



I-70 Floyd Hill to Veterans Memorial Tunnels

Cumulative Impacts Technical Report May 2021

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List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AGS	advanced guideway system
ALIVE	A Landscape Level Inventory of Valued Ecosystem Components
CDOT	Colorado Department of Transportation
CE	categorical exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMGC	Construction Manager/General Contractor
CPW	Colorado Parks and Wildlife
CR	County Road
CSS	Context Sensitive Solutions
DOLA	Department of Local Affairs
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
I-70	Interstate 70
INFRA	Infrastructure for Rebuilding America
ITF	Issues Task Force
LIZ	linkage interference zone
MP	milepost
Mph	miles per hour
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
PEIS	Programmatic Environmental Impact Statement
ROD	Record of Decision
SCAP	Sediment Control Action Plan
SWEEP	Stream and Wetland Ecological Enhancement Program

TDM	travel demand management
US 6	U.S. Highway 6
US 40	U.S. Highway 40
USFS	U.S. Forest Service
V2X	vehicle-to-everything
VMT	vehicle miles traveled

1. Introduction and Purpose of this Report

The Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA), in cooperation with local communities and other agencies, are conducting the Interstate 70 (I-70) Floyd Hill to Veterans Memorial Tunnels Environmental Assessment (EA) as a Tier 2 National Environmental Policy Act (NEPA) process. This EA is a Tier 2 NEPA process that advances a portion of the program of improvements for the I-70 Mountain Corridor identified in the 2011 Tier 1 *Final I-70 Mountain Corridor Programmatic Environmental Impact Statement* (PEIS) (CDOT, 2011a) and approved in the 2011 *I-70 Mountain Corridor Record of Decision* (ROD) (CDOT, 2011b).

The purpose of this technical report is to document the context for the cumulative impacts analysis, including the geographic Study Area, timeframe for analysis, and the past, present, and reasonably foreseeable future actions in the Study Area that may contribute to cumulative impacts; analyze and document the cumulative impacts that may occur on the resources sensitive to such impacts; and document any applicable mitigation for cumulative impacts. This report also includes a description of applicable laws and regulations, CDOT procedures for cumulative impact analysis, and a summary of the resource analysis and mitigation framework from the PEIS and ROD.

2. Proposed Action and Alternatives

2.1. Description of Proposed Action and Alternatives

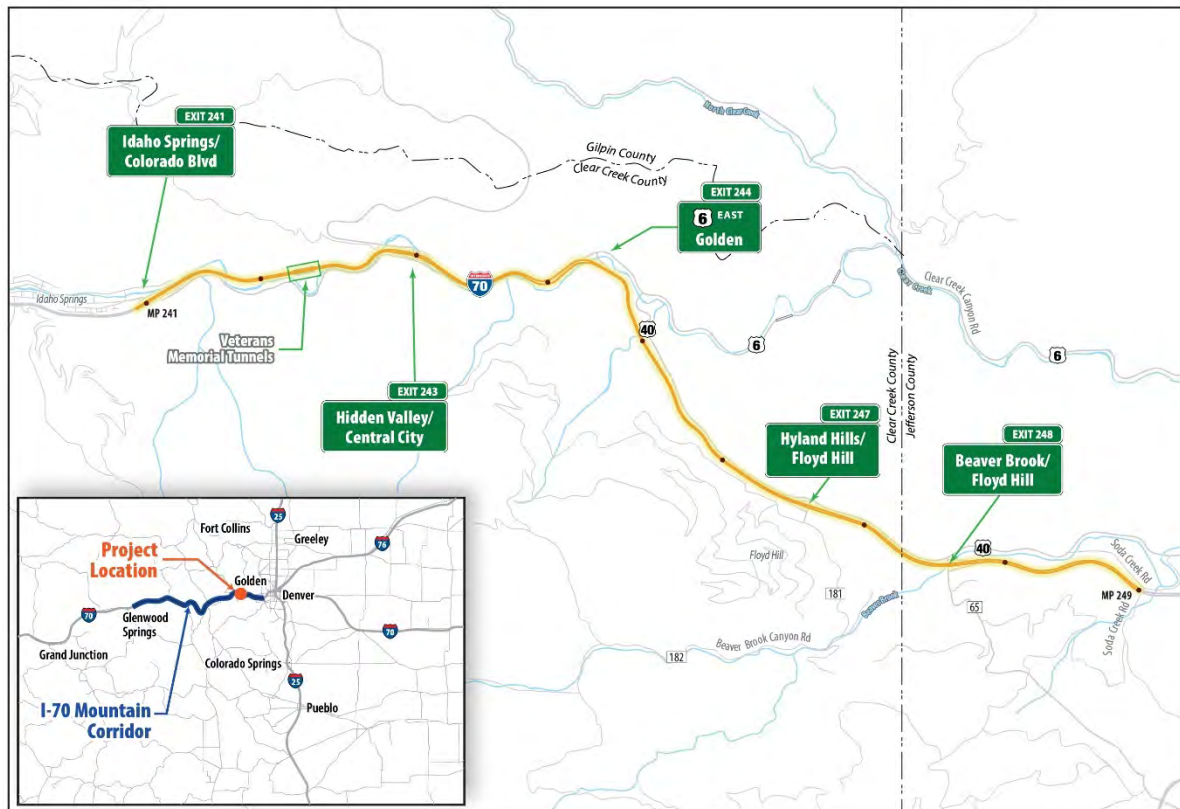
CDOT and FHWA propose improvements along approximately 8 miles of the I-70 Mountain Corridor from the top of Floyd Hill through the Veterans Memorial Tunnels to the eastern edge of Idaho Springs. The purpose of the Project is to improve travel time reliability, safety, and mobility, and address the deficient infrastructure through this area.

The major Project elements include:

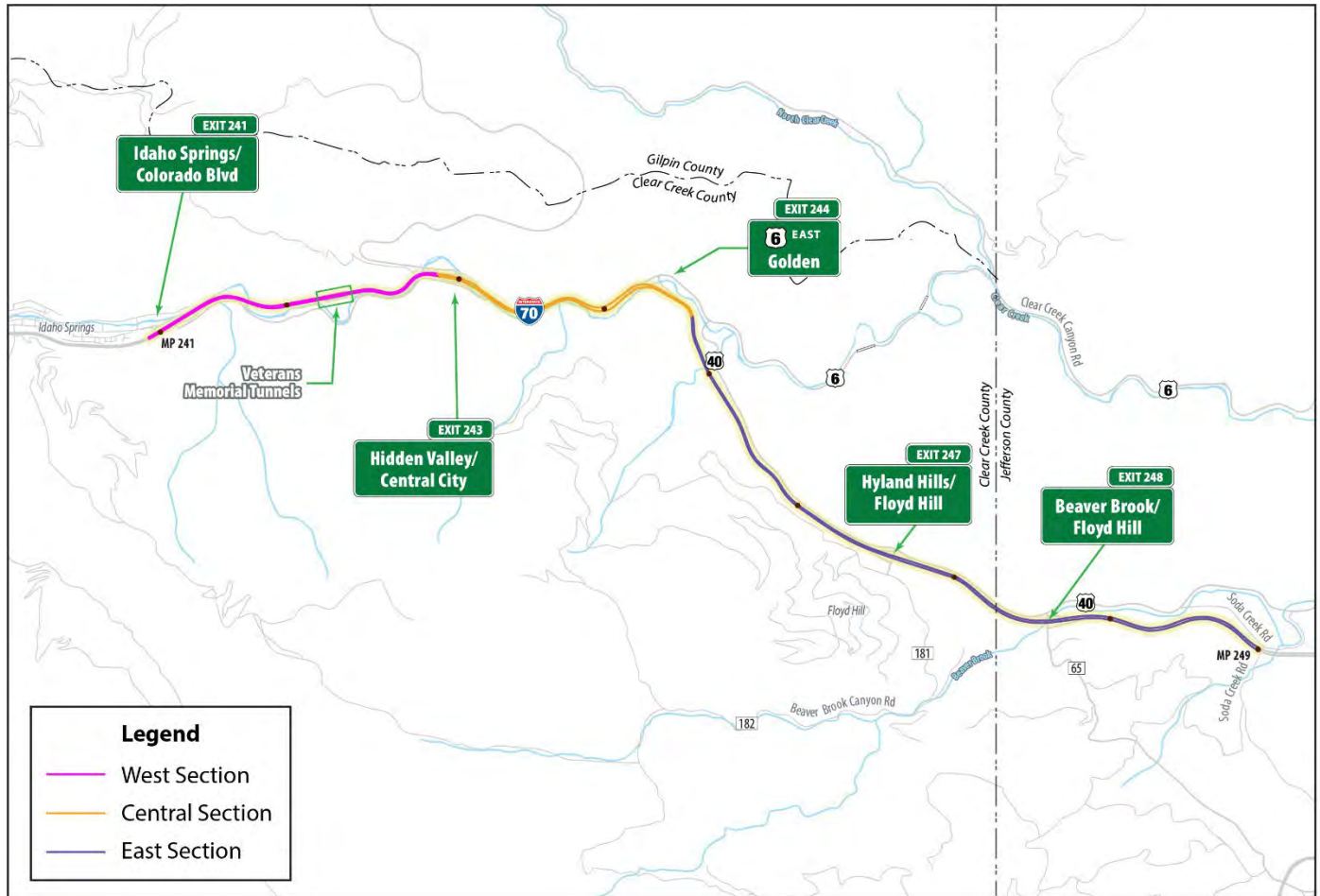
- Adding a third westbound travel lane to the two-lane section of I-70 from the current three-lane to two-lane drop (approximately milepost (MP) 246) through the Veterans Memorial Tunnels
- Constructing a new frontage road between the U.S. Highway 6 (US 6) interchange and the Hidden Valley/Central City interchange
- Improving interchanges and intersections throughout the Project area
- Improving design speeds and stopping sight distance on horizontal curves
- Adding an eastbound auxiliary lane to I-70 on Floyd Hill between the US 6 interchange and the Hyland Hills/Floyd Hill interchange
- Improving the multimodal trail (Clear Creek Greenway) between US 6 and the Veterans Memorial Tunnels
- Reducing animal-vehicle conflicts and improving wildlife connectivity with new and/or improved wildlife overpasses or underpasses
- Providing two permanent air quality monitors at Floyd Hill and Idaho Springs to collect data on local air quality conditions and trends
- Coordinating rural broadband access with local communities, including providing access to conduits and fiber in the interstate right-of-way

The Project is located on I-70 between MP 249 (east of the Beaver Brook/Floyd Hill interchange) and MP 241 (Idaho Springs/Colorado Boulevard), west of the Veterans Memorial Tunnels. It is located mostly in Clear Creek County, with the eastern end in Jefferson County (see Exhibit 1). The primary roadway construction activities would occur between County Road (CR) 65 (the Beaver Brook/Floyd Hill interchange) and the western portals of the Veterans Memorial Tunnels (MP 247.6 and MP 242.3, respectively), with the Project area extended east and west to account for signing, striping, and fencing.

Exhibit 1. Project Location



Three alternatives are being evaluated in the EA: (1) No Action Alternative, (2) Tunnel Alternative, and (3) Canyon Viaduct Alternative. The Project improvements are grouped into three geographic sections: (1) East Section (top of Floyd Hill to US 6 interchange), (2) Central Section (US 6 interchange to Hidden Valley/Central City interchange), and (3) West Section (Hidden Valley/Central City interchange through Veterans Memorial Tunnels) (see Exhibit 2).

Exhibit 2. East, Central, and West Project Sections


The action alternatives—the Tunnel Alternative and Canyon Viaduct Alternative—include the same improvements in the East Section and West Section to flatten curves, add a third westbound travel lane (new lane would be an Express Lane), provide wildlife and water quality features, and improve interchange/intersection operations.

Through the Central Section between the US 6 interchange and the Hidden Valley/Central City interchange, the action alternatives vary in how they provide for the third westbound I-70 travel lane and frontage road connections as follows:

- The **Tunnel Alternative** would realign westbound I-70 to the north (along the curve between MP 244.3 and MP 243.7) through a new 2,200-foot-long tunnel west of US 6. Eastbound I-70 would be realigned within the existing I-70 roadway template to flatten curves to improve design speed and sight distance. This alternative also would include two design options for the alignment of the new frontage road - north or south of Clear Creek. The Clear Creek Greenway would be reconstructed in its current location on the south side of Clear Creek.
- The **Canyon Viaduct Alternative** would realign approximately one-half mile of both the westbound and eastbound I-70 lanes (along the curve between MP 244 and MP 243.5) on viaduct structures approximately 400 feet south of the existing I-70 alignment on the south side of Clear Creek Canyon. Through the realigned area, the frontage road would be constructed under

the viaduct on the existing I-70 roadway footprint north of Clear Creek. The Clear Creek Greenway would be reconstructed in its current location on the south side of Clear Creek. The viaduct would cross above Clear Creek and the Clear Creek Greenway twice.

Additional information regarding the alternatives evaluated in the EA can be found in the *I-70 Floyd Hill to Veterans Memorial Tunnel Alternatives Analysis Technical Report* (CDOT, 2020a).

2.2. No Action Alternative

The No Action Alternative includes ongoing highway maintenance. In addition, due to its poor condition, the westbound I-70 bridge at the bottom of Floyd Hill is programmed to be replaced regardless of whether CDOT moves forward with one of the action alternatives. Therefore, replacing the bridge in kind (as a two-lane bridge) is part of the No Action Alternative. Under the No Action Alternative, the bridge would be replaced in its current location but would need to be designed to current standards, with a 55-miles per hour (mph) design speed and improved sight distance with wider shoulders.

2.3. Action Alternatives: East Section

In the East Section between the top of Floyd Hill and the US 6 interchange, the action alternatives are the same. Through this section, westbound I-70 would be widened to the south to accommodate a third travel lane, which is planned as an Express Lane. The typical section would include an additional 12-foot travel lane and inside and outside shoulders of varying widths, depending on sight distance needs around curves. The proposed footprint would include a 4-foot buffer between the new Express Lane and the existing (general purpose) lanes.

In the eastbound direction, the three travel lanes would be retained but the roadway would be realigned where needed to accommodate westbound widening or curve modifications to improve sight distance and safety. An approximately one-mile-long eastbound auxiliary (climbing) lane would be added in the uphill direction from the bottom of Floyd Hill to the Hyland Hills/Floyd Hill interchange (Exit 247). Water quality features would be added along the south side of the eastbound lanes.

At the Beaver Brook/Floyd Hill and Hyland Hills/Floyd Hill interchange systems, the split diamond interchange configuration (with on- and off-ramps connected by U.S. Highway 40 [US 40]) would remain, and no new accesses would be provided. However, roundabout intersections constructed on US 40 as part of a separate project address immediate issues with traffic flow and delays at the Floyd Hill neighborhood ingress and egress.

Wildlife fencing would be added along the north and south sides of I-70 between the Hyland Hills/Floyd Hill interchange on the west and Soda Creek Road on the east to reduce wildlife-vehicle collisions.

2.4. Action Alternatives: Central Section

The Central Section of the Project involves the most substantial improvements—including realigning curves, adding a third westbound travel lane, improving the Clear Creek Greenway, and providing the frontage road connection. These improvements occur within the most-constrained section of the Project area, where the existing I-70 footprint and planned roadway improvements are located between canyon rock faces north and south of existing I-70 and Clear Creek. Because of these constraints, the action alternatives within this section include the same improvements but differ with respect to the I-70 mainline and frontage road alignments and the relationship of the roadway improvements to the rock faces and the creek. The Clear Creek Greenway would be reconstructed

generally along its existing alignment under both action alternatives, but the Clear Creek Greenway's location to the creek and roadway infrastructure would differ as described below.

2.4.1. I-70 Mainline

The I-70 mainline through this section continues the same roadway typical section from the East Section. Both alternatives would provide an additional westbound 12-foot travel lane; inside and outside shoulders of varying widths, depending on sight distance needs around curves; and a 4-foot buffer between the new Express Lane and the existing (general purpose) lanes.

Under the Tunnel Alternative, approximately one mile of westbound I-70 would be realigned to the north near the US 6 interchange. A portion of the realignment would extend through a 2,200-foot-long tunnel that would tie in to the existing westbound I-70 alignment and elevation just east of the Hidden Valley/Central City interchange. The three eastbound I-70 lanes through this area would remain within the existing roadway prism but would be realigned, moving approximately 100 feet north into the rock face adjacent to the existing westbound lanes to flatten horizontal curves and improve the design speed and sight distance.

Under the Canyon Viaduct Alternative, the westbound I-70 alignment would shift to the south on a new 5,300-foot-long viaduct beginning at approximately MP 245 east of the exit ramp to US 6 and it would rejoin the existing alignment about one-half mile east of the Hidden Valley/Central City interchange at approximately MP 243.5. Through this area, eastbound I-70 also would be realigned on a separate viaduct structure next to westbound I-70 from MP 243.4 east to just beyond MP 244.3. Both viaduct structures would cross Clear Creek and the Clear Creek Greenway twice near MP 243.9 and MP 243.5 (approximately 60 feet above ground level).

2.4.2. Frontage Road

Both alternatives include a new approximately 1.5-mile-long frontage road connection between the Hidden Valley/Central City interchange and the US 6 interchange. The frontage road would run from the intersection of CR 314 and Central City Parkway (south of the I-70 eastbound off-ramp at the Hidden Valley/Central City interchange where CR 314, which acts as a frontage road from east Idaho Springs, terminates) to the US 6/I-70 ramp terminal. The roadway section for the frontage road would consist of two 11-foot lanes (one in the eastbound direction and one in the westbound direction) with consistent 2-foot shoulders. The design speed would be 30 mph and the roadway would be constructed to comply with Clear Creek County local access standards.

The Tunnel Alternative includes two design options for this frontage road:

- **North Frontage Road Option** would provide the new frontage road connection between the two interchanges mostly on the north side of Clear Creek. The I-70 mainline would be realigned north into the mountainside, requiring substantial rock cuts (150 feet high) to make room for the frontage road between the creek and existing I-70. The Clear Creek Greenway would be reconstructed along its current alignment north of Clear Creek. In the Sawmill Gulch area where the existing trail's grade does not meet Americans with Disabilities Act (ADA) standards, the Greenway trail would be lowered to meet grades.
- **South Frontage Road Option** would provide the new frontage road connection between the two interchanges mostly on the south side of Clear Creek. Moving the frontage road to the south side of the creek would require new rock cuts on the south side of Clear Creek Canyon and less substantial rock cuts on the north side of I-70. The Clear Creek Greenway would be

reconstructed generally along its current alignment south of Clear Creek; in the Sawmill Gulch area, an approximately 1,500-foot new section of the Greenway trail would be constructed across the creek to the north (with two pedestrian bridge crossings of the creek) to be ADA compliant, and the existing trail between the two new bridges would remain in place but not be resurfaced. The Clear Creek Greenway would be located closer to the frontage road than under the North Frontage Road Option; although the design seeks to maximize horizontal and vertical separation between the facilities and includes a new section of trail to meet ADA compliance, the alignment of the frontage road nearer to the Greenway is not supported by Clear Creek County, Idaho Springs, community members, or the Project Technical Team because it diminishes the recreational experience.

Under the Canyon Viaduct Alternative, the existing I-70 pavement under the elevated structures would be repurposed for the frontage road; excess right of way would be available for other uses—presumably creek and recreation access—through this approximately one-mile area of the canyon.

2.5. Action Alternatives: West Section

The West Section between the Hidden Valley/Central City interchange and the Veterans Memorial Tunnels continues the widening of the interstate to add the third westbound travel lane and to flatten the S-curve in this location. Improvements in this section are the same under both action alternatives. The curve modifications require realigning both the I-70 mainline and frontage road through this section. The I-70 mainline alignment would shift south approximately 100 feet around the first curve from the Hidden Valley/Central City interchange, then north around the second curve approximately 50 feet, continuing a slight (25 foot) shift north before tying in to the existing alignment at the Veterans Memorial Tunnels. Much of CR 314 would be realigned south between the Doghouse Rail Bridge over Clear Creek near the Veterans Memorial Tunnels east portal and the Hidden Valley/Central City interchange. A small section of CR 314 (between MP 242.6 and MP 242.7) would remain and connect to the reconstructed portions west and east.

These alignment shifts result in substantial rock cuts on both the north and south sides of the canyon. On the north side, rock cuts up to 160 feet high would be required next to the I-70 westbound lanes (along the curve in the area where CR 314 is not reconstructed). To realign CR 314 south, rock cuts from 70 feet to 100 feet high are required on the south side of the canyon. Additionally, a 1,200-foot section of Clear Creek, which is located between I-70 and CR 314, would need to be relocated south near MP 242.5.

The Hidden Valley/Central City interchange would not be reconstructed, and the I-70 bridges would remain because they are wide enough to accommodate the widened I-70 footprint without being replaced. All the on- and off-ramps for the interchange would be reconstructed, but the bridges over Clear Creek for the I-70 westbound off-ramp and I-70 eastbound on-ramp also can be retained. New bridges over Clear Creek to the west would be needed for the I-70 westbound on-ramp and I-70 eastbound off-ramp to accommodate the curve flattening and shift of I-70 to the south in this location. The CDOT maintenance facility would need to be relocated.

No changes are required west of the Veterans Memorial Tunnels. Within the westbound tunnel, the roadway would be restriped for the third lane (the expansion of the tunnel to accommodate the third lane was completed in 2014). After the tunnel, restriping and signing would continue west to the next interchange at Idaho Springs/Colorado Boulevard (Exit 241), where the third lane would terminate. The Express Lane would operate in conjunction with the westbound Mountain Express Lane during peak periods (mostly winter and summer weekends and holidays).

2.6. Construction of Action Alternatives

CDOT is planning to use a Construction Manager/General Contractor (CMGC) delivery method for construction of the Project. This contracting method involves a contractor advising in the design phases to better define Project technical requirements and costs, improve design quality and constructability, and reduce risks through the construction phase. This method promotes innovation and aligns well with the multidisciplinary Context Sensitive Solutions process. It was used successfully on the Twin Tunnels projects to reduce environmental impacts and accommodate community values in the design and construction project development phases.

Construction of the action alternatives is anticipated to be complex and take four to five years but could occur generally within the proposed right of way. CDOT would work with the CMGC to refine the construction details and develop a plan that promotes safety and minimizes disruption to the traveling public and nearby residents and businesses.

The Tunnel Alternative would take approximately one year longer than the Canyon Viaduct Alternative; most of the additional time would be needed for the tunnel blasting and construction that could take place without disrupting traffic. However, in addition to the tunnel rock blasting, the Tunnel Alternative has considerable rock cuts at the tunnel portals and along the north side of I-70 to realign curves, widen the highway, and add the frontage road connection. Rock cuts, staging for the excavation of the tunnel portals, and haul of waste rock are major construction activities that are likely to interrupt traffic on I-70 due to increased construction equipment traffic on the highway and the proximity of construction to live traffic, need for temporary lane closures and detours, and closures for blasting. The North Frontage Road Option has significantly larger (taller and longer) rock cuts than the South Frontage Road Option.

The Canyon Viaduct Alternative has substantially less rock cut and blasting compared to the Tunnel Alternative but would require more work in the existing highway right of way. Bridge construction over and pier placement within the highway template will need to be carefully coordinated. However, construction of some elements, such as the bench portion of the viaduct, are separated from the existing I-70 alignment and could be constructed offline similarly to the tunnel excavation.

Specific construction methods and phasing will be determined with contractor input and could affect the duration and/or physical requirements for construction activities. The focus of environmental impact analysis during the NEPA process is to identify resources and locations sensitive to construction impacts and incorporate reasonable mitigation measures, including potential to avoid impacts by avoiding sensitive areas, to inform the contractor's plans. Final design and construction plans will consider changes in resource impacts, and reevaluations will be completed as needed during final design.

3. Applicable Laws, Regulations, and Guidance

Cumulative impacts are defined in Council on Environmental Quality (CEQ) NEPA implementing regulations, 40 Code of Federal Regulations (CFR) 1508.7, as:

The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The following is a list of federal policies and guidance applicable to cumulative impacts:

- American Association of State Highway and Transportation Officials (AASHTO), *Practitioner's Handbook: Assessing Indirect Effects and Cumulative Impacts under NEPA* (2011)
- CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997)
- CEQ, *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (2005)
- FHWA, *Technical Advisory T6640.8a, Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (1987)
- FHWA, *Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process* (2003)
- FHWA, *Secondary and Cumulative Impact Assessment in the Highway Project Development Process* (1992)
- U.S. Environmental Protection Agency (EPA), *Consideration of Cumulative Impacts in EPA Review of NEPA Documents* (1998)

The CDOT NEPA Manual (CDOT, 2020b) provides guidance on analyzing cumulative impacts consistent with federal guidance. Projects should establish baseline considerations, geographic study area boundaries, and an impact assessment methodology for individual resources, and should establish a timeframe for the analysis based on the context of the project area and its resources. Projects should identify past, present, and reasonably foreseeable future actions that may incrementally contribute to cumulative impacts on relevant resources.

CDOT recommends talking with the public, agencies, and stakeholders during the scoping period to identify resources that have been historically impacted by other actions in the project area or are especially vulnerable to incremental impacts. Previous environmental documents prepared for other projects or plans can also provide information on mitigation that may help reduce cumulative impacts. The project design should seek to avoid or minimize further impacts to sensitive resources.

4. Cumulative Impacts in the PEIS

4.1. Context

The Tier 1 PEIS and associated *I-70 Mountain Corridor PEIS Cumulative Impacts Technical Report* (CDOT, 2011c) evaluated the inter-relationships between the transportation network, community values, and environmental resources within the Corridor and surrounding counties, National Forests, and watersheds. The PEIS team coordinated with federal, state, and local agencies, special interest groups, the I-70 Mountain Corridor Advisory Committee, and communities and residents along the Corridor to scope cumulative impact issues and determine resource sensitivities.

The overarching concern from federal agencies and local communities was, and is, induced growth and tourism caused by increased access to Corridor communities and recreational resources via I-70. To respond to this concern, the PEIS cumulative impacts analysis did not follow a standard approach. Rather, the analysis focused on the resource impacts that could be caused by additional travel demand, population increases, and development due to the PEIS Action Alternatives (beyond local agency planning, population, and employment projections), and the contributions of those impacts to cumulative impacts.

Geographic scope of analysis. The PEIS cumulative impacts analysis evaluated natural and social resources for geographic areas that were defined by adjacent watersheds (for natural resources) and Corridor counties (for social resources) and identified potential cumulative impacts from induced growth caused by the Preferred Alternative in concert with past, present, and reasonably foreseeable future actions.

- The geographic scope for the social resources cumulative impacts analysis comprised the nine-county region that represents the economic base of the Corridor, including Garfield, Eagle, Pitkin, Summit, Lake, Park, Grand, Gilpin, and Clear Creek counties (Jefferson County was not included because it is not part of the economic base of the Corridor). This Project is located in Clear Creek County and the westernmost edge of Jefferson County.
- The geographic scope for the natural resources cumulative impacts analysis encompassed portions of the Eagle River, Blue River, and Clear Creek watersheds adjacent to I-70 that were within the immediate development influence zone. This Project is located in the Clear Creek watershed.

Timeframe of analysis. The timeframe for the PEIS cumulative impacts analysis varied by resource, but generally extended from the historic mining period in Clear Creek County (before I-70 was constructed) to 2050, the timeframe for the long-term vision of the Corridor improvements. Within the context of this Project, the PEIS considered historic mining, ski area development, and residential and commercial development to be the primary generators of past impacts on environmental and social resources in the I-70 Mountain Corridor. In addition to considering the impacts of past actions on resources, the PEIS assessed current conditions of existing land use and development, roadway maintenance operations on I-70, recreational tourism, and biological resources; and considered reasonably foreseeable future actions such as transportation projects, planned development, National Forest plans, and ski area expansions.

Sensitive resources. The PEIS considered the following resources to be susceptible to cumulative impacts from transportation improvements and other past, present, and reasonably foreseeable future actions: air quality, biological resources, wetlands, water resources and water quality, social and

economic values and land use, recreation, visual resources, and historic communities. Table 4-1 in the PEIS identifies the cumulative impact concerns for these resources. Induced growth would generate additional air emissions, fragmentation and loss of wildlife habitat and wetlands, demands on the water supply and impacts to water quality, growth impacts in communities, and increased visitation pressures on recreational lands and historic areas. Table 4-1 in the PEIS describes these concerns in more detail.

Expected cumulative impacts. The PEIS evaluated the amount and distribution of induced growth of the various action alternatives:

- Transit alternatives were anticipated to concentrate induced growth in urban areas surrounding transit centers, primarily in Eagle County.
- Highway alternatives were anticipated to increase development density in rural areas of the Eagle and Blue River watersheds.
- Combination (transit and highway) alternatives were anticipated to induce growth according to both the transit and highway alternative scenarios, resulting in increased growth in both urban and rural areas in both Eagle and Summit counties.

The Preferred Alternative was expected to initially induce growth similar to the transit alternatives, because the Minimum Program of Improvements includes an advanced guideway system (AGS) and minimal highway capacity improvements; and to ultimately induce growth similar to the combination alternatives if the Preferred Alternative were to be fully implemented. In 2014, CDOT concluded an AGS was technically feasible but financially infeasible at that time. As a result, the highway improvements of the Preferred Alternative have proceeded, and the transit improvements have not. The induced development pattern of the highway alternatives is therefore a more likely scenario for cumulative impacts.

The PEIS concluded Clear Creek County would not experience a measurable amount of induced growth, partly because of topographic constraints. Therefore, cumulative impacts identified for other portions of the I-70 Mountain Corridor—including impacts on wetlands, recreation resources, and land use—were anticipated at lower intensities within the Clear Creek watershed. The cumulative impacts would primarily occur to resources previously impacted by construction of the I-70 Mountain Corridor, and the impacts would be associated with additional direct impacts from projects, rather than due to induced growth. Anticipated cumulative impacts in Clear Creek County included further reductions in wildlife habitat, continued channelization of Clear Creek, additional visual impacts, and impacts to historic properties.

4.2. Analysis in Tier 2 Processes

The I-70 PEIS committed to conducting additional and more localized cumulative impacts analysis and coordination during Tier 2 processes. The intent of cumulative impacts analyses performed for Tier 2 processes is to focus on the environmental resources that are of most concern in the applicable study area and watershed. The PEIS directed Tier 2 processes to include updated impacts information based on more specific resource and design information, and revised study area boundaries if applicable. The PEIS also indicated Tier 2 processes should include development of interagency cumulative impact mitigation plans.

4.2.1. Previous Tier 2 Projects

Previous Tier 2 projects in Clear Creek County analyzed cumulative impacts on those resources that would be directly or indirectly affected by the Tier 2 projects. These analyses provide additional insight—beyond the PEIS analysis—into the types of cumulative impacts that could be associated with the current Project when added to the previous Tier 2 projects and other past, present, and reasonably foreseeable future actions.

Generally, the previous Tier 2 analyses concluded beneficial cumulative impacts would occur to water quality and the economy, and minor adverse cumulative impacts would occur to visual resources. The projects contributed to cumulative impacts on other resources differently, depending on the impacts of the particular project.

4.2.1.1. Eastbound Twin Tunnels Expansion

The Eastbound Twin Tunnels EA concluded the following cumulative impacts would occur as a result of the impacts of the Eastbound Twin Tunnels project when combined with the impacts of other past, present, and reasonably foreseeable future actions:

- Beneficial long-term cumulative impacts on **social and economic resources** in Clear Creek County due to improved mobility, recreational enhancement, commercial development opportunities, and planning, which would collectively encourage economic development.
- Adverse short-term cumulative impacts on the **economy and recreation activities** due to construction disruption of commercial rafting operations on Clear Creek.
- Primarily beneficial long-term cumulative impacts on **recreational resources** due to improved mobility.
- Adverse cumulative impacts on **historic transportation facilities** due to changes to the historic Twin Tunnels when combined with other past, present, and reasonably foreseeable future projects on other historic facilities such as the Eisenhower-Johnson Memorial Tunnels and Vail Pass.
- Minor adverse cumulative **visual impacts** due to the continued trend of urban elements encroaching visually in the natural environment, such as the view of retaining walls for recreational users along Clear Creek and the Scott Lancaster Memorial Trail. These visual changes are considered minor relative to the large scale of the natural setting.
- Adverse cumulative impacts on **wildlife** related to habitat fragmentation and loss, due to roadside habitat disturbance and retaining walls.
- Beneficial long-term cumulative impacts on **water quality** due to treatment of more roadway stormwater runoff and continued implementation of the Clear Creek Sediment Control Action Plan (SCAP).
- Cumulative contribution to the **channelization** of Clear Creek, which affects stream morphology and related wetland and riparian habitat.
- Negligible contribution to cumulative impacts on **air quality** due to the rural, mountainous nature of the corridor and lack of major non-transportation emission sources, and CDOT's continued implementation of Policy Directive 1901 and associated Air Quality Action Plan, which address air quality and greenhouse gas emissions.

4.2.1.2. Eastbound Peak Period Shoulder Lane

The Eastbound Peak Period Shoulder Lane Categorical Exclusion (CE) concluded the following cumulative impacts would occur as a result of the impacts of the Eastbound Peak Period Shoulder Lane project when combined with the impacts of other past, present, and reasonably foreseeable future actions:

- Beneficial long-term cumulative impacts on **water quality** due to treatment of more roadway stormwater runoff.
- Minor adverse cumulative **visual impacts** related to the presence of new signage, rock cuts, and retaining walls.
- Primarily beneficial cumulative impacts on the local tourism **economy** from increased recreational visitation due to improved mobility.
- Negligible contribution to adverse cumulative impacts on **historic resources** because new signage was carefully placed outside of key historic property viewsheds.

4.2.1.3. Westbound Peak Period Shoulder Lane

The Westbound Peak Period Shoulder Lane CE concluded the following cumulative impacts would occur as a result of the impacts of the Westbound Peak Period Shoulder Lane project when combined with the impacts of other past, present, and reasonably foreseeable future actions:

- Beneficial long-term cumulative impacts on **water quality** due to treatment of more roadway stormwater runoff.
- Minor adverse cumulative **visual impacts** related to the presence of retaining walls and rockfall mitigation.
- Beneficial cumulative impacts on **social and economic resources** due to improved mobility and consistency with local planning efforts.
- Contribution to potential adverse cumulative impacts on the ability of the U.S. Forest Service (USFS) to manage **forest lands** due to additional recreational visitors.
- Negligible contribution to adverse cumulative impacts on **historic resources** because new signage was carefully placed outside of key historic property viewsheds.

4.2.2. I-70 Floyd Hill to Veterans Memorial Tunnels Tier 2 Process

Core values for this Project include community, historic context, environment, aesthetics, and recreation. The cumulative impacts analysis for this Project considers these topics, and adheres to the following procedural commitments from the I-70 PEIS related to Tier 2 process cumulative impacts analyses:

- Conduct detailed studies to assess effects to historic properties (historic properties were assessed but would not have adverse effects and are not discussed in this cumulative analysis)
- Update impacts information based on greater detail and localized resource information
- Revise study area boundaries, as necessary

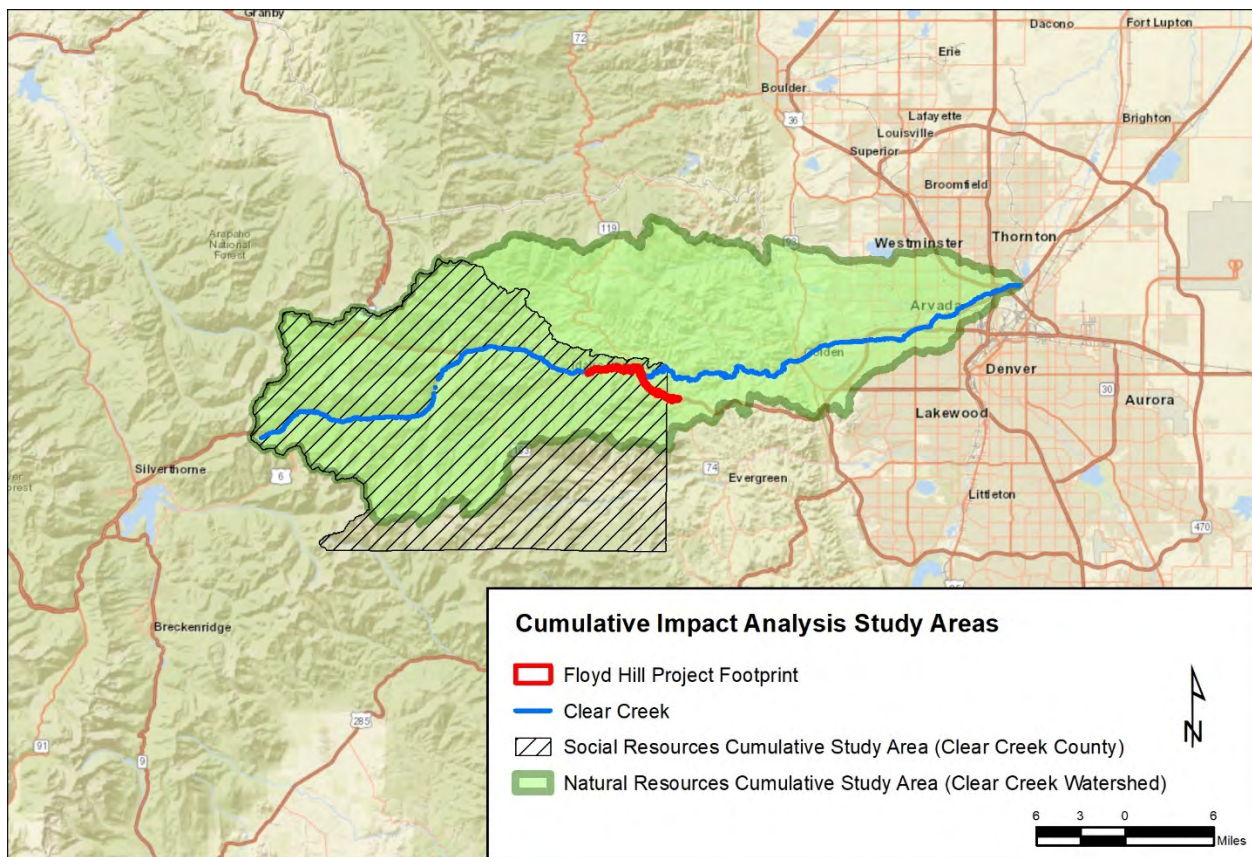
5. Affected Environment

5.1. Study Area

The geographic scope (or Study Area) of the cumulative impacts analysis varies by resource. As shown in Exhibit 3, the Study Area for social resources is Clear Creek County, and the Study Area for natural resources comprises the Clear Creek watershed.

The time frame for the cumulative impacts analysis extends back to the 1850s, when Clear Creek County communities were established around mining operations during the gold and silver rush. It extends forward to 2045, the transportation planning horizon year for this Project. Further context regarding this time frame is provided in the discussion of past actions in Section 5.3.

Exhibit 3. Cumulative Impacts Analysis Study Areas



5.2. Scope of Analysis

Resources evaluated for cumulative impacts analysis are:

- Socioeconomic and community resources
- Recreation resources
- Visual resources
- Air quality

- Wildlife
- Wetlands, other waters of the U.S., and water quality

These resources are analyzed because the PEIS identified them as susceptible to cumulative impacts and because this Project would affect them in some way. The PEIS also identified historic communities as susceptible to cumulative impacts, but this Project would not adversely affect historic properties, and therefore they are not assessed for cumulative impacts.

5.3. Past and Present Actions that Contribute to Current Environmental Conditions

5.3.1. History

The history of Clear Creek County centers around human interaction with the natural environment and its resources, predominantly mining and tourism.

Mining. Communities in Clear Creek County were established during the Colorado gold and silver rush that began in 1858 with placer mining, which later shifted to hardrock mining. Mining continued into the early twentieth century until rising production costs and decreases in mineable deposits curtailed mining activity. Mills, such as the Argo Gold Mill in Idaho Springs, have sat idle since the decline of the gold and silver rush in Clear Creek County.

Development and mining activities in the County have affected water quality, stream morphology (that is, the shape of a river channel and how it changes over time), and biological resources. Placer mining tore up the creek bottoms and bars, and hardrock mining and milling resulted in waste materials being dumped directly into the waterways. Settlers, in need of fuel, clear-cut the surrounding forests, which resulted in sediment runoff. When combined with the mining and milling activities, this caused a severe degradation of the local waterways and soils.

Tourism. The growth of tourism and recreation in the county can be traced back to the 1860s, when rail companies published guides, offered special fares, and encouraged people to take vacations via train travel. More than a century later, the construction of I-70 through Clear Creek County increased the accessibility of many recreation and tourism locations. Today, tourism plays a vital role in the County, providing more jobs and personal income than any other industry.

Modern tourism and recreation activities in Clear Creek County have led to increased preservation of open space and ongoing development of the Clear Creek Greenway, a recreational corridor which ultimately will link Denver's Platte River Greenway to the Continental Divide Scenic Trail.

I-70 construction. Construction of I-70 through the County started in the 1960s and used cut-and-fill methods through mineral deposits and mine waste piles in the Clear Creek Valley. This created the potential for more pollutants, notably metals, to enter Clear Creek from stormwater runoff. Construction of I-70 has caused up to 35 percent of the stream channelization in the Clear Creek watershed. In Lower Clear Creek between Empire Junction and the I-70/US 6 Interchange, Clear Creek is constrained in a narrow canyon, and the construction of US 6, US 40, and I-70 has further channelized the stream, constricting it on both sides in many locations. Winter maintenance on I-70 and other roads throughout the county contributes sand and de-icing chemicals to highway runoff, impairing water quality.

Population. Community populations reached a peak from 1870 to 1900 during the mining boom and then declined sharply as gold and silver resources were depleted. The county experienced another

population growth after the construction of I-70, and in 2000, the population of 9,322 individuals exceeded the mining boom era population (U.S. Census Bureau, 2010). The population declined by a few hundred during the next decade but is on the rise again. The estimated population in 2017 was 9,574 and it is forecasted to increase to approximately 12,623 by 2050 (DOLA, 2018), which is more growth than the PEIS anticipated. Community and transportation development throughout the Rocky Mountains has led to the loss and decline of native plant and animal species, invasion by exotic plants and animal species, the loss and degradation of terrestrial and aquatic ecosystems, and the loss and fragmentation of wildlife habitat.

The two closest communities to the Project are Idaho Springs and the Floyd Hill neighborhood. Idaho Springs, adjacent to the west Project limits is the largest community in Clear Creek County, with a population of 1,717 in 2010 (U.S. Census Bureau, 2010). The city was founded in the mid-1800s during the gold rush and is now heavily tourism-oriented. The Floyd Hill neighborhood, adjacent to the east end of the Project, is a census designated place, with a population of 998 in 2010 (U.S. Census Bureau, 2010). It is primarily a lower-density residential area with some businesses adjacent to I-70.

5.3.2. Recent Projects

Exhibit 4 lists projects built within the last ten years in Clear Creek County.

The recent Tier 2 projects on I-70 have included mitigation commitments that, collectively, address cumulative impacts to water and recreational resources and wildlife habitat and connectivity. These include:

- Installing hazardous spill containment structures to reduce hazardous waste discharge to Clear Creek
- Installation of water quality treatment facilities, water quality monitoring, sediment traps, and erosion control measures to minimize sediment loads and pollutants entering Clear Creek, consistent with the Clear Creek SCAP
- Encapsulating mineralized rock generated during blasting activities beneath the roadway pavement, away from groundwater, to prevent chemical reactions that could dissolve contaminants into Clear Creek
- Preservation and enhancement of recreational accesses to Clear Creek
- Restoration of the old game check area south of the Veterans Memorial Tunnels to provide wetlands and water quality improvements and recreational opportunities
- Redevelopment of Water Wheel Park to preserve recreational use
- Installation of wildlife fencing in some locations to keep wildlife off the highway and direct them to undercrossings, and modifying medians for increased permeability
- Installation of signage warning drivers of wildlife conflicts
- Restoration and enhancement of native vegetation

Exhibit 4. Past Actions—Projects Built in the last 10 Years

Project or Study (Lead Agency)	Description	Status
Transportation		
Eastbound I-70 Twin Tunnels (CDOT) (Part of PEIS Minimum Program of Improvements)	Addition of third eastbound I-70 lane, as an Express Lane, for three miles.	Roadway improvements were completed in December 2013 and habitat and stream improvements were completed in 2015.
Westbound I-70 Twin Tunnels (CDOT) (Part of PEIS Minimum Program of Improvements)	Expansion of westbound tunnel bore to include wide shoulders that will accommodate a future third westbound I-70 lane.	Roadway improvements were completed in January 2015 and CR 314 was restored and retaining walls and trailhead enhancements were in place September 2015.
Eastbound I-70 Peak Period Shoulder Lane (CDOT)	Construction of tolled Express Lane on the eastbound I-70 shoulder to provide a third lane during peak travel periods on I-70 between the Veterans Memorial Tunnels and Exit 232 I-70/US 40 interchange.	Completed in 2015.
Colorado Boulevard Reconstruction in Idaho Springs (Idaho Springs)	Improve city infrastructure, curbs and gutter, sidewalks, drainage, storm sewer, bridges, and other features along Colorado Boulevard between Exit 241 and the Clear Creek Bridge. Also included improvements to local roads, including Miner Street, which was used as a construction detour route, and constructed portions of the Clear Creek Greenway (adjacent to Colorado Boulevard).	Completed in 2018.
Eastbound auxiliary lane east of Eisenhower-Johnson Memorial Tunnels (CDOT) (Part of PEIS Minimum Program of Improvements)	Eastbound auxiliary lane from Eisenhower-Johnson Memorial Tunnels to Herman Gulch. The auxiliary lane ends at approximately 217.5, a half mile west of the Herman Gulch interchange. The Project did not extend entirely to Herman Gulch to limit environmental impacts. Collaborative Effort agreement on project limits.	Completed in 2016.
I-70 Frontage Road—East of Idaho Springs CR 314—Phase I (CDOT) (Part of PEIS Minimum Program of Improvements)	Phase I reconstructed the frontage road (CR 314) between eastern Idaho Springs (I-70 Exit 241) and the Hidden Valley/Central City Interchange (Exit 243). The project constructed a separated shared-use path and brought the road up to standard for times when an alternative route to travel on I-70 is needed.	Completed in 2012.
Fall River Road Bridge (CDOT)	A new two-lane vehicular bridge that connects Stanley Road to the Fall River Road/I-70 interchange near MP 238 in Clear Creek County, west of Idaho Springs. The new bridge includes a 10-foot-wide shoulder for bicyclists. Pavement under the I-70 bridges will be improved to correct drainage and ponding issues. The new Fall River Road Bridge is mitigation for bicycle impacts due to the Westbound Peak Period Shoulder Lane project.	Completed in 2020.

Project or Study (Lead Agency)	Description	Status
Non-infrastructure related components of the PEIS Minimum Program of Improvements	Increased enforcement; bus, van, and shuttle service in mixed traffic; programs for improving truck movements; driver education; expanded use of existing transportation infrastructure in and adjacent to the Corridor; use of technology advancements and improvements to increase mobility; traveler information and other information technology systems; shifting passenger and freight travel demand by time of day and day of week; converting day trips to overnight stays; converting single occupancy vehicle commuters to high occupancy travel and/or public transportation; implementing transit promotion incentives; and other transportation demand management measures.	These non-infrastructure-related actions are ongoing, with the exception of increased enforcement, which was discontinued due to lack of effectiveness. These actions have had some effectiveness at increasing the capacity in the Corridor through increased person trips and transit ridership; improving mobility and accessibility through improved travel time/reliability and improved safety; and decreasing congestion.
Clear Creek Ecological Restoration Project (CDOT)	CDOT restored a segment of Clear Creek by realigning a channel and completing associated floodplain grading and vegetation. This project occurs off the roadway, approximately 1.75 miles north of Georgetown. This project provides the opportunity to mitigate potential impacts of future projects along the I-70 Mountain Corridor, with the ability to create additional wetlands at this location to offset impacts.	Completed in 2018. Reestablishment period of approximately three years following completion of construction.
Recreation		
Clear Creek County Open Space Plan (2005)	In recent years, the Clear Creek County Open Space Commission has undertaken several large construction projects to provide better access to Open Space lands.	Completed projects comprise the Lawson White Water Park, the Philadelphia Mill Site Fishing Area, and a portion of the Clear Creek Greenway in Clear Creek Canyon.
Floyd Hill Open Space Trails (Clear Creek County, Jefferson County, and Mountain Area Land Trust)	About 12,000 acres of land on top of Floyd Hill was conveyed to Clear Creek and Jefferson Counties in 2017 and is managed as public open space by Clear Creek County, with a conservation easement held by Mountain Area Land Trust. The park has developed trails to connect to Peaks to Plains and other trails. (Clear Creek County Open Space, 2018) Additional trails are planned, listed in Exhibit 5.	The southern sections of the Floyd Hill Trail opened in 2018. The trail consists of an unpaved, natural-surface trail of multiple interconnected loops, accessible from a trailhead and parking lot on US 40 north of I-70 Exit 247 (Hyland Hills/ Floyd Hill interchange).
Private Development		
County Health Clinic (Idaho Springs)	In partnership with Clear Creek County, the Centura Health Primary Care Facility opened in Idaho Springs in July 2017. Previously, Clear Creek County Emergency Medical Services was the only source of health care in Idaho Springs. The new clinic offers pediatric and adult primary care.	Completed July 2017.

Project or Study (Lead Agency)	Description	Status
Henderson Mine reopening (mine owner)	The Henderson Mine near Empire resumed molybdenum mining in fall 2017. Mine owners originally expected to close the mine in 2020, then extended operations to 2026, and now plan to continue operations for the foreseeable future beyond 2026. Additional planned developments at the mine were announced in 2019. The mine is the county's biggest private employer and a major contributor to regional tax revenue (70 percent of property tax revenue).	Mine reopened in 2017.

5.4. Reasonably Foreseeable Future Actions

The Project team considered reasonably foreseeable future actions that include water quality management and improvement plans, resource and recreation management plans, development planned for the near term, master plans to accommodate long-term development, and transportation projects. Generally, projects are reasonably foreseeable if:

1. Project applications, entitlements, and/or construction are pending with a government agency,
2. The project is included in an agency's budget or capital improvement program,
3. The project is a foreseeable future phase of an existing project, or
4. The project likely would occur within the 2045 planning horizon.

Exhibit 5 provides information on reasonably foreseeable future actions within Clear Creek County.

Exhibit 5. Reasonably Foreseeable Future Actions

Project or Study (Lead Agency)	Description	Status
Transportation		
Westbound I-70 Peak Period Shoulder Lane (CDOT)	Construction of tolled Express Lane on the westbound I-70 shoulder to provide a third lane during peak travel periods on I-70 between the Veterans Memorial Tunnels and Exit 232 I-70/US 40 interchange.	Currently under construction and expected to be operational in approximately winter 2021.
I-70 Frontage Road—East of Idaho Springs CR 314—Phase II (CDOT)	Phase I reconstructed the frontage road (CR 314) between eastern Idaho Springs (I-70 Exit 241) and the Hidden Valley/Central City Interchange (Exit 243). Phase II will reconstruct and widen CR 314 between I-70 Exit 241A and the Doghouse Rail Bridge (the western terminus of Phase I). CDOT completed a state CE for both project phases in 2012.	CDOT updated the design of Phase II with stakeholder input in 2018 and a federal CE was completed in 2020. Construction is planned to begin in summer 2021.
I-70 Mountain Corridor Preferred Alternative—Minimum Program (CDOT)	Future non-infrastructure, AGS transit, and highway capacity and safety improvements. Remaining projects east of Eisenhower-Johnson Memorial	There is no identified funding for the remaining projects, including the AGS. As funding is identified, these projects

Project or Study (Lead Agency)	Description	Status
	Tunnels include the Empire Junction Interchange, interchange improvements at other locations outside of Clear Creek County, Floyd Hill Project, AGS, and westbound I-70 auxiliary lane east of the Eisenhower-Johnson Memorial Tunnels.	will go through Tier 2 NEPA processes, be added to a fiscally constrained plan, and be constructed.
Smart 70 Project (CDOT)	The Smart 70 Project is establishing a robust vehicle-to-everything (V2X) communication system along the I-70 Mountain Corridor to provide drivers, and ultimately self-driving vehicles, with real-time information about road conditions such as traffic delays, icy conditions, and crashes.	Project began winter 2016 and will continue through 2021. V2X roadside units have been installed, and CDOT can send messages to V2X-equipped vehicles via the roadside units.
Transit Center/Parking Garage (Idaho Springs)	New transit center/parking garage in Idaho Springs. CDOT is partnering with the City of Idaho Springs to develop and build an integrated transit center and parking structure in Idaho Springs. The structure will serve local businesses, Bustang riders, and carpoolers. Currently, Bustang service in Idaho Springs is using a temporary location for passenger pick-up and drop-off with no dedicated space for passenger parking.	The City of Idaho Springs has identified a site and is working with property owners to obtain the land. The City has hired an architect who is conducting site planning. The new transit center/parking garage is anticipated to be built before 2023.
Increased Transit Options in I-70 Mountain Corridor	Transit and rideshare options for traveling through the I-70 Mountain Corridor are increasing. Lyft recently expanded its service to the Rocky Mountain region. Front Range Ski Bus and the Winter Park Express continue to offer opportunities to travel to the mountains without a car. CDOT's Bustang West Line offers service between Denver and Grand Junction with stops in seven Mountain Corridor locations in between, including Idaho Springs. CDOT's Snowstang bus line provides winter service from Denver to Loveland Ski Area, A-Basin ski area, and Steamboat Resort and Howelsen Hill ski areas. There are also local transit services available in mountain communities to transport visitors who do not have access to a vehicle. A comprehensive list can be found at https://goi70.com/mountaintransit .	Ongoing.

Project or Study (Lead Agency)	Description	Status
<p>Travel Demand Management (TDM) Committee, 2016–2017 TDM Work Plan (I-70 Coalition)</p>	<p>The I-70 Coalition works to identify and implement short-term strategies to reduce congestion by TDM actions, including: Traveler education and outreach Partnering with local businesses to provide off-peak travel incentives Promoting TDM strategies through resorts, local governments, and tourism-based organizations Developing and enhancing TDM-related partnerships Supporting carpooling and carpool parking Supporting and promoting transit These TDM programs reduce some single-occupant vehicle travel and switch some travel to off-peak periods.</p>	<p>Ongoing.</p>
<p>Replacement of I-70 bridge over US 6</p>	<p>The westbound I-70 bridge over US 6 at the bottom of Floyd Hill is in poor condition and is programmed to be replaced regardless of whether CDOT moves forward with one of the Floyd Hill to Veterans Memorial Tunnels action alternatives. The bridge would be replaced in its current location but would need to be designed to current standards, with a 55-mph design speed and improved sight distance with wider shoulders.</p>	<p>Will be constructed if Floyd Hill to Veterans Memorial Tunnels Project is not approved.</p>
<p>Operational improvements to the US 40 and CR 65 and US 40 and Homestead Road intersections.</p>	<p>To improve the operations of the Beaver Brook/Floyd Hill and Hyland Hills/Floyd Hill interchange system, the intersections at US 40 and CR 65 and US 40 and Homestead Road would be reconstructed as roundabouts. This would improve the operations of both intersections and mitigate effects of local and interstate traffic conflicts along US 40, which acts as a frontage road for the split diamond interchange and the primary local access road for the Floyd Hill neighborhood. The roundabouts would provide more capacity for through movements at the intersections, improve traffic circulation along CR 65 and Homestead Road, and accommodate turning movements for heavy trucks.</p>	<p>Project is undergoing a Tier 2 NEPA process.</p>

Project or Study (Lead Agency)	Description	Status
Recreational		
Clear Creek Greenway (Clear Creek Greenway Authority, Idaho Springs, and CDOT)	Completion of 14 miles of Greenway from US 6 to US 40. The purpose of the Clear Creek Greenway is to provide a key link in the state's regional trail system by further developing a multi-use pedestrian corridor throughout the county. The Greenway is a recreational corridor that includes a continuous trail from the town of Empire to the west end of the Peaks to Plains Trail, which is located just east of the I-70/US 6 Interchange. It will become a unifying linkage among the towns of Empire, Lawson, Downieville, Dumont, and Idaho Springs. (Clear Creek County, 2005)	The following sections of the Greenway improvements are underway and will be completed by Fall 2022: Dumont Trail Head Connection to Lower Dumont Creek Access West Idaho Springs Trail East Idaho Springs to the Game Check Station Trail Head Additional phases will be constructed as funding is identified.
Greenway in Clear Creek Canyon (part of Peaks to Plains Trail) (Jefferson County and Clear Creek County)	The vision of the Peaks to Plains Trail is a 65-mile trail that will eventually connect the South Platte River Trail in Denver to the headwaters of Clear Creek at Loveland Pass. Once completed, it will connect four counties and seven cities, including spanning the entirety of Clear Creek Canyon.	A new trail section, a developed recreation area, and a trailhead in Clear Creek County opened to the public in the part of the canyon known as "The Big Easy" in September 2017. Construction of the Gateway Segment of Clear Creek Canyon Park in Golden is underway and expected to be completed in 2021. Construction of additional sections continues as funding is identified.
Floyd Hill Open Space Trails (Clear Creek County, Jefferson County, and Mountain Area Land Trust)	Clear Creek County is planning a future expansion of the existing Floyd Hill Trail, which will include a one-way downhill trail back to the parking lot and several miles of trail that will connect to existing trails in Clear Creek Canyon along US 6. The trailhead parking area will be upgraded to include 20 parking spaces; an informational kiosk with maps, regulations, and other materials; portable toilets in an enclosed structure; wildlife-resistant trash cans; and a picnic table.	Construction and upgrades are planned as funding becomes available.
Virginia Canyon Open Space (Area 28) (Partnership of the City of Idaho Springs, Colorado Mountain Biking Association, Clear Creek County, Clear Creek Greenway Authority, and a private developer)	The Virginia Canyon Open Space mountain park and trails system will be located along the northern hillsides of the city of Idaho Springs and is envisioned to have connections from the Clear Creek Greenway and Virginia Canyon Road/Central City. Trails for mountain biking and hiking are being planned by the partnership.	The project will be built over time, in phases, as funding is obtained.
Private Development Projects		

Project or Study (Lead Agency)	Description	Status
Argo Gold Mine and Mill redevelopment plans (private developer)	Redevelopment of the Argo Gold Mine and Mill in Idaho Springs to include a hotel and convention center, housing for multiple income levels, stores, a gondola, and adventure park.	Gondola will be constructed and open to the public summer 2021; hotel construction will start after gondola is constructed, and the remaining development will take approximately five years to complete.
Bighorn Crossing (private developer)	Construction of 64 townhomes, 72 apartments, and a hotel in Georgetown. The development is between I-70 and Georgetown Lake, east of Argentine Street.	Construction began May 2018 and is expected to continue for several years.
Stanley Mines Adventure Park (Private Developer)	The project would consolidate several mining claims into a 37-acre parcel zoned for a heritage tourism venue. The proposed Stanley Mines Adventure Park would be located west of Idaho Springs, off Stanley Road on the south side of I-70 and Clear Creek.	Timeframe unknown (initial plans were to open in 2019, but that has not occurred).
Plans		
Idaho Springs Exit 240 Plan (City of Idaho Springs and Clear Creek County Economic Development Corporation)	The City of Idaho Springs and the Clear Creek County Economic Development Corporation studied the development of an economic hub at I-70 Exit 240. Recommended uses for the development include hotel/lodging, retail, residential, and office space. (Idaho Springs, 2016)	Ongoing.

6. Impacts

6.1. Methodology

The analysis relied on publicly available information and documentation to compile an initial list of past, present, and reasonably foreseeable future actions in the study area. Sources include the NEPA documentation and associated technical reports for the PEIS and the eastbound and westbound Twin Tunnels and Peak Period Shoulder Lane projects.

Cumulative impacts are identified by adding the impacts of the Proposed Action to the impacts of other past, present, and reasonably foreseeable future actions for each sensitive resource. The impacts of the Proposed Action are described in the Project's technical reports for each resource and summarized in the EA. The impacts of past and present actions on each resource are summarized and the impacts of reasonably foreseeable future actions are estimated for each resource in the sections below. The No Action Alternative, which includes replacement of the existing US 6 bridge at the I-70/US 6 interchange, is considered to be a reasonably foreseeable future action if the Proposed Action is not implemented.

6.2. Socioeconomic and Community Resources

6.2.1. Existing Context

Clear Creek County's economic base is tied heavily to recreation and tourism. The development of mountain resort communities west of Clear Creek County and the proximity of the Denver metropolitan area to the east has resulted in approximately 70 percent of county residents commuting out of the county for employment (Clear Creek County, 2018). The Floyd Hill neighborhood is a rural residential neighborhood that relies on services in Idaho Springs and Evergreen, and employment primarily in the Denver metropolitan area. In the decade since the PEIS was published, the recreation industry in Clear Creek County has grown more than expected, and population and employment growth throughout the Corridor have been lower than the PEIS projected. However, issues with affordable housing for workers supporting the recreation economy have worsened throughout the I-70 Mountain Corridor and have expanded to Clear Creek County.

Growth in Clear Creek County, in counties to the west (such as Summit and Eagle), and in the Denver metropolitan area has contributed noticeably to land development in the study area and additional need for transportation infrastructure and other community facilities. Recent transportation projects, such as the Twin Tunnels expansion, the reconstruction of Colorado Boulevard, and the Eastbound I-70 Peak Period Shoulder Lane have improved socioeconomic conditions in the study area by improving mobility in the corridor, on I-70, and on the adjacent roads; and by improving safety for motorists. Sales tax revenue in Idaho Springs increased due to these projects.

Climate change and the increasing frequency of natural disasters, including floods, fire, rockfall, and drought, increasingly stress the natural environment, infrastructure, and communities that rely on the interstate for emergency evacuations. Incidents related to natural disasters have closed the highway periodically, sometimes for long durations, which affects corridor economies, interstate commerce, and Colorado's important recreation and tourism economy.

6.2.2. Impacts of Reasonably Foreseeable Future Actions

Reasonably foreseeable transportation projects improve infrastructure and safety and enhance mobility, which positively affects socioeconomic conditions, such as emergency vehicle response times and worker commute times during peak periods. Intersection improvements on US 40 will improve Floyd Hill neighborhood access. Transportation, recreation, and some private development projects improve recreational access and opportunities in Clear Creek County, attracting more visitors to the area and enhancing the tourist economy, which increases sales tax revenue.

The continued operation of the Henderson Mine is important to the county's employment and property tax revenue. Private development projects, such as the land development at the top of Floyd Hill and Bighorn Crossing in Georgetown, will bring additional housing, residents, and workers to Clear Creek County, and recreation projects will bring additional visitors, all of which will increase jobs and tax revenue. Many of the projects require some right-of-way from public and private properties. The projects are consistent with the county's master plan, which envisions a diverse economy, natural and cultural resource protection, and continued encouragement of recreational opportunities.

6.2.3. Cumulative Impacts of the Tunnel Alternative

Impacts of the Tunnel Alternative. The Tunnel Alternative would improve socioeconomic conditions by reducing congestion, addressing safety concerns, providing redundancy through the frontage road connection, and improving emergency response times. Improved traffic operations and reduced congestion on I-70 would divert less traffic onto US 40, benefiting the Floyd Hill neighborhood and addressing a key concern of residents in that area. The Project would not be expected to change community population trends, affect the availability of housing, or induce growth or development. Construction would result in travel disruptions and inconvenience during the approximately 5-year construction period; however, construction of recent Tier 2 projects near the Project area has had a positive impact on sales tax revenue in Idaho Springs.

Cumulative Impacts. When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative is expected to beneficially impact socioeconomic and community resources due to improved mobility, enhancement of the Clear Creek Greenway, and potential indirect impacts of increased sales tax revenue during construction and increased property values. Recent past projects have also contributed to improved mobility and recreational enhancement, and reasonably foreseeable future actions are expected to have the same positive impact on the economy and community. The Tunnel Alternative would support reasonably foreseeable future projects by providing better access and mobility for the residents, workers, recreationalists, and tourists whom these projects serve.

6.2.4. Cumulative Impacts of Canyon Viaduct Alternative

The Canyon Viaduct Alternative would have the same impacts and the same cumulative impacts related to socioeconomic and community resources as the Tunnel Alternative, however, the construction duration would be approximately one year shorter.

6.3. Recreation Resources

6.3.1. Existing Context

Recreational travel and recreational activities and facilities in the study area are dominant drivers of the local and regional economy. At the same time, recreational travel is the predominant contributor to I-70 peak traffic, and agencies and the public have voiced concerns about transportation improvements resulting in higher recreation visitation to public lands, deteriorating resources and the visitor experience. In the decade since the PEIS was published, the recreation industry in Clear Creek County has grown more than expected, and although the PEIS projected pressures on recreational and environmental resources, overuse and changing climate conditions have increasingly stressed environmental and recreational resources throughout the Mountain Corridor.

Clear Creek County has been implementing the Clear Creek Greenway Plan since 2005 to create a recreational greenway along Clear Creek linking communities together with a string of open spaces, parks, and recreational facilities. The construction of recent projects on I-70 in Clear Creek County (Exhibit 4) have increased access to recreational resources in the county and improved conditions for recreationalists along the Clear Creek Greenway.

6.3.2. Impacts of Reasonably Foreseeable Future Actions

Many of the current and reasonably foreseeable future actions improve access to recreation sites in Clear Creek County and in the mountains to the west of Clear Creek County. Improved access is a benefit for recreationalists and for-profit recreation-oriented businesses, but increased visitation due to better access can place additional strain on public lands, deteriorating resources and the visitor experience.

Development of the Stanley Mines Adventure Park, the Argo Mine and Mill redevelopment, the Peaks to Plains Trail, Floyd Hill Open Space Trails, and the Virginia Canyon Open Space add recreational resources to Clear Creek County, benefiting county residents and tourists alike. Continued implementation of the Clear Creek Greenway substantially enhances recreational values throughout the county and provides a link between Denver's Platte River Greenway and the Continental Divide Scenic Trail.

6.3.3. Cumulative Impacts of Tunnel Alternative

Impacts of the Tunnel Alternative. Both frontage road options would resurface the Clear Creek Greenway trail and reconstruct a portion of the trail for compliance with ADA. Both options would increase recreational access to Clear Creek and improve emergency access to the creek. Both options would have temporary delays, detours, and possible closures for recreation activities along the Greenway during construction.

The South Frontage Road Option is not supported by agencies, community members, or the Project Technical Team because it would introduce roadway infrastructure and traffic noise on the south side of Clear Creek, diminishing the recreational experience of the Clear Creek Greenway, and it would affect access to social trails in the Hidden Valley Open Space.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative North Frontage Road Option is expected to beneficially impact recreation resources by improving visitor access and increasing recreational opportunities regionally.

When combined with other past, present, and reasonably foreseeable future actions, the South Frontage Road Option is expected to beneficially impact some recreation resources by improving visitor access and increasing recreational opportunities regionally; however, it is expected to result in negative cumulative impacts on the Clear Creek Greenway due to the presence of roadway infrastructure and traffic noise on the south side of Clear Creek. Under both frontage road options, increased visitation to public lands, due to improved access and population growth, could strain facilities and negatively impact natural resources.

6.3.4. Cumulative Impacts of Canyon Viaduct Alternative

Impacts of the Canyon Viaduct Alternative. Similar to the Tunnel Alternative, the Canyon Viaduct Alternative would resurface the Clear Creek Greenway trail, reconstruct a portion of the trail for compliance with ADA, increase recreational access to Clear Creek, and improve emergency access to the creek. The alternative would have temporary delays, detours, and possible closures for recreation activities along the Greenway during construction.

The alternative would enhance the recreation experience of the Greenway because I-70 would be removed from the canyon floor and vertically separated from the Greenway. In the area where I-70 would be relocated and elevated above the canyon, existing pavement would be removed, leaving opportunities to enhance the creek and Greenway; traffic noise along the Greenway would be notably reduced; although bridge piers would be visible from the Greenway, visual changes from the Greenway would be less impactful than under the Tunnel Alternative due to fewer rock cuts, retaining walls, and slope and fill.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future actions, the Canyon Viaduct Alternative is expected to beneficially impact recreation resources by improving visitor access and increasing recreational opportunities regionally and by improving the recreation experience along the Clear Creek Greenway. Increased visitation to public lands, due to improved access and population growth, could strain facilities and negatively impact natural resources.

6.4. Visual Resources

6.4.1. Existing Context

Clear Creek and the surrounding steep slopes and canyons are prominent natural features of the mountain setting in the study area. Roads, development, and mining activities have encroached on the natural setting since the 1850s when Clear Creek County experienced a mining boom. Since the construction of I-70 in the 1960s, the highway, the Veterans Memorial Tunnels, tall rock cuts, and large cut and fill slopes have become prominent features of the visual setting along several stretches of Clear Creek canyon. During the I-70 PEIS process, stretches along the I-70 Mountain Corridor that have multiple or unique aesthetic issues (Areas of Special Attention) were identified by stakeholders participating in aesthetic working groups. Idaho Springs, the Veterans Memorial Tunnels (called the Twin Tunnels in the aesthetic guidance), and Floyd Hill were all identified as Areas of Special Attention.

Past transportation projects described in Exhibit 4, such as the Twin Tunnels expansion, the Eastbound Peak Period Shoulder Lane, the reconstruction of Colorado Boulevard in Idaho Springs, and the CR 314 Phase I Improvements have resulted in minor to moderate visual impacts from the widening of two tunnels, an expanded highway footprint, roadway modifications, vegetation clearing, and new walls and signage.

6.4.2. Impacts of Reasonably Foreseeable Future Actions

Some of the reasonably foreseeable future actions will result in changes to the visual character of the study area due to new buildings and roadway infrastructure. Transportation projects on I-70, including the new Fall River Road Bridge and the US 6 bridge replacement over I-70 (under the No Action Alternative for this Project) adhere to the *I-70 Mountain Corridor Aesthetics Guidance* (CDOT, 2015) and will help create more consistency in aesthetic design along the I-70 Mountain Corridor.

There is a trend toward more urban features in and around Idaho Springs; the Argo Mine and Mill redevelopment, Stanley Mines Adventure Park, new transit center and parking garage, and new development around Exit 240 will bring more built elements to the cultural landscape around Idaho Springs. Other projects, like the Virginia Canyon Open Space, the Floyd Hill Open Space Trails, and the ongoing development of the Clear Creek Greenway will preserve views of the natural landscape surrounding the I-70 Mountain Corridor.

6.4.3. Cumulative Impacts of Tunnel Alternative

Impacts of the Tunnel Alternative. The Tunnel Alternative would result in moderate visual impacts for I-70 travelers and high visual impacts for recreationalists, who have high sensitivity to visual changes, due to the presence of large rock cuts, retaining walls, structures, and cut and fill slopes and associated vegetation removal. The South Frontage Road Option would have a greater degree of adverse visual impact than the North Frontage Road Option due to the presence of more visually dominant Project features in recreationalists' views, including the frontage road and tall retaining walls adjacent to the Clear Creek Greenway trail. The Tunnel Alternative, under either frontage road option, would have more severe visual impacts than the Canyon Viaduct Alternative due to its extensive rock cuts, retaining walls, and cut and fill slopes and associated vegetation removal surrounding the Greenway. The Tunnel Alternative would follow *I-70 Mountain Corridor Aesthetics Guidance* (CDOT, 2015) and *I-70 Mountain Corridor Design Criteria* (CDOT, n.d.), and CDOT would consult with stakeholders during design to address design aesthetics and exceptions, using the I-70 Mountain Corridor Context Sensitive Solutions (CSS) process.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative is expected to have a minor adverse cumulative impact on visual resources in the study area. The Tunnel Alternative would add to the trend of increased development and urban elements encroaching visually in the natural landscape. However, these visual impacts are confined primarily to the I-70 alignment through the study area, and other actions such as the Clear Creek Greenway Plan, the Floyd Hill Open Space Trails, and the Virginia Canyon Open Space would preserve the natural landscape and views in other portions of the study area. The cumulative visual changes along the I-70 Mountain Corridor would be minor relative to the large scale of the natural mountain setting.

6.4.4. Cumulative Impacts of Canyon Viaduct Alternative

Impacts of the Canyon Viaduct Alternative. The Canyon Viaduct Alternative would result in moderate visual impacts for I-70 travelers and high visual impacts for recreationalists, who have high sensitivity to visual changes, due to the presence of rock cuts, retaining walls, the viaduct structure, and cut and fill slopes and associated vegetation removal. The Canyon Viaduct Alternative would have less severe visual impacts than the Tunnel Alternative because it would have more riparian restoration north of Clear Creek, and its rock cuts, retaining walls, and cut and fill slopes and associated vegetation

removal would be substantially less extensive than the Tunnel Alternative. The Canyon Viaduct Alternative would follow *I-70 Mountain Corridor Aesthetics Guidance* (CDOT, 2015) and *I-70 Mountain Corridor Design Criteria* (CDOT, n.d.), and CDOT would consult with stakeholders during design to address design aesthetics and exceptions, using the I-70 Mountain Corridor CSS process.

Cumulative impacts. The Canyon Viaduct Alternative would have the same cumulative impacts on visual resources as the Tunnel Alternative. Although its individual Project impacts would be less severe than the Tunnel Alternative, the overall cumulative visual impacts in the context of the study area and the surrounding natural landscape would be the same.

6.5. Air Quality

6.5.1. Existing Context

Air quality within Clear Creek County is good and is expected to remain good in the future, in part due to technological improvements that reduce vehicle emissions over time, even while traffic on I-70 increases. Air quality in Clear Creek County is assessed independently of the adjacent Denver metropolitan nonattainment area to the east. Mountainous terrain in Clear Creek County limits the ability of emissions in one location to affect another location. As a result, the area where I-70 emissions can affect air quality receptors and can accumulate emissions from nearby sources is largely limited to the Clear Creek valley, which I-70 follows.

Recent projects (described in Exhibit 4) have not impacted air quality in Clear Creek County. CDOT monitored particulate matter emissions during tunnel blasting activities when the Veterans Memorial Tunnels were expanded, and levels remained below established thresholds. Based on this monitoring, and recent monitoring in Vail, there are no issues or concerns with exceedances of National Ambient Air Quality Standards. Clear Creek County is monitoring air quality through non-regulatory monitors provided by CDOT as a condition of the 1041 permit for the Westbound Peak Period Shoulder Lane project. Although air quality in Clear Creek County does not exceed National Ambient Air Quality Standards for any criteria pollutants, the county continues to be concerned about the proximity and impacts of highway emissions on residents throughout the county.

6.5.2. Impacts of Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions are not expected to degrade air quality in Clear Creek County. Many of the projects will bring new residents, workers, and visitors to the county, generating additional traffic and emissions from construction and operation. However, vehicle technology improvements have been reducing and will continue to reduce vehicular emissions over time, and future air quality is expected to be better due to these improvements, despite additional traffic volumes.

Construction activities generate localized dust and other particulate matter, but these are mitigated through dust control plans and best management practices. No exceedances of air quality standards were identified during the Twin Tunnels expansion project, which generated more particulate matter than standard construction activities; based on this monitoring, construction of other reasonably foreseeable future actions is not expected to negatively affect air quality.

6.5.3. Cumulative Impacts of the Tunnel Alternative

Impacts of the Tunnel Alternative. The Tunnel Alternative would have no permanent adverse impacts to air quality. It would reduce criteria pollutants (carbon monoxide, oxides of nitrogen, particulate matter less than 2.5 microns in diameter) due to decreased congestion and improved speeds and levels of service. Localized increases in mobile source air toxics (MSAT) concentrations would be minor and only occur in areas where the highway is moved off its current alignment. Temporary, intermittent increases in emissions would occur during construction, primarily from blasting activities and operation of diesel construction equipment. The Tunnel Alternative would not result in a meaningful change in global carbon dioxide emissions, which makes up the largest component of transportation greenhouse gas emissions.

Cumulative impacts. When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative is not expected to negatively impact air quality because it would reduce criteria pollutants due to improved highway operations. On a regional basis over time, emissions would be lowered due to EPA's national control programs that are projected to reduce annual MSAT emissions by more than 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, vehicle miles traveled (VMT) growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Study Area are likely to be lower in the future in nearly all cases.

Additionally, CDOT continues to implement Policy Directive 1901 and associated Air Quality Action Plan (CDOT, 2017), which direct CDOT efforts to reduce air pollution from Colorado's transportation sector, and which will continue to reduce transportation-related pollution throughout the state, including in Clear Creek County. Although the current (2020) national administration does not recognize climate change as a relevant consideration for NEPA decision making or analysis, climate change and transportation's impacts on greenhouse gas emissions remains a significant concern for the I-70 Mountain Corridor Collaborative Effort, CDOT, and Colorado.

6.5.4. Cumulative Impacts of the Canyon Viaduct Alternative

The Canyon Viaduct Alternative would have the same impacts and the same cumulative impacts related to air quality as the Tunnel Alternative.

6.6. Wildlife

6.6.1. Existing Context

Within the Clear Creek watershed, development and transportation infrastructure have caused the loss and fragmentation of wildlife habitat and the degradation of terrestrial and aquatic ecosystems. Mule deer ranges exist on both the north and south sides of I-70, primarily in the Floyd Hill area (in the East Section of the Project), and bighorn sheep ranges exist primarily north of I-70 in the Central Section of the Project. I-70 interferes with the movement of these and other animals through their ranges, creating "wildlife linkage interference zones."

Clear Creek is considered a "high-value" fishery that provides high-quality habitat for a variety of fish species (CPW, 2017). The recent Twin Tunnels projects improved fish habitat adjacent to the tunnels, and since the improvement project, brown trout numbers have increased and the density of brown trout within the habitat enhancement section is the highest it has ever been (CPW, 2017; CPW, 2020).

Recent projects (described in Exhibit 4) identified likely impacts to terrestrial wildlife species, such as temporary and permanent habitat loss, increased fatalities due to attempts at crossing the highway, noise and light impacts, and indirect impacts from conflicts with humans from expanding the highway and Clear Creek Greenway trail. Potential impacts to aquatic wildlife were identified: increased sedimentation caused by erosion and construction activities could affect fish and benthic invertebrate habitat.

6.6.2. Impacts of Reasonably Foreseeable Future Actions

Additional land development, recreation and open space trail development, and human activity leads to habitat loss for wildlife, noise and light impacts, and indirect impacts from additional conflicts with humans.

Future private development projects, such as Bighorn Crossing and the Argo Mine and Mill Development, may result in increases in impervious surfaces, disturbance of mineralized soils, or transfer of mine-related pollutants to Clear Creek, all of which affect water quality and aquatic wildlife. Increased sedimentation from construction activities also affects aquatic wildlife. Much of the stormwater runoff from I-70 is directed to sediment control facilities that are designed to reduce sediment and pollutant loads entering water bodies.

6.6.3. Cumulative Impacts of Tunnel Alternative

Impacts of the Tunnel Alternative. Wildlife fencing installed east of the Hyland Hills/Floyd Hill interchange would help prevent animal-vehicle collisions in this hotspot collision location near the Beaver Brook wildlife linkage interference zone (LIZ), and wildlife connectivity in the Clear Creek LIZ would be improved due to an underpass and wildlife bench under the new US 6/I-70 bridges over Clear Creek. The A Landscape Level Inventory of Valued Ecosystem Components (ALIVE) Issue Task Force (ITF) reviewed wildlife connectivity in the Beaver Brook LIZ and considered numerous locations for overpasses or underpasses. The ALIVE ITF ultimately determined that mitigation in another location outside of the Project area on the I-70 Mountain Corridor within CDOT Region 1 (east of the Eisenhower-Johnson Memorial Tunnels) in Clear Creek County or Jefferson County would be better for wildlife connectivity than constructing a crossing within the Project area. The ITF identified five potential locations, with the commitment to design and construct at least one new crossing concurrently with the Floyd Hill Project.

New infrastructure would impact aquatic wildlife and habitat directly through construction of bridge piers and abutments and indirectly through shading from new bridges. Construction activities may increase sedimentation and pollutants and adversely affect water quality and aquatic habitat; a stormwater management plan will minimize and mitigate these impacts.

North Frontage Road Option. Under the North Frontage Road Option, 20 acres of south-facing slope and big horn sheep habitat would be lost due to rock cuts and removal, and no elk winter range habitat would be lost. Wildlife access to Clear Creek from south of the creek would be preserved, as no new roadway infrastructure would be constructed south of the creek.

South Frontage Road Option. Under the South Frontage Road Option, 11 acres of south-facing slope and big horn sheep habitat would be lost due to rock cuts and removal, and 11 acres of elk winter range habitat on the south side of Clear Creek would be lost. This design option would reduce wildlife access to Clear Creek because it would construct roadways with high retaining walls on both sides of the creek and it would increase human activity on the south side of the creek. The

South Frontage Road Option would also increase wildlife-vehicle conflicts by placing a new road on the south side of Clear Creek. This design option would improve 5 acres of riparian habitat on the north side of Clear Creek where the I-70 westbound lanes would be removed.

Cumulative impacts. Development projects, including this Project, would result in additional habitat loss and fragmentation. Past activities, particularly the construction of the I-70 highway, have created a major barrier to north-south terrestrial wildlife movement and have altered streams and fish habitat and compromised water quality. In the short term, construction of multiple projects would cumulatively create additional noise and light that may disturb animals and cause them to avoid the construction areas. Ground-disturbing activities would also expose soils and could result in additional sedimentation that may affect aquatic habitat. However, the inclusion of new wildlife crossing(s) along the I-70 Mountain Corridor and improving the crossings under US 6 inside the Project area would have a beneficial impact to wildlife connectivity and habitat.

When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative North Frontage Road Option is expected to have a beneficial cumulative impact on wildlife. Land conservation for wildlife habitat in the Floyd Hill Open Space Trails area and Virginia Canyon Open Space (1600 acres total), improvements to wildlife connectivity along Clear Creek through the Central Section of the Project, the Project's committed mitigation to provide additional wildlife crossing locations/structures along the I-70 Mountain Corridor, and riparian restoration along Clear Creek would have a beneficial cumulative impact on wildlife habitat and connectivity.

When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative South Frontage Road Option is also expected to have a beneficial cumulative impact on wildlife, but the benefits would be reduced compared to the Tunnel Alternative North Frontage Road Option. Wildlife connectivity across I-70 in the Central Section of the Project would not be improved to the same extent as under the North Frontage Road Option because the location of the frontage road on the south side of Clear Creek would inhibit wildlife access to Clear Creek.

6.6.4. Cumulative Impacts of Canyon Viaduct Alternative

Impacts of the Canyon Viaduct Alternative. The Canyon Viaduct Alternative would have similar impacts as the Tunnel Alternative North Frontage Road Option except it would:

- Provide greater wildlife connectivity and access to habitat in the Central Section with the relocation of I-70 out of the Clear Creek Canyon, allowing east-west wildlife connectivity along Clear Creek
- Remove less wildlife habitat (5 acres of south-facing slope and big horn sheep habitat and 5 acres of elk winter range habitat on the south side of Clear Creek)
- Have greater benefit to habitat due to the restoration of floodplains and 8 acres of potential riparian habitat on the north bank of Clear Creek where the I-70 westbound lanes would be removed

Cumulative impacts. The Canyon Viaduct Alternative would have similar cumulative impacts on wildlife as the Tunnel Alternative, except the benefits to wildlife would be greater because the Canyon Viaduct Alternative would provide greater wildlife connectivity and access to habitat, eliminate animal-vehicle conflicts with I-70 (because I-70 would be located above the canyon and habitat areas), and restore more riparian habitat.

6.7. Aquatic Resources and Water Quality

6.7.1. Existing Context

Within the Clear Creek watershed, mining, development, and roadway maintenance activities have affected water quality, caused stream channelization, filled wetlands, and changed stream hydrology and habitat. Some of the most substantial impacts have been along Clear Creek immediately adjacent to I-70. Construction in the watershed has also played a role in the exposure and disturbance of mine waste and mineralized rock, further degrading water resources.

In response to the recognized cumulative impacts to water resources and water quality within the Clear Creek drainage associated with highway development, operations, and maintenance, historic mining, and land development, CDOT and stakeholders developed the Clear Creek SCAP as part of the PEIS process and commitments (CDOT, 2013). The SCAP identifies measures to manage roadway traction sand and other highway-related sediment sources that can adversely impact Clear Creek, and CDOT continues to implement the plan as projects are developed.

Recent projects (described in Exhibit 4) have been consistent with the SCAP. They have increased the amount of impervious roadway surface and stormwater runoff, and have included sediment control features, such as detention basins, to minimize and mitigate the amount of pollutants and sediment entering streams. These projects treat more runoff than was treated prior to the projects being constructed, improving water quality in Clear Creek.

6.7.2. Impacts of Reasonably Foreseeable Future Actions

Future private development projects, such as Bighorn Crossing and the Argo Mine and Mill Development, may result in increases in impervious surfaces, disturbance of mineralized soils, or transfer mine-related pollutants to Clear Creek and its tributaries, affecting water quality. Increased sedimentation from construction activities also affects water quality if the sediment is not captured prior to entering water bodies.

6.7.3. Cumulative Impacts of Tunnel Alternative

Impacts of the Tunnel Alternative. The Tunnel Alternative would increase impervious surface and would increase the amount of de-icing salts and mineralized rock runoff from the roadway. However, water quality treatment facilities would be installed to treat stormwater runoff and reduce the amount of sediment, metals, and other pollutants entering Clear Creek and its tributaries, consistent with the Clear Creek SCAP. The water quality treatment facilities would effectively treat 56 percent of roadway runoff, reducing the discharge of sediment, metals, and other pollutants by up to 80 percent over existing conditions, depending on the pollutant and type of water quality treatment facility used.

The Tunnel Alternative would relocate about 1,200 linear feet of Clear Creek downstream of the Veterans Memorial Tunnels; however, this relocated section is highly channelized and does not support wetlands or riparian vegetation. Stream, floodplain, and riparian and fish habitat conditions along Clear Creek would be improved within the Project area to mitigate the impacts of the creek relocation.

Cumulative Impacts. When combined with other past, present, and reasonably foreseeable future actions, the Tunnel Alternative is not expected to have an adverse cumulative impact on water resources. The Tunnel Alternative would reduce sediment and pollutants entering Clear Creek from I-70 stormwater runoff, but other projects would continue to increase impervious surface and runoff. The

Tunnel Alternative would contribute cumulatively to the continued channelization of Clear Creek, but this would be mitigated through improvements to stream, floodplain, and riparian and fish habitat. The Clear Creek SCAP would continue to be implemented to address ongoing cumulative impacts to water quality in Clear Creek. Cumulative impacts to wetlands are not expected to occur.

6.7.4. Cumulative Impacts of Canyon Viaduct Alternative

Impacts of the Canyon Viaduct Alternative, The Canyon Viaduct Alternative would have similar impacts to wetlands, other waters of the U.S., and water quality as the Tunnel Alternative. The alternative would not be able to treat as much of the stormwater runoff as the Tunnel Alternative (46 percent versus 56 percent), and more sediment, metals, and other pollutants would enter Clear Creek and its tributaries than under the Tunnel Alternative. However, the alternative would still reduce the discharge of sediment, metals, and other pollutants substantially over existing conditions.

Cumulative Impacts. The Canyon Viaduct Alternative would have similar cumulative impacts on wetlands, other waters of the U.S., and water quality as the Tunnel Alternative; more untreated stormwater would enter Clear Creek.

7. Mitigation

7.1. Relevant Mitigation Recommended from Tier 1 PEIS and Previous Tier 2 Projects

7.1.1. PEIS

Exhibit 6 lists the mitigation strategies identified in the PEIS that are applicable to the I-70 Floyd Hill to Veterans Memorial Tunnels Project and describes how these strategies have been addressed in the Project development.

Exhibit 6. PEIS Mitigation Strategies Addressed by the Project

PEIS Mitigation Strategy	Project Approach
Address MSAT and greenhouse gas emissions relative to global climate change	CDOT continues to implement Policy Directive 1901 and associated Air Quality Action Plan (CDOT, 2017). EPA's national control programs are projected to reduce annual MSAT emissions by more than 80 percent between 2010 and 2050.
Coordinate with Clear Creek County communities regarding implementation of a marketing program for historic tourism to address the disparate distribution of benefits and impacts from construction activities (which were anticipated to negatively affect Clear Creek County more than other counties, without the level of commensurate benefits from tourism growth and dollars)	The disparate distribution of benefits and impacts anticipated by the PEIS has not occurred. Construction of recent Tier 2 projects near the Project area has shown to have a positive impact on sales tax revenues in Idaho Springs and improved socioeconomic conditions.
Follow the processes outlined in the ALIVE Memorandum of Understanding (MOU) (CDOT, 2008) to improve permeability of the highway to wildlife	Six meetings with the ALIVE ITF have occurred. The Project would include an underpass and wildlife bench under the new US 6/I-70 bridges over Clear Creek, and the Canyon Viaduct Alternative would improve permeability throughout the Central Section where

	the I-70 lanes would be on a viaduct. The Project also commits to providing additional wildlife crossing locations/structures along the I-70 Mountain Corridor to mitigate for habitat fragmentation, loss of connectivity between populations and other wildlife impacts.
Implement the Stream and Wetland Ecological Enhancement Program (SWEET) MOU (CDOT, 2010) and matrix of mitigation to address stream impairment and benefit aquatic resources	Three meetings with the SWEET ITF have occurred. Most of the considerations in the SWEET MOU and Implementation Matrix apply to the Project and are incorporated into the Proposed Action. The Project would incorporate water quality best management practices for treatment of stormwater runoff to improve water quality, and enhancements to riparian and aquatic habitat would mitigate the realignment of Clear Creek in the West Section and improve aquatic and water quality conditions.
Conduct consultation under the National Historic Preservation Act consistent with the I-70 Mountain Corridor Section 106 Programmatic Agreement	Three meetings with the Section 106 ITF have occurred. There is no adverse effect to historic properties, and no mitigation is required.
Implement the I-70 Mountain Corridor CSS aesthetic guidelines	Over 40 stakeholder team meetings have been held as part of the CSS process, and the Technical Team provided continual input on visual impacts during the alternatives development and evaluation process. Engineering criteria and aesthetic considerations are a core value for the Project, and the ability of the Project elements to meet the <i>I-70 Mountain Corridor Aesthetics Guidance</i> (CDOT, 2015) and <i>I-70 Mountain Corridor Design Criteria</i> (CDOT, n.d.), has been a key part of the evaluation for this core value.

7.1.2. Tier 2 Processes

As noted in Section 5.3.2, the recent Tier 2 projects on I-70 have included mitigation commitments that, collectively, address cumulative impacts to water and recreational resources and wildlife habitat and connectivity. These include:

- Installing hazardous spill containment structures to reduce hazardous waste discharge to Clear Creek
- Installation of water quality treatment facilities, water quality monitoring, sediment traps, and erosion control measures to minimize sediment loads and pollutants entering Clear Creek
- Encapsulating mineralized rock generated during blasting activities beneath the roadway pavement, away from groundwater, to prevent chemical reactions that could dissolve contaminants into Clear Creek
- Preservation and enhancement of recreational accesses to Clear Creek
- Restoration of the old game check area south of the Veterans Memorial Tunnels to provide wetlands and water quality improvements and recreational opportunities
- Redevelopment of Water Wheel Park to preserve recreational use
- Installation of wildlife fencing in some locations to keep wildlife off the highway and direct them to undercrossings, and modifying medians for increased permeability
- Installation of signage warning drivers of wildlife conflicts
- Restoration and enhancement of native vegetation
- Continued discussions through the Collaborative Effort regarding increased recreational visitors to address the cumulative impact of transportation improvements affecting recreational travel

7.2. Project Mitigation for Cumulative Impacts

The Project has addressed ROD mitigation strategies as described in Exhibit 6. The Project commits to mitigation measures for direct permanent and temporary impacts for each resource, which are detailed in the individual resource technical reports and the EA mitigation summary. No additional mitigation measures are needed to address cumulative impacts to any resources.

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