Appendix D).

7.2.5 Traditional and Social Media

The project team used both traditional media and social media tactics to ensure timely and relevant dissemination of project related information. The communications team provided information to media about upcoming events and meetings, answered questions, and alerted them to project milestones through news releases, project updates, media briefings, corridor tours, one-on-one outreach, and social media platforms such as Facebook and Twitter.

On May 16, 2017, CDOT conducted a Facebook Live event specifically focused on the I-25 corridor. The PEL Study corridor was also featured in CDOT-promoted events and outreach.

All project meetings were promoted via CDOT social media, and media advisories were sent ahead of each meeting and PEL Study milestones. Promotion of the Mind the Gap safety campaign in October 2017 also included social media publicity and media advisories.

7.2.6 Feedback and Comment Response

The team maintained a database of comments received through PEL Study public meetings and project website. Hundreds of comments, questions, and suggestions were received, catalogued, and responded to. The comments helped shape every aspect of the PEL Study, from identifying transportation needs to influencing improvement alternatives for the regional corridor and site-specific locations to improving methods and clarity of public communications.

Written comments, which are included in Agency and Public Involvement Coordination (Appendix D), echo similar themes heard in other forums. More comments were received in the earlier phase of the PEL Study and were heavily focused on the Gap section between Monument and Colorado Springs, reinforcing the identified needs to address safety issues and reduce crashes, reduce congestion, and improve travel reliability. The comments in January and May 2019 were fewer and more diverse. Comments about tolling – mostly negative – were received throughout the PEL Study.

Comment themes and how the PEL Study responded are summarized in Table 7-4. Other comments less frequently provided included the need to extend the Front Range bicycle trail, concern about impacts to conservation easements, concerns about noise in the Surrey Ridge area, better use of variable messaging signs or billboards, and the need to pave or improve other county or town roads or interchanges.

Table 7-4. How Public Comments Influenced the PEL Study

Topic	Summary of Input	PEL Study Response
Castle Rock area transportation improvements	The need to add capacity through Castle Rock was recognized and supported by public comments. However, some concerns were raised regarding the effects of transportation improvements on ROW, including potential conflicts with local transportation plans. Concerns regarding the phasing of improvements and that Castle Rock would become a new bottleneck to regional travel were also raised. Several issues related to local travel in the Castle Rock area (not directly related to I-25) were raised frequently by residents and community leaders during the PEL Study. These included the need for Castle Rock to advance the Crystal Valley interchange; addressing safety, speeding, and cut-through traffic issues on the I-25 western frontage road; considering reconnecting US 85 directly to I-25 (near Black Feather); and the need to address specific safety and congestion issues on SH 83.	The PEL Study lays out a future vision for transportation improvements in the corridor. As projects are funded and advanced, additional traffic, engineering, and environmental analyses will be needed to identify and mitigate traffic, infrastructure, and ROW impacts. The Town of Castle Rock has identified Crystal Valley as a key transportation need in its Transportation Master Plan. The Town continues to work with CDOT, FHWA, Douglas County, and local developers to strategize about funding options to accelerate the Crystal Valley interchange project. Douglas County is moving forward with a project to improve the intersection of the west I-25 frontage road with Tomah Road. Douglas County and Castle Rock are also advocating for consideration of restoring the US 85 connection with I-25 to improve regional mobility and relieve congestion at the Meadows/Founders Parkway interchange with I-25.
Freight Truck Issues	Drivers expressed concerns about congestion and safety, as it relates to conflicts between slow-moving trucks and fast-moving passenger cars, especially when trucks pass each other and when southbound trucks climb the grades to Monument Hill. Relocating or improving access to and from the weigh station and providing safe areas for trucks to pull off the highway to shelter or park and better located areas for chain up and chain down were other freight-truck-related issues raised by both drivers and the CMCA.	The additional travel lane through the Gap will reduce congestion and improve maneuverability. The I-25 South Gap Project includes a southbound climbing lane south of Greenland Road between MP 166.9 and MP 162.0, and maintains the northbound climbing lane through County Line Road. The I-25 South Gap Project also includes an improved chain up area at the former rest area. The PEL Study recommends monitoring travel conditions for heavy trucks to identify if/when additional climbing lanes may be needed, relocation of the chain up stations, and further evaluation of how and where to relocate the weigh station/port of entry, including the potential of repurposing the former Larkspur rest area.

Topic	Summary of Input	PEL Study Response
Funding	Concern about the lack of transportation funding generally and for improvements to the corridor between Colorado Springs and Denver specifically. Support for maintaining momentum for advancing projects in the PEL Study recommendations beyond the I-25 South Gap Project.	CDOT responded by funding design and environmental review activities for the Gap concurrently with the PEL Study, prioritizing state funding made available through SB 267 for the I-25 South Gap Project construction and working with the I-25 Gap Coalition, a separate local government advocacy group formed by Douglas and El Paso counties, to secure additional project funding, including assisting with El Paso County's application for the federal INFRA grant. Additional recommended improvements will be considered as part of CDOT's 10-year development program. The PEL Study includes an assessment of funding and financing options for recommendations. Partnerships and public awareness for the needs of I-25 that were built during the PEL Study help provide momentum to capitalize on the I-25 South Gap Project investments.
I-25 South Gap Project Priority	Overwhelming interest in addressing the Gap segment of the I-25 PEL corridor related to immediate congestion, safety, and reliability needs. Consensus that addressing the 2-lane Gap section should be the highest priority. Comments expressed support for advancing design and environmental review for the I-25 South Gap Project and gratitude for CDOT's commitment to an accelerated construction schedule. Some comments suggest that additional lane capacity is needed in the Gap to address long-term travel needs (refer to Need for More Lanes).	Based on significant interest from elected officials and the public, CDOT and FHWA, along with the El Paso and Douglas County Commissioners and the Mayor of Colorado Springs, held a press conference on January 6, 2017, announcing that CDOT would fund design and environmental reviews for the I-25 South Gap Project so that if project funding were identified, CDOT would have a project ready for construction in 2019. Based on funding opportunities and momentum, CDOT further accelerated the I-25 South I-25 South Gap Project development so that a project could be construction-ready by fall 2018. Groundbreaking for the I-25 South Gap Project occurred in August 2018. Concurrently with the development of the construction project, the PEL Study identified and implemented several immediate improvements for the Gap. These included a safety campaign, Mind the Gap; improved coordination of VMS messaging; coordination with CSP, the Renaissance Festival, emergency response, and maintenance staff; and an extensive communications program to highlight needs in the corridor. The PEL Study recommends additional improvements in the Gap segment of I-25 to meet long-term travel needs through the corridor.
Need for More Lanes	Concern that additional capacity will be needed in the Gap area and beyond. Related input was that at least three GP lanes beyond the EL are needed in the Gap.	The PEL Study evaluated 2040 travel demand and concluded that additional highway capacity will be needed. The study recommends extending the EL north to C/E-470, then adding additional capacity (including an additional travel lane through the Gap area) and transit as longer-term options to meet the 2040 needs. The operation of the new travel lane would be determined when a construction project is funded, but the study notes stakeholder input regarding current preferences for GP lane capacity.

Topic	Summary of Input	PEL Study Response
Speed Limits and Speeding	Concern that speed limits (and travel speeds) are too high and unsafe because of conflicts with truck traffic, weather, curves, short entrance and exit ramps, and inexperienced drivers. Most of these comments suggested lowering the speed limit, increasing enforcement, or both.	The 75-mph speed limit through the Gap and north of Castle Rock are consistent with Colorado statute for rural interstate routes. The PEL Study acknowledges safety concerns related to speed differentials, aggressive driving, and speeding. The I-25 South Gap Project includes several improvements to reduce freight conflicts (refer to Freight Truck Issues). The PEL Study identified the need for and the I-25 South Gap Project included enforcement zones so that law enforcement can conduct operations safely. The existing narrow shoulders lined with guardrail did not provide adequate space for safe patrolling or interacting with drivers, limiting enforcement to only extreme violations.
Express Lanes	The use of ELs was the most commented-on aspect of the PEL Study (and I-25 South Gap Project). Most comments indicated concerns with ELs related to user cost and equity, regional equity, and perceived ineffectiveness because of the perception drivers would not use them. Some comments supported the implementation of ELs to improve reliability and sustainability because “we can’t build our way out of congestion” and ELs support transit and carpooling as more sustainable travel options.	HPTE staff and management responsible for ELs in Colorado participated in the TWG/RAG; presented at the SC, I-25 Gap Coalition, PPACG Board, and DRCOG Board; and participated in project public meetings and events to explain ELs and answer questions about their operation in Colorado and in the corridor specifically. In conjunction with the Gap EA, CDOT held 12 listening sessions with community members concerned about ELs to hear the concerns, answer questions, and explain the decision-making process. The I-25 South Gap Project will include ELs because operating the new lanes as ELs met the Purpose and Need better, particularly related to the need for reliability and to support additional travel options, such as transit and carpooling. The PEL Study recommends extending the ELs north to C/E-470 to better serve the regional need for reliability in the corridor and beyond to Denver International Airport (through the tolled E-470 facility) or the I-70 Mountain Corridor (through the new C-470 ELs under construction).

Topic	Summary of Input	PEL Study Response
Transit Options	Additional travel options are needed to provide an alternative to driving. There is interest in rail primarily but also some interest or support for bus transit options. Interest in transit in the Castle Rock and Castle Pines areas was pronounced, as these communities have limited transit options available. Although the majority of comments favored increased transit options, some comments indicated that transit is not practical for this corridor because of its diverse origins and destinations and issues with first- and last-mile transfers. Others noted concerns with the cost of rail options.	The PEL Study worked closely with the CDOT DTR to coordinate transit recommendations and outreach along the corridor. Through the course of the PEL Study, DTR expanded Bustang service to include weekend service and new service to DTC. DTR is also actively working with Castle Rock to identify a stop for Bustang to serve Castle Rock. The I-25 South Gap Project includes ELs that provide opportunity for Bustang to travel more reliably and better meet its schedule commitments. The PEL Study recommendation to extend the EL north to C/E-470 would substantially improve reliability for the Colorado Springs to Denver South Line Bustang service. The PEL Study also acknowledges and supports the vision for passenger rail through the corridor, which has been considered by DTR and is being further evaluated by the Southwest Chief & Front Range Passenger Rail Commission. The Rail Commission was established by the legislature in 2017 and is charged with furthering passenger rail in the state. The Colorado Springs to Denver rail connection has been identified as a high priority because it links the state's two largest population and employment centers. The Rail Commission will be looking at a range of options and costs for implementing passenger rail and will seek public input on the service offerings and routes with the highest public support and benefits.
Wildlife	Many comments support preserving wildlife habitat and conservation easements, building wildlife crossings, and reducing wildlife-vehicle collisions. Comments also supported the PEL Study's conclusion that wildlife-vehicle collisions are a safety issue for drivers, accounting for about 10 percent of all crashes.	CDOT responded by including four new underpasses and expanding one existing underpass to provide locations for wildlife to cross under I-25 and reduce wildlife-vehicle conflicts. The study also recommends evaluating additional wildlife crossings and mitigation opportunities. CDOT has partnered with CPW to initiate a comprehensive wildlife monitoring study within the corridor.

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