STATE HIGHWAY 9 AND U.S. HIGHWAY 6 IMPROVEMENT PROJECT AT THE INTERSTATE 70 SILVERTHORNE/DILLON INTERCHANGE

LAUNCH PHASE TECHNICAL SUMMARY

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Region 1

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1. INTRODUCTION

1.1 Context and Overview

The Colorado Department of Transportation began the State Highway 9 (SH 9) and U.S. Highway 6 (US 6) Improvement Project at the Interstate 70 (I-70) Silverthorne/Dillon Interchange in early 2010. In 2010, the project was referred to as the I-70 Silverthorne interchange in the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS). Later, the project was renamed the I-70 Silverthorne/Dillon Interchange project to reflect the importance of the associated improvements to both Silverthorne and Dillon. The current project name reflects the focus of the project on improvements to SH 9 and US 6.

AECOM was hired to assist in the environmental project development and project delivery. The team has been gathering information and public comments about the existing interchange. This report is a summary of the information gathering activities and existing conditions that will be used in future interchange analysis.

The process that CDOT will follow to study potential improvements includes compliance with the I-70 Context Sensitive Solutions (CSS) program that defined methods for public, stakeholder and agency involvement. The process will also be consistent with corridor-wide commitments to avoid, minimize and mitigate potential effects of impacts associated with future improvements as consistent with the PEIS and subsequent Record of Decision (ROD) anticipated in the spring of 2011.

The purpose of this Launch Phase Technical Summary is to summarize the work elements completed as part of the first phase of the project. This phase included:

- Defining Project Rationale
- Defining the study area
- Defining project , goals, and evaluation criteria
- Establishing the project process and conducting initial outreach activities
- Establishing the existing and future no-build conditions to use as a baseline in analysis
- Defining next steps for alternative development and evaluation

This report is a summary of existing conditions. The report format follows a general summary of topics with a series of appendices with more detailed information.

1.2 Project Rationale

A feasibility study is being performed for SH 9 and US 6 improvements at the I-70 Silverthorne/Dillon interchange to look at the current and future conditions, specifically congestion and mobility issues identified in the PEIS between Interstate 70 and US 6 and State Highway 9 and the surrounding area.

Currently the interstate traffic is not impacted by traffic on US 6 & SH 9, but in the future the arterial traffic problems will compound and negatively influence the traffic **on** the interstate**.** The failure on US 6 and SH 9 in the vicinity of I-70 on and off ramps will reduce the efficiency of the interchange. The 2035 traffic forecasts anticipate eastbound off ramp traffic congestion negatively impacting the interstate through traffic during peak periods (summer Saturday afternoons and other congested periods, especially in the eastbound direction). Failure of the interchange to accommodate future traffic volumes creates a safety concern on I-70.

The rationale of the project is to improve traffic operations on and off the interstate to improve anticipated mobility and safety problems in the future. This feasibility study will assess proposed improvements to the ramp configurations including US 6 lane configurations, SH 9 lane configurations, and I-70 lane configurations to determine what improvements need to be made to accommodate future traffic operations.

The study will review existing conditions and future traffic conditions but will not address the proposed future rail transit alignment, transit stations and park and ride facilities proposed at Silverthorne. Solutions proposed as part of this project will not preclude these improvements at a future time.

This report and the technical appendices provide further details about system linkages, transportation demand and capacity, safety, future development, and inter-modal connectivity.

1.3 Study Area

The I-70 Silverthorne/Dillon interchange is located in Summit County, Colorado within the limits of the Town of Silverthorne and the Town of Dillon. The Interchange involves Interstate 70 (I-70) East/West, U.S. Highway 6 (US 6), south, State Highway 9 (SH 9) to the north, and a network of intersecting local roadways and access points along US 6 and SH 9. SH 9 transitions at the interchange to US 6 south of the interchange.

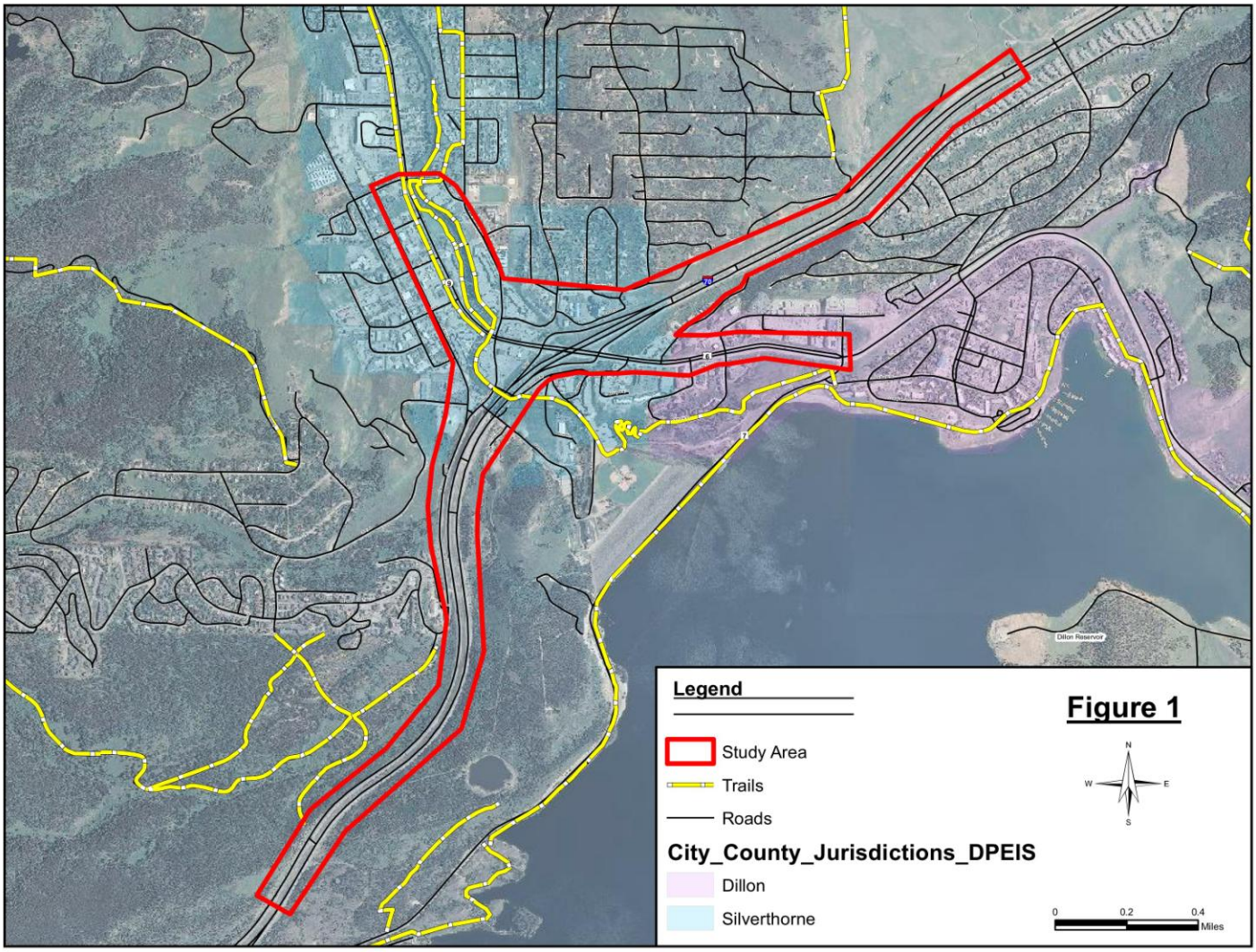
The interchange is located at milepost (MP) 205. The Interstate 70 project study limits extend from MP 203 to 207. The western boundary was set to include the scenic overlook near Frisco and the eastern limit was based on a traffic influence from the ramp set at an estimated 1 mile distance. The project study area limits on SH 9 are the 6th Street intersection to the north and on US 6 are from the interchange to Dillon Dam Road intersection to the south (See Figure 1). The study area boundary is a conservative estimate for potential direct and indirect effects of anticipated improvements. The final boundary was adjusted to respond to comments from the project participants.

The following primary factors were considered to determine the interchange study area limits:

- Safety
- Mobility, Traffic Operations and Congestion
- Planned Improvements to I-70
- Potential Designs and Footprints for I-70 Silverthorne Interchange Improvements
- Community Planning and Land Development
- Bicycle and Pedestrian Facilities and Plans
- Environmental Considerations

Details supporting the selected boundaries of the project study area are presented in Appendix 1 – Study Area Limits Report.

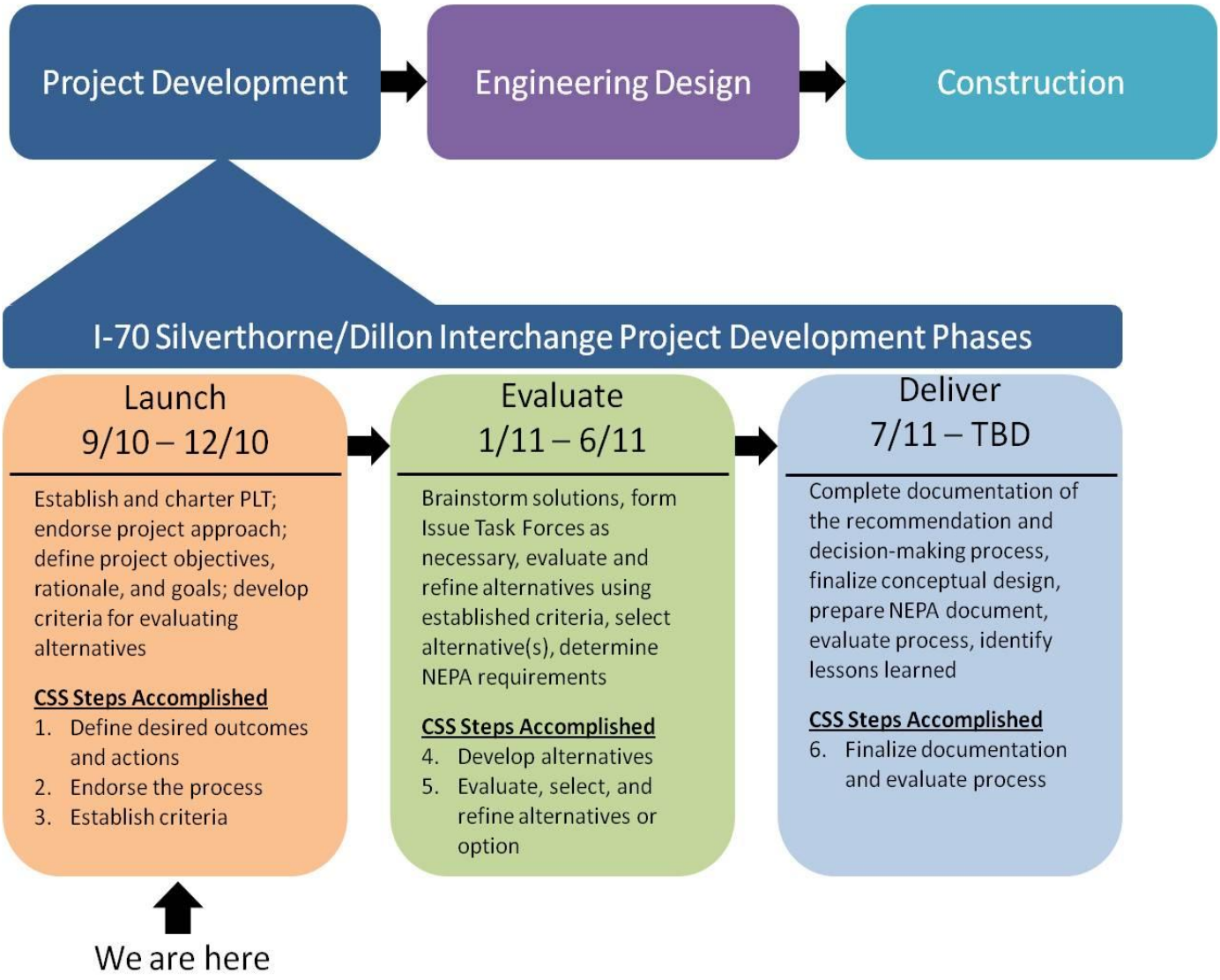
Figure 1 – Study Area Limits



1.4 Project and Process Overview

The project will be implemented in three primary phases of Launch, Evaluate and Deliver (See Figure 2). The existing and no-build conditions are being documented in the Launch Phase.

Figure 2 Three Phases of Project



1.5 Summary of Outreach

Project Leadership Team

A Project Leadership Team (PLT) was formed to help guide decision-making for the project. The PLT was formed in the early stages of the project and has representation from CDOT, Federal Highway Administration FHWA, the Town of Silverthorne, the Town of Dillon, and Summit County, as well as environmental and business interests. The PLT selected a multidisciplinary consultant team, to conduct planning, design, environmental and public involvement activities.

The following roles and responsibilities of the PLT were defined in the initial chartering agreement for this group.

The PLT's primary roles are to:

- Lead and Manage the Project: Using the Scope of Work as a foundation, the PLT will discuss and establish project goals and will identify the actions and decisions needed to reach those goals.

- Champion CSS: The PLT will ensure that the I-70 Mountain Corridor Context Statement, the Core Values, and the 6-Step Process are integrated into the project.

- Enable and Facilitate Decision Making: The PLT will be responsible for making the decisions necessary to keep the project on track.

Membership of the PLT includes a cross section of perspectives including local agencies, CDOT, local business and environmental interests, and the project consultants. The current members of the PLT are:

- CDOT Program Engineer: Scott McDaniel
- CDOT Resident Engineer: Bill Scheuerman
- CDOT Environmental Lead: Wendy Wallach
- CDOT Project Manager: Tyler Weldon
- Federal Highway Administration: Melinda Urban
- Town of Silverthorne: Bill Linfield
- Summit County: Thad Noll
- Town of Dillon: Eric Holgerson
- Business Community: Peggy Long
- Environmental Interests: Steve Swanson
- Consultant Project Manager: R.A. Plummer

During the Launch Phase the PLT met on a monthly basis and accomplished the following outcomes:

1) PLT chartering agreement
2) Established Mission and Goals for the project
3) Defined Alternatives Comparison Criteria

Outreach Meetings

The following provides a summary of the various outreach meetings (including purpose, dates and location) held during the Launch Phase. Meeting minutes, a public meeting summary and a compilation of comments submitted online capture the input provided at these meetings and as result of the overall outreach effort (See Appendix 2 – Public Outreach Summary).

Elected Officials

Purpose of Meetings:

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and CSS process
- Provide information on upcoming public meetings

Meeting Dates:

Board of Summit County Commissioners at CDOT Quarterly Meeting Update at Summit County Courthouse	October 26, 2010
Silverthorne Elected Officials at Silverthorne Town Council Meeting	October 27, 2010
Dillon Elected Officials at Town of Dillon Council Meeting	November 2, 2010

Government Agencies and Non-Governmental Agencies

Purpose of Meetings:

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and CSS process
- Gather feedback on environmental and technical considerations

Meeting Dates:

- Government Agencies. CDOT CTMC office in Golden 1-3pm — October 28, 2010
- Non Governmental Agencies, CDOT CTMC in Golden 1:30 – 3pm — November 8, 2010

Public

Purpose of Meetings:

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and CSS process
- Review a summary of existing conditions including environment, transportation, and land use
- Gather input on the issues to consider in the study
- Review and gather feedback on the alternative comparison criteria

Meeting Dates:

- Business Meeting at Silverthorne Pavilion 5- 7pm — October 28, 2010
- Public Open House Meeting at Silverthorne Pavilion 5-7pm — November 15, 2010

Other Outreach Methods

A project website for the project was created with links to various public meeting and project materials and can be found at:

http://www.coloradodot.info/projects/I70SilverthorneDillon

A public meeting video recap of the launch phase was prepared and a link to the video was provided on the project website.

2. PROJECT GOALS AND CRITERIA

2.1 Goals

The goals for the project developed by the Project Leadership Team are:

- To deliver a project that enhances mobility through collaboration between the Federal Highway Administration (FHWA), CDOT, and local agencies.
- To develop an innovative interchange solution that is of appropriate scale and meets stakeholder needs
- To embrace the I-70 Mountain Corridor Context Sensitive Solutions (CSS) decision-making process
- To allow inclusive and transparent stakeholder involvement
- To improve local traffic flow on US 6 and SH 9 and regional traffic flow on I-70, US 6, and SH 9
- To include, consider, or not preclude future transit improvements -- including an Advanced Guideway System
- To improve safety for motorists, transit riders, cyclists, and pedestrians within the project limits
- To identify, where possible, public and private-sector partnership opportunities
- To define flexible alternatives for interchange phasing, that can be built either in whole or in logical phases
- To avoid, minimize, and mitigate adverse impacts to the local businesses and surrounding environmental resources
- To deliver a project that is economically and physically feasible.
- To incorporate sustainability principles and practices into the decision-making process, design and construction

2.3 Criteria

The project alternative evaluation criteria were tailored from the existing I-70 CSS process and refined by the project team and the PLT with input from the public at the November 15, 2010 public meeting. The following categories of criteria were identified based on the I-70 Mountain Corridor Context Sensitive Solutions (CSS) process:

- Safety
- Mobility and Access
- Healthy Environment
- Sustainability
- Historic Context
- Communities
- Aesthetics

The CSS topics and associated criteria were then customized and sorted into a chronological alternative evaluation sequence featuring a three step screening process:

1. Feasibility Level Evaluation
2. Concept Level Evaluation
3. Detailed Level Evaluation

The feasibility level criteria are questions allowing for yes or no answers with yes being a positive statement about an alternative. The concept level criteria are questions that provide qualitative answers ranging from good to fair to poor. The detailed level criteria are quantitative assessments providing specific quantitative measurements for each alternative that can be compared.

The resulting Alternative Evaluation Criteria from the Launch phase are presented in the following pages in Figure 3.

Figure 3 – Alternatives Evaluation Criteria

Feasibility-Level Evaluation

Criteria	How could we measure it?
Sustainable Operations	
A. Does this alternative preserve future transportation options?	A. (YES/NO)
Safety	
A. Can this idea improve safety?	A. (YES/NO)

Concept-Level Evaluation

Criteria	How could we measure it?
Sustainability	
A. What is the life-cycle cost of the alternative? B. What is the capital cost of this alternative? C. How well can the alternative integrate sustainable construction practices?	A. ● ◐ ○ (GOOD/FAIR/POOR) B. ● ◐ ○ (LOW/MEDIUM/HIGH) C. ● ◐ ○ (GOOD/FAIR/POOR)
Safety	
A. How well does the alternative reduce the number of or improve higher than expected crash locations? B. How well does alternative follow current design standards? C. How well does the alternative maintain a safe work environment for maintenance employees? D. How well does the alternative reduce conflict points?	A. ● ◐ ○ (GOOD/FAIR/POOR) B. ● ◐ ○ (GOOD/FAIR/POOR) C. ● ◐ ○ (GOOD/FAIR/POOR) D. ● ◐ ○ (GOOD/FAIR/POOR)

Detailed-Level Evaluation

Criteria Measures	How could we measure it?
Sustainability	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The sustainability criteria will help determine how well an alternative creates a solution for today that does not diminish resources for future generations.	A. Capital cost of the alternative ($) B. Life-cycle costs of the alternative ($) C. How well can the alternative be phased to meet available funding? (GOOD/FAIR/POOR) D. Length of new roadway requiring more lighting and maintenance
Safety	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The safety criteria will help determine how well an alternative is able to enhance safety in the I-70 Mountain Corridor.	A. Number of improved high-accident locations B. Conflict points between bike/ped and vehicle traffic C. How does the alternative work in inclement weather? (GOOD/FAIR/POOR) D. How many design features does the alternative have that result in more difficult maintenance activities (guardrail, signals, etc.)?

Feasibility-Level Evaluation

Criteria	How could we measure it?
Healthy Environment	
A. Can adverse environmental impacts be avoided, minimized, or mitigated?	A. (YES/NO)
B. Can impacts to irreplaceable natural resources (e.g., wetlands or Gold Medal Fisheries) be avoided?	B. (YES/NO)

Concept-Level Evaluation

Criteria	How could we measure it?
Healthy Environment	
A. How well can adverse environmental impacts be avoided, minimized, or mitigated?	A. ● ◐ ○ (GOOD/FAIR/POOR)
B. How well does the alternative minimize right of way requirements?	B. ● ◐ ○ (GOOD/FAIR/POOR)
C. How well does the alternative address water quality?	C. ● ◐ ○ (GOOD/FAIR/POOR)
D. How well does the alternative avoid, minimize, and mitigate impacts to wetlands?	D. ● ◐ ○ (GOOD/FAIR/POOR)
E. How well does the alternative avoid, minimize, and mitigate impacts to the Gold Medal Fisheries?	E. ● ◐ ○ (GOOD/FAIR/POOR)
F. How well does the alternative avoid, minimize, and mitigate impacts to recreational resources?	F. ● ◐ ○ (GOOD/FAIR/POOR)
G. How effectively can Best Management Practices for water quality be accommodated?	G. ● ◐ ○ (GOOD/FAIR/POOR)

Detailed-Level Evaluation

Criteria Measures	How could we measure it?
Healthy Environment	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The healthy environment criteria will help determine how well an alternative is able to preserve, restore, and enhance natural resources and ecosystems. The healthy environment criteria are a proxy for the overall goal of avoiding, minimizing, and mitigating impacts. For example, a significant increase in acres of new right-of-way impacted indicates that more biological resources may be impacted. These impacts could be mitigated, however, if a solution provides the same access and mobility with significantly fewer acres of new right-of-way. This may be a solution that minimizes or even avoids impacts to biological resources. Some measures, such as hours of LOS C per day, indicate environmental goals for improved noise levels.	<u>Right-of-Way</u> A. Total acres of new right-of-way <u>Biological Resources</u> A. Acres of riparian habitat disturbed <u>Air Quality</u> A. Hours of delay at signalized intersections <u>Noise</u> A. Hours of LOS C per day B. Number of sensitive receptors potentially impacted? <u>Wildlife</u> A. Number of acres of wildlife habitat and fisheries? B. Number of linkage interference zones impacted <u>Wetlands</u> A. Number of acres of wetlands impacted (Straight Creek and Blue River). <u>Recreation Resources</u> A. Number of recreation resource impacts. Including: a. Number of 4(f)properties b. Number of 6f properties

Feasibility-Level Evaluation

Criteria	How could we measure it?
Historic Context	
A. Can impacts to paleontological, historicaland archaeological resources be avoided, minimized, or mitigated?	A. (YES/NO)
Communities	
A. Is the alternative compatible with local land use plans? B. Does the alternative serve as a gateway to the area, providing good identity for local communities? C. Are impacts to community resources irresolvable?	A. (YES/NO) B. (YES/NO) C. (YES/NO)
Mobility and Accessibility	

Concept-Level Evaluation

Criteria	How could we measure it?
Historic Context	
A. How well can impacts to paleontological, historical and archaeological resources be avoided, minimized, or mitigated?	A. ● ◐ ○ (GOOD/FAIR/POOR)
Communities	
A. How compatible is the alternative with local comprehensive plans? B. How well does the alternative limit disproportionate impacts on low-income or minority communities? C. How well does the alternative minimize adverse effects on local businesses? D. How well does the alternative treat residential areas? E. How well does the access provided by the alternative support existing and future economic development.	A. ● ◐ ○ (GOOD/FAIR/POOR) B. ● ◐ ○ (GOOD/FAIR/POOR) C. ● ◐ ○ (GOOD/FAIR/POOR) D. ● ◐ ○ (GOOD/FAIR/POOR)
Mobility and Accessibility	

Detailed-Level Evaluation

Criteria Measures	How could we measure it?
Historic Context	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The historic context criteria will help determine how well an alternative contributes to and is compatible with the human-made past that creates the corridor's sense of place and is the foundation of the corridor's character.	A. Number of paleontological resources impacted B. Number of archaeological resources impacted C. Number of Historic Resources impacted
Communities	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The criteria related to communities will help determine how well an alternative respects the individuality of communities and promotes their viability.	A. How well does this alternative support current and ongoing economic investments in the community? (GOOD/FAIR/POOR) B. Number of businesses directly/indirectly impacted C. Number of residential units and neighborhoods directly/indirectly impacted D. How well are construction impacts minimized? (GOOD/FAIR/POOR) E. How equitable are the effects of the project relative to environmental justice considerations?
Mobility and Accessibility	

Feasibility-Level Evaluation

Criteria	How could we measure it?
A. Does the alternative improve mobility? - Traffic - Bike/Ped - Transit	A. (YES/NO)
B. Is this alternative compatible with the existing and planned transportation system?	B. (YES/NO)
C. Does this alternative provide access for local trips?	C. (YES/NO)
Aesthetics	
No specific aesthetics criteria are used to evaluate alternatives at the feasibility level.	

Concept-Level Evaluation

Criteria	How could we measure it?
A. How well does the alternative improve regional mobility?	A. ● ◐ ○ (GOOD/FAIR/POOR)
B. How well does the alternative address local access traffic?	B. ● ◐ ○ (GOOD/FAIR/POOR)
C. How well does the alternative address cut-through traffic?	C. ● ◐ ○ (GOOD/FAIR/POOR)
D. How well does the alternative promote efficient freight movement?	D. ● ◐ ○ (GOOD/FAIR/POOR)
E. How easy is the interchange to use for non-local drivers?	E. ● ◐ ○ (GOOD/FAIR/POOR)
F. How well does the alternative accommodate existing/future transit?	F. ● ◐ ○ (GOOD/FAIR/POOR)
G. How well does the alternative accommodate bike/ped (multi-modal) mobility?	G. ● ◐ ○ (GOOD/FAIR/POOR)
Aesthetics	
A. How consistent is the alternative with the I-70 CSS Aesthetic Guidance?	A. ● ◐ ○ (GOOD/FAIR/POOR)

Detailed-Level Evaluation

Criteria Measures	How could we measure it?
Detailed-Level Criteria Measures will measure very specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The mobility and accessibility criteria will help determine how well an alternative addresses local, regional, and national travel while providing reliable, efficient interconnectivity between systems and communities.	A. Projected LOS, travel times and vehicle miles travelled for US 6, SH 9 and I-70 B. Projected number of person trips on alternate modes C. Potential for enhanced bike/ped usage? D. How well are Summit Stage/local transit service and stops accommodated? E. How many access points are hindered or eliminated? F. How much shorter are ramp backups than existing or no-build conditions?
Aesthetics	
Detailed-Level Criteria Measures will measure specific items, will be quantitative more than qualitative, and will help further support and answer the criteria questions asked during the Concept-Level Evaluation. The aesthetics criteria will help determine whether an alternative was inspired by the surroundings, protects scenic integrity, and incorporates the context of the I-70 Mountain Corridor.	A. How well does this alternative support the goals of the I-70 CSS Aesthetic Guidance? (GOOD/FAIR/POOR)

3. Implementation of CDOT Environmental Policy and I-70 Mountain Corridor Commitments

3.1 CDOT Environmental Policy

The Mountain Corridor CSS process and the outcome of the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS) provide commitments and environmental mitigation measures applicable to the I-70 Mountain Corridor as projects are planned and implemented along the Corridor.

CDOT's environmental commitment is specifically expressed by the Context Sensitive Solutions (CSS) process developed for the I-70 Mountain Corridor.

During this initial phase, PEIS requirements were reviewed to ensure consistency with the I-70 Mountain Corridor Programmatic Environmental Impact Statement (PEIS). As the Final PEIS and Record of Decision (ROD) are finalized these commitments will need to be reviewed to ensure consistency between the PEIS and any proposed solutions.

3.2 I-70 Mountain Corridor EIS Environmental Commitments and Requirements

Section 3.19 of the Revised Draft PEIS (RDPEIS) provides a mitigation summary for the Mountain Corridor project. A programmatic EIS process is composed of two primary phases of work or "tiers" of analysis. Tier 1 addresses issues raised by a program of improvements at a broad corridor wide level, while Tier 2 provides more in depth analysis of individual program components. Although proposed improvements do not actually qualify as a Tier 2 action, Tier 2 planning does provide relevant context for project planning.

Tier 2 Key excerpts from Section 3.19 include:

> "One role of this document is to provide general mitigation strategies guiding subsequent Tier 2 National Environmental Policy Act (NEPA) processes and implementation of the Preferred Alternative. These mitigation strategies will undergo necessary refinement as a result of public review and comment on the Revised Draft and Final PEIS, and may become specific mitigation commitments in Tier 2 processes."
>
> "Practical measures were taken throughout this process to identify alternatives minimizing environmental and community impacts. These efforts centered on developing alternatives through the coordination of conceptual planning, design, and environmental studies, with the intent of minimizing alternative footprints."
>
> "In Tier 2 NEPA processes, project-specific mitigation is further shaped and implemented with design efforts to further avoid and minimize impacts to the greatest extent possible."

The approach of utilizing the I-70 Mountain Corridor Context Sensitive Solutions process established in the I-70 Mountain Corridor maximizes the benefits of the programmatic and tiered NEPA process and is consistent with CDOT's environmental program and associated commitments.

3.3 Project Environmental Permits and Compliance Requirements

Section 3.19 of the RDPEIS will provide a summary list of all environmental permits and compliance processes by referencing laws and agreements that will be applicable to implementing project on the I-70 Mountain Corridor. The summary of this information is shown in Table 1.

Table 1 – Summary of RDPEIS Environmental Permits and Compliance Requirements

ISSUE	APPLICABLE COMPLIANCE AND PERMITTING REQUIREMENTS REFERENCED IN THE RDPEIS
Engineering Design Criteria	Employ I-70 Mountain Corridor Context Sensitive Solutions design criteria for engineering and aesthetic guidance to further minimize impacts on communities and the environment.
Wildlife Movement and Habitat Fragmentation	Fulfill responsibilities set forth in the ALIVE Memorandum of Understanding (A Landscape level Inventory of Valued Ecosystem components) to be developed in conjunction with the ALIVE committee comprised of city, county, local, and federal representatives. The ALIVE program provides opportunities to address issues related to improving wildlife movement and reducing habitat fragmentation in the Corridor.
Protected Species	Fulfill responsibilities set forth in the Biological Assessment/Biological Opinion developed in conjunction with the U.S. Fish and Wildlife Service (USFWS). Mitigation measures will be developed to offset impacts on species identified in the Biological Report for the White River National Forest and the Arapaho and Roosevelt National Forests.
Wetlands and Waters of the U.S.	Comply with the Section 404(b)(1) guidelines of the Clean Water Act.
Water Quality, Fisheries, Wetlands, and Riparian Areas	Engage stakeholders to continue the work of the Stream and Wetland Ecological Enhancement Program (SWEEP) committee to integrate water resource needs (such as water quality, fisheries, wetlands, and riparian areas) with design elements for construction activities and long-term maintenance and operations of the transportation system.
Stormwater Management	Integrate winter storm management and maintenance procedures into any of the proposed improvements.
Water Quality	Addresses specifically identified Total Maximum Daily Load (TMDL) thresholds and implement the Sediment Control Action Plans developed specifically for Straight Creek to identify methods to control the existing transport of winter sanding materials. Develop Sediment Action Control Plans for other Corridor areas such as the upper reaches of Clear Creek.
Construction Disruption	Develop information systems (such as advertising campaigns to support local businesses, signage with hours of operation, and detour plans) to inform affected communities, I-70 travelers, businesses, and homeowners about construction activities and schedules.

4. EXISTING AND FUTURE NO BUILD LAND USE AND TRANSPORTATION CONDITIONS

A series of technical reports presented in the Appendices provide the basis for many of the following discussions. Each technical report is cited where applicable.

4.1 Land Use

The project study area includes the jurisdictional areas of Summit County, the Town of Silverthorne (primarily northwest of the I-70 interchange) and the Town of Dillon (southeast of the Interchange). Commercial, retail, food and lodging uses are located along either side of SH 9 in Silverthorne (See Figure 4). Commercial and retail uses including restaurant, hotels, grocery and retail shopping have developed north of US 6 in Dillon. A variety of residential uses exist within and near the study area. Residential densities of up to 25 units per acre can be found west of Silverthorne in portions of the Wildernest area. Moderate density single-family and multi-family residential neighborhoods, along with school and church uses, are located north of US 6 in Dillon Valley. These land uses reflect the potential for community sensitivity in terms of private property acquisition (full and partial takes) and zoning requirements and nuisance issues (noise, dust, etc).

Various Summit County and Municipal planning documents assess existing land use and development patterns and project future land use development in the project study area. In Silverthorne, Planned Unit Development zoning designations such as the “Gateway”, Mixed Use and Town Core in the study area encourage flexibility and creativity in development and a shift from factory outlet retail development patterns to a more intensive, higher density mix of uses in the future.

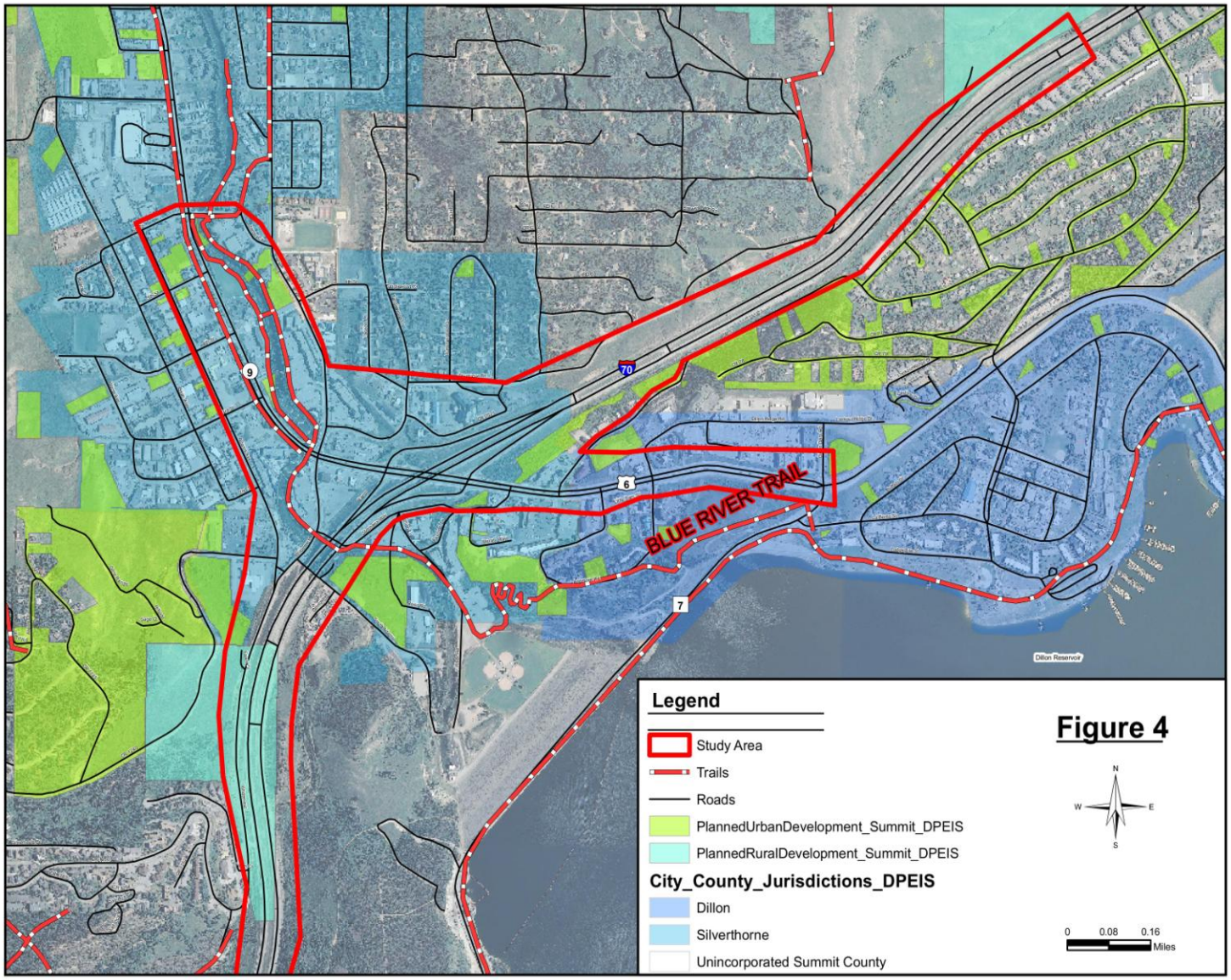
Silverthorne’s existing River Front Mixed Use zoning district promotes the Blue River as the central image of the Town with a variety of mixed uses along the river including commercial, entertainment, residential, public, and recreation uses. Three “Design Districts” exist within and near the study area. Higher densities, mixed uses, and pedestrian friendly development are encouraged.

In Dillon, the study area is within the Dillon Town Center, which has become the focus of a major revitalization effort guided by the Dillon Economic Revitalization Advisory Committee.

Land development since 1970 has been substantial. In recent years, growth has slowed down. However, the County and both Towns anticipate considerable development within and near the study area.

Appendix 3 – Existing Land Use Technical Report provides additional details and land use maps.

Figure 4 – Existing Land Use



4.2 Traffic Operations

Traffic models of the existing conditions and 2035 no-build conditions have been developed for the study area for SH 9, US 6 and I-70. The models were created using VISSIM traffic simulation software. The no-build 2035 VISSIM model is based on future traffic forecasts, recent Town of Silverthorne traffic reports and the I-70 travel demand model developed for the RDPEIS and local land use. The conclusions of the model have confirmed the work previously done for the RDPEIS Travel Demand Technical Report, August 2010.

Future travel demands were developed using a variety of sources. Existing traffic counts conducted in August 2010 were the starting point for all future-year travel forecasts. These counts and the trip patterns they suggest provided the base over which the more generalized demand growth rates from the RDPEIS model were then overlaid on these observed patterns. This methodology accounts for both local travel patterns and constraints while still being consistent with the overall macro-level growth patterns suggested in the RDPEIS model. In March 2007 Felsburg Holt & Ullevig (FHU) conducted a traffic study for the Town of Silverthorne to assess the impact of proposed new commercial projects near the existing factory shops at the interchange. The 2030 forecasts from the FHU study are nearly identical with those reported for 2035 in this study.

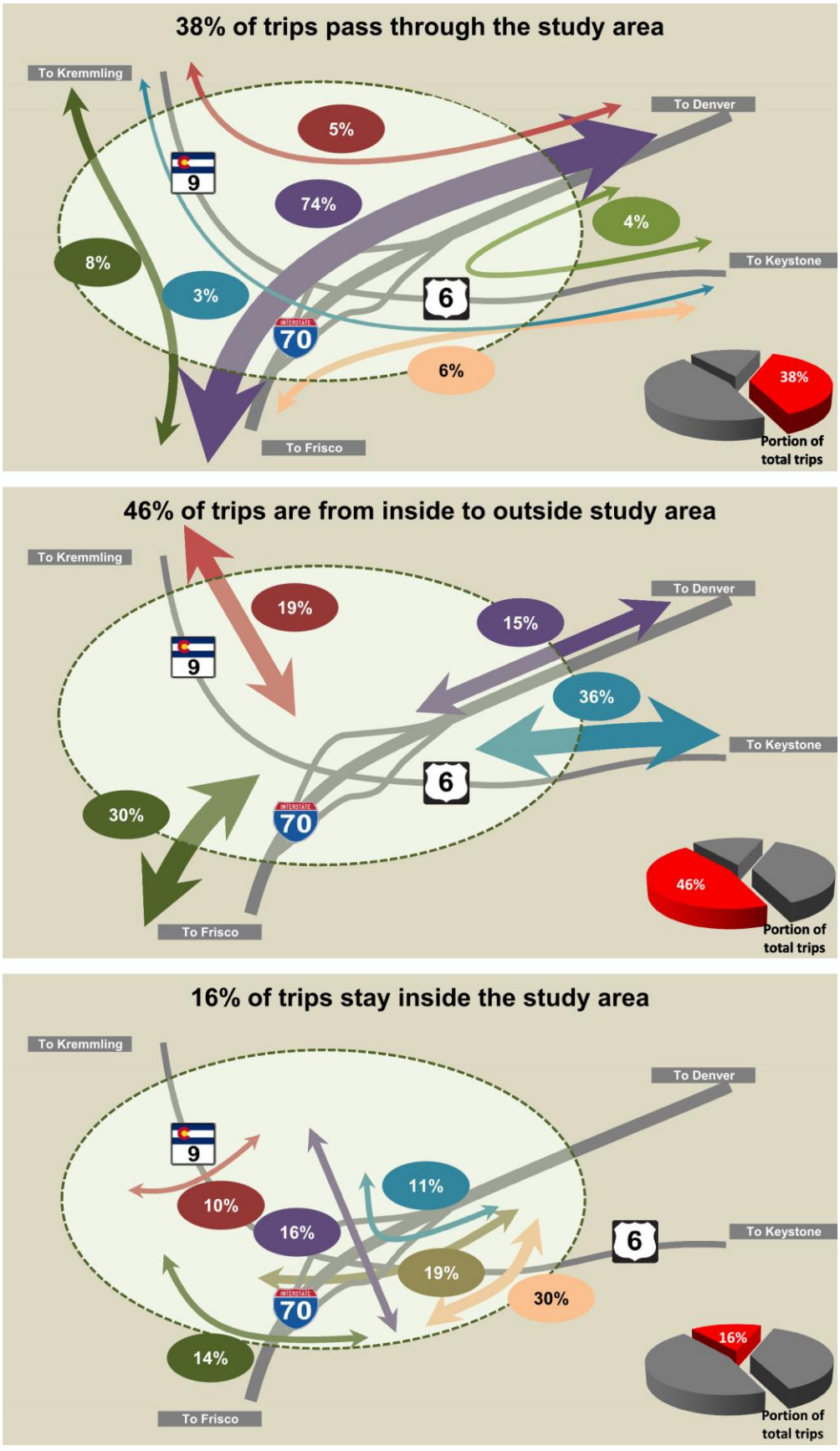
Existing Condition Data

Week-long, 24-hour a day traffic counts were performed on each of the four interchange ramps and on US 6 and SH 9, both directions, just outside the interchange. These counts were conducted during the last full week of August 2010. During the same week, turning movement counts were conducted at all study intersections in the study area. Existing signal timing was obtained from CDOT Region 1 Traffic.

Traffic data from automatic traffic recorders (ATR) located on I-70 at the Eisenhower Tunnel and on SH 9 and US 6, north and south of Silverthorne/Dillon respectively was also obtained. This data was used to determine the demand for the I-70 mainline lanes as well as used to determine overall travel demand patterns and daily traffic variations.

Existing traffic origins and destinations (OD) were estimated based on the data collected. OD information is a necessary input into the VISSIM modeling process. Figure 5 depicts the OD demands for the traffic passing through the study area, traffic with either an origin or a destination within the study area, as well as trips internal to the study area.

Figure 5 – Existing (2010) Origin-Destination Travel Patterns



Forecast Traffic Conditions

The travel demand model for the I-70 RDPEIS was made available to AECOM by CDOT and JF Sato. The RDPEIS travel demand forecasts along with the existing traffic data collected formed the primary sources of data used in the development of future-year forecasts. These primary sources of information were further validated by reviewing local land use plans in the area, and other traffic studies, to confirm the order of magnitude consistency between the various sources of information. The resulting traffic growth at study area boundaries between 2010 and 2035 is depicted in Table 2.

Table 2 - Traffic Growth Summary

Traffic Area	2010-2035 Growth in Traffic
SH 9, north of study area	74%
Silverthorne, east of study area	22%
Silverthorne, west of study area	53%
Dillon, east of study area	37%
Dillon, west of study area	15%
US 6, south of study area	4%
I-70, east of study area	37%
I-70, west of study area	34%

Using overall growth patterns from the RDPEIS Travel Demand Model and the Origin-Destination of local trips observed in the existing traffic counts, the 2035 Saturday afternoon in August traffic forecasts developed.

VISSIM traffic simulation models were built and calibrated to existing conditions then used to assess traffic level-of-service (LOS) for the forecast 2035 traffic conditions. The time analyzed was a Saturday afternoon in August. This time was chosen as it has the heaviest overall travel demand. The results of this analysis are shown in Figure 6.

Definitions for LOS for signalized intersections and freeways are as follows:

Signalized Intersections

LOS for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic, and incidents. Specifically, LOS criteria for traffic signals are stated in terms of the average control delay per vehicle, typically for a 15-min analysis period.

LOS are defined to represent reasonable ranges in control delay.

> LOS A describes operations with low control delay, up to 10 s/veh. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
>
> LOS B describes operations with control delay greater than 10 and up to 20 s/veh. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

LOS C describes operations with control delay greater than 20 and up to 35 s/veh. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

LOS D describes operations with control delay greater than 35 and up to 55 s/veh. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

LOS E describes operations with control delay greater than 55 and up to 80 s/veh. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

LOS F describes operations with control delay in excess of 80 s/veh. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

Freeways

Although speed is a major concern of drivers as related to service quality, freedom to maneuver within the traffic stream and proximity to other vehicles are equally noticeable concerns. These qualities are related to the density of the traffic stream. Unlike speed, density increases as flow increases up to capacity, resulting in a measure of effectiveness that is sensitive to a broad range of flows.

The LOS are defined to represent reasonable ranges in the three critical flow variables: speed, density, and flow rate.

LOS A describes free-flow operations. Free-flow speeds (FFS) prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.

LOS B represents reasonably free flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.

LOS C provides for flow with speeds at or near the FFS of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to form behind any significant blockage.

LOS D is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.

At its highest density value, LOS E describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speeds that still exceed 49 mi/h. Any disruption of

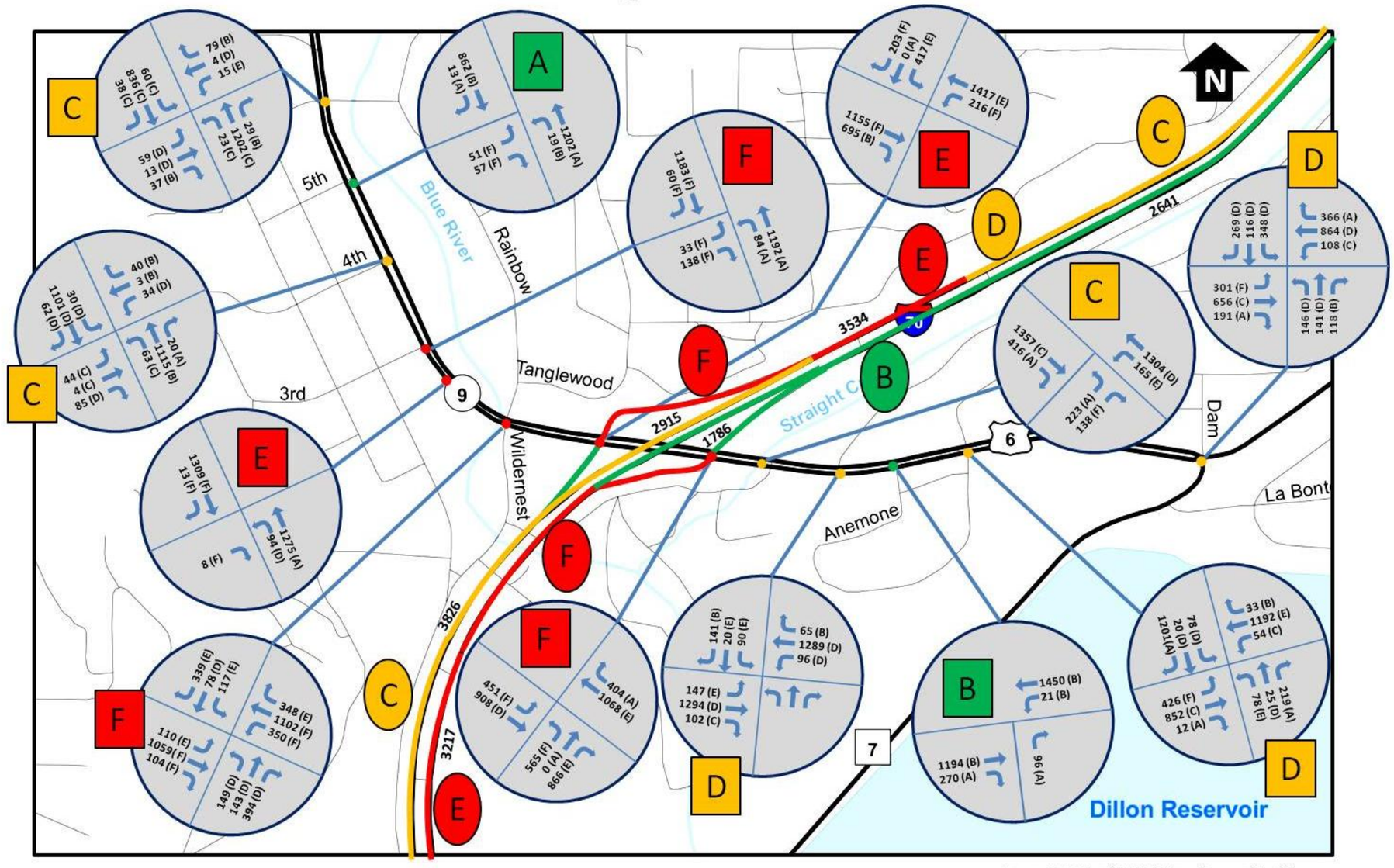
the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.

LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. Breakdowns occur for a number of reasons:

- Traffic incidents can cause a temporary reduction in the capacity of a short segment, so that the number of vehicles arriving at the point is greater than the number of vehicles that can move through it.
- Points of recurring congestion, such as merge or weaving segments and lane drops, experience very high demand in which the number of vehicles arriving is greater than the number of vehicles discharged.
- In forecasting situations, the projected peak-hour (or other) flow rate can exceed the estimated capacity of the location.

Source: *2000 Highway Capacity Manual*

Figure 6 - 2035 August Saturday Peak Hour Levels-of-Service



Source: AECOM and I-70 PEIS Travel Demand Model

Legend

00 (X) - Peak Hour Turning Movement Volume (Peak Hour Turning Movement Level of Service)

C - Overall Intersection LOS B - Freeway LOS

Summary of Traffic Model Analysis

The building and calibration of the traffic simulation models for 2035 no build conditions indicated the following:

Existing 2010

- The WB to NB, I-70 to SH 9 movement from the east results in weaving vehicles trying to get over to make a left at Wildernest Road whereas the movement from the west has much more room to move over.

- Split-phasing (minor street approaches each with a dedicated signal phase) of the intersections along US 6 and SH 9 reduces signal coordination and constrains capacity. These constraints are particularly noticeable in the future. Split phasing is currently being used primarily due to skewed intersection alignments, the limited width of cross street approaches and lane balancing from one side of the intersection to the other. In addition, growth in pedestrian demand will only exacerbate these conditions as split phasing and heavy pedestrian demand will require a significant share of green time being given to the side street, at the detriment of US 6 and SH 9 through mobility.

- Closely spaced driveways and signalized minor street accesses are contributing to congestion. Even with removal of split phasing, the number of accesses may hinder providing optimal signal progression as well as adequately providing queue storage for left turning vehicles.

Future 2035

Interchange operations fail by 2035 with conditions forecast to cause traffic to significantly back onto I-70 in the east bound direction without interchange improvements. The current traffic operations do not allow for enough traffic to exit EB heading towards Dillon causing back-ups onto the Interstate.

- To accommodate future travel demand, EB I-70 should be widened to 3-lanes beginning west of the interchange and continuing over the US 6/ SH 9 bridge to the east of the interchange.

- Overall, there is a higher expected growth in traffic on I-70 west of the interchange. This is largely because Silverthorne and Dillon are much more a part of the local communities and industries to the west, than they are a part of the communities to the east towards the EJMT Tunnels and Denver. Improvements to the interchange therefore should consider that growth in travel demand to and from the west is expected to be the greatest.

- The future travel demand shows significant growth north of Silverthorne. This will generate heavy right turn movements from southbound SH 9 to westbound I-70, especially during the morning and mid-day hours. This increasing local demand peaks at times other than during the weekend afternoon analysis period.

Appendix 4 - Existing and Future No Action Traffic Technical Report provides additional details.

4.3 Crash History

A crash analysis was prepared to assess the magnitude and nature of the safety problems within the vicinity of the Silverthorne/Dillon Interchange. The crash analysis is based on five years of crash history.

The conclusions of the analysis of crash history from 2002 to 2006 indicated the following:

I-70

- Based on a Safety Performance Functions (SPF) analysis by CDOT, the 6-mile segment of I-70 centered on the interchange exhibits overall accident frequency that is higher than expected when compared to other mountainous 4-lane interstate highways throughout the state. Of particular note is that the total crash frequency to the west of the Silverthorne/Dillon interchange is considerably higher than east of the interchange. Figure 7 depicts this information graphically.

- Over 46% of crashes in the 6 miles of I-70 analyzed, occurred within 1-mile of the interchange. Given that the overall frequency in the 6-miles is higher than the expected mean, the number of the crashes within 1-mile of the interchange further compounds the magnitude of the influence the interchange is having on the number of crashes. Improvements to the on ramps and off-ramps and merge lanes may improve safety.

- Adverse weather is a significant issue with 57% of crashes occurring during a weather condition. See Figure 8. Maintaining median barriers, roadside clear zones, and pavement conditions may improve safety. Other geometric conditions such as narrow shoulders, curves on bridges, and high differential between speeds at on-ramp and off-ramp locations further exacerbate the difficulty to drive safely during a weather condition.

- Vehicle speed was a contributing factor for 30% of crashes on I-70. Improvements to speed advisory information, roadside clear zones and shoulder buffer areas may improve safety.

Figure 7 – I-70 Safety Performance Function Graph

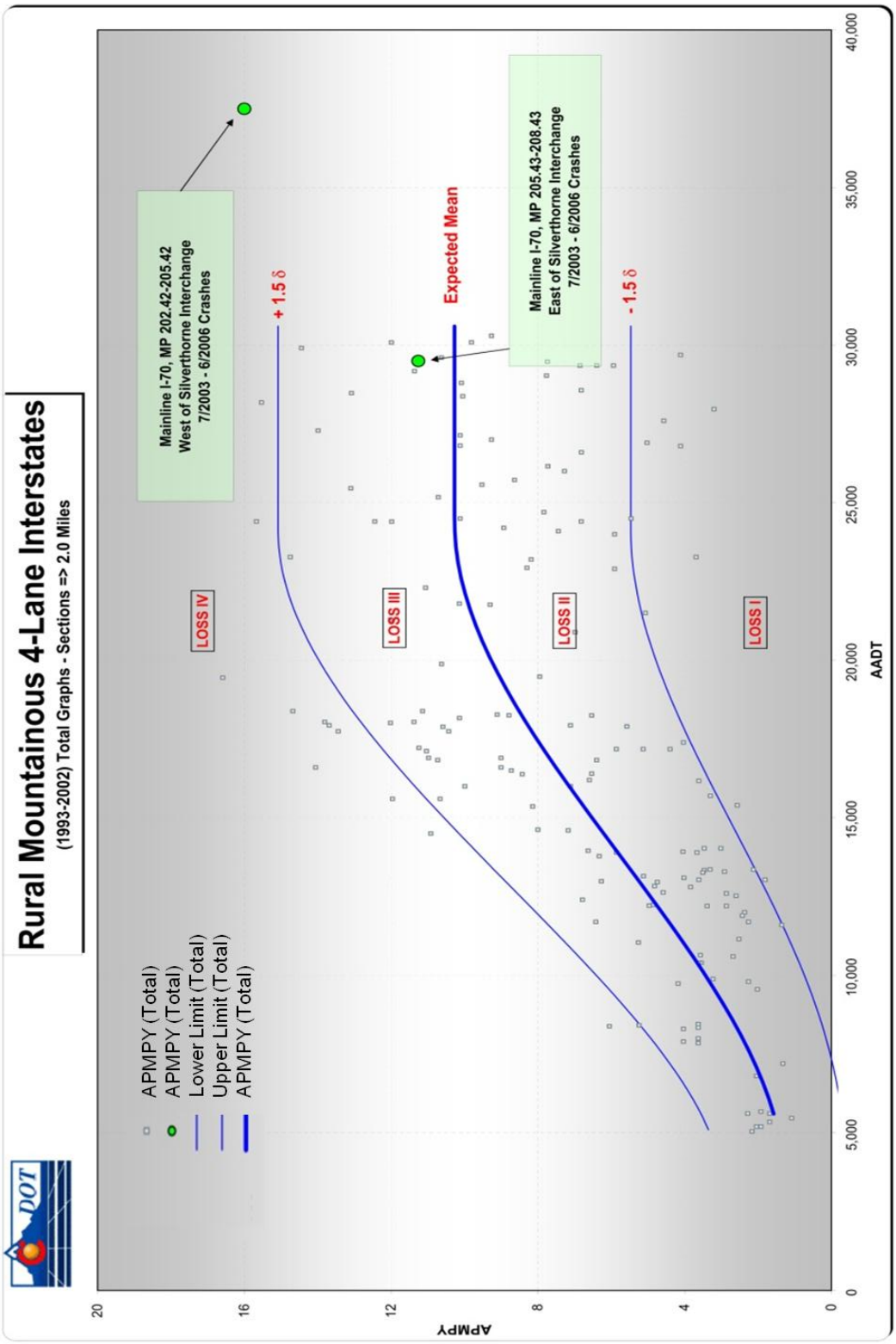
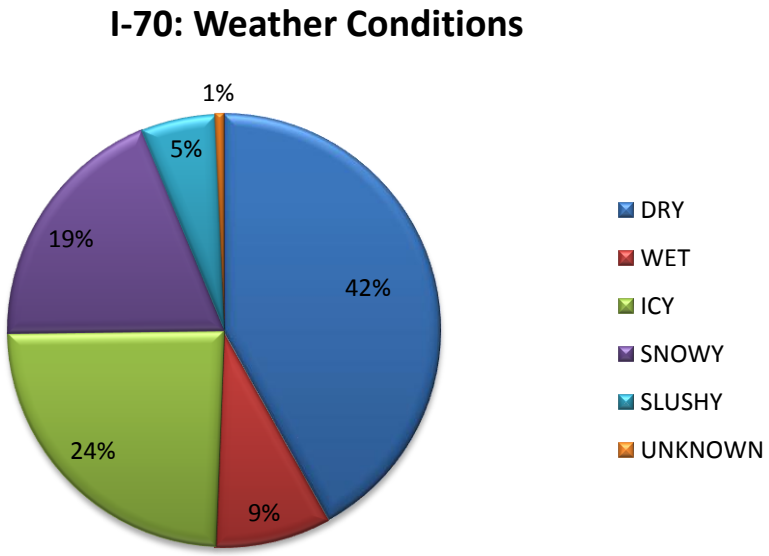


Figure 8 – Crashes Relative to Weather Conditions



US 6 and SH 9

- In general, higher crash rates occurred near the Silverthorne/Dillon interchange ramps. Reduction of congestion and improved interchange intersections may improve safety.
- Adverse weather conditions contributed to 44% of crashes on US 6. Improved intersection geometry including turn-lane storage, sight distance and approach grades at start/stop areas near intersections may improve safety.
- Compared to crashes on US 6, a higher percentage of crashes occurred at driveways on SH 9 with a higher percentage of broadside and turning crashes. Improvements to access control, sight distance and weaving between intersections may improve safety.

Appendix 5 – Crash History Technical Report provides additional details.

4.4 Roadway Geometry

In summary, the following roadway geometry conditions were observed:

- The 12’ through lanes provided on I-70 and the State Highways, are of sufficient width. The bridges over US 6 and SH 9 currently have only two through lanes with 3 lanes on each end of the interchange, counting the auxiliary lanes on each end of the on ramps.
- Both WB and EB have an auxiliary lane that are not through lanes and have only 6’ shoulders.
- Both On-ramps have yield conditions and substandard merge lengths to be considered 2 lane on-ramps.
- The WB on-ramp has a very steep grade at 6.52%.
- Turn lanes on the arterial should be widened to a 12’ standard.
- Sufficient width exists in several locations to restripe the road and meet lane and shoulder width guidelines.

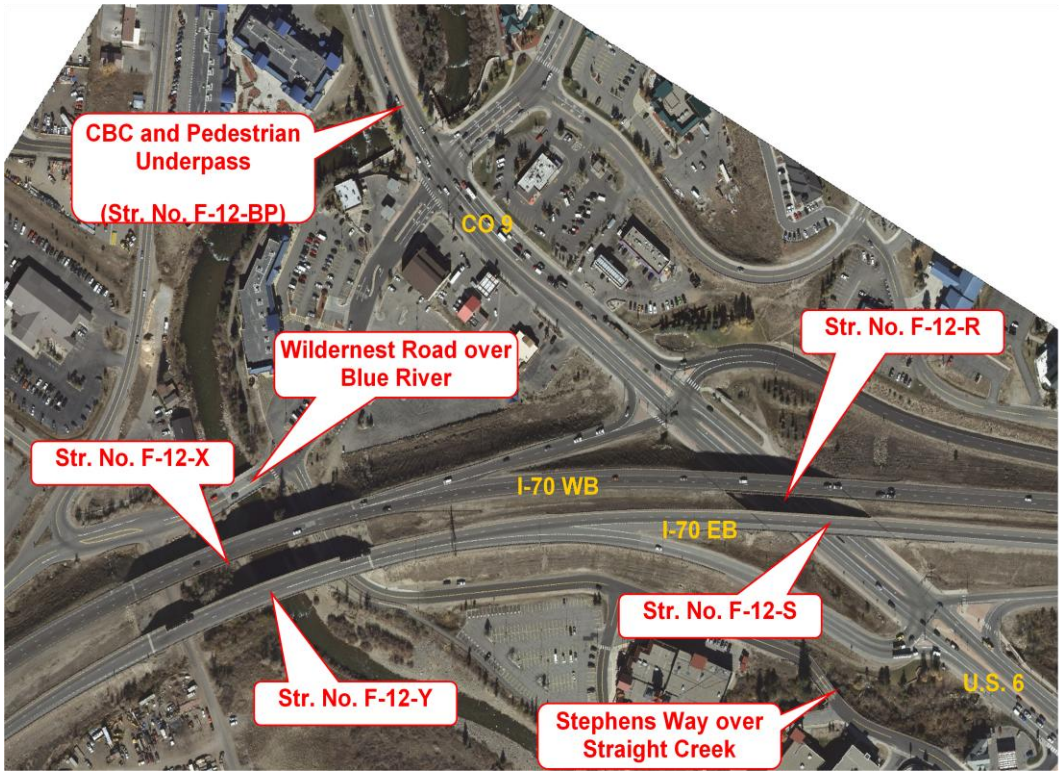
- Several turn lane widths were substandard on local road approaches. Those impacting the state highways should be upgraded with this project.
- Horizontal sight distance on local roads should be reviewed if the project impacts those areas.

Appendix 6 –Existing Roadway Geometry Technical Report provides additional details.

4.5 Structures

Overall the seven existing structures within the study area are structurally sufficient (See Figure 9 and Table 9). Bridges maintained by CDOT have a structure number and are inspected biannually in accordance with FHWA requirements. These inspections yield a formalized report that documents key bridge properties, structural condition, problem areas, recommended maintenance, and an overall rating known as the Sufficiency Rating. The Sufficiency Rating is a number between 0 and 100 that allows one to gauge the overall condition of a bridge with a single data point. None of the bridges have a sufficiency rating below 80, which means none of the bridge components have deteriorated to the point that capacity (e.g. strength) has been compromised.

Figure 9 – Location of Seven Existing Structures



While the sufficiency ratings of the structures are high, four of the six bridges are classified as functionally obsolete. Functionally obsolete (FO) is a term used by the National Bridge inventory to classify bridges where the size or geometric clearances of the bridges is less than fully adequate. Some of the functional shortcomings of the four functionally obsolete bridges could be mitigated relatively easily; modifying inadequate approach railing is one example of an easy repair. Other functional violations are much harder to address in a retrofit. The inadequate vertical/lateral clearances are one example of difficult repair. None of the structures were classified as structurally deficient. Structurally deficient is a term used by National Bridge Inventory to classify bridges where the structural condition of capacity of the bridges is less than fully adequate.

Table 3 – Structure Summary

Structure	Sufficiency Rating	Functionally Obsolete
WB I-70 over CO 9 (Str. No. F-12-R)	92.9	**Yes**
EB I-70 over CO 9 (Str. No. F-12-S)	93.3	**Yes**
WB I-70 over the Blue River, Stephens Way, and South Adams Avenue (Str. No. F-12-X)	84.7	**No**
EB I-70 over the Blue River, Stephens Way, and South Adams Avenue (Str. No. F-12-Y)	87.9	**Yes**
CBC and Underpass beneath CO 9 (Str. No. F-12-BP)	65.0	**N/A for CBC's**
Wildernest Road over the Blue River	83.3	**No**
Stephens Way over Straight Creek	80.2	**Yes**

A low sufficiency rating of the Concrete Box Culvert structure that carries SH 9 over the Blue River is due to the seepage and cracking observed in the cells of the original box structure. Even with this considered the resulting rating is not particularly low and does not call for any immediate replacement. Consideration of the outstanding condition of the new pedestrian underpass, decorative stone veneer, and associated site work further bolsters this conclusion.

Appendix 7 – Existing Structures Technical Report provides additional details.

4.6 Drainage

The seven major drainage structures in the study area function very well.

The construction of the Dillon Reservoir has vastly improved flooding conditions along the Blue River through the Town of Silverthorne. The limits of the 100-year floodplain are mostly confined to the river section. Some overtopping of the banks of Straight Creek occurs in isolated areas because it is not controlled by Dillon Reservoir.

According to the FEMA Flood Insurance Study water surface profiles, none of the structures are overtopped by the 100-year storm event. The majority of the Blue River and Straight Creek 100-year floodplains are considered to be part of the floodway. Encroachment into the floodplain with any new construction is not permitted by FEMA. This limitation will need to be considered during evaluation of interchange improvement alternatives. The location of existing minor drainage structures and pedestrian bridges will also need to be considered during the alternative evaluation process. Where possible existing drainage patterns and pedestrian movements should be maintained or improved.

There are existing detention ponds or water quality features at the WB off ramp and existing bridge drains that are capturing some of the highway runoff. Potential locations for additional water quality structures should also be considered in the different alternatives, to compensate for any additional pavement surface that may need to be treated before flows are released into the Blue River or Straight Creek.

Appendix 8 – Existing Drainage Technical Report provides additional details.

4.7 Transit Operations

The major transit provider located in the project study area is Summit Stage who initiated operation of ski-bus service in 1977. With the increasing demand for intercity and year-round transit service, the County assumed operation of Summit Stage in 1989. Summit Stage provides free bus service between Summit County communities and ski resort areas with major service hubs located in Silverthorne, Frisco, and Breckenridge. The Frisco Station serves as the central hub for the transit operation. Summit Stage operates both Town-to-Town and Residential fixed-routes as indicated below.

Four fixed-routes operate within the project study area including the Silverthorne (S), the Silverthorne-Frisco (S-F), the Wildernest- Silverthorne (W-S) and the Silverthorne-Dillon-Keystone (S-D-K) routes. See Figure 10. Local bus stops are provided throughout the study area along existing bus routes. Bus stop intervals are approximately every two blocks.

Per Summit Stage staff, the S-D-K route is currently operating at capacity, both in terms of ridership capacity and the ability to maintain headways and on-time performance for current routing configuration. Additional stops are not being considered for this route at this time. Summit Stage staff is currently evaluating the option

of creating additional circulator routes that would serve off-highway areas and connect to the mainline S-D-K route to reduce out-of-direction travel and minimize travel time for the S-D-K route.

Bus stops are located along SH 9 and SH 6. The Silverthorne Dillon Keystone (S-D-K)route has stops along SH 6 in the vicinity of the interchange. The heavily used stops despite the lack of pedestrian facilities are located at the 1st Bank Stop NB and an Office Max Stop at Litter Beaver Trail SB. The local Silverthorne (S) route does not have any stops on SH 9 in the vicinity of the interchange. The route turns off of SH 9 to the transfer station and runs along Adams Avenue and then to Stevens Way avoiding the interchange.

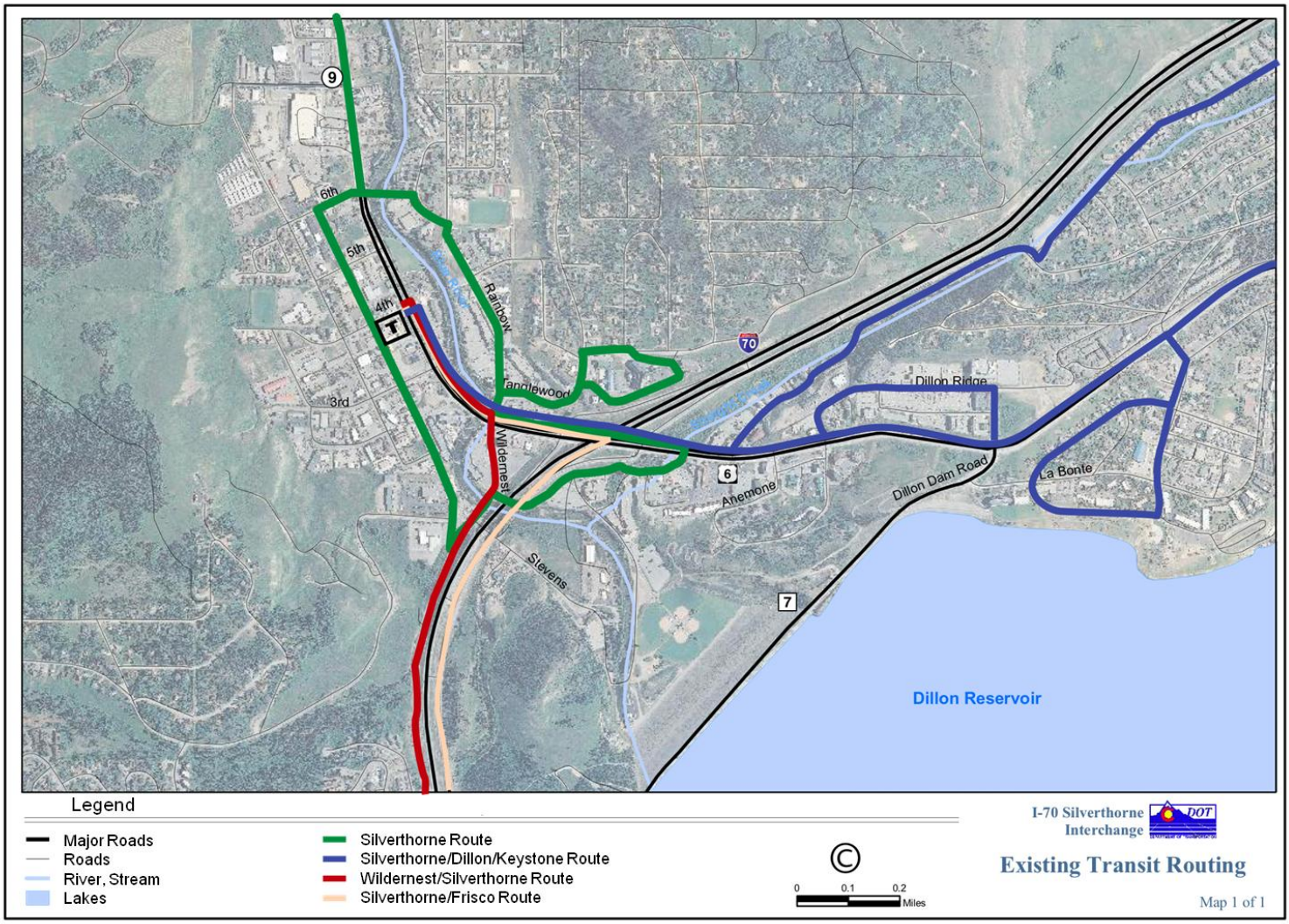
The Silverthorne Transit Station is located within the study area on the corner of Fourth Street and Adams Avenue and is the hub for routes to Frisco, Dillon, Dillon Valley, Keystone, Silverthorne and Wildernest. At the Silverthorne Transfer Station a public parking area containing 24 standard spaces and one van accessible space, along with a restroom facility, is adjacent to the site across Adams Avenue. This facility serves as a park and ride for the Summit Stage and public parking for the Town of Silverthorne community (Town of Silverthorne, 2008).

Summit Stage fixed-route service is complemented by year-round paratransit service to residents and visitors. Paratransit service is available to anyone with a disability to travel anywhere within Summit County. To obtain transportation on the paratransit system, a rider must call at least 24 hours before transportation is needed to make reservations. Reservations are accepted on a first-come, first-served basis (Summit Stage, 2010a).

Observations in the interchange vicinity include:

- None of the Summit Stage routes use the I-70/Silverthorne Interchange to head east of the interchange along I-70CDOT guidelines for on-road vs. off-road accommodation of bicycles should be reviewed
- The 1st Bank Stop along the S-D-K route on Highway 6 is heavily used despite the lack of pedestrian facilities serving the stop and adjoining destinations.
- Ridership on the Summit Stage system is substantially higher during the winter season compared to the summer season due to the higher demand to access the area during the ski season and the greater demand for employee travel to and from residential areas and resort employment.
- The S-D-K route is currently operating at capacity, both in terms of ridership capacity for the operating vehicle type, and the ability to retain headways and on-time performance for current routing configuration. Additional stops are not being considered for this route at this time. Summit Stage staff is currently evaluating the option of creating additional circulator routes that would serve off-highway areas and connect to the mainline S-D-K route to reduce out-of-direction travel and minimize travel time for the S-D-K route.

Figure 10 – Transit Routes



Future interchange improvements should include intermodal connectivity features that protect or enhance transit stop accessibility, transit mobility, and the safety of riders as they walk across intersections and driveways and travel along roadways in the study area.

4.8 Pedestrian and Bicycle

There are several key recreational pedestrian and bike facilities located within the project study area. See Figure 11. The Summit County Recreational Trail runs along Dillon Dam Road and adjacent to Lake Dillon through the Dillon Town Center. This trail links to the Silverthorne Blue River Trail near Dillon Dam Road, creating a continuous path through the core of Silverthorne. The bike path in Silverthorne follows Stevens Way and avoids the vicinity of the interchange until it splits at the Wildernest Road intersection heading under SH 9 along the river or north along the west buffered edge of SH 9. Additionally, SH 9 is a designated bike route and multi-use route and is part of the "Transamerica Bicycle Trail."

The majority of Summit County, Silverthorne and Dillon bike and pedestrian trail improvements are recreational facilities that link the communities, provide access between jurisdictions and create access to Dillon Lake. These facilities bypass existing retail and commercial uses found within Dillon and Silverthorne.

The sidewalk network runs on both sides of US 6 and SH 9 through the interchange. There are crossings at all interchange ramps and side streets.

There are a set of informal trails located in the interchange facility. One such path comes down from the hotels above the WB off ramp, cross the ramp lanes and joins with the sidewalk network. Another informal trail is along US 6 form Little Beaver trail to the Dillon ridge shopping center.

Observations in the interchange vicinity include:

- Sidewalk ramps need to be upgraded to include truncated domes.
- CDOT guidelines for on-road vs. off-road accommodation of bicycles should be reviewed
- Poor signing of pedestrian underpass at SH 9 and Wildernest Road
- Conflict points a free flow off ramps with pedestrian movements

A variety of plans and policies protect local pedestrian and bike routes.

In 2001, Silverthorne adopted a Parks, Trails, and Open Space Master Plan. This plan identified a number goals specifically related to trail and pedestrian facilities, including among others, the following:

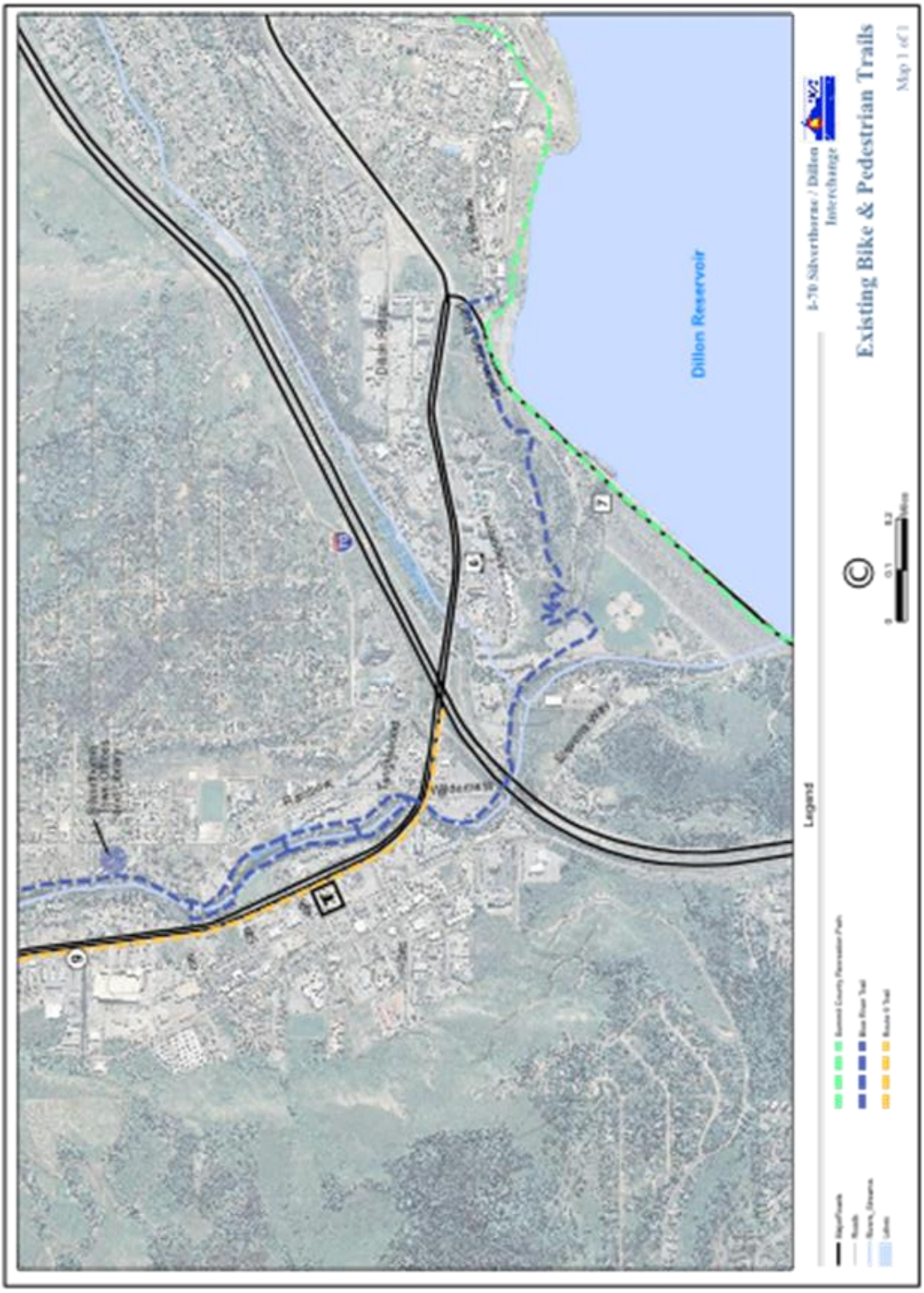
- Develop an integrated network of multi-use trails
- Develop a variety of trail length and experiences
- Grade separate trails from street traffic using safe underpasses and overpasses traversing SH 9 and other traffic routes
- Link the trail network system into town center and regional trails
- Develop an on-street bikeway and sidewalk system that ties to the trail network

The Town of Silverthorne has designated the Town Core area in the study area. This core area around the Town pavilion and river way will anticipate high pedestrian movements across SH 9 in the area.

The County's Upper Blue River Master Plan (2010) identifies several policies relevant to bike and pedestrian facilities located within or adjacent to the project study area.

Additional information about plans and policies and the extent and condition of sidewalks is provided in Appendix 10 – Pedestrian and Bicycle Facilities Technical Report.

Figure 11 – Existing Bike and Pedestrian Trails



4.9 Incident Management

Incident management involves recurring and non-recurring disruptions to traffic due to crashes, weather, or other causes. The goals of incident management are to detect, verify and reduce the response time and the time required clearing the incident as well as using traveler information to suggest alternate routes for traffic during the incident. Intelligent transportation systems consist of the application of computers, electronics, communications, and data management used for the purpose of effectively and efficiently managing the transportation system to improve transportation mobility and safety and to provide information to travelers.

CDOT's report entitled: "Regional Intelligent Transportation Systems Architecture for Southeastern Colorado, 2006" describes the ITS elements, their relationship to each other, the roles and responsibilities of the stakeholders and a systematic approach for implementation of intelligent transportation systems in Colorado Department of Transportation Region 1 (and Region 2) over the next 10 years. The following discussions are based on statements found in this document.

The incident management systems in place on I-70 in the vicinity of the interchange are substantial and sophisticated. At the I-70 tunnels alone, the following incident management capabilities/systems are in operation:

- Traffic Data Collection
- Collect Traffic Surveillance
- Traffic Maintenance
- Traffic Management Center (TMC) Freeway Management
- TMC Traffic Information Dissemination
- TMC Incident Detection
- TMC Incident Dispatch Coordination/Communication
- TMC Reversible Lane Management
- TMC Speed Monitoring
- Barrier System Management
- Safeguard System Management
- TMC Evacuation Support

At the I-70 Silverthorne/Dillon interchange on ramp gates are used to close access to I-70 during certain incidents and conditions.

Based on the strategic objectives and the critical issues in the ITS report, a program of ITS strategic projects is recommended. Two projects of statewide significance related to the interchange are identified:

- Install fiber-optic cable along I-70 from Vail to Frisco including all equipment, connections with lateral devices and C2C with CSP and local jurisdictions.
- Complete the I-70 Mountain Corridor Incident Management system improvements from Vail to Clear Creek County, including automated pass maintenance and closure for Loveland Pass and Vail Pass and select freeway management system elements.

One project of regional significance related to the interchange is identified:

- Implement transit management and multi-modal coordination in Summit County;

Based on consultations with CDOT, the following key incident management issues exist within the study area:s

- Road closure gates are located on the interchange on ramps and are used when I-70 is closed. The Town of Silverthorne manages these gates. CDOT manages the gates on I-70.
- CDOT manages traffic congestion on I-70 and congested related stops in the tunnels by pulsing traffic through the Eisenhower/Johnson Memorial (eastbound) tunnel east of the interchange. Traffic

backups from this incident management activity and other I-70 incidents (in either direction) can reach the interchange creating congestion on the I-70 off ramps, along SH 9 and US 6, and on adjacent roadways. The Town of Silverthorne provides truck parking areas under these conditions.

- Truck chain-up areas are located along I-70 east of the interchange. The chain-up areas exist within and near the existing eastbound on-ramp.

4.10 Maintenance

Based on consultations with CDOT, the following key maintenance issues exist within the study area:

- Ice forms and persists under the I-70 bridges
- Plow trucks headed to the CDOT maintenance yard are delayed when the left turn lane at Wildernest Road is congested
- CDOT traffic operations personnel maintain interchange area traffic signals, nearby variable message signs (VMS), and other signs, and provide services as part of the bridge maintenance program. Future operational improvements could influence the nature of these tasks
- Drainage is generally good, but there is some ponding at the SH 9/Rainbow Drive intersection

The use of sand on the roadways to improve traction is important, especially in relation to the steep grades on the interchange ramps and US 6. Sediment transport and deposition at and near stormwater inlets and into surface waters is not unusual or problematic. New inlet structures and gutters have improved past conditions. A reduction in the use of traction sand and an increase in the use of magnesium chloride are expected in the future.

CDOT maintenance personnel would like to review and comment on future interchange design possibilities.

4.11 Right of Way and Survey

CDOT is currently conducting field surveying and ownership mapping near the interchange. The ownership mapping and right-of-way documentation is not expected to be completed until spring of 2011. The field survey that has already been completed in the summer of 2010 will be used for the preliminary alternatives design comparisons to the extent that it covers the area needed for the footprint of the alternatives. This field survey information will be the most detailed and reliable in terms of preparing more exact engineering design. To supplement the already available field survey, the project team will also obtain aerial mapping that includes 1’ to 2’ contours that will provide additional information outside the CDOT right-of-way and will allow an aerial background to be used for visual comparisons of alternatives.

4.12 Utilities

Existing and ongoing survey information was compiled and reviewed, site reconnaissance was performed, and initial consultation with key utility providers performed to identify locations for key utilities and to identify existing design constraints that could represent fatal flaws or substantial cost differentials between future interchange alternatives. In the next phase of this study the consultant will obtain additional information on future projects that may impact the future interchange.

Existing survey information included the following documents:

- HCL Survey 10-14-2010
- Information received by HCL from CDOT 9-13-2010

This survey shows the various components of water distribution system, Silverthorne/ Dillon Joint Sewer Authority (JSA) Mains and Town of Silverthorne (TOS) Sewer (storm). It should be noted that no invert elevations are provided in the survey.

- HCL 8-27-10 GIS information received from North Line GIS, Silverthorne's GIS provider
  This file shows the aerial mapping for the project area overlaid with parcels, 2 ft contours, JSA sewer lines, TOS sewer lines, water mains, fire hydrants and water valves.

Utility Information

Site reconnaissance and consultation with key utilities providers generated the following information and findings:

- Water- A majority of the project area is served by The Town of Silverthorne (TOS) water system along with water for fire protection. The distribution system has a network of pipes of pipes which cover a majority of eth roadways within the project boundaries. It should be noted that portions of the project may fall within the Town of Dillon (TOD) water system.

- Sewer – The sewer system is maintained by the Silverthorne/ Dillon Joint Sewer Authority which provides collection and treatment. The survey has identified a sanitary collector system on either side of the Blue River which transports the sanitary flows to the north to a treatment plant. While the survey did not identify a service system it should be assumed that a system is in place to convey the individual point discharges to the main collection systems.

- Gas- Xcel Energy provides gas for the TOS within the project area. Gas lines are located along SH-9 north and south of I-70 with one crossing of I-70 located at S. Adams Avenue.

- Electricity- Xcel Energy provides electricity for the project area. Underground electric lines parallel the I-70 corridor on both sides of the roadway. Additionally, underground electric lines also parallel SH-9 (SH north and south of I-70. Some overhead electric wires are noted on the survey located on the south side of I-70 and along some portions of SH-9.

- Telecommunications- This includes the following telephone, cable, and fiber optic telephone. The telephone provider based on contact with the utility companies is Qwest, no cable provider has been identified at this time.

- Underground fiber optic for telephone runs parallel to the north side of I-70 and paralleling the east side of SH-9. Additional underground telephone cables exist along both sides of SH-9 and in a sub-division to the west of the interchange.

Figure 12 shows the existing utilities near the I-70 Silverthorne/Dillon interchange.

Figure 12 – Existing Utilities for I-70 Silverthorne/Dillon Interchange

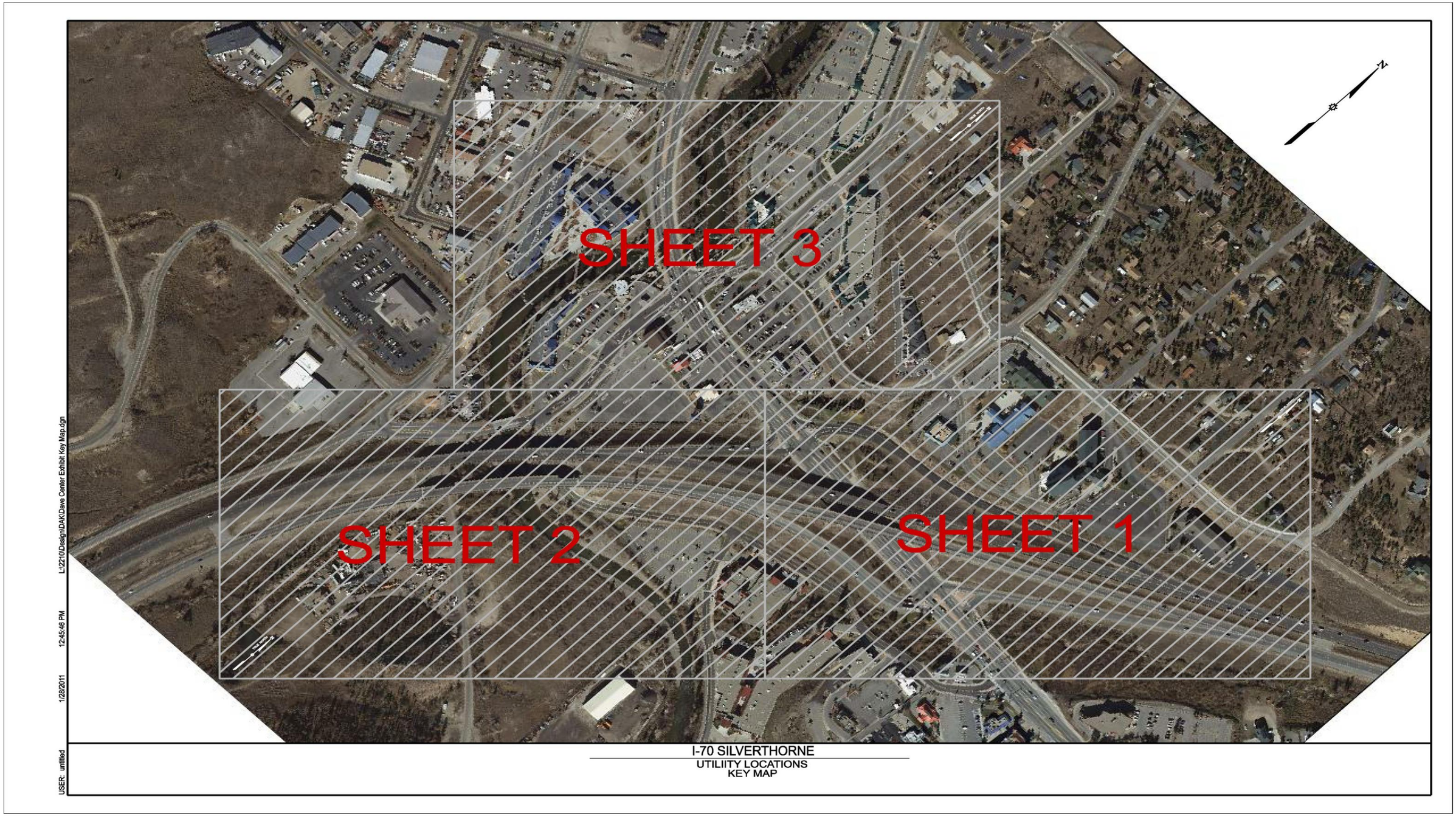


Figure 12 – Existing Utilities for I-70 Silverthorne/Dillon Interchange (cont.)

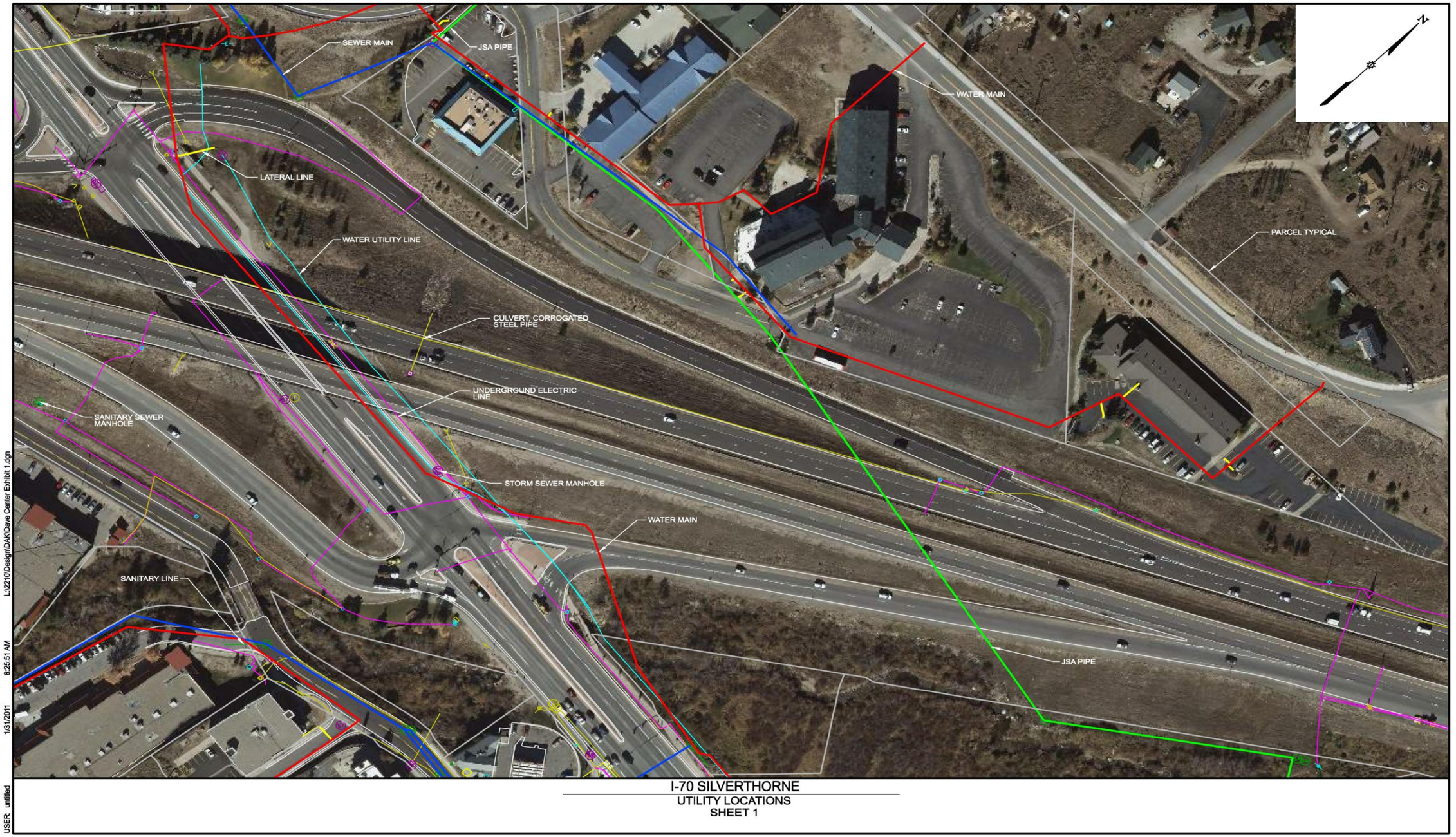


Figure 12 – Existing Utilities for I-70 Silverthorne/Dillon Interchange (cont.)

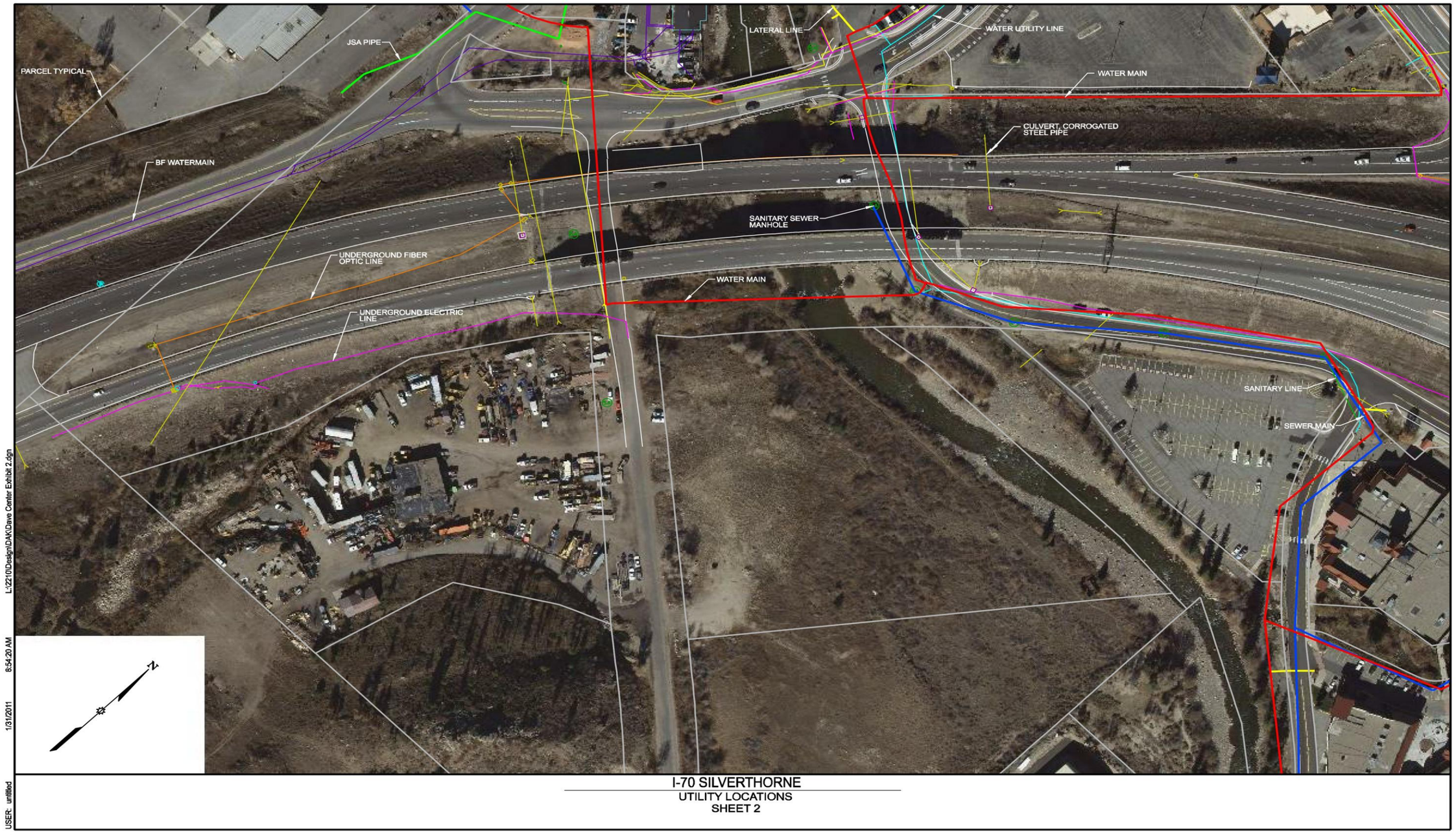


Figure 12 – Existing Utilities for I-70 Silverthorne/Dillon Interchange (cont.)

5. EXISTING ENVIRONMENTAL RESOURCE CONSIDERATIONS

5.1 Summary of Affected Resources

Based on review of the RDPEIS and field reconnaissance, the following resources are either not present within the study area or would not be expected to be adversely impacted by potential I-70 Silverthorne/Dillon Interchange alternatives:

- Prime, Unique, Statewide, or Locally Important Farmland
- Archaeology
- Historic Resources/Historic Bridges
- Threatened and Endangered Species
- Low Income and Minority Populations

Table 5 summarizes the potentially affected resources and provides a characterization of their applicability in relation to the I-70 Silverthorne/Dillon Interchange. Additional detail is presented in Appendix 11 – Environmental Technical Report.

Table 5 – Affected Resources

AFFECTED RESOURCES	APPLICABILITY TO THE PROJECT
Land Use and Urban Policy	A wide range of local plans and policies administered by the Town of Silverthorne and the Town of Dillon address public and private lands within the study area. Possible alternatives may require unanticipated right of way acquisition and may generate new land use planning and development considerations.
Air Quality	Particulate matter is an issue to be addressed in the study area during the construction period.
Noise	I-70 is a major noise source. A noise analysis is required.
Hazardous Waste	There are records of hazardous waste sites in the study area presenting the potential to encounter contaminated water or soils during the construction process (See Appendix 12 – Environmental Technical Report). A Phase I Environmental Site Assessment is needed.
Senate Bill 40[1]	Both the Blue River and Straight Creek fall under the jurisdiction of SB40.
State Species of Concern	The study area is within 0.5 miles of a Bald Eagle roost and provides habitat suitable for the Northern Pocket Gopher and North River Otter.
Migratory Birds	Numerous species of migratory birds protected under the Migratory Bird Treaty Act are likely to use habitat within the study area for nesting and foraging.
Wildlife - Crossings and Linkages	Laskey Gulch, located to the east of the study area between I-70 mileposts 207 and 210, is a Wildlife Linkage Interference Zone. These linkage zones are key connections for wildlife habitat previously impacted by the barrier effects of I-70.
Fisheries	A 35-mile section of the Blue River, from Dillon Reservoir to the town of Kremmling, is designated as a "Gold Medal Fishery" by CDOW.
Waters of the US and Wetlands	"Waters of the United States," as defined by the US Army Corps of Engineers occur within the study area along the Blue River and Straight Creek. No fens[2] occur within the study area.
Paleontology	An area of medium to high paleontological sensitivity exists in the study area.
Section 4(f) and 6(f) – Recreation	The Blue River Recreation Trail, local parks, and open space in the Town of Silverthorne are Section 4(f)[3] resources within the study area.
Invasive Species/Noxious Weeds	Multiple noxious weed species occur in disturbed areas within the study area.
Water and Water Quality	The Blue River and Straight Creek pass though the study area. These resources are highly sensitive and are subject to wide water quality effects and protection measures.
Visual Quality/Aesthetics	The interchange is a gateway to the Towns of Silverthorne and Dillon. Aesthetic improvements and visual/aesthetic policies guide development within the study area.

[1] Colorado Senate Bill 73-40 (§*33-5-101-107*, *Colorado Revised Statute 1973* as amended) requires any agency of the state to obtain wildlife certification from the Colorado Division of Wildlife (CDOW) when the agency plans construction in any stream or on any stream bank. A stream is considered to come under the jurisdiction of SB40 if it meets any one or more of the following four criteria:

- All perennial streams represented by solid blue lines on U.S. Geological Survey 7.5' Quad maps.
- Segments of ephemeral and intermittent streams providing live water beneficial to fish and wildlife.
- Segments of streams at which 25 percent or more of the vegetation is comprised of riparian vegetation, such as cottonwood, willow, alder, sedges, or other plants dependent on groundwater. Such segments shall be within 300 feet upstream or downstream of the project. The 300-foot distance shall be measured along the length of the stream.
- Segments of streams having wetlands present within 600 feet upstream or downstream of the project. The 600-foot distance shall be measured along the length of the stream.

Both the Blue River and Straight Creek fall under the jurisdiction of SB40. Further information concerning CDOW certification under SB40 can be found in the 2003 Memorandum of Agreement between CDOT and CDOW.

[2] Fens are one of the most important wetland resources in Colorado. Fens provide special habitats and often support threatened and endangered species. Fens take centuries to form and their losses are essentially irreparable. In recognition of these facts, the US Fish and Wildlife Service has elevated fens to a the most protected "Resource Category 1" and the US Army Corps of Engineers has exempted fens from the Nation Wide 26 permit coverage.

[3] The Department of Transportation Act (DOT Act) of 1966 included a special provision - Section 4(f) - which stipulated that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the property resulting from use.

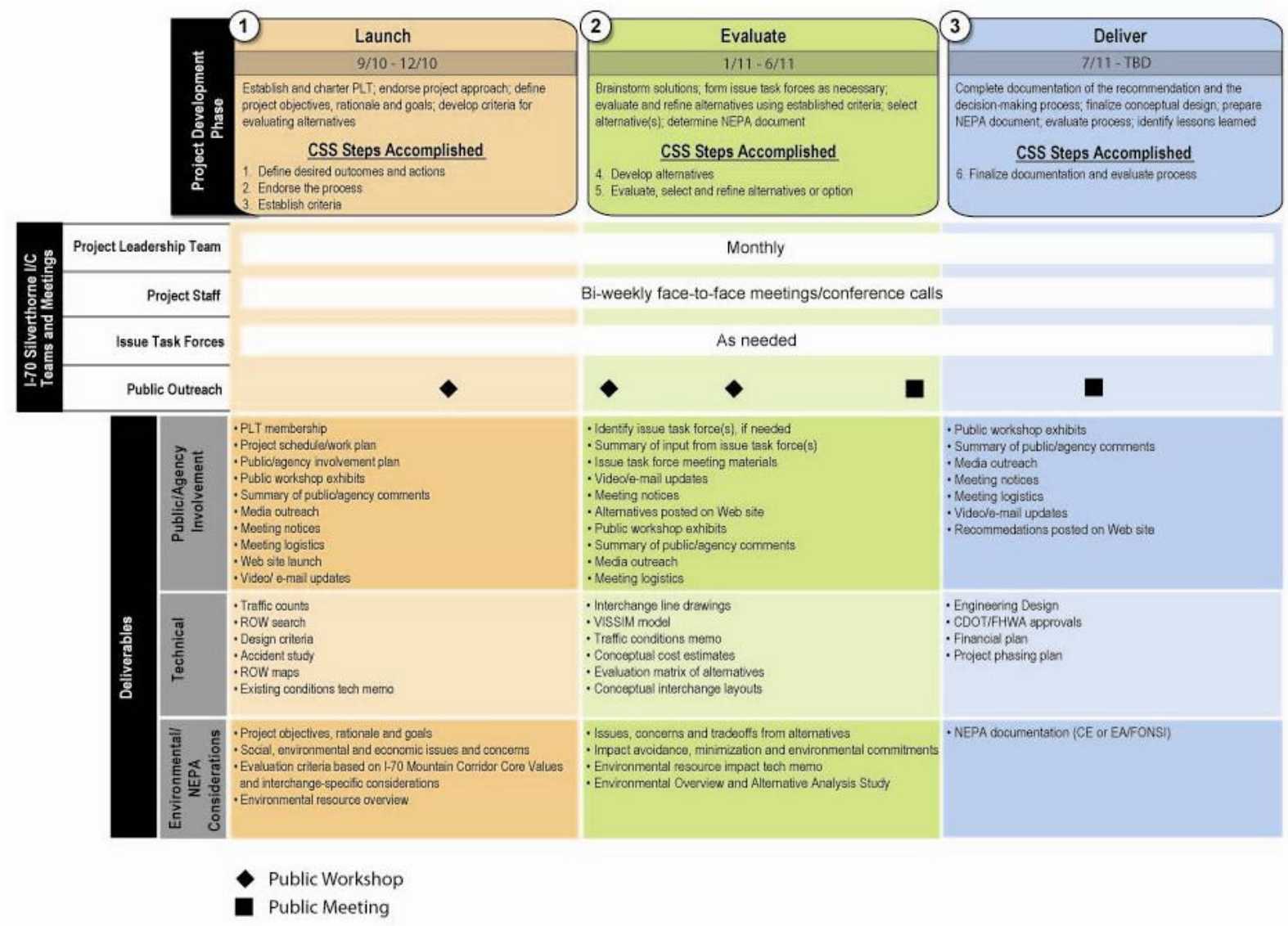
6. NEXT STEPS

The I-70 Silverthorne/Dillon Interchange project includes three phases: Launch, Evaluation and Deliver. Refer to Figure 12. This report summarizes the results of the Launch phase. The Evaluate phase begins in early 2011. The Deliver phase will begin after the evaluate phase is complete.

The evaluate phase will include development of alternatives that address the project's rationale and goals. These alternatives will be subject to an evaluation process that applies the project specific criteria developed in the Launch phase.

The Deliver phase of the project will include preliminary engineering and design for the alternative or alternative advanced for further consideration at the completion of the Evaluation phase, and preparing the appropriate NEPA documentation.

Figure 13 – Next Steps Overview



APPENDIX

Appendix 1 – Rationale for the Proposed Study Area Limits

Appendix 2 – Public Outreach Summary

Appendix 3 – Existing Land Use Technical Report

Appendix 4 – Existing and Future No Action Traffic Technical Report

Appendix 5 – Crash History Technical Report

Appendix 6 – Existing Roadway Geometry Technical Report

Appendix 7 – Existing Structures Technical Report

Appendix 8 – Existing Drainage Technical Report

Appendix 9 – Existing Transit Services Technical Report

Appendix 10 – Pedestrian and Bicycle Facilities Technical Report

Appendix 11 – Environmental Technical Report

I-70 Silverthorne/Dillon Interchange

Rationale for the Proposed Study Area Limits

February 2011

INTRODUCTION

The following discussion provides the rationale for the I-70 Silverthorne/Dillon Interchange project study area limits (See Figure 1). The following primary factors were considered to define the rationale for the interchange study area limits:

- Safety
- Mobility, Traffic Operations and Congestion
- Planned Improvements to I-70
- Potential Designs and Footprints for I-70 Silverthorne Interchange Improvements
- Community Planning and Land Development
- Bicycle and Pedestrian Facilities and Plans
- Environmental Considerations

The following discussions provide background information in relation to each one of these factors.

Safety

The recently released I-70 Mountain Corridor Revised Draft Programmatic Environmental Impact Statement (RDPEIS) and supporting Safety Technical Report states the following regarding the I-70 Silverthorne interchange (referred to herein as the I-70 Silverthorne/Dillon interchange):

High traffic volumes (on I-70) in the eastbound and westbound directions, along with several signalized intersections within a short distance, suggest (the) need for redesign of (the Silverthorne) interchange and adjoining intersections. Future off-ramp traffic is expected to back up onto I-70 and create significant congestion on U.S. Highway 6 (US 6) and State Highway 9 (SH 9).

This finding indicates that the interchange project area should include I-70 west and east of the existing interchange ramp termini and intersections along US 6 and SH 9 to fully address interchange issues.

The study area boundaries extend approximately 0.5 miles beyond the existing ramp termini and include several intersections of SH 9 and US 6 to the north and south, respectively. The ramp distances were estimated by considering future improvements and ramp grades east and west of the interchange. The selected intersections include SH 9/6th Street, US 6/Dillon Dam Road and those intersections in between. The following discussions provide additional information about the SH 9 and US 6 limits and the perimeter of the study area.

Mobility, Traffic Operations and Congestion

The nearest interchange to the west is located approximately three miles away in the Town of Frisco. The nearest interchange to the east is located approximately 10 miles away beyond the Eisenhower and Johnson tunnels that pass under the continental divide. These distances reflect the fact that local and regional mobility and interchange operations are relatively independent of the nearest interchanges.

The following discussions summarize the overall function of the interchange as a means of addressing the north south intersection limits of the study area with respect to mobility, traffic operations and congestion.

The I-70 Silverthorne/Dillon interchange provides a primary access to destinations north of I-70 such as Kremmling and Steamboat Springs and the Steamboat ski resort, and connects motorists to a variety of destinations such as the Town of Dillon, Dillon Reservoir, and Keystone ski resort to the east and south. The interchange also provides access to commercial and residential areas in the Towns of Silverthorne and Dillon surrounding the interchange.

I-70 has two through lanes in each direction across the bridge at the interchange. To the east of the interchange, there are three lanes in each direction to the Eisenhower Tunnel, where the road again reduces to 2-lanes in each direction. To the west of the interchange, there are three lanes in the westbound direction continuous to the Frisco interchange 3 miles west, and two lanes in the eastbound direction from the Frisco interchange to the Silverthorne/Dillon interchange.

US 6 has two through lanes southeast of the interchange, and a continuous acceleration/deceleration auxiliary lane between intersections in the study area. A variety of raised and painted medians and lef turn pockets provide access control at the 5 intersections between the interchange ramp intersection and Dillon Dam Road. Direct driveway access to and from US 6 serving commercial property parking lots is not provided. Beyond Dillon Dam Road, intersections along US 6 are further apart and traffic volumes and turning movements decrease. Dillon Dam Road provides an alternative parallel route of I-70 between Frisco and Silverthorne/Dillon. If US 6 is closed or otherwise restricted there are no continuous parallel or direct bypass routes. However, Stephens Way does provide an alternative route for vehicles to pass under I-70, and does get used as a local connection that helps reduce local traffic on US 6 and SH 9.

SH 9 has two through lanes in each direction north of the interchange. Raised medians restrict left turning movements to only the 5 major intersections in the study area from the interchange ramp intersection to 6th Street. Right-in/Right-out driveway access to and from SH 9 serving commercial property parking lots do exist along SH 9. Beyond 6th Street, intersections along SH 9 a further apart and traffic volumes and turning movements decrease. Rainbow Drive and Adams Avenue are roughly parallel to SH 9. Either road can be used as a bypass route if SH 9 is unavailable.

Based on this information, a northern boundary for SH 9 of 6th Street and a southern boundary for US 6 of Dillon Dam Road were selected and adjacent roads and properties to either side of SH 6 and US 6 were included in the Study Area.

Planned Improvements to I-70

The interchange is within the I-70 Mountain Corridor Environmental Impact Statement (EIS) which has been the subject of a “Tiered” NEPA analyses. Primary decisions associated with Tier I EIS work are nearing completion. The I-70 Mountain Corridor Revised Draft Preliminary EIS (RDPEIS) includes the portion of I-70 located roughly between Denver and Glenwood Springs, Colorado. The final step in the Tier I process for the Mountain Corridor will be completed with the Final Programmatic Environmental Impact Statement (FPEIS) and Record of Decision (ROD). The ROD is expected to be complete in the spring of 2011. The next steps of Tier 2 in the process will address specific projects that are part of the overall program of improvements for I-70, such as the I-70 Silverthorne/ Dillon Interchange project.

The RDPEIS has set forth a program of improvements for I-70 including the portion of I-70 passing over the Silverthorne/Dillon Interchange. The anticipated Final EIS and Record of Decision (ROD) will finalize this program of improvements.

The I-70 RDPEIS defines the “Consensus Recommendation” as the Preferred Alternative. The RDPEIS defines improvement of the I-70 Silverthorne/Dillon interchange as an “early action project.” A continuous eastbound auxiliary lane from the I-70 Frisco interchange continuing to the east of the I-70 Silverthorne/Dillon interchange is considered part of the No Action Alternative or future baseline condition. The need for three lanes in the westbound direction across the bridge is not defined as a high priority improvement of the Preferred Alternative. The RDPEIS suggests that a single point urban interchange (SPUI) as a possible design. Safety issues related to congestion are identified as the primary need for improvements to the I-70 Silverthorne Interchange.

The potential for a future "Advanced Guideway System" passing through the I-70 Silverthorne/Dillon interchange area is defined as a central part of the Preferred Alternative and includes the commitment by the lead agencies to evaluate and implement an Advanced Guideway System within the Corridor. However, at this time, this improvement is not fully defined or funded. A total of 15 transit stations are referenced. At least one station would be located in Summit County. The location of this station is not defined. A transit alignment and station at or in the vicinity of the I-70 Silverthorne/Dillon interchange is possible.

Based on possible improvements to I-70, a broad area surrounding the interchange is included within the interchange study area.

Potential Designs and Footprints for I-70 Silverthorne Interchange Improvements

Although specific designs that would address the defined purpose and need for making improvements to the I-70 Silverthorne/Dillon interchange have not been developed yet, some basic and standard interchange design concepts exist that provide information for consideration. Some conceptual designs that may be appropriate in this location include:

Reconstructed Diamond	Double Roundabout
Diverging Diamond	Single Point Urban Interchange (SPUI)
Split Diamond	Other

Each design and other potential designs would require improvements and/or modifications to:

- I-70 exit and entrance ramp locations
- Intersections, cross sections and access points along portions of US 6 and SH 9
- Some of the roads and driveway access points in the local roadway network.

Figure 1 presents preliminary footprint boundaries of these interchanges to define approximate limits of potential interchange improvements.

Improvements to the I-70 bridge structure may be needed to address SH 9 and US 6 future capacity needs. The current span of the bridge may be too narrow for future lane needs. In addition, changes to the lane configurations, striping, and/or the cross section of I-70 above the interchange to provide 3 lanes in each direction may be needed; especially in relation to the planned eastbound auxiliary lane along I-70 from Frisco to Silverthorne.

The study area includes the potential overall construction footprint for all of these alternatives.

Community Planning and Land Development

Regional economic development forecasts reflect continued growth and development in Summit County, Silverthorne, Dillon, and Frisco. The Town of Silverthorne and the Town of Dillon anticipate some portion of this growth will occur along US 6 and SH 9 in the commercial districts located in the vicinity of the interchange. This growth is expected because this area is a gateway to both communities and has high visibility and traffic volumes, especially during the summer and winter peak tourism periods.

Existing land development conditions in the vicinity of the interchange are expected to change. However, "reasonably foreseeable" development in the vicinity of the Interchange is limited to projects that are under construction, currently under review by local government, or proposed and fully funded by a public agency. While it can be expected that more development may occur over time than is "reasonably foreseeable," addressing that development as a means of making project specific decisions about this transportation project or other transportation projects is considered speculative at this time. However,

there is one primary exception. This exception is the site for the proposed Home Depot located in the southwest quadrant of the interchange. This development proposal is currently under review. The location of this site is such that interchange improvements would not influence site design.

As a result of these conditions, the Home Depot site and the broad commercial districts on either side of I-70 are not included within the study area. Rather, a more focused boundary is provided as described previously.

Bicycle and Pedestrian Facilities and Plans

Bicycle and pedestrian facilities are provided along SH 9 and US 6 and a public recreation path/trail is provided along portions of the Blue River. Sidewalks under the I-70 bridge can be uncomfortable for pedestrians and cyclists due to weather related impacts and relatively high traffic volumes and noise levels. Pedestrian activity in the area also includes some informal routes between properties include some routes through undeveloped areas.

The study area includes the primary bicycle and pedestrian facilities associated with SH 9 and US 6 and adjoining properties. Additional areas are not included because they are beyond the core transportation service area of the interchange and related improvements would be more closely associated with land development and related community design decisions.

Environmental Considerations

The following discussion addresses key environmental considerations in terms of potential direct, indirect, and cumulative effects that guide selection of the study area limits. The spatial considerations for direct effects are largely addressed by the potential footprints for the interchange designs that may be appropriate at this location. Indirect and cumulative effects of the interchange project and effects from I-70 improvements that were directed to Tier 2 environmental analysis are addressed in the following discussions.

Noise

The RDPEIS refers to direct noise impacts at three sensitive receptors in the vicinity of the interchange, references a noise wall in the vicinity of these three receptors, and directs Tier 2 environmental analysis to perform “a more robust analysis of potential noise impacts and mitigation based on the configuration of proposed highway improvements, associated traffic projections, and refined field noise measurements taken at potentially affected receptor locations.”

The primary sensitive receptors in the vicinity of the interchange are the residences and a church along Straight Creek Drive mentioned in the RDPEIS. Relatively new noise walls located along the south side of I-70 east of the interchange are currently in place to address noise issues in this location.

Other sensitive receptors in the area include park and recreation resources along SH 9 and US 6, additional residences and lodging. The additional residences are more distant from I-70 than those along Straight Creek Drive and some of them are separated further from I-70 by intervening topographical conditions/barriers. Construction and operational noise along SH 9 and US is not expected to generate noise levels that warrant mitigation. Consequently, sensitive receptors that are relatively close to I-70 should be considered in relation to the study area boundaries.

The study area includes noise sensitive receptors along SH 9, US 6 and those with close proximity to I-70 noise sources and anticipated project limits.

Water and Biological Resources

The Blue River begins at the Dillon dam outlet located just south of the interchange. Straight Creek and its watershed are located along the south side of I-70 near the interchange and on both sides of I-70 further upstream.

Straight Creek is a tributary to the Blue River. The confluence of Straight Creek and the Blue River is located in the study area. The waters of the Blue River support plant, wildlife, fish and other aquatic habitats and provide water that sustains wetlands and provides for other uses downstream. Straight Creek supports plant, wildlife, fish and other aquatic habitats east of the study area and provides water supply to Dillon and Dillon Valley. Erosion and sedimentation caused by road construction, development, the use of liquid deicer and traction sand along Straight Creek, and the contribution of contaminants in stormwater associated with road salt, automobile use, accidental spills, and urban area runoff contribute to water quality conditions in Straight Creek and the Blue River.

The Study Area includes the portion of Straight Creek adjacent to the potential limits of the future ramp termini to the east and the Blue River within the potential footprint of future construction activity.

Paleontological Resources

The I-70 Mountain Corridor includes 40 mapped geologic units. Of these, three are classified as highly sensitive for paleontological resources, and 19 are classified as moderately sensitive. The remaining 18 geologic units have little or no potential for important paleontological resources. Sensitive areas in the Corridor, west to east, generally include the first 42 miles from Gypsum to Vail Pass, the 6.6 miles between Frisco to Dillon, and the last 1.6 miles of the Hogback near C-470.

Paleontological resources are affected by the alternatives when and if sensitive geologic formations are disturbed by construction activities. The effects on these resources relate to the timing of construction of transportation components. The primary paleontological resource that could be influenced by the project is the area characterized by the steep slope north of the westbound on ramp. This area is included in the study area.

Section 4(f) and 6(f) Resources

There are resources that appear to be Section 4(f) and 6(f) resources in the vicinity of the interchange. These resources include public parkland and the Blue River recreation trail. The boundaries for the study area include all of these resources.

Other Resources

No other resources create geographic considerations that would influence the boundaries of the study area.

I-70 Silverthorne/Dillon Interchange
Public Outreach Summary

February 2011

Meeting Summary
I-70 Silverthorne/Dillon Interchange
Agency Meeting Summary

Thursday, October 28, 2010
1:00 p.m. - 3:00 p.m.
CDOT Traffic Management Center, Trail Ridge Pass Conference Room
425 Corporate Circle, Golden CO

Meeting Goals

The meeting goals and agenda were to:

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and Context Sensitive Solutions process
- Gather feedback on environmental and technical considerations

Agenda

1. **Welcome** — **Scott McDaniel, CDOT**

2. **Introductions and Agenda Review** — **Andy Mountain, GBSM**

3. **Project Goals** — **Bill Scheuerman, CDOT**
   a. Goals/Objectives

4. **Project Overview** — **R.A. Plummer, AECOM**
   a. Study Limits
   b. Schedule and CSS process
   c. Public Involvement
   d. Questions?

5. **Environmental Considerations** — **Brian Kennedy, AECOM**
   a. What we know already
   b. Environmental studies and potential evaluation criteria
   c. Questions?

6. **Technical Considerations** — **Alan Eckman, AECOM**

a. Existing conditions
b. Technical studies and potential evaluation criteria
c. Questions?

7. Wrap-up and Next Steps **Andy Mountain, GBSM**

MEETING SUMMARY

- After introductions and Andy Mountain's reviewed the agenda and summarized the role and composition of the Project Leadership Team.

- Scott McDaniel then stated that this initial meeting and following agency meetings are intended to be inclusive of all agencies to solicit input and participation.

- Bill Scheuerman then provided a general review of the goals for the project that the Project Leadership Team Developed. In his review, he specifically highlighted a few including:

    - Collaboration between FHWA, CDOT and local agencies
    - An innovative solution of appropriate scale
    - Embracing the Context Sensitive Solutions process
    - Improved local traffic flow on US 6 and SH 9
    - Ability to accommodate future transit improvements (e.g. AGS)
    - Identify potential public-private partnerships
    - Flexible alternatives that could be phased

- Next, R.A. Plummer discussed the study limits, characteristics and issues within them, the project schedule and public involvement activities. R.A. also discussed the Context Sensitive Solutions process and that the prescribed 6-step process is being accomplished on this project in three phases. The Launch Phase will include steps 1-3, the Evaluate Phase will include steps 4-5 and the Deliver Phase will include step 6.

    - Melinda Urban with FHWA asked what was to be presented at the Silverthorne Business Owners meeting.

        - R.A. responded that similar information would be presented and that the bulk of the meeting would focus on gathering input on issues that should be considered as the process moves forward.

- Randy Jensen asked whether non-government organizations (NGOs) like the Colorado Motor Carriers have been or will be involved.
    - R.A. noted that typical NGOs have been engaged and will be invited to an NGO-specific meeting on November 8th and that the PLT will continue to engage other stakeholders as early in the process as possible.

- Brian Kennedy discussed Environmental Considerations. The considerations discussed were focused on what is currently known and potential impacts to the Blue River, a potential pedestrian pathway, public parks, noise issues and paleontological issues.
    - Melinda asked if there is an existing EIS for State Highway 9 and if that EIS was being used.
        - Bill responded by saying that the EIS involved Exit 203 (Frisco) and State Highway 9 toward Breckenridge, so it was not relevant.
    - Scott McDaniel asked Amy Turney with Denver Water if there was anything specific to security issues with Dam Road or other Denver Water issues that should be considered.
        - Amy Turney responded that the process should establish and maintain communication with the existing Dam Road security task force and that the two efforts should continue to coordinate to adequately address potential issues.

- Alan Eckman discussed Technical Considerations the project will need to consider and criteria to help evaluate existing conditions. Some of the systems that will be evaluated include transportation systems, trail systems, multi-modal safety and potential infrastructure needs. The project team will evaluate alternatives within the context of effects on sustainability, safety, environment, historic context, mobility, community and aesthetics, and will remain open to review additional criteria to create a more robust review.
    - Randy Jensen asked how livability will be factored into the criteria.
        - R.A. responded that livability probably fits best within the Communities criteria but that the broader concepts will actually be covered through multiple criteria.

- Amy noted that Dillon Recreation should be included in the process to evaluate compatibility within the community.

- Andy then discussed next steps, including:
    - Upcoming public meeting on November 15th
    - Creating Issue Task Forces in 2011
    - Additional Public Workshops in 2011
    - Noting that the project website will soon be live

- Randy Jensen then asked how the project team was characterizing the need for the project.
    - Scott McDaniel, Bill Scheuerman and R.A. Plummer all responded, noting that the primary drivers for the need of the project include:
        - It's the highest-volume interchange on the I-70 Mountain Corridor
        - There are future capacity and mobility issues on ramps and throughout the interchange that need to be addressed
        - The I-70 Collaborative Effort prioritized this intersection as the first of the 20 that were identified for improvement
        - There are safety concerns with the increased congestion that is projected to occur
        - There are mult-modal transportation needs at this location that should be addressed

ACTION ITEMS

- Email presentation, comment form and project maps/materials to attendees and invited other agencies

MEETING PARTICIPANTS

- Scott McDaniel CDOT
- Bill Scheuerman CDOT
- Wendy Wallach CDOT
- Amy Turney Denver Water
- Randy Jensen FHWA
- Melinda Urban FHWA

- Alan Eckman Project Team
- Brian Kennedy Project Team
- Kyle Miller Project Team
- Andy Mountain Project Team
- R.A. Plummer Project Team
- Tom Schilling Project Team

Meeting Summary
I-70 Silverthorne/Dillon Interchange
Business Meeting Summary

Thursday, October 28, 2010
5:00 p.m. - 7:00 p.m.
Silverthorne Pavilion
400 Blue River Dr., Silverthorne CO

Meeting Goals

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and Context Sensitive Solutions process
- Gather input on issues to consider in the study

Summary

All business owners in the study area were invited to participate in this kick-off meeting. In total, 12 business leaders attended and participated in the meeting.

The project team presented a 15-20 minute overview of the project. That presentation identified the project rationale, goals, schedule and process. Following the presentation, participants moved to two breakout discussion tables.

Each table had an aerial map of the study area. Each session had a facilitator and a technical expert. During the breakout session, the facilitator posed a series of questions to participants and helped facilitate discussion and input. The focus of the input was on issues the project team should consider in its analysis. As issues were identified, the facilitator captured the input on the map.

Following the meeting, the input captured on the maps was organized into geographic categories. A summary of that input, by category is listed below.

US 6

- Grade issues on US 6 create problems
- Bike access in/around US 6 is an issue
- Multiple access points into roads/developments off US 6 create conflict
- Dam Road closure creates problems

- Westbound US 6 traffic wanting to go east on I-70 backup on US 6 – single right turn lane starts at Little Beaver then impacts through lanes above that
- Tankers merging on US 6 to 60 Westbound
- Tankers/house on trailers from Loveland Pass on US 6 increase congestion
- Need sidewalk on north side of US6 from Little Beaver up to Dillon Ridge
- Signal coordination/progression
- Main Street/Hwy. 6 part of study area?
- Gridlock east bound on US 6 all the way to Lake Dillon Dr. on big ski days
- Biggest safety issues on US 6 between Lake Dillon Dr. and Dam Road

SH 9

- This is a significant growth area
- Lots of truck traffic related creates problems
- The intersection of SH 9 and Wildernest Road is most dangerous and problematic
- Back-ups trying to turn eastbound on Wildernest Road
- Would like to evaluate option of leverage Adams Ave. as either a local or truck access road. Could improve access to Wildernest. Could be combined w/ a new access point off I-70.
- Lowes development will only increase congestion and problems in this area
- Southbound SH 9 turning to westbound ramp – grade issues and merge issues during icing conditions
- VMS on SH9 outside Silverthorne so Steamboat traffic is informed.

I-70 mainline

- Grades on east and west side of interchange create acceleration, deceleration and congestion issues
- Maintenance (particularly snow removal) is an issue, particularly w/ the grades. Desire to evaluate progressive maintenance approaches (e.g. geothermal) to deal with ice/snow.
- Desire to evaluate a secondary access point off of the highway (e.g. open the emergency access west of the intersection to the public) to separate truck and local traffic, while improving access to Wildernest
- Improved/additional message signs should be considered. Current signs notify of closures too late to make a difference
- May want to consider stacking like what is done through Glenwood Canyon
- Add another local street crossing over I-70 east of the interchange to help keep traffic out of construction zone and permanent local option
- New bridges – no pillars
- Lane designations during snow storms – can't see stripes

- Tunnels for peds under interchange?
- Buildings already around interchange
- Direction lane signage as traffic approaches interchange: Denver traffic left lane

I-70 ramps

- Grades create issues. Evaluate auxiliary lanes
- Westbound access from Wildernest and Mesa Cortina is challenging
- Wider inbound and outbound (two lanes)
- Ramp grade too steep, creates school time issues
- Single turn lane onto I-70 from Keystone going west and Steamboat going east
- Construction impacts: no way to redirect traffic; needs phasing for traffic control

General

- Business access issues are most influenced by weather, confused tourists and peak volume days/holidays
- CDOT maintenance facility needs better access to the highway
- Any evaluation of a frontage road (e.g. to address Dam Road issues) should be considered in this study
- Balance the need for improved mobility with unintended local impacts (e.g. cut-through traffic in neighborhoods, new congestion points)
- Way-finding is very important, particularly given the number of tourists in the area
- Eisenhower tunnel closures create problems in this area
- Emergency shelters Silverthorne Rec Center
- Density in Wildernest – needs access
- Variable Message Signs to advise skier traffic on US 6 near Keystone and/or in Steamboat
- Construction impacts: no work Fri-Sun; make sure lane closures are necessary to get work done day of closure
- "closed but no work" – minimize closure
- Winter-related traffic snarls, traffic closures – no alternatives
- All emergency services for Silverthorne are south of I-70; congestion creates safety issues in Silverthorne.
- Reduce number of signals

Meeting Summary
I-70 Silverthorne/Dillon Interchange
Stakeholders Meeting Summary

Monday, November 8, 2010
1:30 p.m. - 3:00 p.m.
CDOT Traffic Management Center, Trail Ridge Pass Conference Room
425 Corporate Circle, Golden, CO

Meeting Goals

The meeting goals and agenda were to:

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and Context Sensitive Solutions process
- Gather feedback on environmental and technical considerations

Agenda

1. **Introductions and Agenda Review** — **Megan Alderton, IMCA**

2. **Project Goals** — **Bill Scheuerman, CDOT**
   a. Goals/Objectives

3. **Welcome** — **Scott McDaniel, CDOT**

4. **Project Overview** — **R.A. Plummer, AECOM**
   a. Study Limits
   b. Schedule and CSS process
   c. Public Involvement
   d. Questions?

5. **Environmental Considerations** — **R.A. Plummer, AECOM**
   a. What we know already
   b. Environmental studies and potential evaluation criteria
   c. Questions?

6. **Technical Considerations** — **R.A. Plummer, AECOM**

a. Existing conditions
b. Technical studies and potential evaluation criteria
c. Questions?

7. Wrap-up and Next Steps **Megan Alderton, IMCA**

MEETING SUMMARY

- After introductions, Megan Alderton reviewed the agenda.

- Bill Scheuerman then provided a general review of the goals for the project that the Project Leadership Team developed. In his review, he specifically highlighted a few, including:

  - Collaboration between FHWA, CDOT, and local agencies
  - An innovative solution of appropriate scale
  - Embracing the Context Sensitive Solutions process
  - Improved local traffic flow on US 6 and SH 9
  - Ability to accommodate future transit improvements (e.g., AGS)
  - Identification of potential public-private partnerships
  - Flexible alternatives that could be phased

- Scott McDaniel welcomed the participants and thanked them for providing input during the initial stage of the project. He emphasized that the project team is in the information-gathering stage to help define what conditions any interchange improvements may need to address. After studying the conditions and developing the criteria developed with stakeholder input, the team will begin considering alternatives with continuing public input.

- Next, R.A. Plummer discussed the study limits, characteristics and issues within them, the project schedule and public involvement activities. R.A. also discussed the Context Sensitive Solutions process and noted that the prescribed 6-Step Process is being accomplished on this project in three phases. The Launch Phase will include steps 1-3, the Evaluate Phase will include steps 4-5, and the Deliver Phase will include step 6. He also outlined the study limits.

  - Rick Warren of the Blue River Group of the Sierra Club asked if the interchange is the second busiest in the I-70 Mountain Corridor and whether traffic impacts of the new Lowe's proposed in Silverthorne will be studied.
    - R.A. responded that the interchange is one of the busiest – if not *the* busiest – on the Mountain Corridor, a unique situation where the interstate connects with two state highways. He also said that the team will consider future traffic impacts during modeling.

  - Art Ballah of the Colorado Motor Carriers Association (CMCA) stated that since the Dillon Dam Road is no longer available as an alternate route for

incident management, the Dillon-Frisco segment is a critical concern. He suggested that the project team look beyond the immediate footprint of the interchange for a solution to this problem.
    - R.A. responded that the project team recognizes this issue must be addressed in whichever alternative is selected. In previous meetings, Denver Water has also brought up this issue.

- R.A. discussed environmental considerations. The considerations discussed were focused on currently known and potential impacts to the Blue River, a potential pedestrian pathway, public parks, noise issues, and paleontological issues.
    - Allison Deans Michael of U.S. Fish and Wildlife Service (USFWS) said there is a potential 4(f) site on the Blue River, where the Colorado Division of Wildlife (CDOW) has provided a third-party grant of USFWS funds to a program called Fishing is Fun, which provides access to the Blue River at the north end of the study area. Allison said she could provide further information.
    - Greg Winkler of the Colorado Department of Local Affairs (DOLA) said the study should consider plans for a potential hydroelectric facility near Dillon Dam; Silverthorne's planned new public works facility on SH 9, as well as the upcoming downtown development study in Silverthorne.

- R.A. discussed technical considerations the project will need to consider and criteria to help evaluate existing conditions. Some of the systems that will be evaluated include transportation systems, trail systems, multi-modal safety, and potential infrastructure needs. The project team will evaluate alternatives within the context of effects on sustainability, safety, environment, historic context, mobility, community, and aesthetics and will remain open to review additional criteria to create a more robust review.
    - Art Ballah said the CMCA is concerned about use by loaded tanker trucks coming off US 6, accelerating up a steep grade fully loaded, and being unable to merge into traffic because of a short acceleration lane.
        - R.A. said that the design criteria will factor in and that some ramps have steep grades that are likely to be addressed along with acceleration and deceleration lengths.
    - Pam Fischhaber of the Colorado Public Utilities Commission (PUC) stated that the PUC is concerned that the project not preclude future grade separations or other design elements required for future rail development in the corridor. In the study area, the steep grades will be a concern for potential heavy rail or commuter rail development.
        - R.A. said that not precluding rail options is an overarching goal for the project.
    - Art Ballah asked if the schedule is consistent with the I-70 Mountain Corridor PEIS.
        - R.A. said the project team is monitoring progress with the PEIS and will determine what type of NEPA document will be pursued after a ROD is issued.

- Scott added that the feasibility study is part of the PEIS process but also that the interchange was identified as an early action item. Although CDOT thinks there will be a ROD for the PEIS soon, either way the intention is to move forward with the project.

- John Jones of the Summit Stage Transit said the interchange is one of the agency's highest traveled in the corridor. He said there are discussions about future development of light rail and bus rapid transit systems between Silverthorne and Keystone Resort. The agency also is concerned about the steep grades on the westbound ramps, which make acceleration difficult for fully loaded buses. Additionally, the ramps should accommodate turning radiuses for longer transit units between 60-80 feet. Summit Stage is also concerned about long queues on SH 9 and US 6 due to backups on the eastbound ramp. He suggested that flying access onto the interstate could alleviate long backups. He also suggested that longer queue capacity on the ramps could prevent backups onto the mainline, minimizing trucks and other traffic traveling on the mainline.
- Pam Caskie of the Northwest Colorado Council of Governments noted that the interchange is a heavily congested commercial area and asked if the project team will consider redesigning commercial interest on SH 9 to correct existing issues.
  - R.A. said that access to businesses near the interchange is going to be an important consideration, not necessarily changing the land use. How vehicles access the interchange from businesses impacts how well the interchange functions. As the project team studies the operations of SH 9 and US 6 and how well the interchange ties in, it's likely the team will look at access points and how well they work together.
- John Jones asked if there has been any consideration of developing frontage roads on both sides of the interstate. Pam Caskie asked if the study limits would preclude frontage road alternatives between Frisco and Silverthorne or Dillon.
  - R.A. and Scott said the project team is not yet at the alternative development stage; however, several meeting participants have expressed support for frontage roads. The study limits would not preclude considering or studying frontage roads between Frisco and either Dillon or Silverthorne.

- Megan then discussed next steps, including:

- Upcoming public meeting on November 15th
- Creating Issue Task Forces in 2011
- Additional Public Workshops in 2011
- Noting that the project website will soon be live

ACTION ITEMS

- Email presentation, comment form, and project maps/materials to attendees and invited other agencies

MEETING PARTICIPANTS

- Art Ballah, Colorado Motor Carriers Association
- John Jones, Summit Stage Transit, Summit County
- Pam Fischhaber, Colorado Public Utilities Commission
- Rick Warren, Blue River Group, Sierra Club
- Bill Copley, Federal Motor Carrier Safety Administration
- Pam Caskie, Northwest Colorado Council of Governments
- Allison Deans Michael, U.S. Fish & Wildlife Service
- Greg Winkler, Colorado Department of Local Affairs
- Scott McDaniel CDOT
- Bill Scheuerman CDOT
- Wendy Wallach CDOT
- Randy Jensen FHWA
- Melinda Urban FHWA
- R.A. Plummer Project Team
- Tom Schilling Project Team

Meeting Summary
I-70 Silverthorne/Dillon Interchange
Public Meeting #1 Summary

Monday, November 15, 2010
5:00 p.m. - 7:00 p.m.
Silverthorne Pavilion
400 Blue River Dr., Silverthorne CO

Meeting Goals

- Provide an understanding of the project's focus and goals
- Summarize the project schedule and Context Sensitive Solutions process
- Gather public input on the evaluation criteria and issues to consider in the study

Summary

The meeting began with an open-house format for the first 45 minutes. Stations with display boards were staffed by project team members who helped explain information, answer questions and encouraged members of the public to submit comments. The 31 meeting attendees were free to spend as much time at each station as they wanted.

The display stations included:

- **Critical Issues –** Each meeting attendee was given three dots to place next to the Context Sensitive Solutions issue or issues they felt were most important to this project.
- **Project Overview –** Boards summarizing the project and its schedule were here.
- **Existing Conditions –** Boards summarizing a variety of existing data including crash counts, transit routes and various environmental resources were displayed here.
- **Evaluation Criteria and Screening Process –** Meeting attendees were encouraged to review the criteria and identify any additional criteria they felt should be considered on post-it notes.
- **Issues Maps –** Two tables with roll-plot maps of the study area were set-up. Project team members engaged meeting attendees in discussions to help

identify specific issues or problem areas they were hoping the study could address. As issues were identified, they were written down on the maps.

- **Public Comments –** All meeting attendees were given comment forms. Additional blank forms, as well as a basket to hold completed forms, were at this table.

Following the initial open house period, the project team presented a 20-minute overview of the project. That presentation identified the project rationale, goals, schedule and process. Following the presentation, a 15-minute general question and answer session was facilitated.

Participants' questions covered the following topics:

- Whether the evaluation criteria are weighted or if all are equally considered
    - All are equally considered
- Whether there are already potential solutions existing and how many
    - Potential solutions will be developed in the next phase, after we have all the data and a clearer understanding of the problems we are trying to solve
- How input from all previous studies/projects is being integrated into this study
    - Work from other efforts (e.g. Context Sensitive Solutions) about critical issues are being integrated in. In addition, potential solutions identified in previous studies will be considered as part of the alternatives development and evaluation process in the next phase of the study
- Whether there are any more immediate opportunities for signal timing improvements on SH 9
    - Signal timing is incredibly complex, particularly in an area like this where weather and other factors can strongly influence actual travel speeds. The signal systems currently used in the area would need to be upgraded in order to be able to adapt to various situations. This study will consider opportunities to phase projects, such that if it makes sense to implements some solutions earlier (e.g. signal upgrades), that could be an option.

After the question an answer period, the open house displays were re-opened and meeting attendees visited stations and provided input for the remainder of the meeting.

The following table identifies the critical issues that meeting participants placed voting dots next to, as well as the number of dots placed.

Category	Issue	Dots
Mobility and Accessibility: System Connections and Effectiveness	Minimize inconvenience and delays to the traveling public	8
Mobility and Accessibility: System Connections and Effectiveness	Improve and enhance connections to interstate	5
Environmental: Specific Environmental Issues	Protect community water supplies and watersheds	4
Communities	Promote future vision of corridor communities and tie it to land use	3
Communities	Support tourism/economics	3
Mobility and Accessibility: Intermodal Connectivity and the Respect for the Needs of Special Users	Provide and strengthen multi-modal connections, including pedestrian and bike connections, to communities off the corridor and across the highway	2
Mobility and Accessibility: Intermodal Connectivity and the Respect for the Needs of Special Users	Maintain access to communities	2
Mobility and Accessibility: Intermodal Connectivity and the Respect for the Needs of Special Users	Recognize and respect the draw of the mountains for recreation	2
Decision Making: Balancing Various Decision Making Considerations	Engage different communities and involve them in decision making process	2
Communities	Consider land use and how town development affects transportation	2
Environmental: Specific Environmental Issues	Support and preserve habitat corridors and linkages	2
Sustainability	Integrate and balance transportation alternatives with growth and land use	2
Aesthetics	Preserve and enhance natural and cultural beauty of corridor surroundings	2
Safety	Enhance safety for first responders, motor carriers, transportation workers and people who live on the corridor	2
Mobility and Accessibility: System Connections and Effectiveness	Enhance mobility to all points along the corridor	1
Historic Context	Maintain sensitivity toward the existing built environment, historic	1

	environment, others	
Category	**Issue**	**Dots**
Communities	Coordinate among communities in the design/construction of I-70, transportation modes, and management of recreation use on public and private lands	1
Environmental: Environmental Objectives	Promote and support restoration	1
Environmental: Environmental Objectives	Minimize construction impacts	1
Aesthetics	Protect views and aesthetics and ensure the ability to enjoy the beauty of the corridor's resources	1
Safety	Accommodate safe hazardous materials transport	1
Safety	Minimize animal/vehicle collisions	1
Safety	Encourage responsible driving	1
Decision Making: Balancing Various Decision Making Considerations	Maintain and enhance quality of land, water, air	1
Decision Making: Overall Objectives of the Decision Making Process	Develop good design alternatives	1
Decision Making: Overall Objectives of the Decision Making Process	Facilitate affordable and effective solutions	1
Decision Making: Overall Objectives of the Decision Making Process	Enhance and support long-term statewide transportation planning	1
Decision Making: Overall Objectives of the Decision Making Process	Promote long-term solutions that work well	1
Decision Making: Overall Objectives of the Decision Making Process	Build it to last for the future and develop lasting value	1

Four comments about potential screening criteria were submitted. They were:

- Consider bus/HOV/future light rail concepts to Towns like Dillon/Silverthorne, Frisco, Copper, Vail, etc.

- The "How well does the alternative address local access traffic" criterion should address the added impact of additional traffic and traffic lights associated with the planned Lowes and Home Depot.
- Does Summit County have a local comprehensive plan?
- I would like to see the plan accommodate a Summit Stage stop on the northeast corner of Adams and Wildernest.

A summary of the issues identified on the issues maps is below.

- The intersection of SH 9 & Wildernest – Big problem
- In looking at the interchange, we need proper accommodation for pedestrians. They should be included in the design of the interchange, not only piecemeal segments here and there.
    - Need to move pedestrians from one side to another
- New development in the area (e.g. Lowe's, Home Depot) will increase congestion
- Silverthorne Recreation Path – Bad pedestrian crossing. Cars don't anticipate crossing
- Adams Ave. & Wildernest – Two stoplights will impact congestion at interchange
- Congestion impacts extend past Target on worst days
- Need to get through interchange without stoplights
- Improve north/south connectivity to remove local traffic conflicts with highway-bound traffic
- It's important that the interchange design preserve space for the potential rail line
- Roundabouts?
- Believe Brian Ave. from 2nd to 6th should be included in study area
- Exit 205 should look at using Adams Avenue as a bypass
- SH 9 should become Silverthorne Main Street
- Wildernest, Stephens Way & Ramp – Key cut-through for locals that can create significant gridlock
- Conflict with old pairings (shopping, local employment, etc.)
- New access point off I-70 west of the existing interchange?
- Be sure to consider north/south connectivity under I-70 for periods when the tunnel is closed and gridlock exists in Silverthorne and Dillon. During these periods, one cannot go north/south within the communities
- Despite sign changes, people are still accidentally making a left from SH 9 and ending up going the wrong way up the exit ramp from WB I-70. This is a serious safety issue.
- Truck's w/overheated brakes exiting I-70 are still a problem a this intersection.

I-70 Silverthorne/Dillon Interchange

Existing Land Use Technical Report

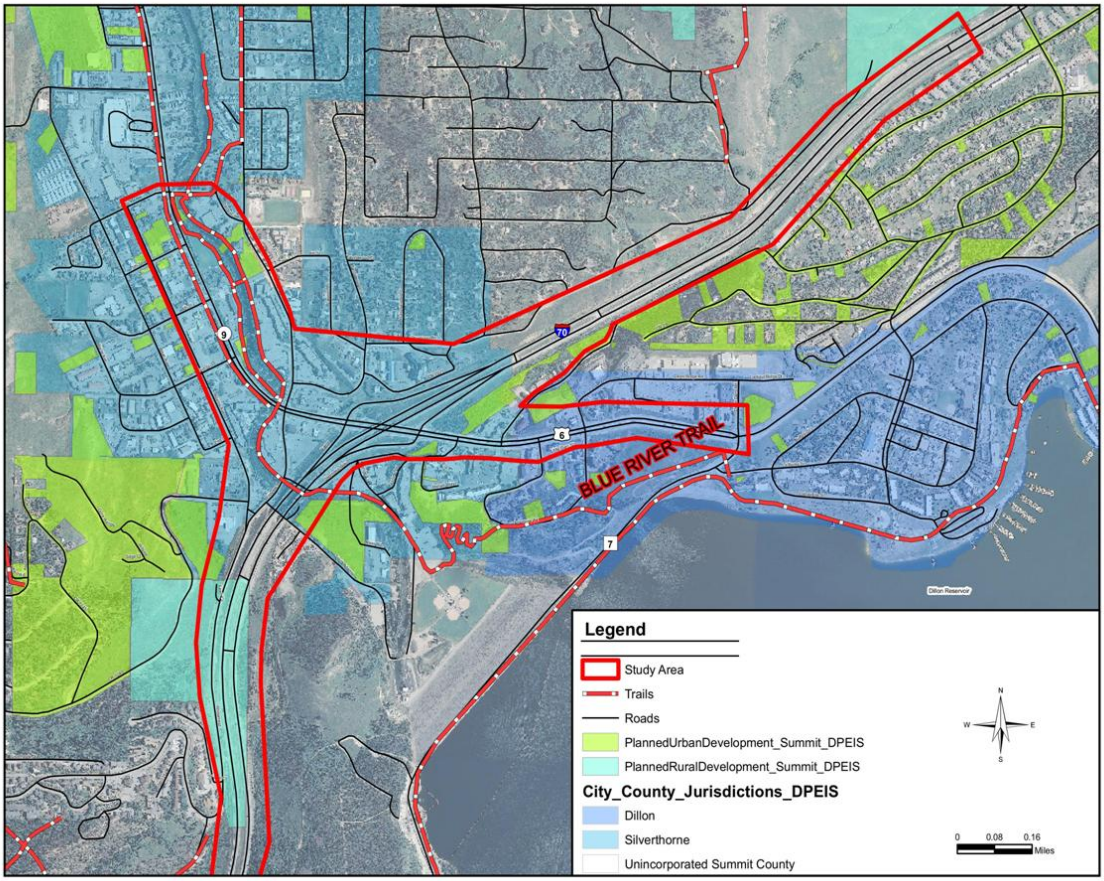
Prepared by Ordonez and Vogelsang, LLC

February 2011

INTRODUCTION

The project study area includes the jurisdictional areas of Summit County, the Town of Silverthorne (primarily northwest of the I-70 interchange) and the Town of Dillon (southeast of the Interchange) as depicted in Figure 1 below. While the study area boundaries shown in red in Figure 1 focus primarily around the interchange, the consideration of existing and future land use factors extends to a broader area north and south along SH 9 and US 6.

Figure 1 - Jurisdictions within the Project Study Area



Source: AECOM, 2010.

Existing Land Use

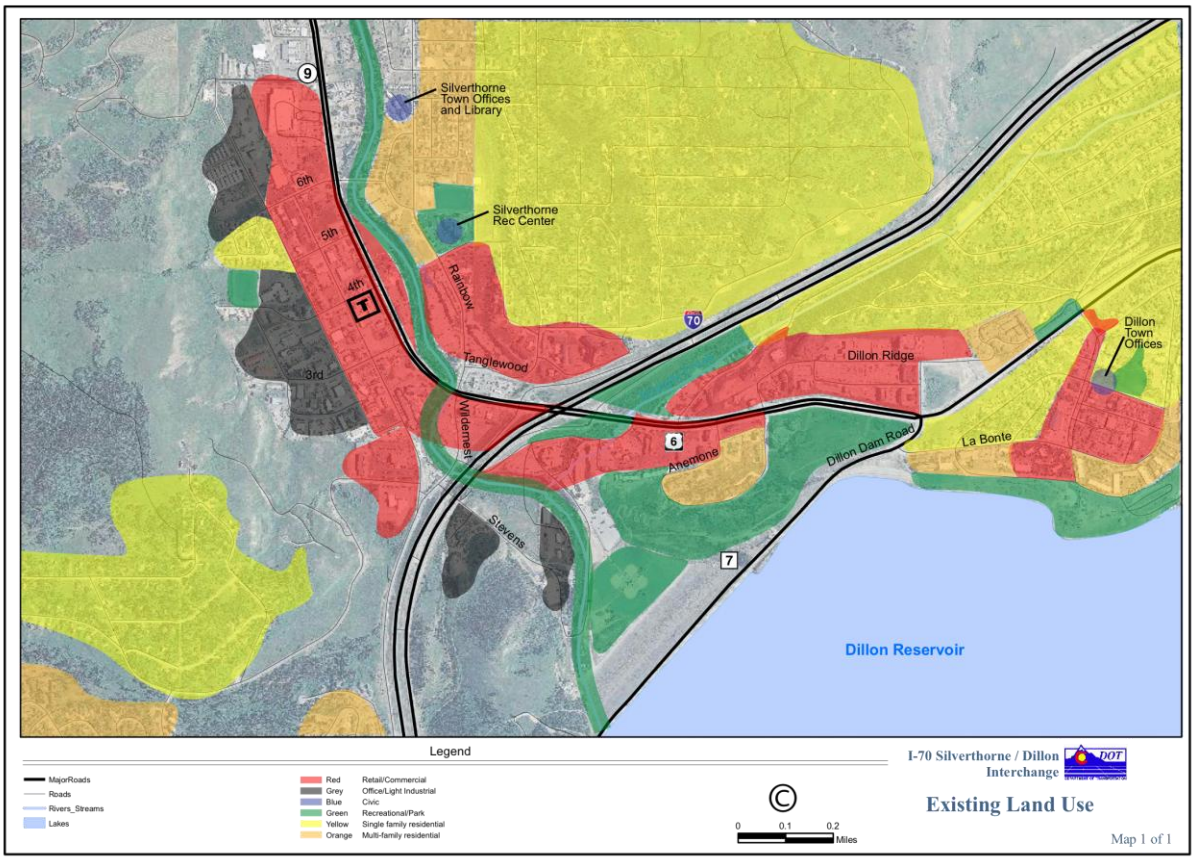
Commercial, office and industrial uses are located almost entirely within the Town of Silverthorne and Town of Dillon, with the exception of a gravel mining and crushing operation located just north of the Silverthorne town limits. Generally, light industrial uses occupy the majority of land southwest of SH 9 in Silverthorne. Commercial, retail, food and lodging uses are located along either side of SH 9 in Silverthorne. The factory outlet stores and supporting

retail extend both north and south of the I-70 interchange in Silverthorne. New commercial and retail uses including restaurant, hotels, grocery and retail shopping have developed north of US 6 in Dillon, and local retail uses continue in the Dillon Town Center, south of US 6 at Dillon Reservoir.

The unincorporated residential land surrounding the Town of Silverthorne to the north and west of I-70 has a variety of low-density residential uses, with some areas containing residential lots of 20 acres or greater north of town. Higher residential densities of up to 25 units per acres can be found west of Silverthorne in portions of the Wildernest area. Moderate density single-family and multi-family residential neighborhoods, along with school and church uses, are located north of US 6 in Dillon Valley.

Existing land use categories by location are identified within the project study area as shown in Figure 2.

Figure 2 - Existing Land Use by Category



Source: OV Consulting, 2010

County and Municipal Land Use Planning

There are a number of Summit County and Municipal planning documents that assess existing land use and development patterns and project future land use development in the study area. This section highlights the County Plans that guide general land use planning in the study area, and examines in more detail the existing and planned land use patterns in the jurisdictional areas of Silverthorne and Dillon which lie specifically within the study area. The principal planning documents relevant to the land use review include:

- Summit County Comprehensive Plan: Lower Blue River Master Plan, Snake River Master Plan
- Town of Silverthorne Comprehensive Plan
- Town of Silverthorne Design District Standards
- Town of Dillon Comprehensive Plan
- Town of Dillon Downtown Center Redevelopment Plan

Summit County Planning

Lower Blue River Master Plan

The Summit County Countywide Comprehensive Plan is intended to provide general policy guidance and serve as the umbrella document for its sub Basin Plans, including the Lower Blue River Master Plan and Snake River Master Plan that encompass the study area, on either side of I-70. The Basin Plans are intended to serve as the primary documents for particular guidance envisioned for the Basin, and to work in harmony with the Countywide Comprehensive Plan, newly updated and adopted by the County Board of Commissioners in March 2010.

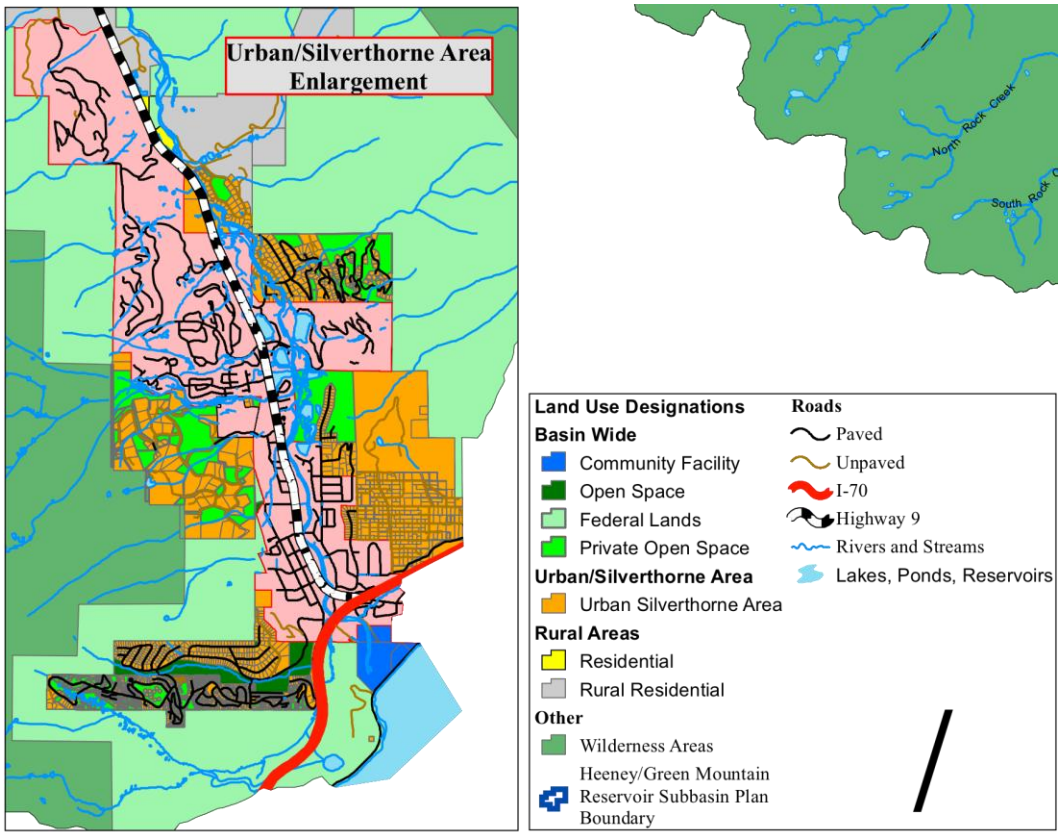
The Blue River Basin Plan applies to all unincorporated land in the Basin from Dillon Dam on the south to the Grand County-Summit County line on the north. The majority of the study area lies within the Blue River Basin, however, the Town of Dillon is located in the Snake River Basin and information for the town area is pulled specifically from the Snake River Basin Plan.

The Lower Blue River Basin Plan divides land use into two types of designations; the Rural Area and the Urban/Silverthorne Area. The Plan's philosophy and goals focus development in existing urban areas and protect rural, outlying areas of the Basin from

Because Summit County is such a high tourism county, it is necessary to consider not only the permanent population, but also the second-home population and peak population. All of these greatly impact Summit County during the winter months. During the 1990 ski season the estimated population was 12,881 permanent residents, 61,310 second home residents or short term residents, and at peak times 91,323 residents. Peak time includes first-home, second home residents, day skiers, and visitors. (://www.summitcove.com/area-info/summit-county/ states)

development pressure. The Plan thereby allows for higher density development in the identified Urban/Silverthorne Area and land use designations for a range of activities, urban development patterns and the utilization of Transfer Development Rights for increased development within the urbanized area. See Figure 3 for Urban/Silverthorne Area.

Figure 3- Land Use Map Urban/Silverthorne Area - Summit County Lower Blue River Master Plan



Source: Lower Blue Basin Master Plan, Summit County, 2010.

The Summit County Comprehensive Plan and its Basin Plans promote the utilization of Transfer Development Rights (TDRs) as a planning tool to redirect growth and development and to protect valued resources in undeveloped parts of the County. TDRs provide a mechanism to help preserve resources by providing an incentive for landowners who might otherwise develop their properties to seek compensation through the program, or seek to develop in more appropriate locations such as the designated urbanized areas. As of October 2009, a total of 1,501 acres had been protected County-wide through the utilization of TDRs and specifically in the project study area:

- The Snake River Basin has had a TDR program in place since 1998, and has had nine (9) separate TDR transactions protecting approximately 300 acres.

- The Lower Blue Basin TDR regulations were adopted in September 2007, and the basin has had one (1) transaction protecting 20 acres.

The County, in combination with the Town of Silverthorne, has evaluated ultimate residential build-out potential permitted by zoning, as well as a realistic-build-out. As of July 2009, realistic build-out of the Basin was 7,581 residential units. To date, total units built basin-wide are 5,355 or roughly 70% of build-out. According to the Summit County Planning Department and Town of Silverthorne, total units within the County will be 4,933 at realistic build-out, and within the Town of Silverthorne, 2,648 units.

Permanent Resident Population Estimates

According to Summit County 2010 population estimates, Silverthorne has a resident population of 4,355 and the Town of Dillon, 867.

The majority of all Affordable Workforce and Employee Housing Units in the Basin are located in the Town of Silverthorne. According to the Summit County Planning Department and Town of Silverthorne, there are 182 existing units with a potential for 284 units as of 2009. It is recognized that properties within the Town of Silverthorne provide good opportunities to locate affordable housing, as they are typically within proximity to employment, have the necessary infrastructure to accommodate higher residential densities and provide better opportunities for redevelopment and infill.

There is not a significant amount of commercially zoned land within the unincorporated areas of the County. The majority of commercial activity is located within the incorporated towns. The Summit County Comprehensive Plan states that although commercial build-out is somewhat difficult to estimate, it is assumed to be at approximately 62% of build-out in the unincorporated portions of the County. (Source: Summit County, Land Use Element of Summit County Comprehensive Plan 2009.)

Snake River Master Plan

The Snake River Master Plan applies to the unincorporated land from the Dillon Reservoir southeast to encompass the drainages and tributaries of the Snake River, to the top of Grays Peak, including the Town of Dillon, Montezuma and unincorporated areas of Dillon Valley, Summit Cove and Keystone. Ten miles of Interstate 70 runs through the northwest portion of the Snake River Basin, extending from the western edge of the Eisenhower Tunnel down to the Town of Silverthorne, and encompassing the eastern portion of the study area.

The Snake River Basin experienced significant growth in the 1990's. Excluding Dillon Valley, but including the Town of Dillon, permanent population growth in the Basin from 1990 to 2000 was approximately 2,671 residents. Since 2000 permanent population growth has slowed and modest growth is anticipated through 2020, as shown in Table 1.

Table 1 - Existing and Projected Population: Snake River Basin

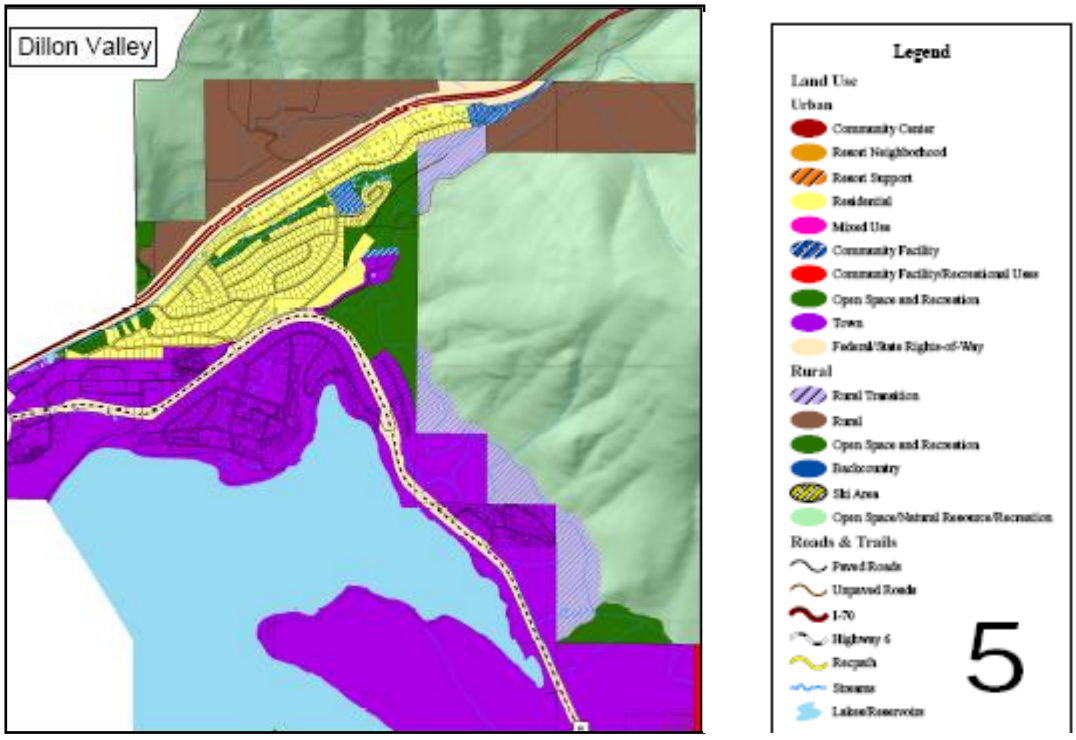
Existing/Projected Population	1990	2000	2009	2010	2020
Town of Dillon	553	802	861	897	1,178
Snake River Basin	1,765	4,187	5,205	5,538	7,271

Sources: Colorado Department of local Affairs Demography Section, Summit County Planning Department, Snake River Basin Plan, 2010.

The Snake River Basin consists of a variety of land use types and development patterns. The predominant uses include National Forest lands, a town center in Dillon, the US 6 corridor, permanent residential neighborhoods in Dillon Valley and neighboring resort development at Keystone. The linear orientation of the valley along the Snake River and US 6 has greatly influenced the development pattern of concentrated commercial/retail uses with highway access, supported by "off-highway" residential and recreational uses. Of the total 74,216 acres in the Basin, only 821 acres or just over 1% are managed by the local municipalities of Dillon, Montezuma, Silverthorne and City and County of Denver (Denver Water).

Figure 4 highlights in yellow the existing residential uses in the unincorporated area of Dillon Valley and indicates the majority of the Basin along US 6 that lies within the jurisdiction of the Town of Dillon.

Figure 4 - Land Use Map Unincorporated County, Snake River Master Plan



Source: Snake River Master Plan, Summit County, 2010.

In order to preserve open spaces and retain each community's identity, development in the Snake River Basin is to be clustered. The Snake River Basin Plan indicates that in the southeast Dillon area, the most appropriate location for clustered residential development is immediately surrounding the Corinthian Hills subdivision, within the Dillon town limits. However, the Town of Dillon is approaching residential build-out under the current planning efforts. Of the 10,172 total residential units allowed in the Basin, 1,755 are slated to be within the Town of Dillon. As of July 2009, only 23 units remained to be built for Dillon to reach full build-out.

Per the Town of Dillon's 2008 Comprehensive Plan, approximately 529,365 square feet of commercial is built within the Town. A total of 601,773 square feet of commercial is permitted, therefore, Dillon is approximately 88% built-out in terms of commercial use. (Source: Snake River Master Plan, 2010)

Town of Silverthorne

The Town of Silverthorne is approximately 4.2 square miles in size and acts as a gateway to Summit County. US 6 runs east-west from I-70 to the eastern Town limit and SH 9 generally runs north-south from I-70 through Town to the northern Town limit. The town is bisected by Interstate 70. Wildernest Road provides access to some commercial areas within the core of Silverthorne and also provides the primary access to the Wildernest subdivision, in unincorporated Summit County. Willowbrook Road is a long east-west roadway that serves one of the more dense residential areas within the Town limits. The roads within the commercial core south of 6th Street and west of SH 9 are generally configured in a grid pattern.

The current land use pattern in the Town of Silverthorne is generally composed of residential land uses in northern and eastern areas of Town with commercial uses in the western and southern areas of the Town. Development in town is concentrated on either side of the interchange and along US 6 and SH 9. All development in town is governed by the Silverthorne Town Code, the Town's Comprehensive Plan and the District Design Standards, as discussed in this section.

Population

Silverthorne has a large percentage of permanent full-time residents compared to other municipalities within Summit County. Silverthorne's population has steadily increased over the past decades, since its incorporation in 1967, as shown in Table 2.

Table 2 - Historic Population: Town of Silverthorne

Year	Population
1970	400
1980	989
1990	1,768
2000	3,422
2008	4,065

Source: Colorado Department of Local Affairs, Division of Local Govern, State Demography Office, 2008

Zoning

There are nine zone districts in the Town of Silverthorne that regulate the types of land uses allowed within each zone district area. They are organized into five categories: Residential, Commercial, Open Space and Public, Planned Unit Development, and Mixed Use (Town of Silverthorne, 2008).

Within the project study area there are two Commercial zones; C1 in red, C2 in orange which govern the majority of business along and adjacent to SH 9.

- Commercial 1 (C-1) Zone District – sales and service facilities and establishments which conduct all activities inside and may require outside display, some outside servicing and/or secured storage for large merchandise.

- Commercial 2 (C-2) Zone District - Heavy Commercial Zone District that allows for uses that do not require visibility from main thoroughfares, are fairly self-contained operations, and are likely to have large vehicles associated with a service production.

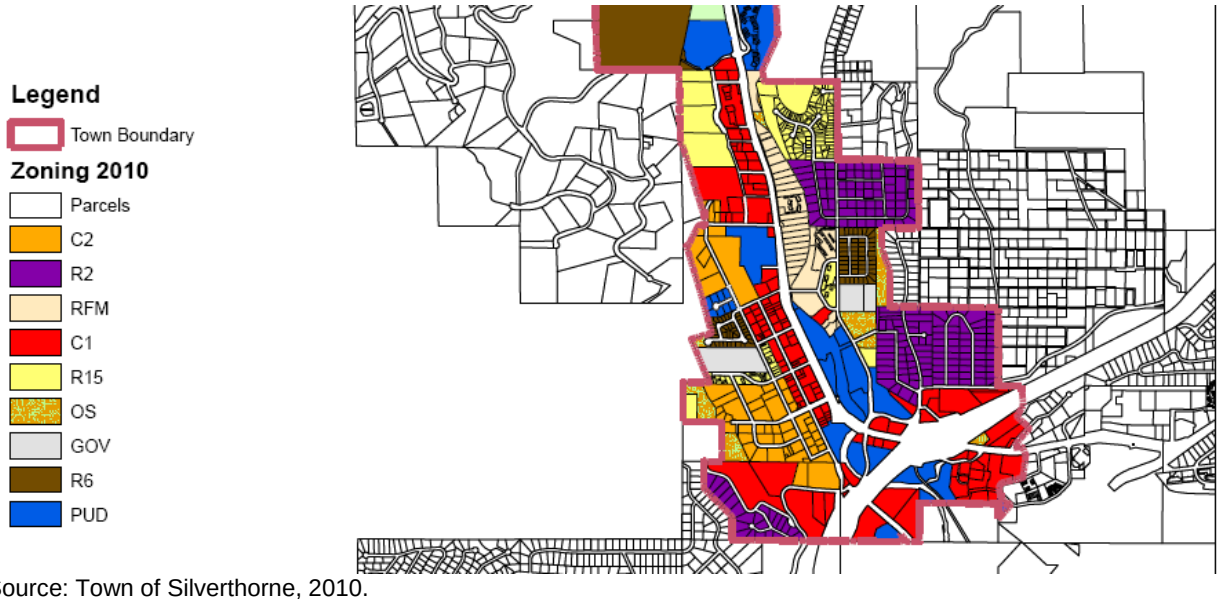
The PUD area is indicated in blue and includes the majority of the factory outlet stores north of the interchange. The purpose of the Planned Unit Development is to encourage flexibility and creativity in development in the Town of Silverthorne and to encourage a shift in today's factory outlet pattern to a more intensive, higher density mix of uses in the future. This area is complemented by the adjacent River Front Mixed Use Zone, shown in light yellow.

The RFMU Zone District is intended to promote the Blue River as the central image of the Town with a variety of mixed uses including commercial, entertainment, residential, public, and recreation uses.

Residential uses within the study area are zoned for a mix of densities for single family and multi-family uses and are located primarily along the Blue River, northeast of the interchange in areas shown in yellow, brown and purple.

- R-2 Zone District – residential uses with an average density of 2 dwelling units per acre
- R-6 Zone District – residential units with an average of 6 dwelling units per acre
- R-15 Zone District – residential uses with an average density of 15 dwelling units per acre

Figure 5: Town of Silverthorne Zoning Map



Source: Town of Silverthorne, 2010.

Residential and commercial development activity has slowed in Silverthorne over the past seven years. The average number of building permits issued from 1990 to 2000 was 182 permits per year. However, the average number of building permits issued from 2001 to 2007 was 100 permits per year.

Town of Silverthorne Design Districts

The Town of Silverthorne is spatially organized into a collection of districts that are linked together by travel or open space corridors. There are six Design Districts that provide additional site and architectural standards and set maximum allowable heights for development within the district. The most relevant of these districts to the study area are the Gateway District, the Core District and the Core Periphery District described below and shown in Figure 6.

- The Gateway District is located in the south-eastern portion of the Town (blue) and is the highly visible front door to Silverthorne. Higher development densities are encouraged and the mix of uses should be oriented to the vehicle and the interstate/highway traveler.

Convenience and accessibility are important features of this District. Maximum allowable building heights are 70-feet.

- The Town Core District (red) allows for a diverse mix of commercial uses with retail and restaurant uses on the ground level being considered the highest priority. Residential uses and other compatible commercial uses will be allowed on levels above the ground floor only. Activity along the Blue River, including the Town Center, Recreation Center (62,000 sq. ft.) and the Pavillion (13,900 sq. ft), acts as an economic anchor to the core. This district is very pedestrian-oriented and development should be compact, walkable and attractive with an allowable building height of 45-feet. A large volume of vehicular traffic travels along the highway through this District, however, the District aims to create opportunities to encourage visitors to stop, park their cars and spend time in a safe, pedestrian friendly, village-like setting.
- In the Town Core Periphery District (green) infill development should provide a pedestrian friendly setting with a variety of service-oriented uses and multi-modal linkages. This district should be pedestrian-oriented but scaled to vehicular traffic as well. Maximum allowable building heights are 40-feet (Town of Silverthorne, 2010).

Figure 6 - Silverthorne Design Districts Map

Town of Dillon

The Town of Dillon is located at the northern edge of Lake Dillon and runs from a joint boundary with Silverthorne on the north side of US 6 east to Dillon Cemetery. Most of the Town is located in areas that are relatively flat, however portions of Dillon on the north side of US 6 including the Corinthian Hill subdivision have been developed on the hillsides. Several elements have influenced the development patterns in Dillon including the Dillon Reservoir, US 6, Dillon Valley residential area of unincorporated Summit County, retail development in Silverthorne and I-70.

Today, land use development in Dillon is concentrated along US 6 with new commercial retail just north of US 6 in the Dillon Ridge Market Place, located at US 6 and Dillon Dam Road. The Market Place is the primary commercial center in the town and is comprised of a major grocery store, sporting goods store, bookstore, home furnishings stores restaurants and other supporting commercial uses. It is the highest sales generating development in the town and additional uses, such as Walgreens and infill restaurant uses have recently gone in adjacent to this core development.

The Dillon Town Center over the years has become more of an office location than a core commercial area, as it previously was. This key area in town has become the focus of a major revitalization effort guided by the Dillon Economic Revitalization Advisory Committee, as discussed later in this section.

Today low-density single-family residential uses are found east and west of the Town Center. Multi-family uses are developed adjacent to Lake Dillon. This general residential pattern was supplemented over the past 10 plus years by the development of the Tenderfoot Addition and the Corinthian Hill subdivisions east of the Town Center adjacent to US 6, expanding Dillon linearly along US 6. The Lookout Ridge townhouses have also developed near the Dillon Ridge Market Place.

The Denver Water Board owns four large parcels of land within the Town limits near the Dam. These parcels for the most part are considered to be urban reserve and are unlikely to develop.

The mix of commercial/retail, residential and park or recreational uses in Dillon is illustrated in Figure 7.

Figure 7 - Town of Dillon Land Use

Source: Town of Dillon Comprehensive Plan, 2008.

Table 3 indicates the square footage of office, retail, restaurant and other uses located within the major development areas within the Town limits.

Table 3 - Town of Dillon Total Square Footage by Focus Area, 2007

	Town Center	Dillon Ridge	Anemone Trail	Other	Total Sq. Ft.
Office	69,945	26,074	21,815	5,133	122,967
Retail	15,531	179,836	29,728	716	225,811
Restaurants	11,470	12,487	14,438	0	38,395
Vacant	54,272	6,020	6,695	0	66,987
Residential	12,993	4,200	86,000	5,377	108,570
Other	44,237	1,420	3,324	14,984	63,965
Hotel (units)	0	46,500	21,661	7,044	75,205
Total sq. ft.	208,448	276,537	183,661	33,254	454,160

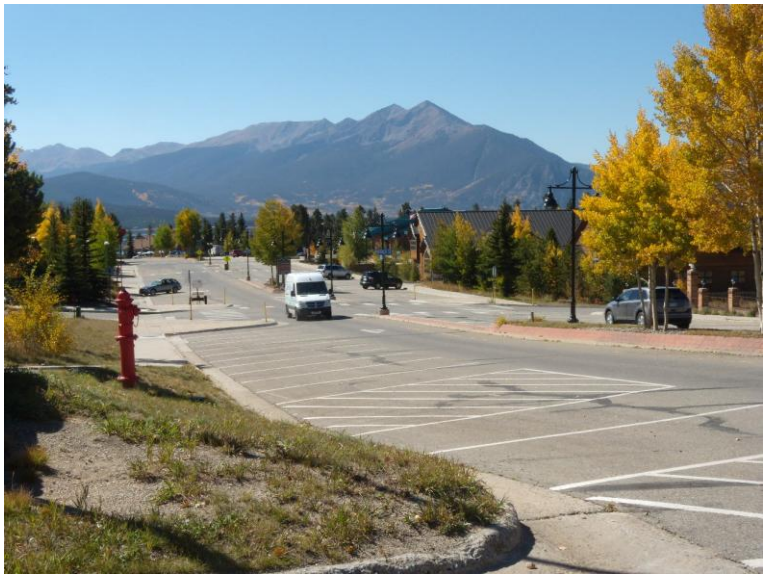
Source: Town of Dillon Comprehensive Plan, 2008

Zoning

The Town of Dillon zoning map indicates the land use designations within the study area. Along Lake Dillon, parks and open space are prevalent. The commercial areas north of US 6 are zoned primarily for Mixed Use commercial uses. The Town Center has a specific area zoning of Core Area Retail, although this zoning may change with efforts for revitalization and the adoption of a desired form-based code for the Town Center area. The core is surrounded by both low- density and high-density residential use zoning.

Figure 8 - Town of Dillon Zoning Map

Source: Town of Dillon, 2008.



Redevelopment of the Town Center

One of the unique features of the Town of Dillon is the Town Center, located off US 6 on the eastern edge of the project study area. The Town Center and surrounding area of 172 acres was designed in 1961 with a land use pattern that placed retail, civic and school uses on the interior of a ring of single-family residential uses. The entire Center was and still is bounded by US 6 and the Dillon Reservoir.

Today's Town Center land uses include multi-family residential and visitor lodging, recreational uses, suburban style retail and office uses and Dillon Town offices and other civic uses. The Town of Dillon has worked over the past 20 years to develop a vision for change for this area. They have implemented street and streetscape improvements in 1993, developed an improved pedestrian connection to Lake Dillon, adopted the Dillon Town Center Redevelopment Plan, 2009, and put in place an Urban Renewal Authority in 2009. Amendments to the PUD regulations and streamlining of the development review process adopted in 2010 will greatly enhance the opportunities for this area to modify its mix of uses and densities, increase street level activity and create a compact walkable core.

Land Use References:

Summit County. 2010 *Summit County Lower Blue Master Plan*. March.

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Summit County. 2009. *Summit County Comprehensive Plan.* October.

Town of Dillon. 2008. *Town of Dillon Comprehensive Plan Update 2008.* March.

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I-70 Silverthorne/Dillon Interchange

Existing and Future No Action Traffic Technical Report

February 2011

INTRODUCTION

As part of the I-70 Silverthorne/Dillon interchange environmental study, this report documents existing traffic conditions and future 2035 No Action conditions for the interchange and surrounding and intersecting roadways. As part of this effort, VISSIM simulation models were built and calibrated for the analysis. The models and findings of this report will serve as the basis for the alternative analysis to be conducted in Phase 2 of the project.

By way of orientation, it is assumed in this study, and by the project as a whole, that US 6 and SH 9 are north/south facilities and that I-70 and its ramps are east/west facilities. Every cross street intersecting US 6 and SH 9 are also considered east/west facilities.

Data Collection

Week-long, 24-hour a day traffic counts were performed on each of the four interchange ramps and on US 6 and SH 9, both directions, just outside the interchange. These counts were conducted during the last full week of August 2010. During the same week, turning movement counts were conducted at all study intersections in the study area. The intersections counted were the following:

- SH 9 and 4th Street
- SH 9 and 3rd Street
- Nike Driveway
- SH 9 and Wildernest Road
- I-70 WB Ramp (Silverthorne/Dillon)
- I-70 EB Ramp (Silverthorne/Dillon)
- SH 6 and Stephens
- SH 6 and Little Beaver Trail
- SH 6 and W Anenome Trail
- SH 6 and Dillon Ridge Rd

The turning movement counts were collected for weekdays during the midday and afternoon peaks, and during Friday and Saturday afternoons. Based on these counts, it was determined that Saturday afternoon was the peak flow for the roadways within the study area during the count period.
After taking the counts, the study area was slightly expanded by CDOT to include the following additional intersections:

- SH 9 and 6th Street
- SH 9 and 5th Street
- US 6 and Dillon Dam Road

Existing traffic turning movement counts for these intersections were taken from a traffic signal timing study being conducted for SH 9 and US 6 by CDOT. These counts and the counts conducted for this study were then normalized to render a single set of existing turning movement counts.

An additional source used in the data collection effort was automatic traffic recorders (ATR) located on I-70 at the Eisenhower Tunnel and on SH 9 and US 6, north and south of Silverthorne/Dillon respectively. This data was used to determine the demand for the I-70 mainline lanes as well as used to determine overall travel demand patterns and daily traffic variations. Existing traffic counts reflecting a Saturday afternoon in August 2010 are depicted on Figure 1.

Based on the traffic turning movement counts, existing traffic origins and destinations (OD) were estimated based on the data collected. OD information is a necessary input into the VISSIM modeling process. Figure 2 depicts the OD demands for the traffic passing through the study area, traffic with either an origin or a destination within the study area, as well as trips internal to the study area. It is recognized that many of the internal trips depicted may be either pass-by trips (i.e. a motorist exiting to get gas then continuing to a destination outside the study area), or part of a linked trip (part of a single trip with a set of intermediate destinations). This means that some of the internal trips depicted don't necessarily mean the ultimate destination or origin of the trip was within the study area but rather that an internal stop was part of the trip.

Figure 1 - Existing Levels-of-Service and 2010 August Saturday peak hour turning movements

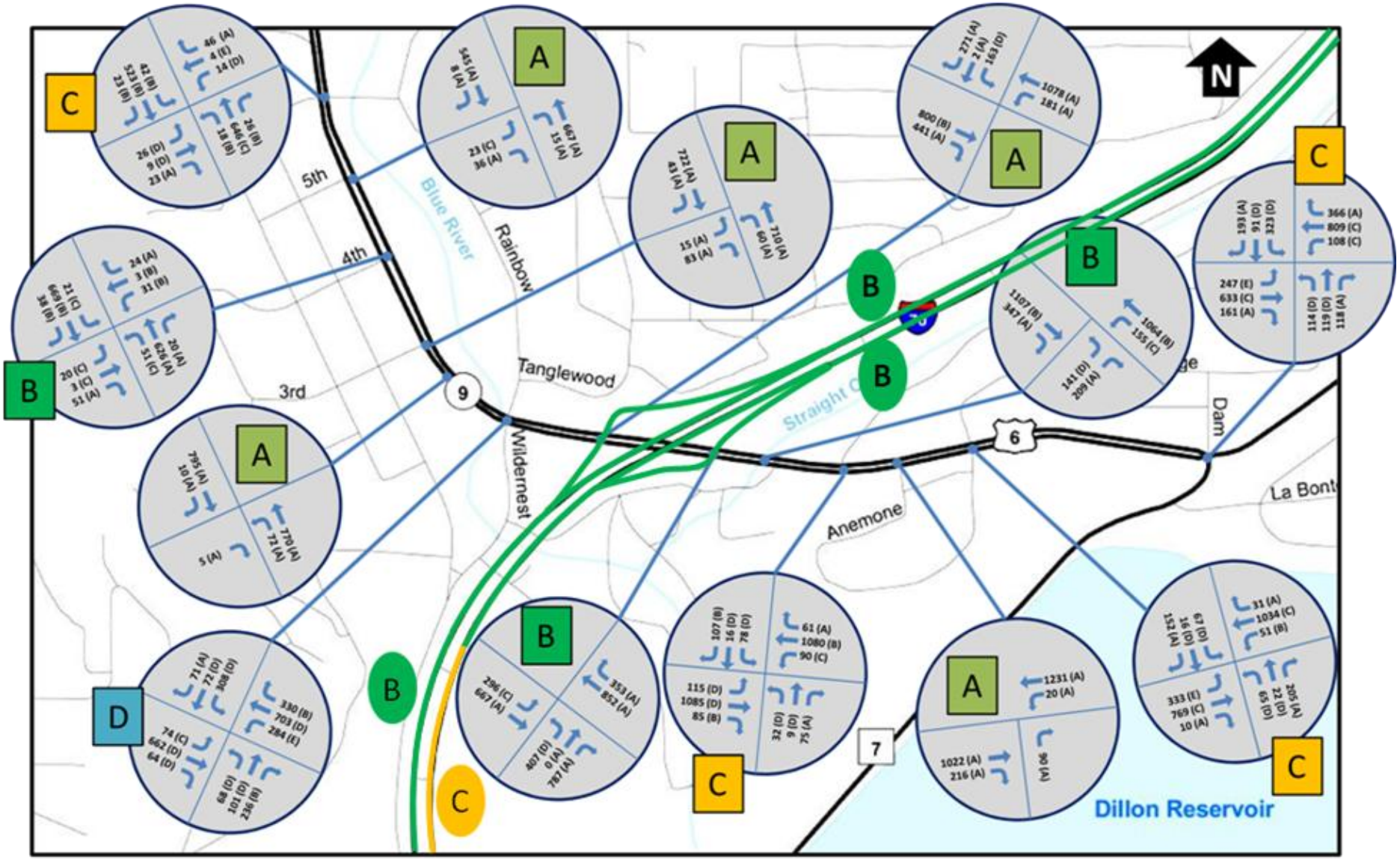
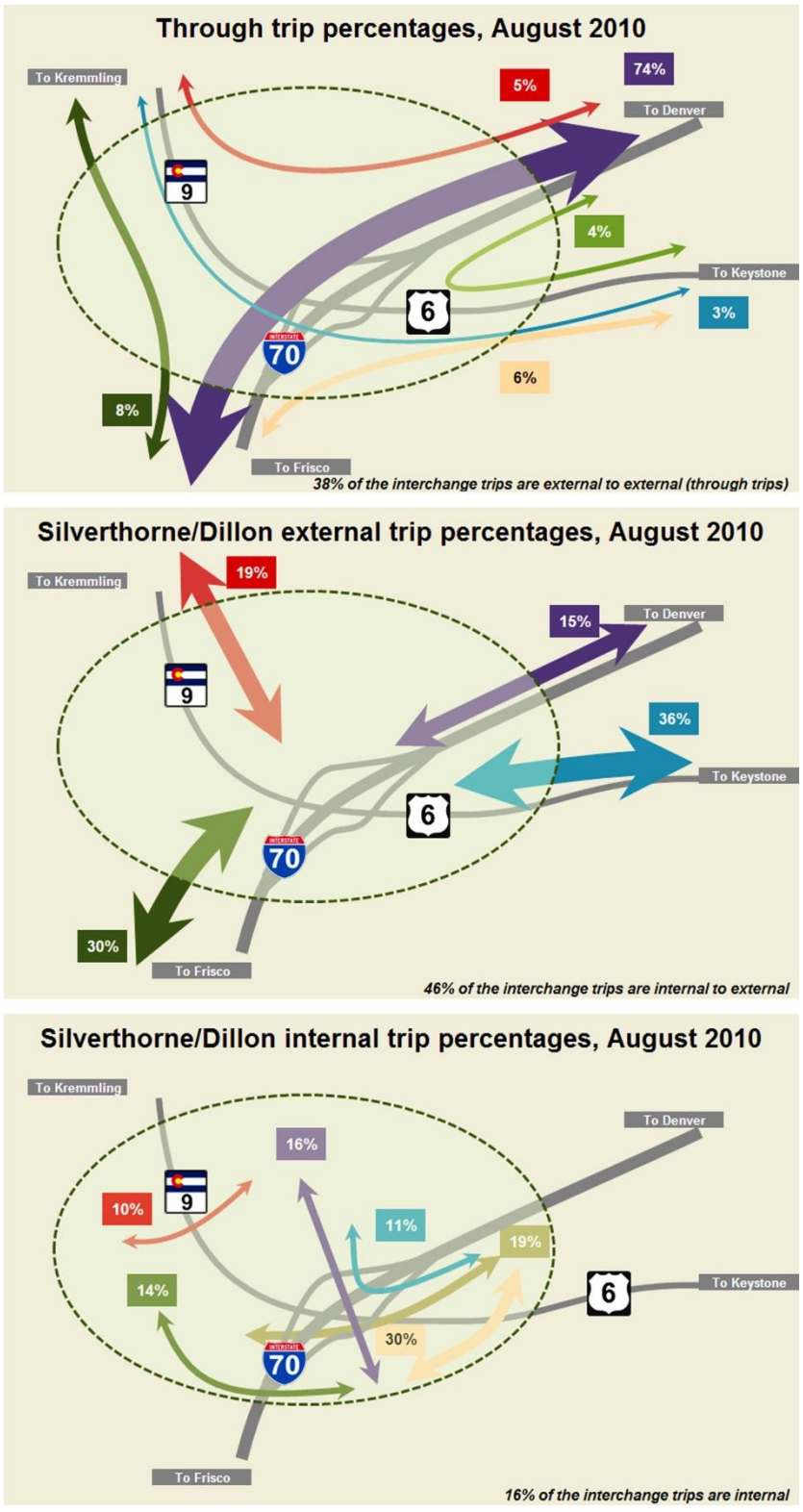


Figure 2 - Origin-destination (OD) estimates of existing travel patterns



Future Travel Demands

Future travel demands were estimated for a Saturday afternoon in August 2035. The following describes the methodology used in developing these forecasts.

Future travel demands were developed using a variety of sources. Existing traffic counts conducted in August 2010 were the starting point for all future-year travel forecasts. These counts and the trip patterns they suggest provided the base over which the more generalized demand growth rates from the RDPEIS model were then overlaid on these observed patterns. This methodology accounts for both local travel patterns and constraints while still being consistent with the overall macro-level growth patterns suggested in the RDPEIS model.

In March 2007 Felsburg Holt & Ullevig (FHU) conducted a traffic study for the Town of Silverthorne to assess the impact of proposed new commercial projects near the existing factory shops at the interchange. The 2030 forecasts from the FHU study are nearly identical with those reported for 2035 in this study. While there were some minor differences, most notably the fact that FHU forecasted more growth towards Keystone during peak periods, both this study and the FHU study recognize the need for improvements to the interchange and the US 6/SH 9 corridor to maintain adequate traffic flows with future traffic growth.

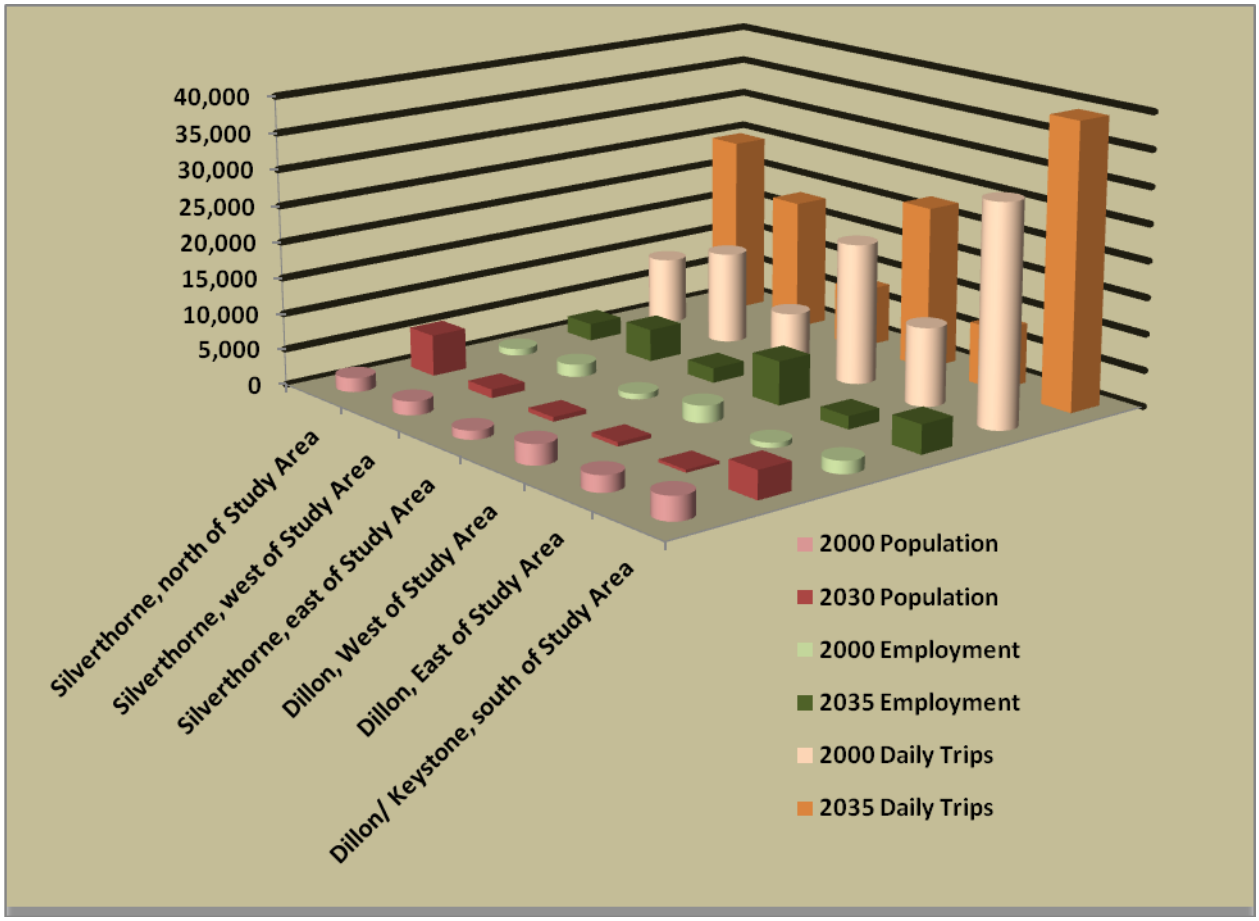
Future year travel demands were estimated by splitting the land uses of the study east and west of US 6/SH 9 and further north and south of I-70. This results in four analysis areas; Silverthorne West, which is west of SH 9 and between I-70 and roughly 6th Street, Silverthorne East bounded west by SH 9 between I-70 and 6th Street, Dillon west (west of US 6 between Dillon Dam Road and I-70), and Dillon east of US 6 between I-70 and Dillon Dam Road. Two other analysis areas were also taken into consideration. SH 9 north of Silverthorne from about 6th Street to the end of the Silverthorne town area development, and US 6 southwest of Dillon Dam Road including Keystone. From the sources mentioned above, future year land use and daily trips forecasts were developed by AECOM to reflect not only regional growth patterns but also anticipated Dillon/Silverthorne generated traffic growth from future development. The following in Table 1 are the transportation demands and the corresponding development generating that demand.

Table 1
Forecast Land use and daily trip forecasts (Saturday, August)

	Units		2000	2025	2035		2000	2025	2035
Population	persons	Silverthorne, north of Study Area	1,950	4,800	5,710	Dillon, West of Study Area	2,840	480	570
Households	households		670	1,860	2,210		1,190	190	230
Basic Employment	# of emp.		420	1,220	1,410		1,080	3,110	3,600
Retail Employment	# of emp.		120	130	150		300	330	380
Service Employment	# of emp.		390	730	840		1,000	1,850	2,140
Total Employment	# of emp.		930	2,080	2,410		2,380	5,290	6,120
Daily Trips Generated, Saturday, Aug.	veh. trips		9,290	21,700	24,940		19,520	19,740	22,690
Population	persons	Silverthorne, west of Study Area	1,910	1,000	1,190	Dillon, East of Study Area	2,280	340	400
Households	households		810	390	460		930	130	150
Basic Employment	# of emp.		790	2,290	2,650		320	930	1,080
Retail Employment	# of emp.		220	240	280		90	100	120
Service Employment	# of emp.		730	1,360	1,570		300	550	640
Total Employment	# of emp.		1,740	3,890	4,500		710	1,580	1,830
Daily Trips Generated, Saturday, Aug.	veh. trips		12,820	15,980	18,370		10,870	7,310	8,400
Population	persons	Silverthorne, east of Study Area	1,240	530	630	Dillon/ Keystone, south of Study Area	3,240	3,260	3,880
Households	households		440	210	250		1,110	1,260	1,500
Basic Employment	# of emp.		360	1,040	1,200		500	1,400	1,620
Retail Employment	# of emp.		100	110	130		180	200	230
Service Employment	# of emp.		330	620	720		1,080	1,880	2,180
Total Employment	# of emp.		790	1,770	2,050		1,760	3,480	4,030
Daily Trips Generated, Saturday, Aug.	veh. trips		6,960	7,170	8,240		30,520	34,300	39,420
Totals						*Population*	*13,460*	*10,410*	*12,380*
						Total Employment	*8,310*	*18,090*	*20,940*
						Daily Trips Generated, Saturday, Aug.	*89,980*	*106,200*	*122,060*

The data represented above indicates an overall drop in population in the core interchange area reflecting further commercialization of the interchange area resulting in an increase in overall travel demand caused by commercial and recreation traffic. Travel demand growth is expected to more than double north of the study area while growth south towards Keystone and Loveland Pass is expected to increase at a much lower rate of increase. Figure 3 on the following page depicts this growth graphically showing some of the data presented in Table 1.

Figure 3
Population and daily trip forecasts (Saturday, August)



Growth at study area boundaries is depicted below in Table 2 for peak hour trips for August 2010 conditions to August 2035 conditions. The following provide a few notable observations about growth in travel demand.

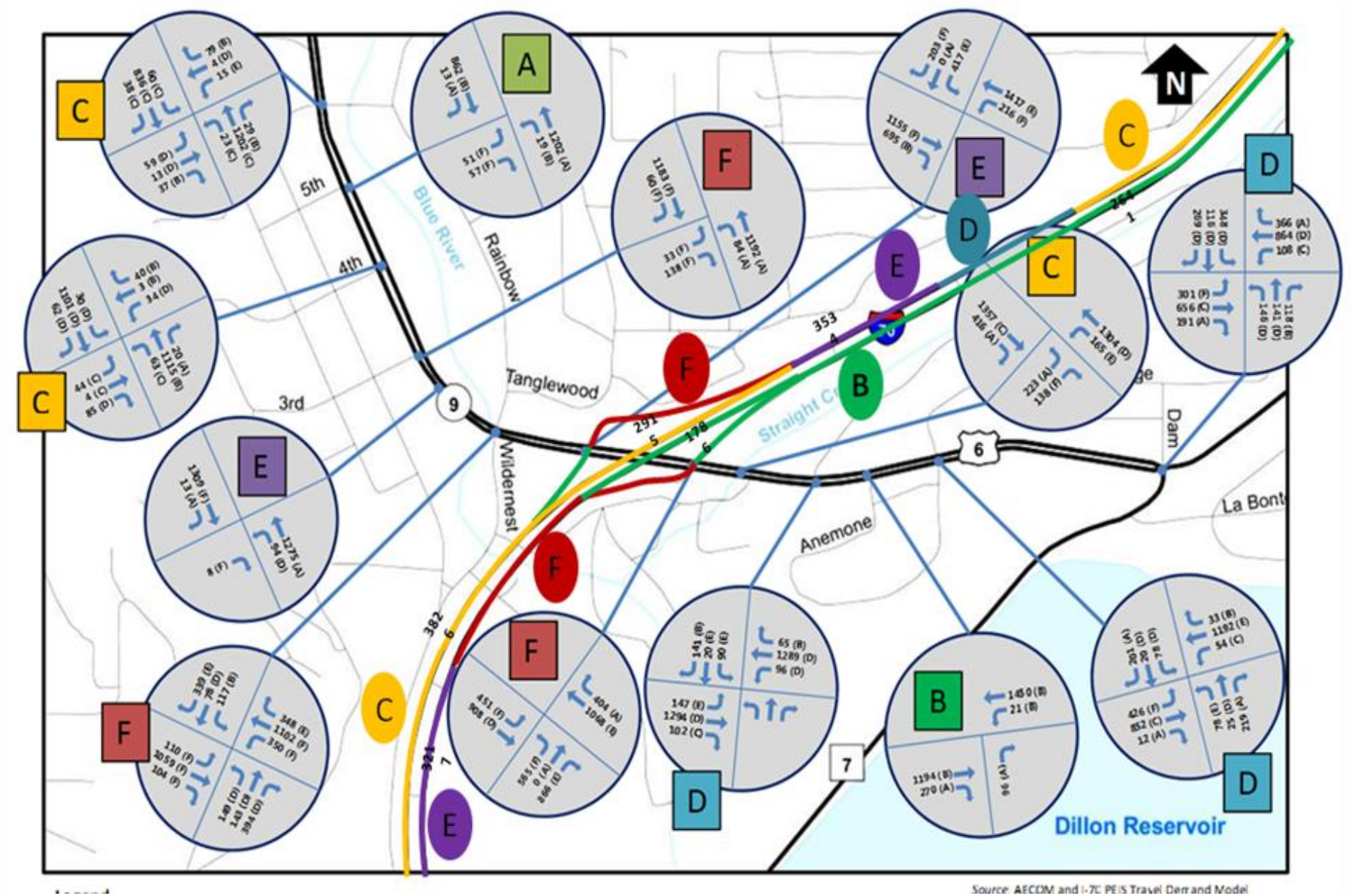
- There is expected to be a higher rate of residential development north and west of the project study area, which will result in higher peak-hour commuter-like travel patterns.
- Given that I-70 is at capacity during peak periods under existing conditions, rate of growth in peak-hour traffic from 2010 to 2035 is expected to occur at a slower rate than between 2000 and 2010. The overall travel demand is expected to continue to increase, which means that the length of time of the peak traffic conditions will increase, and the associated congestion will be experienced for more hours of the day. An example of this pattern is daily traffic growth south of the study area towards Keystone which reflects an almost 30% growth rate between 2000 and 2035 whereas the peak hour rate only is forecast to climb by 4 percent from 2010 to 2035. Given the recreational nature of travel patterns in this direction, more peak spreading is assumed accounting for this difference in daily to peak hour traffic growth.

Table 2
Traffic growth summary
2010 existing conditions to 2035 forecast levels

Traffic Area	**2010-2035 Growth in Traffic**
SH 9, north of study area	74%
Silverthorne, east of study area	22%
Silverthorne, west of study area	53%
Dillon, east of study area	37%
Dillon, west of study area	15%
US 6, south of study area	4%
I-70, east of study area	37%
I-70, west of study area	34%

Using these growth forecasts, the distribution of local trips observed in the existing traffic counts and future traffic assignment assumptions derived from existing travel patterns and those suggested in the RDPEIS model assignments, the 2035 Saturday afternoon in August forecasts depicted on Figure 4 were developed. Overall, these forecasts represent a growth rate of 27% in total daily trips in and through the study area between 2010 and 2035. This growth results in an approximate 1.0% growth in traffic per annum compounded between 2010 and 2035.

Figure 4
2035 No Action, August Saturday peak hour Levels-of-Service and peak hour turning movements



Traffic Simulation Modeling

A VISSIM traffic model was developed to analyze existing and no-build future conditions as well as to serve as a base to test future alternatives to be examined in later phases of this project. VISSIM is a state-of-the-art traffic simulation model that can be used to model complex travel movements. All delay and queuing findings reported in this study come from the VISSIM model runs.

Input data going into the models is summarized below:

- Existing and future demand were taken from the existing traffic counts and 2035 travel forecasts cited in this report.
- Traffic peaking was model with the Peak Hour Factor (PHF) taken from the traffic volume data collected as part of the traffic counts. This resulted in the assumption of a PHF of 0.95 for both existing and future conditions.
- All roadway grades were derived from the topographic survey conducted for this study.
- Existing traffic signal timing and phasing was provided by CDOT. This timing and phasing set was utilized in both the existing and 2035 future simulation models. The SH 9/US 6 signal cycle is 120 seconds with split phasing a several intersections. The impact of split phasing on future traffic operations will be discussed later in this report.
- For all locations where there are pedestrian crosswalks, 20 pedestrians per hour were assumed across each intersection leg. All minor street pedestrian movements were assumed to be actuated with major street pedestrian movements assumed to be operating on ped recall.

Five model runs were conducted for August 2010 Saturday afternoon traffic conditions as well as for August 2035 Saturday afternoon no-build conditions. Calibration of the existing conditions model was conducted by comparing the model outputs to the input traffic counts. Calibration results were very good for the existing conditions model with the industry standard GEH statistic for each intersection and ramp being below 1.5 with most locations being well below 1.0. For comparison, any GEH value under 5.0 is considered acceptable.

Observed queuing at the northbound Wildernest left turn and the southbound left turn to EB I-70 was also reflected in the model. Outside of these conditions, most of the other model movements moved freely in the simulation.

Model Results

Level-of-Service (LOS) results for both intersections and for freeway segments were calculated based on applying the *Highway Capacity Manual* LOS criteria to the VISSIM model delay and freeway density outputs. The resulting LOS is depicted on Figure 1 for August 2010 Saturday afternoon conditions. Modeled conditions are existing roadway geometries and traffic control. As depicted in Figure 1, all intersections and freeway segments operate at a LOS “D” or better.

The future traffic conditions depicted on Figure 4 show widespread congestion throughout the modeled area. Areas of concern include:

- Southbound left turn lane from SH 9 to EB I-70. 2035 forecasts indicate that this movement's demand is approximately two times the available capacity provided by the present single left turn lane.

- Split phasing at Wildernest (all movements) and Dillon Ridge Road (SB left turn movement) is also contributing to the overall levels of congestion. Although it is a tee intersection, Stephens traffic demand is such that not all of it is able to exit to US 6.

- Split phasing is also seriously constraining the quality of signal progression along US 6/SH 9. This lack of good signal progression is also contributing to congestion in 2035.

- Freeway operations are significantly impacted by the lack of capacity at the ramp signals. There is significant backing onto the freeway from the ramp operations. Once traffic flows past the off ramps good traffic conditions are again evident.

Other Studies Conducted in the Study Area

Felsburg Holt & Ullevig (FHU) in March 2007 conducted a traffic study for the Town of Silverthorne to assess the impact of proposed new commercial projects near the existing factory shops at the interchange. These proposed projects include a lifestyle center at the intersection of Wildernest Road and Buffalo Mountain Road, a potential big box south of the river along Adams Street and a hotel near the existing factory shops on the east side of I-70. The Town wanted to know if the existing surrounding roadway infrastructure is sufficient to accommodate future traffic volume forecasts for the area.

The report provided 2030 long-term traffic forecasts based on the proposed development and the Towns 2005 Transportation Master Plan. Anticipated level-of-service at area intersections, both with and without roadway enhancements, were also calculated. It also included a comparison of interchange operations between the existing diamond configuration and a potential single point urban interchange (SPUI) configuration. The interchange comparison found that the SPUI provided comparable capacity to the existing interchange configuration but did allow for better intersection spacing along US 6/SH 9.

The report indicated that several new improvements would be needed to adequately address the impact of development. These improvements were:

- Create dual left-turn lanes from northbound SH 9 to Wildernest Road.
- Widen Wildernest Road from two-lanes to four-lanes between SH 9 and Stephens Way.

- Widen the Wildernest Road bridge between Adams Street and Stephens Way in order to provide a left-turn lane into the Factory Shops access.
- Install a traffic signal at the Stephens Way / Wildernest Road intersection.
- Construct a roundabout to replace the Adams Avenue intersection with Buffalo Mountain Road and Wildernest Road. This improvement is planned to be associated with the Silverthorne Lifestyle Center development.
- Increase the storage length for the left-turn movement from eastbound Wildernest Road to northbound SH 9.
- Construct a new bridge across Blue River to access the potential big box site.
- Widen Stephens Way in order to provide left-turn deceleration lanes at a new access serving the potential big box site and at existing intersections with River Road, Fashion Lane and Merlay Way.
- Provide eastbound dual left-turn lanes from Stephens Way to westbound US 6.
- Install a raised median along Stephens Way from US 6 to just north of Merlay Way. This median would restrict the driveway accesses to right-in/right-out only.

The 2030 forecasts from the FHU study are nearly identical with those reported for 2035 in this study. At Stephens Way, there are somewhat more vehicles forecast for both Stephens Way and US 6 as compared to the 2035 forecasts of this report. The FHU report indicates that there will be significant growth towards Keystone where as the I-70 RDPEIS predicts much less growth towards Keystone during the peak hour. Regardless, both this study and the FHU study recognize the need for improvements to the interchange and corridor to maintain adequate traffic flows with future traffic growth.

A complete assessment of the FHU improvements to the interchange as well as to US 6/SH 9 will be completed in a later phase of this project. However, an initial review of the improvements indicate that they may not be alone sufficient to meet forecast 2035 conditions and that other improvements may need to be considered. Indeed, FHU's findings regarding the effectiveness of a SPUI interchange also support a broader review of interchange configurations.

Improvements identified in the RDPEIS

The RDPEIS identified an EB auxiliary lane between the Frisco and Silverthorne/Dillon interchanges in the EB direction. The RDPEIS also assumes three through lanes in the EB direction over the US 6/SR 9 bridge where there are now only two lanes in this direction. RDPEIS travel demand forecasts justify carrying three eastbound lanes across the bridge.

Currently the third EB lane between Silverthorne/Dillon and the Eisenhower tunnel results from an added lane from the EB on-ramp from the Silverthorne/Dillon interchange. This gives the entering vehicles a long acceleration lane to get up to speed. This provision for acceleration is critical given the uphill grades on the ramp and mainlines climbing toward the Eisenhower Tunnel. Maintaining an

acceleration lane in the EB direction will require widening of I-70 if three EB lanes are carried across the bridge.

The need for three lanes over the bridge in the WB direction is less critical given that the WB peak is more smoothed out over time than the Sunday EB peak as Front Range residents are heading home at the end of a weekend. The need for this third lane will be examined further with the interchange options to be looked at in the next phase of the study.

Initial Conclusions

The building and calibration of the traffic simulation models for 2010 August Saturday afternoon conditions as well as for 2035 conditions indicates to us the following:

- Interchange operations fail by 2035 with conditions forecast to cause traffic to significantly back onto I-70 in both directions without interchange improvements.

- Although the interchange demand to and from the west toward Frisco does not cause the same level of traffic operational concerns on a weekend afternoon as does the movements to and from the east (Denver), the western demand is 80 percent higher than the eastern demand towards the Eisenhower/Johnson Memorial tunnel. The major reason western traffic is not causing the same level of congestion is that southbound to eastbound movement is a left turn movement where as the SB to WB movement is a right turn movement and hence conflicts with far fewer cars. The I-70 to SH 9 movement from the east results in weaving vehicles trying to get over to make a left at Wildernest Road whereas the movement from the west has much more room to move over. Also, the northbound left turn movement onto I-70 shows much less peak hour growth reflecting the RDPEIS model assumptions. The resulting southern growth rate is significantly less than that forecasted for the north.

- Overall, there is a higher expected growth in traffic on I-70 west of the interchange than there is to the east of the interchange. This largely because Silverthorne and Dillon are much more a part of the local communities and industries to the west, than they are a part of the communities to the east. Improvements to the interchange therefore should consider that growth in travel demand to and from the west is expected to be the greatest.

- The RDPEIS model shows significant growth north of Silverthorne. This will generate heavy right turn movements from southbound SH 9 to westbound I-70, especially during the morning and mid-day hours. This increasing local demand peaks at times other than during the weekend afternoon analysis period.

- Split-phasing (minor street approaches each with a dedicated signal phase) of the intersections along US 6 and SH 9 reduces signal coordination and constrains capacity. These constraints

are particularly noticeable in the future. Split phasing is currently being used primarily due to the limited width of cross street approaches and lane balancing from one side of the intersection to the other. Growth in pedestrian demand will only exacerbate these conditions as split phasing and heavy pedestrian demand will require a significant share of green time being given to the side street, at the detriment of US 6 and SH 9 through mobility.

- Previously identified improvements by the Town of Silverthorne in the 2007 Wildernest Road traffic study may not be sufficient to accommodate 2035 demand.

- Closely spaced driveways and signalized minor street accesses are contributing to congestion. Even with removal of split phasing, the number of accesses may hinder providing optimal signal progression as well as adequately providing queue storage for left turning vehicles.

- To accommodate future travel demand, eastbound I-70 should be widened to 3-lanes beginning west of the interchange and continuing over the US 6/ SH 9 bridge to the east of the interchange.

I-70 Silverthorne/Dillon Interchange

Crash History Technical Report

February 2011

INTRODUCTION

The purpose of this crash analysis is to assess the magnitude and nature of the safety problems within the vicinity of the Silverthorne/Dillon Interchange. This report is based on the analysis of five years of accident history along Interstate 70 (I-70), U.S. Highway 6 (US 6), and State Highway 9 (SH 9) near the Silverthorne/Dillon Interchange.

Site Location

This crash analysis addresses six miles of I-70, centered on the Silverthorne Interchange, located in Summit County, Colorado. It also addresses the crossing highways at this interchange: State Highway 9 to the north and U.S. Highway 6 to the south.

Site Conditions

Interstate 70 is classified as a Federal Aid Interstate Urban Principal Arterial-Interstate. The 2006 Average Daily Traffic (ADT) varied between 29,500 and 37,500 through the study area with a truck percentage of 7.5% to 9.7%. This traffic data was received with the crash data from CDOT for I-70 in 2006 and is summarized below in **Table 1.**

Table 1

2006 Traffic Data, I-70 MP 202.35 to 208.27

MP	% Trucks	ADT
202.35 – 205.41	7.5	37,500
205.42 – 208.27	9.7	29,500

US 6 is classified as a Federal Aid Urban Other Principal Arterial. The 2006 Average Daily Traffic (ADT) varied between 11,100 and 22,300 through the study area with a truck percentage of 3.2% to 6.0%. This traffic data was received with the crash data from CDOT for US 6 and is summarized below in **Table 2.**

Table 2

2006 Traffic Data, US 6 MP 208.66 to 210.00

MP	% Trucks	ADT
208.66 – 208.94	6.0	22,300
208.95 – 209.83	5.9	15,300
209.84 – 210.00	3.2	11,100

SH 9 is classified as a Federal Aid Urban Other Principal Arterial. The 2006 Average Daily Traffic (ADT) varied between 11,400 and 33,300 through the study area with a truck percentage of 6.9% to 8.0%. This traffic data was received with the crash data from CDOT for SH 9 and is summarized below in **Table 3.**

Table 3

2006 Traffic Data, SH 9 MP 101.56 to 103.00

MP	% Trucks	ADT
101.56 – 101.76	6.9	33,300
101.77 – 102.27	7.0	21,000
102.28 – 102.48	6.8	15,900
102.49 – 103.00	8.0	11,400

Calculating Crash Rates

Crashes are classified in three levels of severity: Fatal, Injury to persons, or Property Damage Only (PDO). Current crash rates are based on vehicle miles travelled (VMT). A weighted average crash rate, which places a higher weight to a more severe crash classification, was also calculated for I-70.

Crash rates for a section of roadway and crash rates for an intersection are calculated differently.

Crash rates along a known distance of roadway are calculated using the following formulas:

Average Crash Rate per million vehicle-miles = ————————

Weighted Average Crash Rate per million vehicle-miles = ————————

Where, *A* = Number of crashes
ADT = Average Daily Traffic
Length = Length of Section being investigated in miles
D = Number of Days in study period
Aw = Weighted number of crashes

Crash rates at an intersection are calculated using the following formula:

Crashes per Million Entering Vehicles (MEV) = ————————————

Where, *A* = Number of crashes
D = Number of Days in study period

Crash History

The crash history for this project includes a total of 6 miles on I-70 (milepost 203 to 209), 0.72 miles north to 6th Street on SH 9 and 0.78 miles south to Dillon Dam Road on US 6. The crash history was gathered for a 5 year period of January 1, 2002 through December 31, 2006. In the five year period, there were a total of 878 crashes reported between the three roadways. Only one fatal crash was recorded for the five year period.

INTERSTATE 70

Interstate 70 is classified as an Urban Federal Aid Interstate. The cross section varies between 4 and 6 lanes. I-70 is a divided facility throughout with both depressed median sections and concrete barrier sections. The project section traverses high altitude, mountainous terrain with adverse weather conditions and sections of steep grades. **Table 4** below shows the State average crash rates for all roadways which are also classified as Urban Federal Aid Interstate. There was no information available for year 2006.

Table 4
Average Traffic Crash Rates on Urban Federal Aid Interstates Statewide

Period	AADT	Crash Rate Data*			
		Property Damage Only	Injury	Fatal	Total
2002	72,690	1.55	0.53	0.81	2.09
2003	64,620	1.35	0.49	0.72	1.85
2004	65,420	1.32	0.48	0.56	1.81
2005	72,880	1.19	0.37	0.64	1.57
2002-2005 Average Statewide Rates for other Urban Federal Aid Interstates		1.35	0.47	0.68	1.83

*Rates are crashes per million vehicle-miles of travel
Source: CDOT Safety & Traffic

There were a total of 484 crashes on I-70 alone with 102 crashes resulting in injury and 1 fatal crash reported during the 5 year period. Crash rates on I-70 were calculated for the three mile segment from the Frisco/Breckenridge Interchange to the Silverthorne/Dillon Interchange and the segment from the Silverthorne/Dillon Interchange to three miles east. The crash data was split into the 3 mile segments to get a better understanding of where the most crashes along I-70 were occurring whether it is west of the Silverthorne/Dillon Interchange or east. **Table 5** and **Table 6** summarize the crash rates by year on I-70.

Table 5
I-70 Frisco/Breckenridge Interchange to I-70 Silverthorne/Dillon Interchange, MP 202 to 205
(Total segment of 3 miles)

Period	AADT	Crash Rate Data*			
		Property Damage Only	Injury	Fatal	Total
2002	39,900	1.28	0.27	0.00	1.55
2003	33,400	1.39	0.38	0.00	1.77
2004	38,500	0.95	0.21	0.00	1.16
2005	37,500	1.24	0.29	0.00	1.53
2006	37,500	0.84	0.24	0.00	1.07
5 Year Average	37,400	1.13	0.27	0.00	1.41
2002-2005 Average Statewide Rates for other Urban Federal Aid Interstates		1.35	0.47	0.68	1.83

*Rates are crashes per million vehicle-miles of travel

The weighted average crash rate for the section of I-70 from the Breckenridge Interchange to the Silverthorne Interchange, MP 202 to 205, is 2.50.

The only crash rate from this section of I-70 that was higher than the state average is Year 2003 Property Damage Only with a crash rate of 1.39 and the State average of 1.35. All other crash rates are close to the state average, except for the fatal crash rate.

Table 6
I-**70 Silverthorne/Dillon Interchange to 3 miles east of the Interchange, MP 205 to 208**
(Total segment of 3 miles)

Period	AADT	Crash Rate Data*			
		Property Damage Only	Injury	Fatal	Total
2002	29,300	0.89	0.26	0.00	1.15
2003	28,700	1.11	0.47	0.00	1.57
2004	28,300	0.82	0.24	0.03	1.09
2005	28,900	1.16	0.17	0.00	1.33
2006	29,500	0.81	0.36	0.00	1.17
5 Year Average	28,900	0.96	0.30	0.01	1.26
2002-2005 Average Statewide Rates for other Urban Federal Aid Interstates		1.35	0.47	0.68	1.83

*Rates are crashes per million vehicle-miles of travel

The weighted average crash rate for the section of I-70 from the Silverthorne Interchange to 3 miles east of this interchange, MP 205 to 208, is 2.53.

The crash rates for this section of I-70 do not exceed the statewide average crash rates for any category.

Types of Crashes on I-70

Out of the total 484 crashes on I-70, 16% (77) were rear-end crashes, 14% (68) were sideswipe same direction, 12% (59) were overturning, and 10% (50) hit the guard rail. The one fatal crash that occurred in 2004 was a result of the vehicle overturning. The remaining 48% of the crashes were caused by various reasons including hitting a wild animal (8%; 37), hitting a sign (6%; 27), hitting the embankment (6%; 27), hitting a parked motor vehicle (5%; 22), and a variety of other reasons. **Figure 1** shows the percentage of the various types of crashes that were reported along I-70. Out of the total crashes on I-70, 33% (159) involved a collision with a fixed object, 37% (179) involved a collision with another vehicle, and 30% (146) involved a collision with an unfixed and non-vehicle object. **Figure 2** shows the percentage of each type of crash that involved a fixed object on I-70.

Figure 1

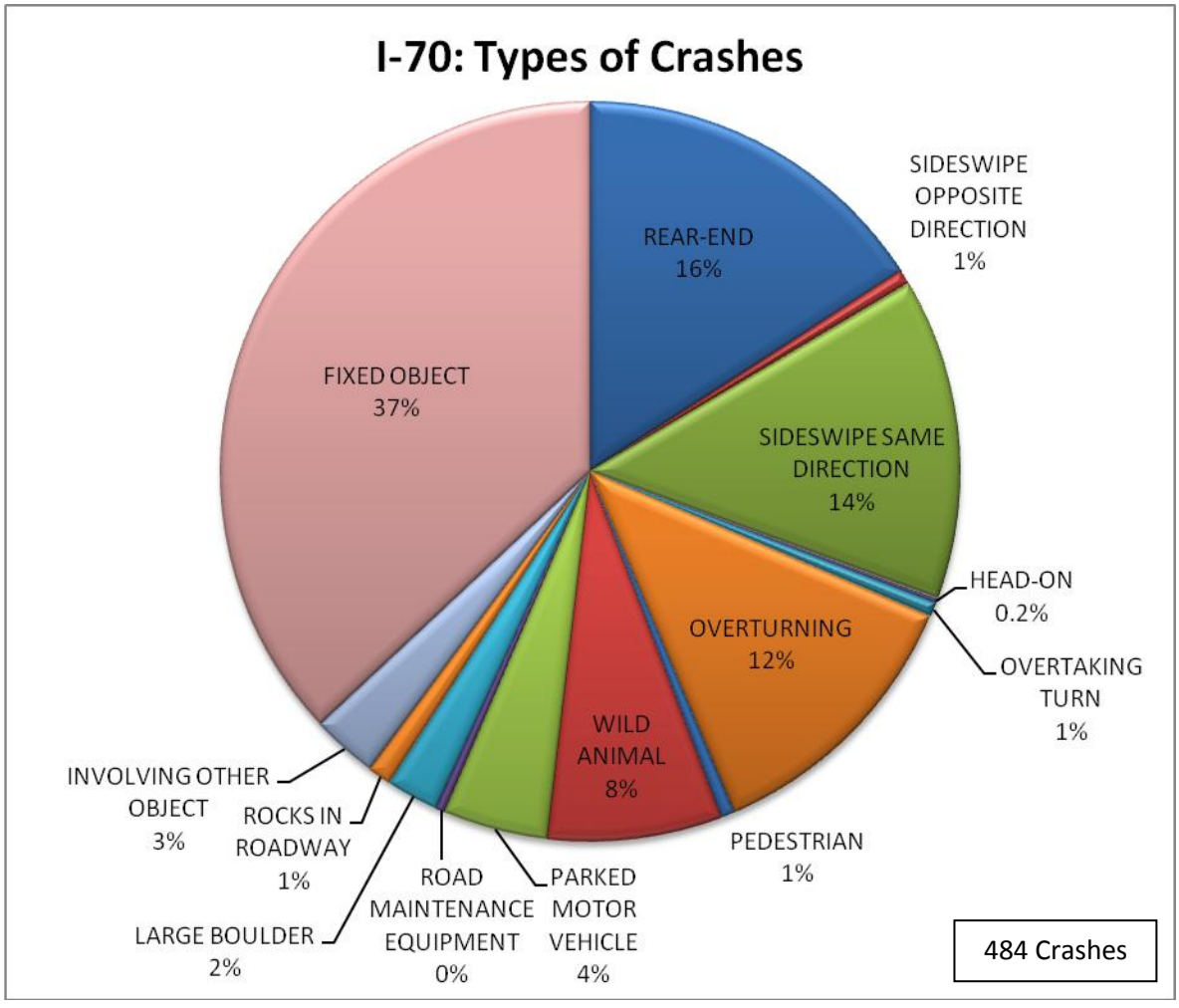
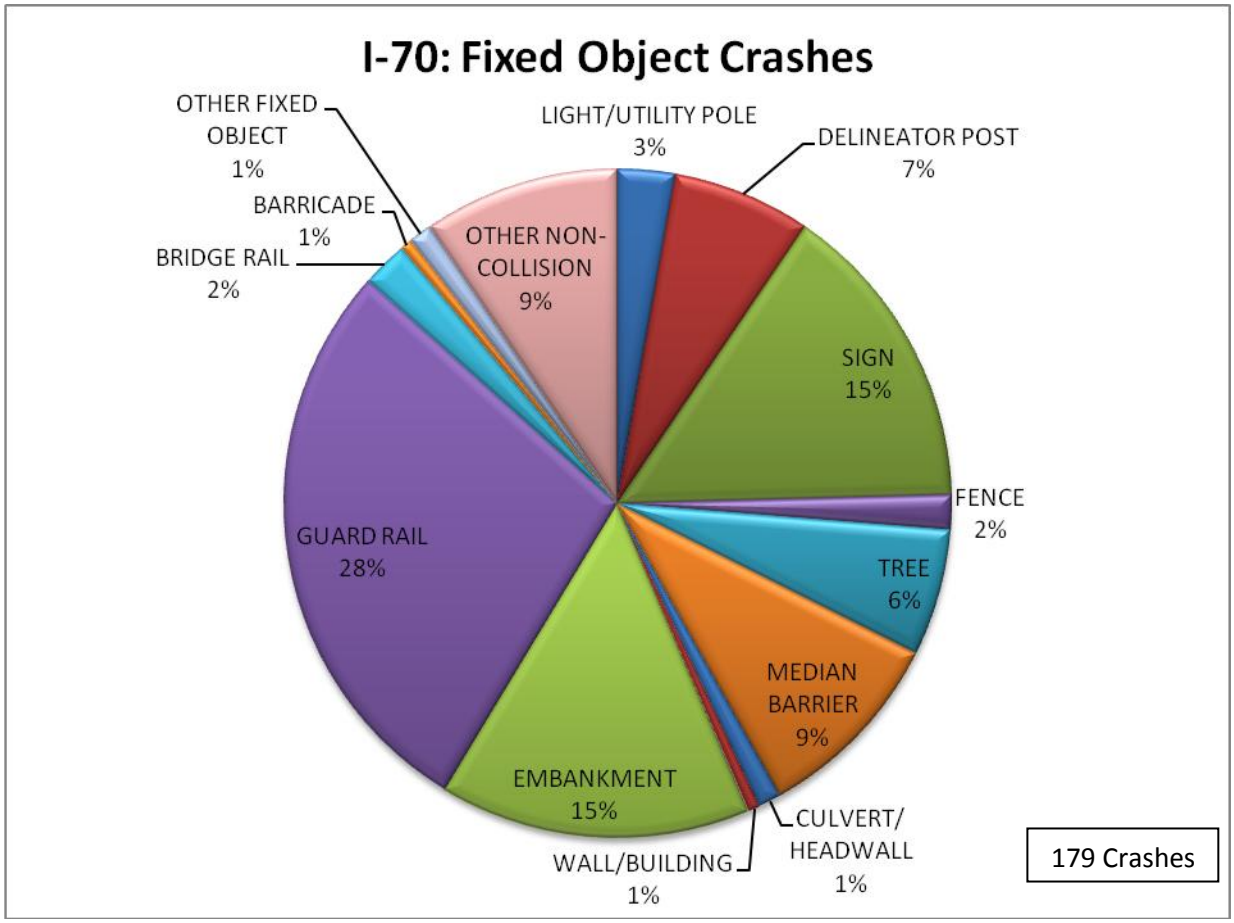


Figure 2

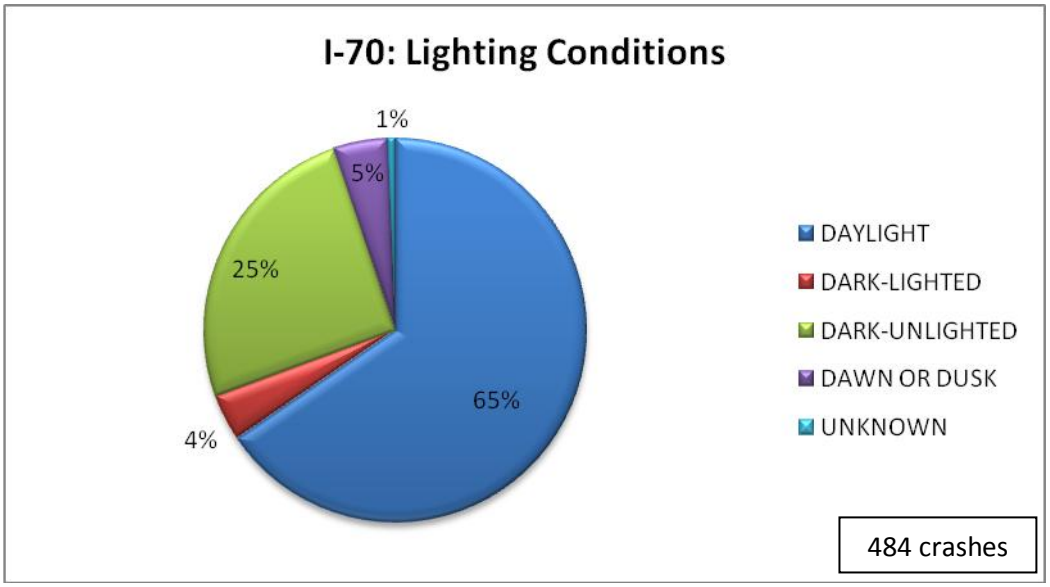


The most frequent type of fixed object crashes on I-70 involved guard rail (28%; 50), sign (15%; 27), embankment (15%; 27), and median barrier (9%; 17).

Time of Day and Weather Conditions on Interstate 70

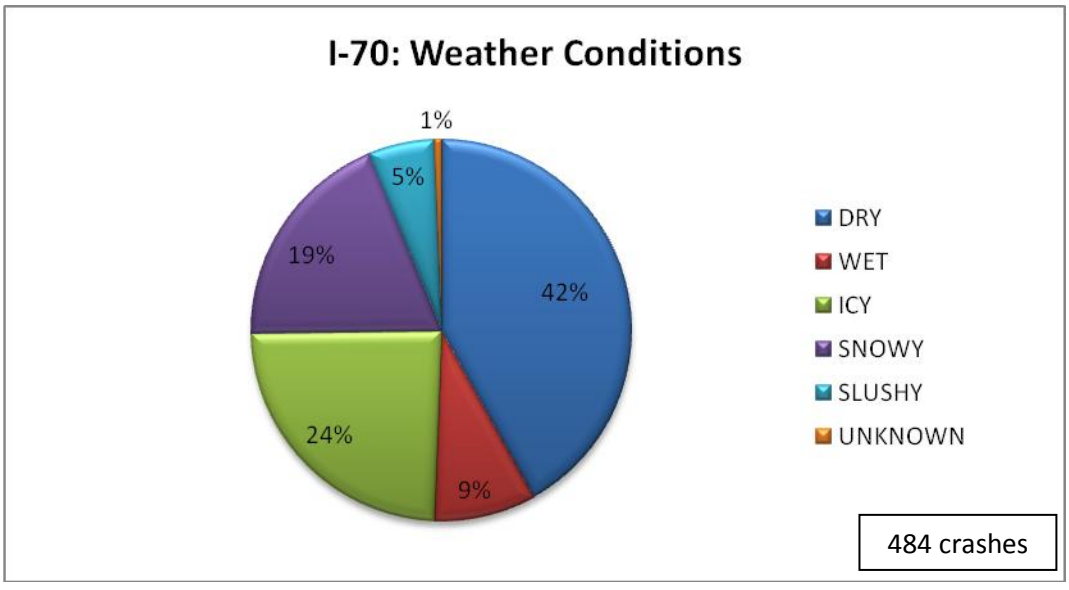
Of the total 484 crashes on I-70, 65% (317) occurred during daylight conditions, 25% (123) occurred during dark but unlighted conditions, 5% (22) occurred during dawn or dusk, 4% (19) occurred during dark but lighted conditions, and the remaining 1% (3) was reported as unknown lighting conditions. **Figure 3** shows the percentages of the lighting conditions for the crashes.

Figure 3



Crashes that occurred during dry weather conditions comprised 42% (203) of the total crashes on I-70. Icy weather conditions were reported for 24% (117) of the crashes, snowy for 19% (92), wet for 9% (42), slushy for 5% (27), and 1% (3) was reported as unknown weather conditions. **Figure 4** shows the percentage of different weather conditions reported for crashes on I-70. Less than half of all crashes on I-70 occurred during dry weather conditions.

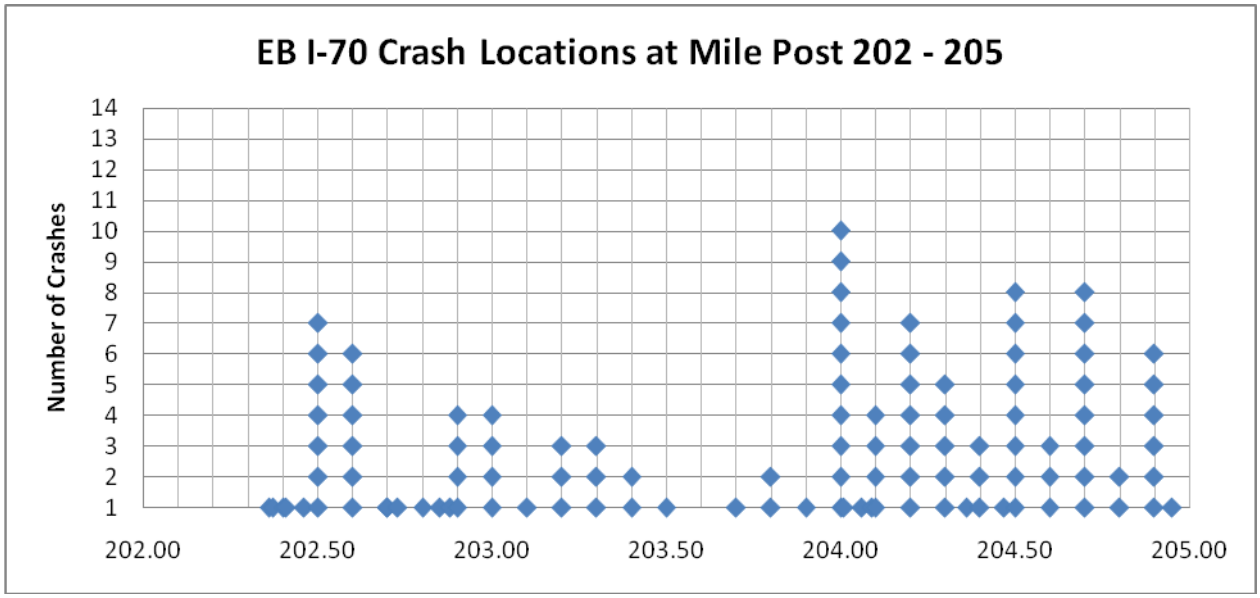
Figure 4

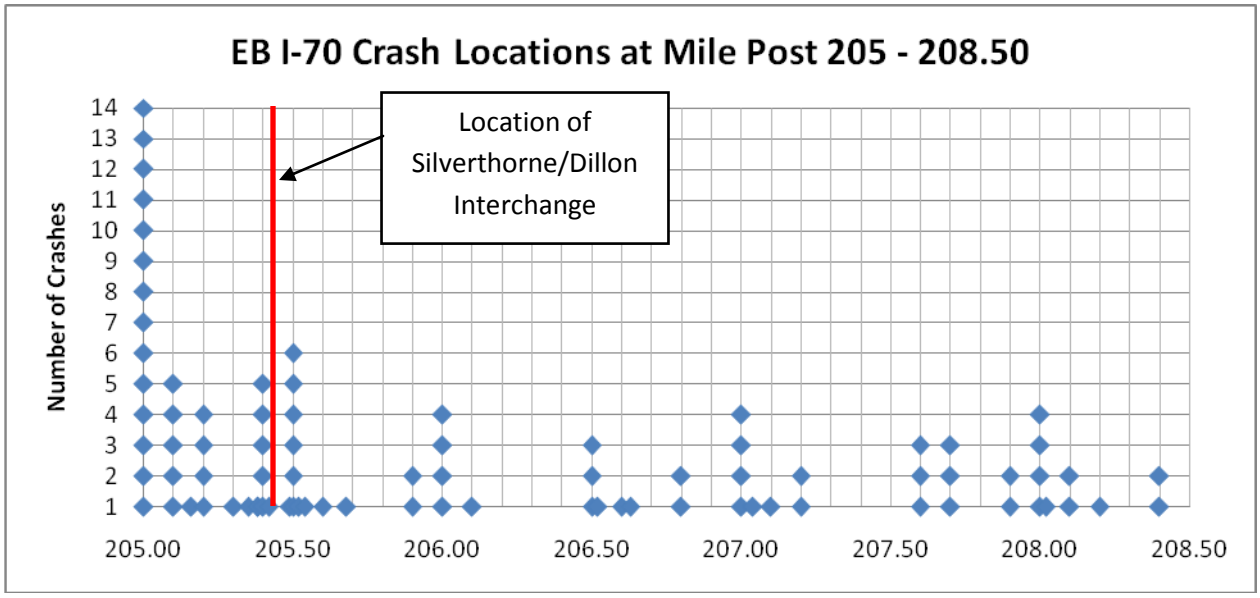


There were a total of 147 crashes, making up 30% of the total crashes, where the recorded vehicle speed was 65 mph or higher. The speed limit on I-70 is 65 mph.

The graphs in **Figure 5** and **Figure 6** present where crashes occurred by mile post over the 5 year period of 2002-2006 for eastbound and westbound I-70, respectively.

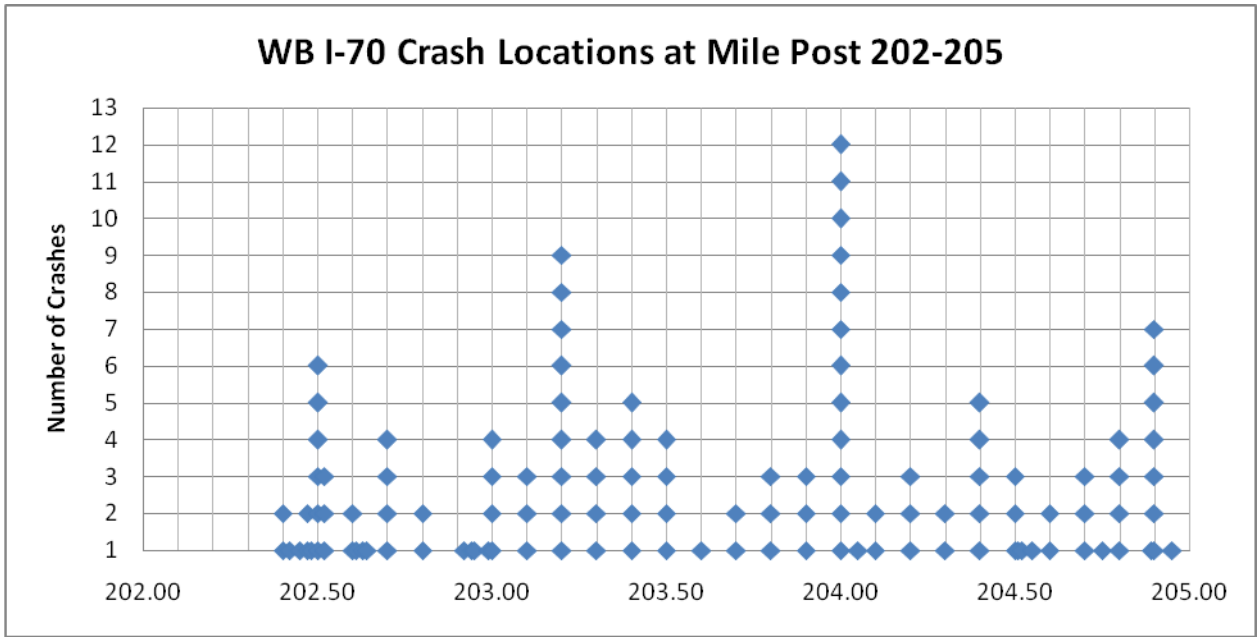
Figure 5
Location of Crashes on Eastbound I-70 from Mile Post 202 to 208.5
(Total of 194 Crashes)

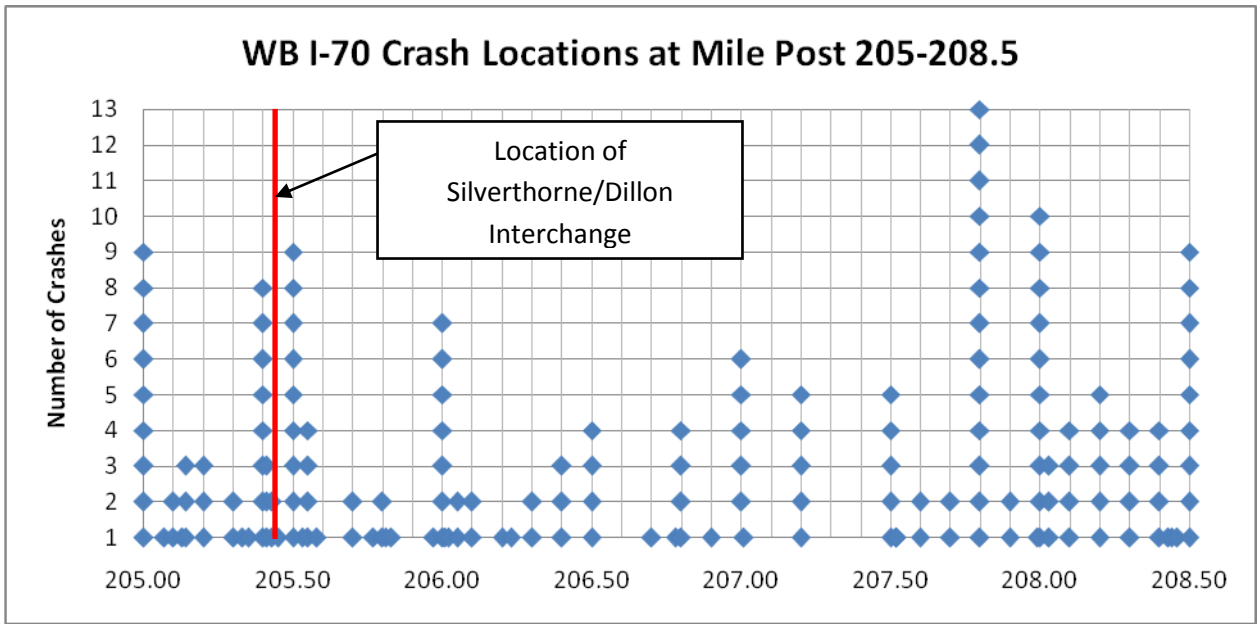




West of Silverthorne/Dillon Interchange: 35 (18%) crashes within ½ mile, 63 (32%) crashes within 1 mile
East of Silverthorne/Dillon Interchange: 13 (7%) crashes within ½ mile, 18 (9%) crashes within 1 mile

Figure 6
Location of Crashes on Westbound I-70 from Mile Post 202 to 208.5
(Total of 290 crashes)





West of Silverthorne/Dillon Interchange: 35 (17%) crashes within ½ mile, 59 (28%) crashes within 1 mile
East of Silverthorne/Dillon Interchange: 25 (12%) crashes within ½ mile, 46 (22%) crashes within 1 mile

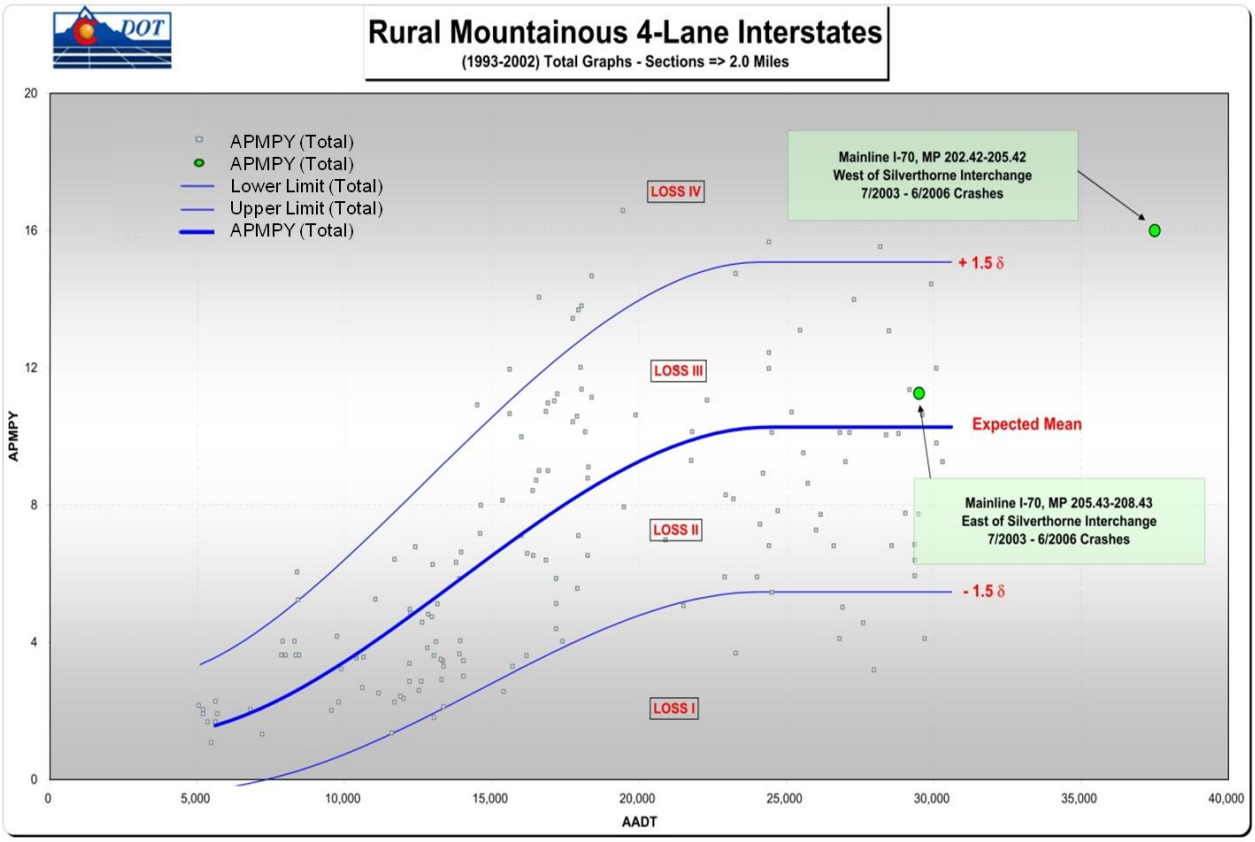
Safety Performance of I-70

The assessment of the magnitude of safety problems on I-70 has been refined through the use of Safety Performance Functions (SPF).The SPF reflects the complex relationship between traffic exposure measured in ADT and accident count for a unit of road section measured in accidents per mile per year (APMPY). The SPF models provide an estimate of the normal or expected accident frequency and severity for a range of ADT among similar facilities. Two kinds of SFP were calibrated: one addressing the total number of accidents and second addressing only accidents involving an injury or fatality.

The Safety Performance Function analysis was performed by the Colorado Department of Transportation. The data includes I-70 crashes reported during the 3-year period of 7/1/2003 to 6/30/2006 for 3-mile segments east and west of the I-70 Silverthorne/Dillon interchange.

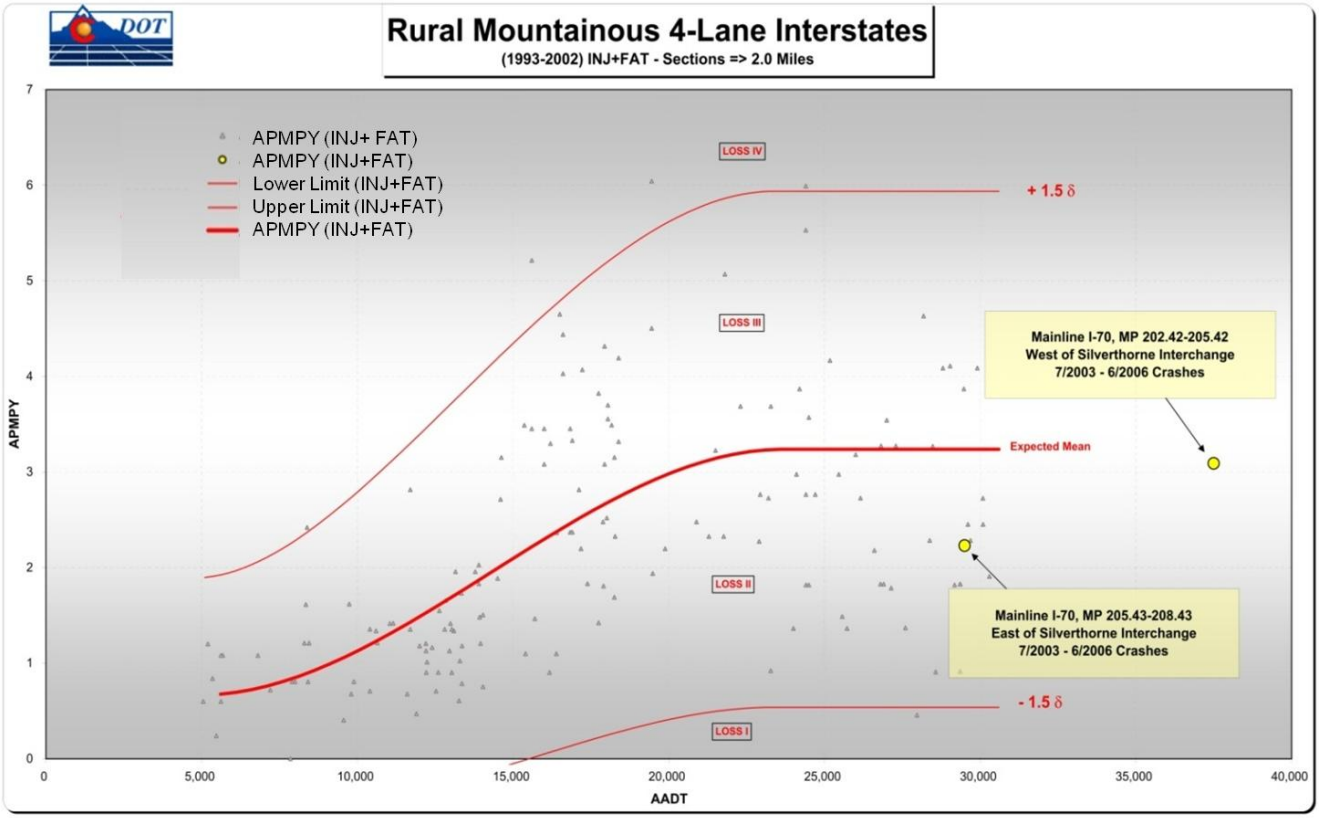
Figure 7 and 8 depict the SPF calibrated specifically for rural mountainous 4-lane interstates. The unique weather conditions on the section of I-70 in this analysis may contribute to some variance from expected performance on a statewide level. For this evaluation, data for the 3 years of accident history has been partitioned into 2 separate sub-sections: west of the interchange and east of the interchange. The sub-sections are shown by the larger green and yellow dots on the graphs. The heavier center graph line identifies the statewide, expected crash frequency. The area above this line defines crash frequency that is higher than expected, while the area below the heavier center line shows accident frequency that is lower than average for similar highway types.

Figure 7 – West of the Interchange



Colorado Department of Transportation
HQ Safety Engineering and Analysis Group

Figure 8 – East of the Interchange



Colorado Department of Transportation
HQ Safety Engineering and Analysis Group

Review of **Figures 7 and 8** suggests that this 6-mile segment of I-70 exhibits overall accident frequency that is higher than expected when compared to other mountainous 4-lane interstate highways throughout the state. The total crash frequency to the west of the Silverthorne/Dillon interchange is considerably higher than that east of the interchange. **Figure 8** shows that the severity of the crashes west of the interchange are higher than the severity of crashes east of the interchange.

U.S. HIGHWAY 6

U.S. Highway 6 is classified as an Urban Principle Arterial. This segment of US 6 analyzed is a four- lane divided facility with channelized intersections and a posted speed limit of 35 to 45 mph. **Table 7** below shows the State average crash rates for all roadways which are also classified as Urban Principle Arterial. There was no information available for Year 2006.

Table 7
Average Traffic Crash Rates on Urban Principle Arterials

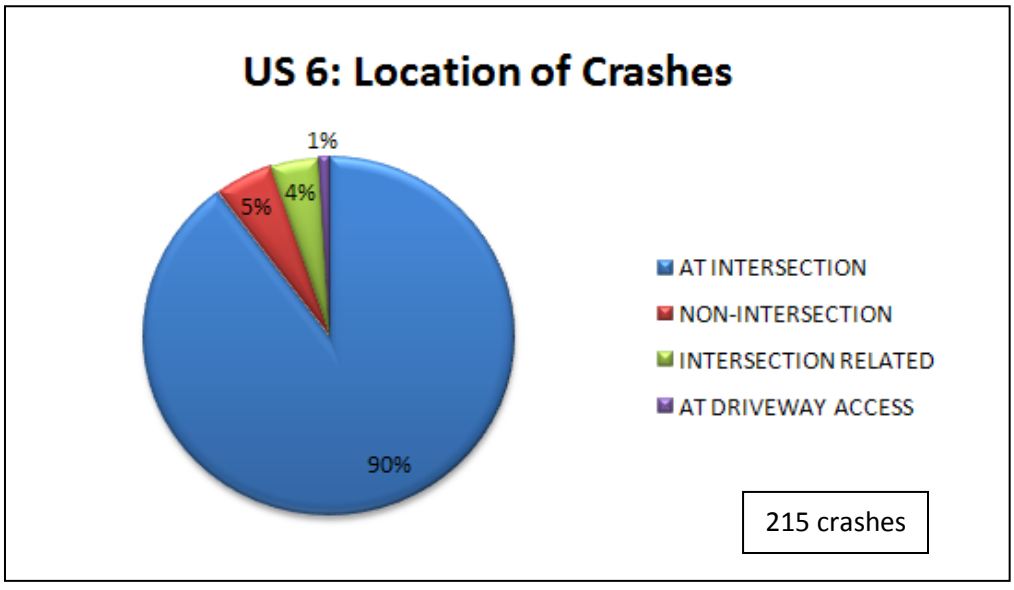
Period	AADT	Crash Rate Data*			
		Property Damage Only	Injury	Fatal	Total
2002	23,430	3.83	1.42	1.66	5.27
2003	22,520	3.49	1.25	1.41	4.75
2004	22,170	3.37	1.22	1.53	4.60
2005	22,660	3.31	1.04	1.15	4.37
2002-2005 Average Statewide Rates for other Urban Principle Arterials**		3.5	1.23	1.44	4.75

Source: CDOT Safety & Traffic
*Rates are crashes per million vehicle-miles of travel
**Average Statewide Rates include both segment and intersection crashes

Total of All Crashes on US 6

During the five year period of crash data collected, there were a total of 215 crashes with 21% (45) crashes resulting in injury and 79% (170) resulting in property damage only. There were no fatal crashes reported on US 6. Crashes at Intersection accounted for 90% (193), non-intersection for 5% (11), intersection related for 4% (9) and at driveway access crashes accounted for the remaining 1% (2). **Figure 9** summarizes the location of crashes along US 6.

Figure 9



Of the total 215 crashes reported, 50% (107) were rear-ends, 19% (41) were approach turns, 12% (25) were sideswipe same direction, 9% (20) were broadside crashes and the remaining 10% (22) were a variety of other crash types. Collisions with other vehicles comprised 94% (202) and collisions with fixed objects comprised 4% (9) of the total crashes. The remaining 2% (4) of the crashes were with unfixed, non- vehicle objects.

Crashes on Sections of US 6

Of the 215 crashes, 5% (11) crashes were non-intersection related, with 10 crashes resulting in property damage only and 1 resulting in injury. **Table 8** summarizes the crashes on roadway sections between intersections. Intersection related crashes are discussed later.

Table 8
U.S. Highway 6 Crashes per Segment (2002-2006)

Segment	Segment Length (miles)	AADT	Total No. of Crashes	Crash Rate Data*			
				Property Damage Only	Injury	Fatal	Total
Begin of US6 to EB I-70 Silverthorne Ramps	0.12	19,000	1	0.24	0.00	0.00	0.24
EB I-70 Silverthorne Ramps to Stephens Way	0.01	19,000	0	0.00	0.00	0.00	0.00
Stephens Way to Little Beaver Trail	0.14	19,000	2	0.41	0.00	0.00	0.41
Little Beaver Trail to W. Anemone Trail	0.05	17,600	3	1.87	0.00	0.00	1.87
W. Anemone Trail to Dillon Ridge Road	0.09	15,900	2	0.77	0.00	0.00	0.77
Dillon Ridge Road to Dillon Dam Road	0.32	15,900	3	0.22	0.11	0.00	0.32
2002-2005 Average Statewide Rates for other Urban Principle Arterials**				3.5	1.23	1.44	4.75

*Rates are crashes per million vehicle-miles of travel
**Average Statewide Rates include both segment and intersection crashes

Crash rates on US 6 are significantly below that of the state wide average for similarly classified roadways.

Crashes at Intersections of US 6

Of the 215 crashes, 204 crashes were intersection related, 78% (160) of the crashes resulted in property damage only and 22% (44) were injury crashes. There were no fatal crashes reported on US 6 during the five year period. **Table 9** summarizes the intersection related crashes on US 6.

Table 9
U.S. Highway 6 Crashes per Intersection (2002-2006)

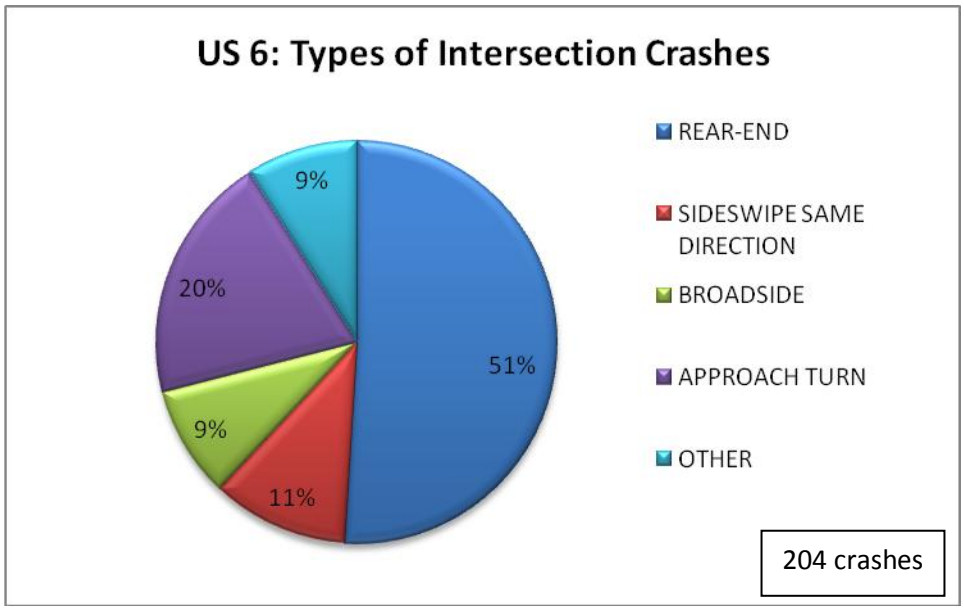
Intersection with US 6	Approach AADT	Total No. of Crashes	Crash Rate Data*			
			Property Damage Only	Injury	Fatal	Total
EB I-70 Silverthorne Ramps	31,290	55	0.75	0.21	0.00	0.96
Stephens Way	28,860	24	0.42	0.04	0.00	0.46
Little Beaver Trail	27,450	32	0.58	0.06	0.00	0.64
W. Anemone Trail	24,780	2	0.04	0.00	0.00	0.04
Dillon Ridge Road	25,970	53	0.78	0.34	0.00	0.12
Dillon Dam Road	25,970	38	0.57	0.23	0.00	0.80
2002-2005 Average Statewide Rates for other Urban Principle Arterials**			3.5	1.23	1.44	4.75

*Rates are crashes per million entering vehicles
**Average Statewide Rates include both segment and intersection crashes

Crash rates on US 6 are significantly below that of the state wide average for similarly classified roadways.

Out of the 204 intersection crashes, 51% (104) were rear-end crashes, 20% (40) were approach turn, 11% (23) were sideswipe same direction and 9% (19) were broadside crashes. The remaining 9% (18) of the crashes were various other crash types including overtaking turn (2%; 3), hitting a sign (1%; 2), hitting the curb (1%; 2), and various other reasons. **Figure 10** shows the percentage of the various types of crashes that were reported at intersections on US 6. Out of the total crashes, 95% (193) involved a collision with another vehicle, 4% (9) involved a collision with a fixed object, and 1% (2) involved a collision with an unfixed, non-vehicle object.

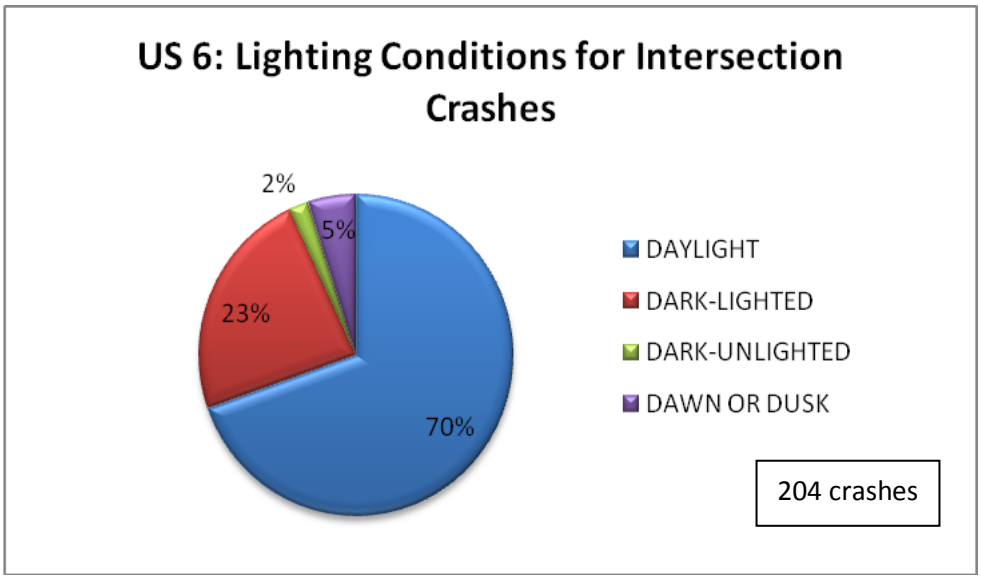
Figure 10



Lighting and Weather on US 6

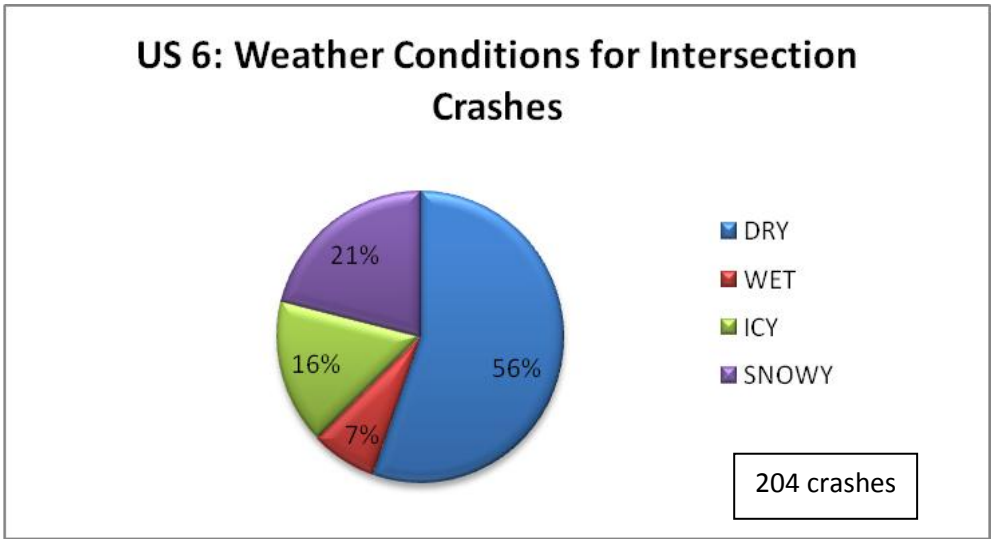
Of the total 204 intersection crashes, 70% (142) occurred during daylight conditions, 23% (48) occurred during dark but lighted conditions, 5% (10) occurred during dawn or dusk, and the remaining 2% (4) occurred during dark but unlighted conditions. **Figure 11** shows the percentages of the lighting conditions reported for the intersection crashes on US 6.

Figure 11



Crashes that occurred during dry weather conditions comprised 56% (113) of the total intersection crashes on US 6. Snowy weather conditions were reported for 21% (43) of the crashes, icy or slushy for 16% (33), and wet conditions for 7% (15). **Figure 12** shows the percentage of different weather conditions reported for intersection crashes on US 6.

Figure 12



MP 208.78 US 6 at I-70 Eastbound Silverthorne/Dillon Interchange ramps –There were a total of 55 intersection related crashes at this location. The predominate crash types were rear-end, approach turn, and sideswipe same direction crashes. The rear-end crashes involved vehicles traveling on the eastbound off-ramp for the interchange and colliding with those making all movements of left-turn, right-turn and going straight. Conditions were mainly dry and with daylight. The off-ramp makes a sharp curve before coming to the intersection. Possible sight distance could be the cause. Sideswipe same direction crashes were caused by vehicles travelling eastbound off-ramp. A possible cause could involve driver confusion on which direction to turn to get to their desired location. Adding better signing about locations north and south could help ease confusion. Approach turn crashes involved southbound US 6 vehicles turning left on to the I-70 On-ramp and colliding with northbound US 6 traffic. Poor signal phasing at the intersection could be a cause.

MP 208.80 US 6 at Stephen's Way- There were a total of 24 intersection related crashes at this location where most are rear-end crashes in the westbound, eastbound and northbound directions. Most crashes involved vehicles going straight and hitting those stopped in traffic. Stephen's Way intersection is roughly 500 feet east of I-70 Eastbound Ramp intersection and 500 feet west of the Little Beaver Trail intersection. Close proximity to adjacent intersections and/or poor signal phasing could be the cause of crashes.

MP 208.95 US 6 at Little Beaver Trail – There were 32 intersection related crashes at this location involving a mix of approach turn, broadside, rear-end and sideswipe same direction crashes. Broadside crashes involved westbound traffic. Approach turn crashes involved both east and west bound traffic. The causes could be related to possible sight distance issues or poor signal phasing. Sideswipe same direction crashes involved westbound vehicles. West of the intersection, the right lane westbound becomes a Must Turn Right lane leading to the Eastbound I-70 on-ramp. This could be a cause of the sideswipes as vehicles weave between the right turn lane and through lane. Rear-end crashes happened in all directions at the intersection. No specific cause could be identified for these rear-ends.

MP 209.01 US 6 at W. Anemone Trail – There were 2 intersection related crashes at this location. One crash per year is not unexpected.

MP 209.11 US 6 at Dillon Ridge Road – There were 53 intersection related crashes at this location with the majority being rear-end crashes followed by approach turn crashes. Half of the total rear-end crashes were in the westbound US 6 direction. There is a slight curve of US 6 east of the intersection and many of the westbound crashes occurred in icy or snowy conditions. The roadway geometry could be a possible contributing factor to the rear-end crashes. The remaining rear-end crashes involved vehicles in the eastbound and southbound directions. Southbound Dillon Ridge Road has a sharp curve leading to the intersection which could be a factor leading to crashes. Eastbound US 6 does not have any obvious geometry issues that could be causing crashes. Approach turn crashes mainly occurred in the eastbound direction making a left turn. Sight distance issues or poor signal phasing could be a factor leading to crashes.

MP 209.44 US 6 at Dillon Dam Road- There were 38 intersection related crashes at this location with half being rear-end crashes. Approach turn crashes were the next frequent type. The majority of the rear-end crashes were in the westbound direction. Westbound US 6 traffic has a curve in the roadway geometry leading up to the intersection. This could be a factor leading to the rear end crashes westbound. Northbound Dillon Dam Road also has a sharp curve leading up to the intersection. This could be a factor leading to the rear end crashes northbound. Eastbound US 6 does not appear to have any major geometric flaws that could be the leading factor for the rear end crashes in this direction. Approach turn crashes were all but one in the eastbound direction making a left turn. As previously mentioned, the westbound traffic has to navigate a curve to enter the intersection. This geometry of the roadway could be affecting the sight distance for the eastbound left turn movement. Poor signal phasing could also be a factor leading to approach turn crashes.

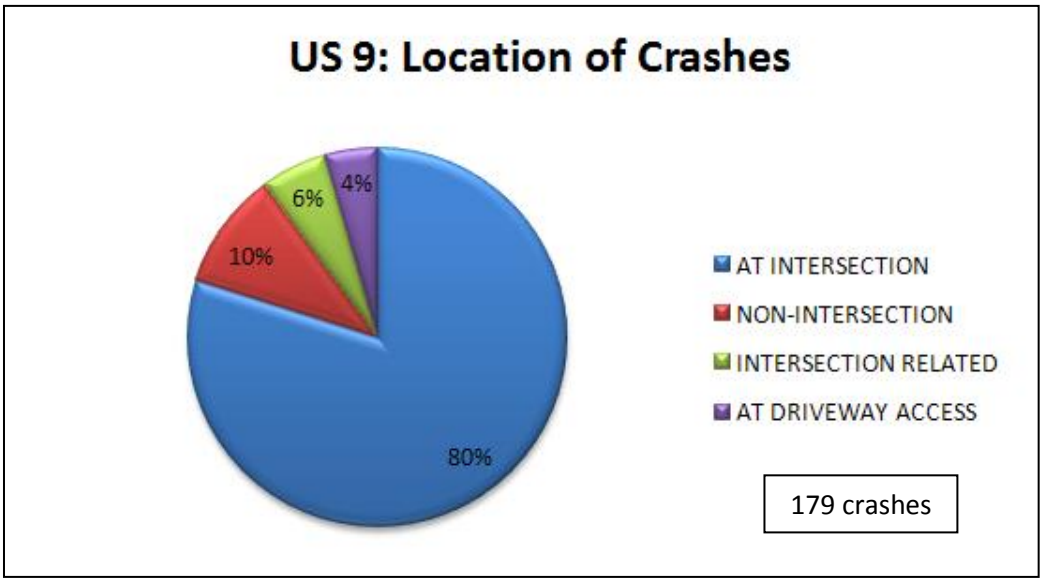
STATE HIGHWAY 9

State Highway 9 is classified as an Urban Principle Arterial within the study area. This segment of SH 9 is a four-lane divided facility with a variable width curbed median, left turn channelized intersections and a posted speed limit of 35 to 45 mph. **Table 7,** which was presented above when discussing US 6, shows the State average crash rates for all roadways which are also classified as Urban Principle Arterial.

Total Crashes on SH 9

During the five year period of crash data collected, there were a total of 179 crashes with 20% (35) crashes resulting in injury and 80% (144) crashes resulting in property damage only. There were no fatal crashes reported on SH 9. Crashes at intersections accounted for 80% (143), non-intersection for 10% (18), intersection related for 6% (10) and at driveway access for 5% (8). **Figure 13** summarizes the location of all reported crashes on SH 9.

Figure 13



Of the total 179 crashes, 43% (77) were rear-ends, 22% (39) were approach turns, 12% (21) were broadside crashes, and 10% (18) were sideswipe same direction. The remaining 13% (24) crashes were various other types. Collisions with other vehicles comprised 89% (159), collisions with fixed objects comprised 8% (14), and collisions with unfixed non-vehicle objects comprised 3% (6) of the total crashes.

Crashes on Sections of SH 9

Of the total 179 crashes, 14% (25) crashes were non-intersection related. **Table 10** summarizes the total crashes on the roadway sections of SH 9 between intersections. Intersection related crashes are discussed later.

Table 10
State Highway 9 Total Crashes per Section (2002-2006)

Segment	Segment Length (miles)	AADT	Total No. of Crashes	Crash Rate Data*			
				Property Damage Only	Injury	Fatal	Total
Begin of SH 9 to WB I-70 Silverthorne Ramps	0.07	30,700	0	0.00	0.00	0.00	0.00
WB I-70 Silverthorne Ramps to Wildernest Road	0.13	30,700	12	1.37	0.27	0.00	1.65
Wildernest Road to 3rd Street	0.14	28,300	2	0.14	0.14	0.00	0.28
3rd Street to 4th Street	0.11	28,300	2	0.35	0.00	0.00	0.35
4th Street to 5th Street	0.12	28,300	3	0.48	0.00	0.00	0.48
5th Street to 6th Street	0.10	28,300	6	0.97	0.19	0.00	1.16
2002-2005 Average Statewide Rates for other Urban Principle Arterials**				3.5	1.23	1.44	4.75

*Rates are crashes per million vehicle-miles of travel
**Average Statewide Rates include both segment and intersection crashes

Crash rates on SH 9 are significantly below that of the state wide average for similarly classified roadways.

Of the 12 crashes in the segment of SH 9 from the WB I-70 off-ramp to Wildernest Road, 8 were in the northbound direction and consisted of 4 rear-ends, 2 sideswipe-same direction, 1 hitting curb, and 1 overturning. The WB I-70 off-ramp right turn lane to northbound SH 9 becomes a right turn only lane at Wildernest Road. There is an estimated 260 feet of weaving distance for northbound traffic to change lanes to continue straight through the Wildernest Road intersection. The 4 rear-ends and 2 sideswipes could be attributed to the short weaving distance as drivers are concentrating on changing lanes and watching the Wildernest Road signal.

Crashes at Intersections of SH 9

Of 154 intersection related crashes, 80% (123) of the crashes resulted in property damage only and 20% (31) were injury crashes. There were no fatal crashes reported on SH 9 during the five year period. **Table 11** summarizes the intersection related crashes on SH 9.

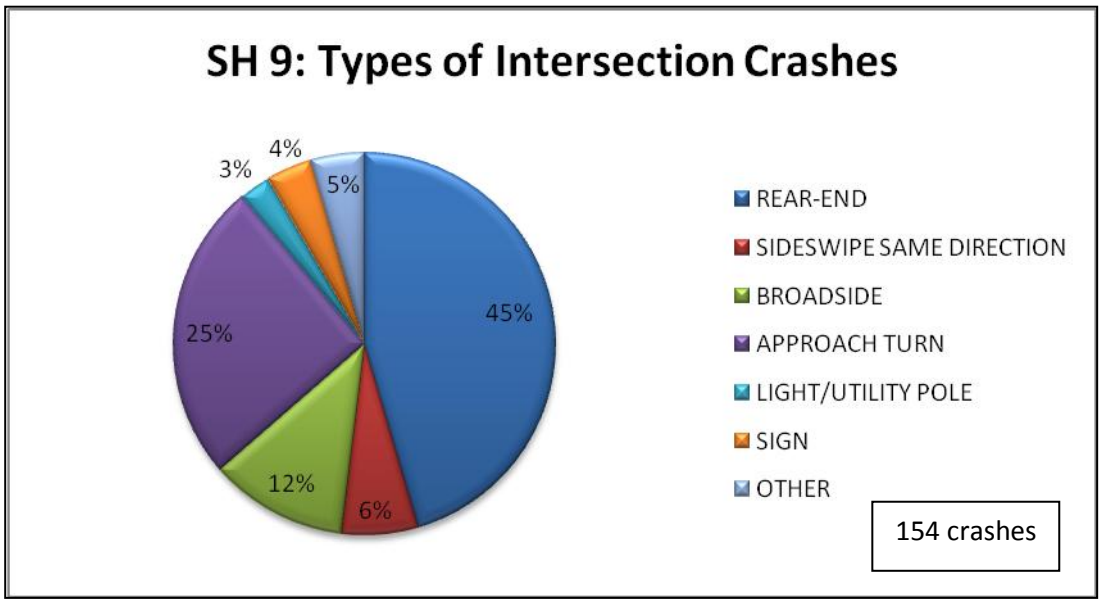
Table 11
State Highway 9 Total Crashes per Intersection (2002-2006)

Intersection with SH 9	Approach AADT	Total No. of Crashes	Crash Rate Data*			
			Property Damage Only	Injury	Fatal	Total
WB I-70 Silverthorne Ramps	40,620	65	0.66	0.22	0.00	0.88
Wildernest Road	37,590	58	0.69	0.16	0.00	0.85
Nike Factory Store Drive	24,600	1	0.02	0.00	0.00	0.02
3rd Street	23,700	9	0.21	0.00	0.00	0.21
4th Street	22,230	5	0.12	0.00	0.00	0.12
5th Street	22,230†	1	0.00	0.02	0.00	0.02
6th Street	22,230†	15	0.30	0.07	0.00	0.37
2002-2005 Average Statewide Rates for other Urban Principle Arterials**			3.5	1.23	1.44	4.75

*Rates are crashes per million entering vehicles
**Average Statewide Rates include both segment and intersection crashes
†Approach ADT information was not available at the time of this report therefore to calculate the crash rates for intersections north of 4th Street. Approach AADT of 22,300 was used to get an estimate.

Out of the 154 intersection crashes, 46% (70) were rear-end crashes, 25% (39) were approach turn, 12% (18) were broadside, and 7% (10) were sideswipe same direction crashes. The remaining 10% (17) of the crashes were caused by various reasons including 4% (6) hitting a sign, and 3% (4) hitting a light/utility pole. **Figure 14** shows the percentage of various types of crashes that were reported at intersections on SH 9. Out of the total crashes, 92% (141) involved a collision with another vehicle, 7% (11) involved a collision with a fixed object, and 1% (2) involved a collision with an unfixed non-vehicle object.

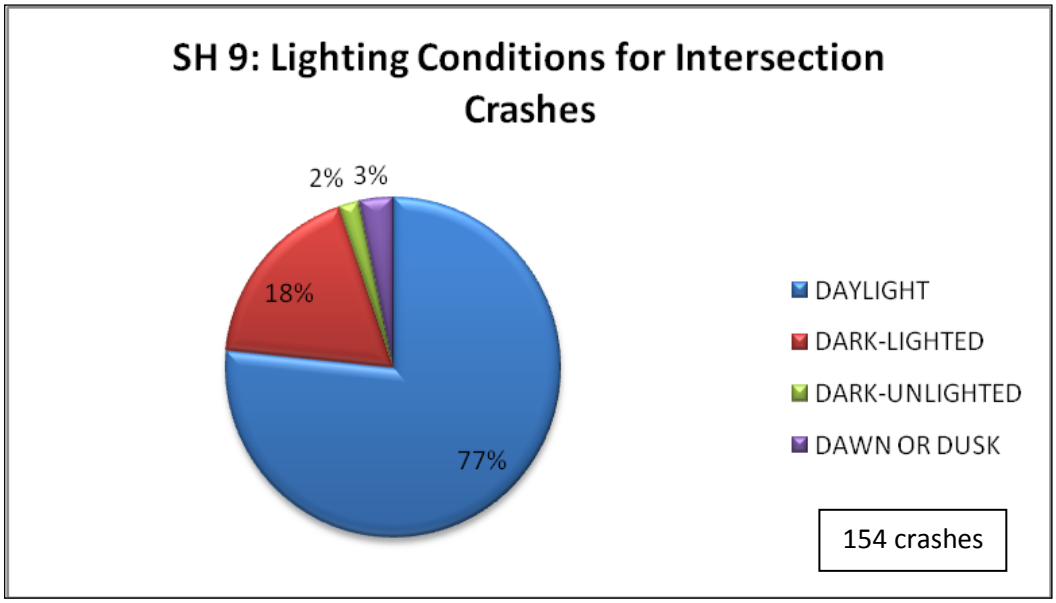
Figure 14



Lighting and Weather on SH 9

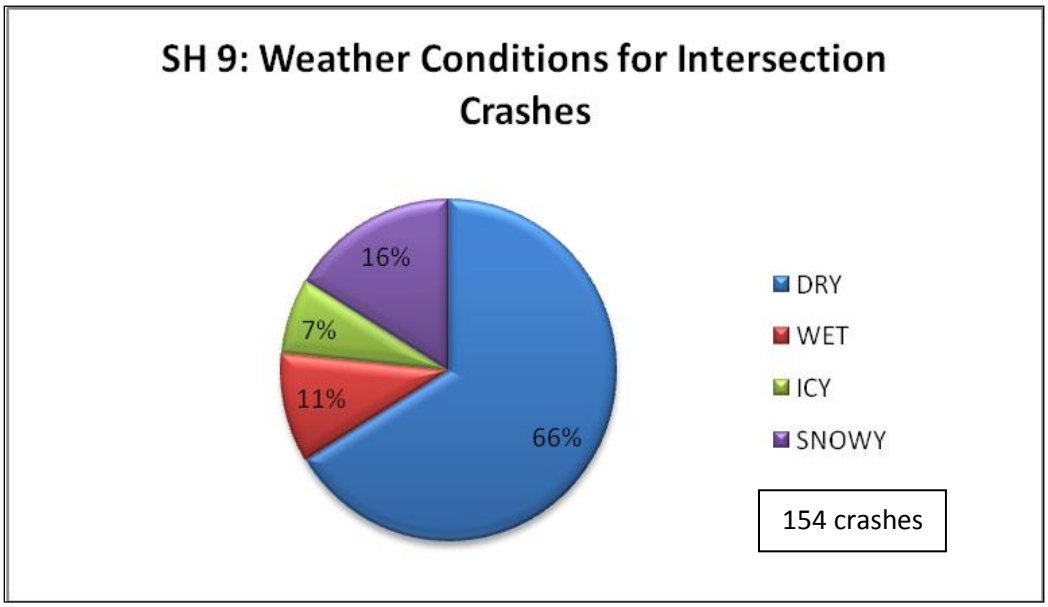
Of the total 159 intersection crashes, 77% (118) occurred during daylight conditions, 18% (28) occurred during dark but lighted conditions, 3% (5) occurred during dawn or dusk, and the remaining 2% (3) occurred during dark unlighted conditions. **Figure 15** shows the percentages of the lighting conditions for the intersection crashes.

Figure 15



Crashes that occurred during dry weather conditions comprised 66% (102) of the total intersection crashes on SH 9. Snowy weather conditions were reported for 16% (25) crashes, 11% (16) were reported as wet conditions and 7% (11) were reported as icy or slushy. **Figure 16** shows the percentage of different weather conditions reported for intersection crashes.

Figure 16



MP 101.63 SH 9 at the intersection of the WB I-70 On- and Off- Ramps at Silverthorne/Dillon Interchange- There were a total of 65 crashes related to this intersection. Rear-End crashes were the most dominate crash type, followed by Approach Turn. Rear-End crashes occurred mainly in the westbound I-70 off-ramp in the right-turn lane. Weather conditions were mainly dry and daylight. Possible sight distance issues or driver not warned for future Signal Ahead could be causes. Rear-end crashes on northbound SH 9 had snowy or icy conditions. Approach turns were caused predominately by the northbound SH 9 traffic making a left-turn and colliding with southbound SH 9 traffic going straight. Weather conditions were mainly dry and day lit. Possible sight distance issues could be a factor or issues with the signal phasing.

MP 101.77 SH 9 at Wildernest Road Intersection- There were a total 58 crashes related to this intersection. The most crash types were rear-ends, followed by approach turn. Most of the rear-end crashes occur in the northbound SH 9 direction with vehicles hitting others who are going straight but stopped in traffic at the moment. Approach turn crashes were both in the northbound and southbound SH 9 directions. Possible sight distance issues could be a factor or inappropriate signal phasing for left-turn movements.

MP 101.86 SH 9 at Nike Factory Store Driveway – Only one crash occurred at this location within the 5 year analysis period. Approximately one crash per year is expected.

MP 101.92 SH 9 at 3rd Street – There were a total of 9 crashes at this intersection. Five of the crashes were Broadside crashes. At this location, there is a wide raised median with vegetation to the north. Sight distance should be examined.

MP 102.04 SH 9 at 4th Street – There were a total of 5 crashes at this intersection. Approximately one crash per year is not unexpected.

MP 102.17 SH at 5th Street – There was 1 crash at this intersection. Approximately one crash per year is expected.

MP 102.28 SH 9 at 6th Street – There were a total of 15 crashes at this intersection with 7 being rear-end crashes. There are no consistent crash types with the other 8 crashes. Rear-end crashes occurred in the northbound SH 9 direction. The southern leg has a slight curve before the intersection so possible sight distance issues may occur.

CONCLUSION

The conclusions presented are based on the analysis of five years of crash history from 2002 to 2006.

I-70

- There were a high number of crashes near the Silverthorne/Dillon interchange. Improvements to the interchange ramps and merging lanes may improve safety.
- The highest number of crashes occurred within one mile west of the Silverthorne/Dillon interchange. Improvements to the westbound on-ramp and the eastbound off-ramp may improve safety.
- Adverse weather is a significant issue. Maintaining median barriers, roadside clear zones, and pavement conditions may improve safety.
- Vehicle speed was a contributing factor. Improvements to speed advisory information, roadside clear zones and shoulder buffer areas may improve safety.

US 6

- In general, higher crash rates occurred near the Silverthorne/Dillon interchange ramps. Reduction of congestion and improved interchange intersections may improve safety.
- Adverse weather conditions contributed to 44% of crashes on US 6. Improved intersection geometry including turn-lane storage, sight distance and approach grades at start/stop areas near intersections may improve safety.

SH 9

- In general, higher crash rates occurred near the interchange ramps. Reduction of congestion and improved interchange intersections may improve safety.
- Compared to crashes on US 6, a higher percentage of crashes occurred at driveways on SH 9 with a higher percentage of broadside and turning crashes. Improvements to access control, sight distance and weaving between intersections may improve safety.

I-70 Silverthorne/Dillon Interchange

Existing Roadway Geometry Technical Report

Prepared by Jacobs Engineering

February 2011

Roadway Geometry Technical Report

Existing Conditions and Proposed Standards

Silverthorne Interchange Project
CDOT Project Number IM 0703-341

Prepared by Jacobs Engineering
February 2011

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Project Overview

The Colorado Department of Transportation (CDOT) has undertaken this project to identify the existing interchange at I-70 and US 6 / SH 9 conditions. A new interchange or modifications to the the existing will offer increased vehicle capacity and improved safety. The purpose of this report is to identify existing roadway sections and to note any deviations from applicable standards.

Sources of Information

Jacobs researched aerial photography, photos, CDOT's and Silverthorne's bridge inventory, as-built plans for the intersection (References 1 and 2), and field survey of the project area to identify existing roadway widths, number of lanes and posted speed limits.

Design Standards

References used for the review of roadway design criteria are listed below.

- CDOT Design Guide, 2005
- Town of Silverthorne Street Design Criteria, December, 2005
- AASHTO – A policy on Geometric Design of Highways and Streets, 2004
- AASHTO – Roadside Design Guide, 2002
- AASHTO Guide for the Development of Bicycle Facilities
- I-70 Mountain Corridor Design Criteria

Design Vehicle

The design vehicle for I-70 mainline, ramps, SH 9 and US 6 will be the AASHTO WB-67 semi-trailer. The design vehicle for all other roadways will be the AASHTO WB-50.

Design Speeds

Design speeds for I-70, US 6 and SH 9 shall be per CDOT design standards. Speeds for collector street classification shall range from 25 to 30 mph and speeds for local streets shall range from 20 to 25 mph.

Pedestrian/Bicycle Facilities

Per town standards, minimum concrete sidewalk width shall be six feet. Minimum asphalt bike pathway width shall be ten feet wide. Shoulders for both sidewalks and bike paths shall be 2 feet wide. Reduced width for bike paths may be considered where ROW widths are limited, subject to Town review and approval. Per city standards, roadway crossings are to meet ADA compliance to CDOT Standard M-608-1, which requires truncated domes.

Roadway Sections

I-70 Westbound –

Approaching the interchange of I-70 and US 6/SH 9, I-70 westbound consists of three 12 foot lanes with a 6' outside shoulder and a 4' inside shoulder. At Deer Path Road about 1.3 miles prior to the interchange westbound I-70 crosses a bridge where the shoulders temporarily narrow to only about 2 feet on each side. The right lane becomes the exit lane for the westbound off ramp leaving two through lanes across the interchange. The westbound on ramp joins the highway as a continuous climbing lane creating three lanes to the Frisco exit. Due to the discontinuity in the right lane through the interchange, the right lane is not a through lane but is instead an auxiliary lane. The result is that westbound I-70 has three lanes for most of the study area. However, functionally there are only two through lanes.

Existing I-70 meets CDOT standards. Vertically the highway comes down from the east at 3.5% flattening to 2.5% across the interchange and then rises at 6% to the west. The outside lane is considered an auxiliary lane therefore the 6 foot outside shoulder is standard.

The PEIS identifies this interchange to be replaced, but does not specify an increase to the number of westbound lanes across the bridge. Instead it leaves our study to determine the need to add a third lane for westbound I-70. Adding a third lane would require replacing the structure over US 6 & SH 9 and the Blue River to maintain AASHTO standards.

The westbound off-ramp terminal at US 6/SH 9 is a signalized intersection. Two lanes turn left onto eastbound US 6 and one lane turns right onto northbound SH 9. The right turn lane is channelized and becomes a short auxiliary lane on SH 9, turning right at the next intersection at Rainbow Drive. Due to the short auxiliary lane length the channelized off-ramp right turn has a yield sign.

I-70 Westbound Ramps

The westbound off-ramp and on-ramp (continuous lane) meet standards for acceleration and deceleration length. The current off-ramp inside shoulder does not meet the standard 4 foot width required. The westbound on-ramp outside shoulder does not meet the required 8 foot width. Since there is adequate existing pavement to accommodate 2-12' lanes with standard shoulders, restriping of the on-ramp will bring it up to current standards.

Existing ramps meet CDOT standards, but grades are very high. The westbound off-ramp has a 5.25% grade, which flattens adequately as it approaches SH 9. The westbound on-ramp is 6% for the first 150' from SH 9, and has been a cause for problems. Flattening the gore area immediately at the intersection should be looked at during alternative development. Increasing the length of the island up the ramp, may also encourage drivers making the right turn onto the ramp, to not stop. Once stopped, they have difficulty getting started again on the steep 6% slopes in icy conditions.

I-70 Eastbound

As I-70 eastbound approaches the US 6/SH 9 interchange from the west it consists of two 12 foot lanes with a 4 foot inside shoulder and a variable width outside shoulder through the ramp transition area. Eastbound I-70 features a long horizontal curve to the right approaching the exit. The curve continues across the bridge over the Blue River and through the gore area of the eastbound off-ramp. A deceleration lane is created for the eastbound off-ramp and two through lanes continue across the interchange. The eastbound on-ramp joins the highway as a continuous climbing lane creating 3 lanes east of the interchange to the Eisenhower Tunnel. Vertical grades are similar to I-70 westbound stated above.

The PEIS states that a 3 lane section should be added from Frisco to Silverthorne, and that this additional lane be extended across the US 6 bridge until it connects to the 3 lane section east of the interchange. Extending this lane will require widening at the gore areas of the eastbound on and off ramps, and replacement of the existing bridge structures.

I-70 Eastbound Ramps

The eastbound off-ramp and on-ramp (continuous lane) meet standards for acceleration & decelerleration length. The existing eastbound off-ramp meets required standards. The on-ramp outside shoulder does not meet the required 6 foot width, but similar to the westbound on-ramp, restriping of the existing pavement will bring it up to current standards.

Existing ramps meet CDOT standards. The eastbound off-ramp is shorter than the westbound off-ramp from the gore point to the ramp terminal, but still meets deceleration length criteria. Steep fill slopes extend down to Stephens Way along this off-ramp. The eastbound on-ramp has flat grades at first, which increase to 5% grades for the next 400' before flattening out to a 3.5% grade. It's connection to I-70 is a continuous lane, but if a third lane is extended on I-70 across the intersection, the roadway will require widening, and the merge lane length will need to be studied. This would impact the existing chain up station and noise walls/berms.

SH 9 north of I-70

The roadway section for SH 9 north of Wildernest Road consists of two 12 foot lanes in each direction separated by a raised median and curb and gutter. SH 9 features several closely-spaced intersections and business accesses north of I-70. These intersections and accesses cause weaving as traffic maneuvers to and from them along SH 9.

South of Wildernest Road, SH 9 continues through the interchange with two through lanes in each direction and additional auxiliary lanes for right and left turns for the I-70 ramps. The grades are approximately 2.5% to 3% from the north down to the interchange.

Both northbound and southbound SH 9 have adequate through lane widths, but several of the right and left turn lanes range between only a 9 foot and 11 foot width.

Attached sidewalks exist on both sides of the road up to the interchange underpass area, where the sidewalk becomes detached and located behind the bridge piers. A detached sidewalk exists on the southbound side, and an attached sidewalk on the northbound side. The median includes left turn lanes at cross streets.

US 6 east of I-70

US 6 continues east from SH 9 with two 12 foot through lanes and additional auxiliary lanes for left and right turns. The through lanes are separated by a raised median with the exception of one block between Stephens Way and Little Beaver Trail, which has a painted median. The south side of the road has curb and gutter with an attached sidewalk. On the north side of US 6, the typical section varies. Between the interchange and Little Beaver Trail, the sidewalk is generally attached, and there is curb and gutter. There are Summit Stage bus stops on both sides of the road in this area. East of Little Beaver Trail, a gutter pan section exists, with an informal gravel path adjacent to the road.

The grades for US 6 increase from 2.5% near the interchange to 6% as the road continues east. Current survey has not been extended far enough to see if this grade gets even steeper. As with SH 9, several right and left turn lanes do not meet the required standard 12' lane width. If the roadway is restriped correctly, the overall pavement widths for both the eastbound and westbound roadways could meet current standards.

Wildernest Road (Collector)

Wildernest Road from the intersection of Stephens Way to SH 9, consists of one lane in each direction separated by a raised median with left turn bays. A right turn lane exists at SH 9 and at one commercial property traveling southbound. Both sides of the road are constructed with curb and gutter with attached brick patterned sidewalk. Curb and gutter consists of both mountable and vertical curb, and is generally

in very poor condition. For Wildernest Road south of Stephens Way, there is not curb and gutter or sidewalk.

It appears as though current lane widths generally do conform to the 13 foot wide City standard, but turn lanes widths are less than 11'. One substandard area exists at the northbound intersection with SH 9. This area has a 32 foot width for the 3 existing lanes. There is a double left turn and a right turn lane. The right turn lane movement has to yield to U-turns at the intersection for drivers heading back to the interstate.

Rainbow Drive (Collector)

Rainbow Drive consists of one through lane in each direction separated by a raised median with separate right and left turn lanes. The street has curb and gutter with attached sidewalk on both sides. The overall street width for both directions does not meet the required City standard of 13 foot wide lanes. At the intersection of SH 9 WB there is a right turn, thru and left and a left. Into Rainbow there is a tight curve into Rainbow that the radius should be checked.

Stephens Way (Collector)

The existing roadway section for Stephens Way is one lane in each direction with narrow gravel shoulders. As the street approaches the intersection with US 6, the gravel shoulders are replaced with curb and gutter and attached sidewalks. Horizontal sight distances for vehicles accessing Stephens Way from the Diamond Shamrock gas station are also limited and possibly substandard.

A horizontal curve with limited sight distance also exists on Stephens Way as it passes under I-70 eastbound. Due to the proximity of the eastbound I-70 embankment, the sight distance is limited to approximately 200' which is below the required City standard of 250'. Currently the curve is signed for 10mph (yellow/advisory).

4th Street (Collector)

4th Street is one lane in each direction with curb, gutter and attached sidewalk on both sides within approximately 100' of the intersection with SH 9. Further west of SH 9 the curb, gutter and sidewalk section continues along the south side of the street, but the north side transitions to a gravel shoulder and walkway. A left turn lane is provided at the intersection with SH 9.

A Summit Stage stop is located off 4th Street.

3rd Street (Local)

3rd Street is one lane in each direction with a left turn lane at the intersection with SH 9. The south side of the street includes curb and gutter with an attached sidewalk while the north side has a gravel shoulder and ditch section.

W. Anemone Trail (Local)

The existing roadway section for W. Anemone Trail consists of one lane in each direction with curb, gutter and attached sidewalk on both sides. The sidewalk on the east side of the street ends at the commercial driveway approximately 50 feet south of the intersection with US 6.

E. Anemone Trail (Local)

The existing roadway section for E. Anemone Trail consists of one lane in each direction with curb, gutter and attached sidewalk on the west side only. The east side shoulder consists of a gutter pan.

Little Beaver Trail (Collector)

Little Beaver Trail is one lane in each direction with curb and gutter on both sides. A right turn lane exists at the intersection with US 6. The lane widths and overall roadway width do not conform to City standards of 13 foot lanes for a collector. The existing 60 degree angle at which Little Beaver Trail meets US 6 does not meet the City standard of 70 degrees and could also cause sight distance issues for right turning vehicles. No sidewalks exist along Little Beaver Trail.

Dillon Ridge Road (Local)

Dillon Ridge Road consists of one lane in each direction with a painted median and curb and gutter on both sides. Attached sidewalk is located intermittently on both sides of the street and appears narrower than 6 foot in width on east side (no ground survey). Left turn lanes are provided at driveways and at the intersection with US 6.

Pedestrian/Bicycle Facilities

In general, sidewalks facilities run the length of the project on both the south and north sides of US 6 and SH 9 to the west of Little Beaver Trail. To the east of Little Beaver Trail, the gravel path is narrow and sloped into the highway,. Wheelchair accessible crossing are provided throughout the project, but truncated domes are not present.

This project should review CDOT bicycle guidelines.

Table 1 summarizes existing roadway information.

TABLE 1: Existing Roadway Information

Roadway	Lanes Each Direction	Shoulders (Inside/Out side)	Posted Speed	% Grade	Comments * Substandard Items
I-70 WB	2 plus auxiliary	4'/6'	60	<3.5 to east; Up to 6 to west	2 lanes across bridge Bridge widths 6'/12'/12'/12'/6' Blue River Bridge 6'/12'/12'/12' Over US 6 & SH 9
I-70 WB off Ramp	1-3	Substandard Inside 4'/6' Standard	45	5.25	Double left turn and single right *Substandard inside shoulder
I-70 WB on Ramp	2-1	Substandard Outside 4'/6' Standard	Not Posted	6	Adequate width exists to restripe lanes and provide adequate shoulders
I-70 EB (west of interchange)	2	4'/varies	60	6	2 lanes across bridge Bridge widths 6'/12'/12'/12'/6' Blue River Bridge 6'/12'/12'/12' Over US 6 & SH 9

I-70 EB (east of interchange)	2 plus auxiliary	4'/varies	60	3.5	
I-70 EB off Ramp	1-3	4'/6'	35	<3	Double left turn and single right
I-70 EB on Ramp	2-1	Substandard Outside 4'/6' Standard	Not Posted	5	Adequate width exists to restripe lanes and provide adequate shoulders
SH 9	2	C&G	35	<3	Raised median with left turn bays Substandard turn lane widths
US 6	2	C&G	35	>4	Raised median with left turn bays Adequate width exists to restripe lanes and provide adequate shoulders Grades are 4% at the intersection and 6% towards Keystone
Wildernest Road	1	C&G Gravel	25	4% at SH 9	Raised median with left turn bays *Substandard turn lane widths *Substandard lane widths at SH 9
Stephens Way	1	Gravel	25	Up to 7%	C&G within 300' of intersection with US 6 Steep Grades are about 200' to 400' from US 6 *Substandard sight distances *10 mph advisory speed under I-70
Rainbow Drive	1	C&G	20	5% Survey is short	Raised median with left turn bay – allows double turn at SH 9 *Posted speed of 20 mph does not match city standards for Collector road *Substandard lane widths
4th Street	1	C&G Gravel	Not Posted	<3% No Survey	Left turn lane at intersection with SH 9
3rd Street	1	C&G Gravel	Not Posted	<3% No Survey	Left turn lane at intersection with SH9
W. Anemone Trail	1	C&G	20	<3% No Survey	

E. Anemone Trail	1	C&G	20	<3% No Survey	
Little Beaver Trail	1	C&G	25	<3% No Survey	*Narrow lanes, poor sight distance and substandard 60 degree skew Combination of narrow road and lack of sidewalk a concern Right turn lane at intersection with US 6
Dillon Ridge Road	1	C&G	25	Assume >3% No Survey	Left turn lanes
Bicycle/Pedestrian Facilities	NA	2' suggested	NA	NA	*No truncated domes on ramps *Inconsistent widths for off road bicycle facility Wheelchair ramps present

Summary

In summary, the following conditions were observed:

- Roadway through lanes were generally of sufficient width, except on a few side road intersections with US 6 and SH 9.
- Sufficient width exists in several locations to restripe the road and meet lane and shoulder width guidelines.
- Several turn lane widths were substandard on US 6, SH 9 and local roads. Those impacted on state highways should be upgraded with this project.
- Horizontal sight distance on local roads should be reviewed if the project impacts those areas.
- Sidewalk ramps need to be upgraded to include truncated domes.
- CDOT guidelines for accommodation of bicycles should be reviewed.

Note: Per discussions with the City, their requirements for 13' lanes generally apply to a 2-lane roadway with gravel shoulders. Normal 12' lanes are adequate at intersections and areas with curb and gutter. A statement clarifying this will be obtained from the city.

References

1. *Plan and Profile of Proposed Federal Aid Project No. I70-3(66)212;* State Highway No. 70, Summit County; Colorado Department of Transportation; 1969.

2. *Plan and Profile of As Constructed Federal Aid Project No. IM-NH-I(CX)-CX 070-2(176);* State Highway No's. 70 & 9, Summit County; Colorado Department of Transportation; 1994.

I-70 Silverthorne/Dillon Interchange
Existing Structures Report

Prepared by Jacobs Engineering

February 2011

Existing Structures Report

Identification and Assessment of Structures with the Project Limits

I-70 Silverthorne/Dillon Interchange Project
CDOT Project Number IM 0703-341

Prepared by Jacobs Engineering
February 2011

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PROJECT OVERVIEW

The Colorado Department of Transportation (CDOT) has undertaken this project to rebuild the existing interchange at I-70 and U.S. 6 / CO 9. A new interchange will offer increased vehicle capacity and improved safety. . This document provides a brief description of the structures that could be impacted, their current conditions, known deficiencies, and recommended repairs.

Sources of Information

Jacobs called upon aerial photography, CDOT's asset inventory, Silverthorne's asset inventory, and staff knowledge of the area to identify structures within the project limits. Staff then reviewed the information to determine what agency was responsible for maintenance and upkeep of each structure. Requests for information were then issued to CDOT and Silverthorne for the bridges under their respective authority.

Bridges maintained by CDOT have a structure number and are inspected biannually in accordance with FHWA requirements. These inspections yield a formalized report that documents key bridge properties, structural condition, problem areas, recommended maintenance, and an overall rating known as the Sufficiency Rating. The Sufficiency Rating is a number between 0 and 100 that allows one to gauge the overall condition of a bridge with a single data point. This number is also factored into funding decisions and helps determine if improvement projects qualify for federal aid dollars.

One other key part of the CDOT inspection report is the deficiency classification. Depending upon the condition of the bridge and associated roadways, it may be deemed either Structurally Deficient or Functionally Obsolete. Structural deficiencies arise when bridge components have deteriorated to the point that capacity (e.g. strength) has been compromised. Functional obsolescence occurs when the geometrics of the bridge no longer meet current design standards. This is due to the evolution of design standards that occur over the life of the structure and not with deterioration of the bridge.

Structures not maintained by CDOT are referred to as "Off System Bridges". These structures are still subject to inspection and maintenance; however, that responsibility falls to the local municipality. Most municipalities will use the same inspection process employed by CDOT and generate very similar inspection reports. They even tend to use the same inspection companies as CDOT, since the inspectors must be NBSI-certified to perform the work in accordance with federal requirements. The Town of Silverthorne (Silverthorne) is the local municipality for this project

The aforementioned requests for information asked for two particular items at each bridge: the As-Built plans and the latest inspection report. Both CDOT and Silverthorne were able to provide the most recent inspection reports for each structure. Silverthorne uses the same inspection process as CDOT, so the reports from the two agencies contained the same information.

While inspection reports are usually quite current, locating relevant plans can be difficult. Many times the As-Built plans cannot be found. The original design plans are usually a good substitution; however, the structure may have undergone subsequent renovation projects that changed key features. Locating subsequent project plans is even more difficult. Both CDOT and Silverthorne were able to provide the original design plans for the affected structures. Jacobs also obtained plans related to the renovation of the CDOT bridges. The Silverthorne structures are new enough that no major renovations have occurred. One of their bridges recently underwent a repair and resurfacing operation, but Silverthorne was able to provide information on the upgrade. There is only one structure in the vicinity that experienced a significant upgrade whose plans could not be located. These were the plans for the upgrade of Structure F-12-BP. The original 1982 installation consisted of a corrugated metal pipe but renovations in 1993 replaced the pipe with a four-cell CBC and pedestrian underpass.

Affected Structures

Seven structures fall within the project limits and may be impacted by the interchange reconstruction project:

1. Bridge carrying WB I-70 over CO 9 (Str. No. F-12-R)
2. Bridge carrying EB I-70 over U.S. 6 (Str. No. F-12-S)
3. Bridge carrying WB I-70 over the Blue River and local roads (Str. No. F-12-X)
4. Bridge carrying EB I-70 over the Blue River and local roads (Str. No. F-12-Y)
5. Concrete box culvert and adjacent pedestrian underpass; carries CO 9 over the Blue River and pedestrian trail (Str. No. F-12-BP)
6. Bridge carrying Wildernest Road over the Blue River (Off-system bridge; no structure number)
7. Bridge carrying Stephens Way over Straight Creek (Off-system bridge; no structure number)

Figure 1 shows the locations of the seven structures.

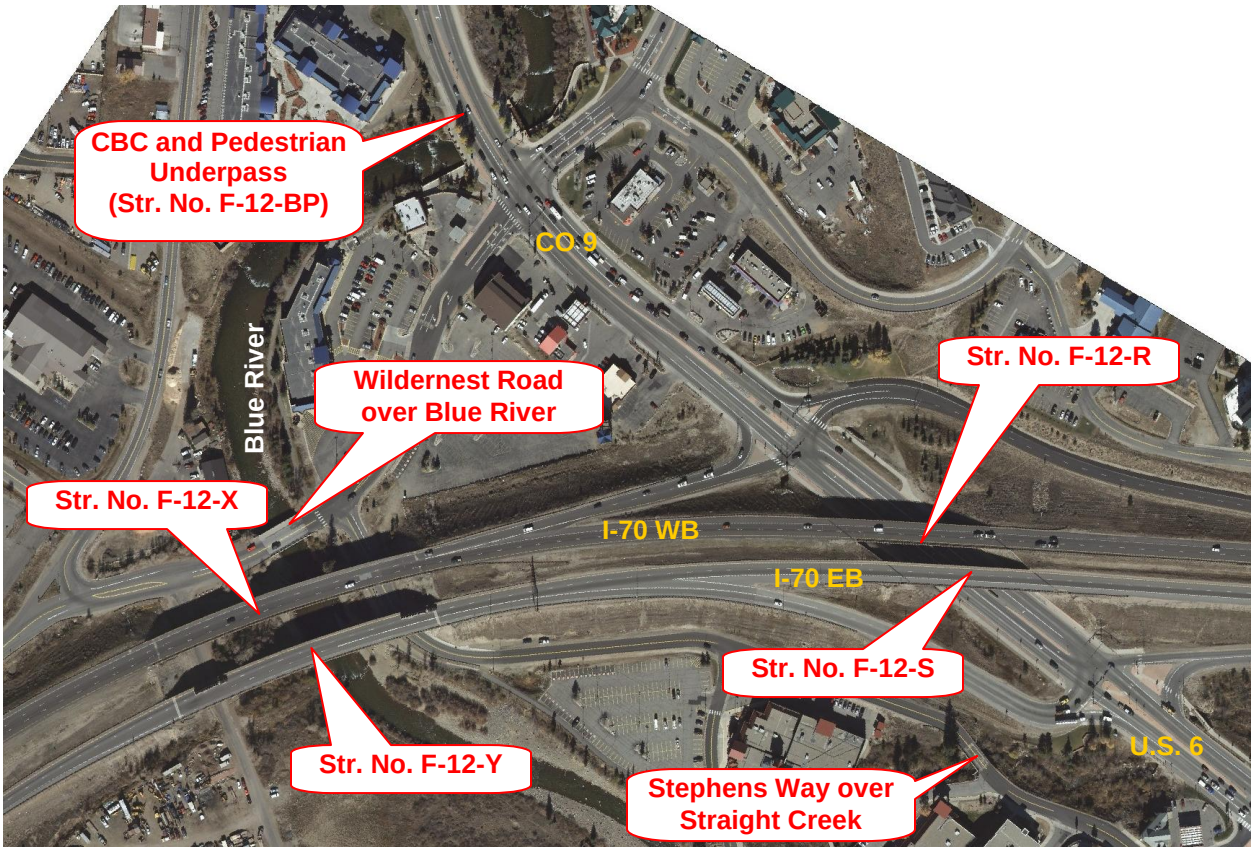

Figure 1 - Structures within Project Limits

Str. No. F-12-R: Bridge carrying WB I-70 over CO 9

Structure Description

Structure Number F-12-R is a bridge that carries the westbound lanes of Interstate 70 over Colorado State Highway 9. Constructed in 1971, the structure measures 44.5 feet wide and approximately 312 feet long[1]. The bridge achieves this total length with a four-span configuration of 61.83 feet, 84.21 feet, 85.00 feet, and 73.00 feet. The structure has a skew angle of 34.4 degrees[2].

The horizontal alignment of Interstate 70 crosses the bridge on a horizontal curve that leads to a tangent. A sloping tangent carries the vertical profile. Bound by Type 10R Bridge Rails on each side of the deck, the interstate is currently configured with a 6-feet wide inside shoulder, two 12-feet wide traffic lanes, and a 12-feet wide outside shoulder. Beneath the structure, CO 9 is aligned on both a horizontal tangent and a sag vertical curve. Three traffic lanes, plus the associated shoulders, occupy the space under each of the two center spans. Elevated, pedestrian pathways and concrete slope paving occupy the space beneath each of the end spans.

The superstructure consists of five, continuous steel plate girders topped with a 7.5-inch thick concrete deck. An asphalt overlay covers the bare concrete deck. Cast-in-place concrete substructure units support the 54-inch (max) deep girders. Seat-type abutments, founded on driven steel piles, are employed at each end of the bridge. Interior support points use multi-column piers. Each pier is comprised of five, 2.33-feet diameter columns supporting a cap beam. Every pier column is anchored to a 6-feet by 6-feet spread footing that transfers the load to the ground.

In addition to routine maintenance, the structure has undergone some enhancements. A 1994 project replaced the original bridge rails with the crash-compliant Type 10R rails that exist today. The elevated pedestrian pathways under each end span were also installed during this project. The asphalt overlay and expansion devices have been replaced multiple times during the bridge's 39-year service life.

Structure Assessment

Last inspected in June 2009, this structure received a sufficiency rating of 92.9. Despite this high sufficiency rating, the bridge is categorized as functionally obsolete. Inadequate lateral/vertical clearance is the reason for the functional shortcoming. The bridge also possesses concrete end posts that do not comply with current CDOT Standards for bridge approaches. This latter factor could also contribute to the functional obsolescence.

CDOT's inspection report contains a wealth of information about the structure; the summary that follows simply highlights some key findings. The steel girders have fared well and exhibit only minor rusting at the ends near each abutment. The rocker bearings have also performed well and avoided the tipping problems that often plague such support mechanisms. Significant debris has accumulated on each abutment seat. Combined with the rusting girder ends, this indicates that the expansion joints, which are located directly above, leaked at some point in time. The environment has also taken its toll on the Type 10R curbs and pier columns. Delamination and spalling has occurred at each column base, with enough to expose some reinforcing steel in one of the columns. The curbs are also exhibiting spalling, cracking, and scrapes. Contact with snowplow blades has precipitated or accelerated many of these curb failures.

CDOT anticipates routine maintenance on its bridges and uses the inspection report to recommend less typical upkeep. The June 2009 inspection recommends only one item – removal of accumulated abutment debris. The report recommends removal by 2011 and estimates the activity will cost $250.

[1] In this report, bridge length is the distance specified in the latest inspection reports. This distance is typically measured from the back face of the lead abutment to back face of end abutment. The span lengths quoted are those listed in the bridge description on the plans.

[2] In this report, skew angles are given as the angle between bridge longitudinal centerline and support centerline. In such a system, a skew angle of 90 degrees represents an orthogonal (rectangular) bridge.

Str. No. F-12-S: Bridge carrying EB I-70 over US 6

Structure Description

Structure Number F-12-S is a bridge that carries the eastbound lanes of Interstate 70 over U.S Highway 6. Constructed in 1971, the structure measures 44.5 feet wide and approximately 297 feet long. The bridge achieves this total length with a four-span configuration of 60.54 feet, 84.50 feet, 85.17 feet, and 63.50 feet. The structure has a skew angle of 34.4 degrees.

The horizontal alignment of Interstate 70 crosses the bridge on a horizontal curve that leads to a tangent. A sloping tangent carries the vertical profile. Bound by Type 10R Bridge Rails on each side of the deck, the interstate is currently configured with a 6-feet wide inside shoulder, two 12-feet wide traffic lanes, and a 12-feet wide outside shoulder. Beneath the structure, US 6 is aligned on both a horizontal tangent and a sag vertical curve. Three traffic lanes, plus the associated shoulders, occupy the space under each of the two center spans. Elevated, pedestrian pathways and concrete slope paving occupy the space beneath each of the end spans.

The superstructure consists of five, continuous steel plate girders topped with a 7.5-inch thick concrete deck. An asphalt overlay covers the bare concrete deck. Cast-in-place concrete substructure units support the 54-inch (max) deep girders. Seat-type abutments, founded on driven steel piles, are employed at each end of the bridge. Interior support points use multi-column piers. Each pier is comprised of five, 2.33-feet diameter columns supporting a cap beam. Every pier column is anchored to a 6-feet by 6-feet spread footing that transfers the load to the ground.

In addition to routine maintenance, the structure has undergone some enhancements. A 1994 project replaced the original bridge rails with the crash-compliant Type 10R rails that exist today. The elevated pedestrian pathways under each end span were also installed during this project. The asphalt overlay and expansion devices have been replaced multiple times during the bridge's 39-year service life.

Structure Assessment

Last inspected in June 2009, this structure received a sufficiency rating of 93.3. Despite this high sufficiency rating, the bridge is categorized as functionally obsolete. Inadequate lateral clearance is the reason for the functional shortcoming. The bridge also possesses concrete end posts that do not comply with current CDOT Standards for bridge approaches. This latter factor could also contribute to the functional obsolescence.

CDOT's inspection report contains a wealth of information about the structure; the summary that follows simply highlights some key findings. The steel girders have fared well and exhibit only minor rusting at the ends near each abutment. The rocker bearings have also performed well and avoided the tipping problems that often plague such support mechanisms. Significant debris has accumulated on each abutment seat. Combined with the rusting girder ends, this most likely indicates that the expansion joints, which are located directly above, leaked at some point in time.

Although the structure provides adequate vertical clearance over the roadway below, the girders have been struck on past occasions. Several girders in each of the two interior spans display scrapes on the bottom flanges. The outermost girder in Span 3 also has a twisted bottom flange and deformed diaphragm in the adjacent bay, both of which indicate a more significant vehicle collision.

Adequate vertical clearance is a clearance distance greater than the minimum required. CDOT requires 16' - 6" minimum vertical clearance on bridges over roadways. Per the 2009 inspection report, this bridge provides 17.6 feet of vertical clearance.

The environment has also taken its toll portions of the structure. Delamination and spalling has occurred at each column base, with enough to expose some reinforcing steel in several of the columns. On top of the bridge, the Type 10R rails have also experienced deterioration. Section loss has been observed on many of the vertical rail posts while spalling, cracking, and scrapes are present on the concrete curbs. Contact with snowplow blades has precipitated or accelerated many of these curb failures.

CDOT anticipates routine maintenance on its bridges and uses the inspection report to recommend less typical upkeep. The June 2009 inspection recommends five items, those most significant being column repair and repainting of all steel components. The report recommends completing all five items by 2012 and estimates a total cost of $23,800.

Str. No. F-12-X: Bridge carrying WB I-70 over Blue River

Structure Description

Structure Number F-12-X is a bridge that carries the westbound lanes of Interstate 70 over Stephens Way, the Blue River, and South Adams Avenue. Constructed in 1971, the structure measures 50.5 feet wide and approximately 554 feet long. The bridge achieves this total length with a four-span configuration of 110.00 feet, 165.00 feet, 165.00 feet, and 110.00 feet. The structure has a skew angle of 90 degrees[3].

The horizontal alignment of Interstate 70 crosses the bridge on a horizontal curve. A sag vertical curve carries the profile. Bound by Type 10R Bridge Rails on each side of the deck, the interstate is currently configured with a 6-feet wide inside shoulder, two 12-feet wide traffic lanes, a 12-feet wide acceleration lane, and a 6-feet wide outside shoulder. Beneath the structure, Stephens Way is aligned on both a horizontal and vertical tangent through the eastern end span. The Blue River follows a generally linear path through the eastern interior span. Low lying land with moderate vegetation occupies the other interior span beneath the structure. South Adams Avenue is an unimproved road, but follows a general tangent for both line and grade beneath the westernmost end span.

The superstructure consists of six, continuous steel plate girders topped with a 7.5-inch thick concrete deck. An asphalt overlay covers the bare concrete deck. Cast-in-place concrete substructure units support the 87-inch (max) deep girders. Seat-type abutments, founded on driven piling, are employed at each end of the bridge. Interior support points use hammerhead style piers. The base of each hammerhead wall is anchored to a 22-feet by 14-feet spread footing that transfers the load to the ground.

Beyond routine maintenance, the most significant structural enhancement has been replacement of the bridge rails. A 1994 project replaced the original bridge rails with the crash-compliant Type 10R rails that exist today. The asphalt overlay and expansion devices have been replaced multiple times during the bridge's 39-year service life.

Structure Assessment

Last inspected in July 2009, this structure received a sufficiency rating of 84.7. The bridge was neither structurally deficient nor functionally obsolete.

CDOT's inspection report contains a wealth of information about the structure; the summary that follows simply highlights some key findings. The steel girders have fared well and exhibit only minor rusting at the ends near each abutment. The rocker bearings have also performed well and avoided the tipping problems that often plague such support mechanisms. A moderate level of debris has accumulated on each abutment seat. Combined with the rusting girder ends, this most likely indicates that the expansion joints, which are located directly above, leaked at some point in time.

The environment has also taken its toll portions of the structure. The most significant concrete deterioration has occurred on the southern (lower) sides of the pier cap. Reinforcing steel is exposed on the decorative pier riser posts and wire reinforcing is visible on the bottom of the hammerhead cap cantilevers. On top of the bridge, the Type 10R rails have also experienced deterioration. Rust and pitting has developed at the bottom of the vertical rail posts and the rails themselves have been subject to vehicle impacts on past occasions. The concrete curbs for these rails display spalling, cracking, and scrapes common to the other bridges in the vicinity.

CDOT anticipates routine maintenance on its bridges and uses the inspection report to recommend less typical upkeep. The July 2009 inspection recommends two items – spot painting the steel components at

[3] Measured with respect to a working line that is tangential to the roadway curve at Pier 3.

each abutment end and replacing approach railing on west abutment. The report recommends completing these items by 2011 and estimates a total cost of $5,500.

Str. No. F-12-Y: Bridge carrying EB I-70 over Blue River

Structure Description

Structure Number F-12-Y is a bridge that carries the eastbound lanes of Interstate 70 over Stephens Way, the Blue River, and South Adams Avenue. Constructed in 1971, the structure measures 50.5 feet wide and approximately 554 feet long. The bridge achieves this total length with a four-span configuration of 110.00 feet, 165.00 feet, 165.00 feet, and 110.00 feet. The structure has a skew angle of 90 degrees[4].

The horizontal alignment of Interstate 70 crosses the bridge on a horizontal curve. A sag vertical curve carries the profile. Bound by Type 10R Bridge Rails on each side of the deck, the interstate is currently configured with a 6-feet wide inside shoulder, two 12-feet wide traffic lanes, a 12-feet wide deceleration lane, and a 6-feet wide outside shoulder. Beneath the structure, Stephens Way is aligned on both a horizontal and vertical tangent through the eastern end span. The Blue River follows a generally linear path through the eastern interior span. Low lying land with moderate vegetation occupies the other interior span beneath the structure. South Adams Avenue is an unimproved road, but follows a general tangent for both line and grade beneath the westernmost end span.

The superstructure consists of six, continuous steel plate girders topped with a 7.5-inch thick concrete deck. An asphalt overlay covers the bare concrete deck. Cast-in-place concrete substructure units support the 87-inch (max) deep girders. Seat-type abutments, founded on driven piling, are employed at each end of the bridge. Interior support points use hammerhead style piers. The base of each hammerhead wall is anchored to a 22-foot by 14-foot spread footing that transfers the load to the ground.

Beyond routine maintenance, the most significant structural enhancement has been replacement of the bridge rails. A 1994 project replaced the original bridge rails with the crash-compliant Type 10R rails that exist today. The asphalt overlay and expansion devices have been replaced multiple times during the bridge's 39-year service life.

Structure Assessment

Last inspected in July 2009, this structure received a sufficiency rating of 87.9. Despite this high sufficiency rating, the bridge is categorized as functionally obsolete. Inadequate lateral and vertical clearances on the road below are the most likely reason for the functional shortcoming.

CDOT's inspection report contains a wealth of information about the structure; the summary that follows simply highlights some key findings. The steel girders have fared well and exhibit only minor rusting at the ends near each abutment. The rocker bearings have also performed well and avoided the tipping problems that often plague such support mechanisms. Several girders in the span over South Adams Avenue display scrapes on the bottom flanges. While no gross deformation has occurred, these are clearly signs of vehicular impact, most likely due to the inadequate vertical clearance cited above.

Light cracking is visible on most concrete members of the bridge – piers, abutments, and wingwalls. More significant areas of delamination and efflorescence are visible on the underside of the bridge deck overhangs. While this concrete deterioration is primarily an environmental issue, the metal bridge rails have suffered from both environmental factors and vehicular collisions. Rust pack has developed at the rail expansion devices and will eventually limit movement if unchecked. Vehicular impact, to the railings on both sides of the bridge, has deformed the horizontal members and caused post anchorage failures at four locations.

CDOT anticipates routine maintenance on its bridges and uses the inspection report to recommend less typical upkeep. The July 2009 inspection recommends three items – repairing damaged bridge rail

[4] Measured with respect to a working line that is tangential to the roadway curve at Pier 3.

sections, cleaning abutment debris, and spot painting the steel components at each abutment. The report recommends completing all five items by 2012 and estimates a total cost of $8,000.

Str. No. F-12-BP: Culvert and Pedestrian Underpass carrying CO 9 over the Blue River and Pedestrian Trail

Structure Description

Structure Number F-12-BP is a combination concrete box culvert (CBC) and pedestrian underpass that carries State Highway 9 over the Blue River and the associated pedestrian trail. Constructed in 1982, the culvert portion of the structure measures 53.75 feet wide and 136.00 feet long. A large corrugated metal pipe (102-inch equivalent) was installed along the pedestrian trail alignment during this initial construction operation. Both of these structures were installed with a skew angle of 90 degrees, with respect to the highway above.

Jacobs has been unable to obtain plans documenting the installation of the present-day pedestrian underpass. Based upon site visits, inspection reports, and photographs Jacobs offers the following information. Construction of the pedestrian underpass was in progress during the August 1993 site inspection. The passage was constructed parallel to the four-cell CBC and approximately five feet south of it. Vertically, the trail surface is located approximately 8 feet above the bottom slab of the CBC. It appears that the pedestrian underpass has the same length of the original CBC – 136.00 feet. There is approximately 5 feet of fill on top of the four-cell CBC and very minimal fill (0 to 1 feet range) on top of the pedestrian underpass.

The 1993 inspection report indicates that the two original wingwalls on the south side were removed during this modification and replaced with new wingwalls that integrate the pedestrian underpass. The new wingwalls were concrete with decorative stone façade. The existing headwalls were also modified at this time, incorporating extensions and the same decorative stone façade applied to the wingwalls. Pilasters and pedestrian railing were installed for the sidewalks adjacent to CO 9. Lighting was also added to the underpass. The approaches to the structure exhibit the same stone façade theme and all the pieces are well integrated. It is not clear how much of the short, retaining walls on the approach trails are considered part of the structure proper.

Structure Assessment

Last inspected in September 2007[5], this structure received a sufficiency rating of 65.0. The structure was neither structurally deficient nor functionally obsolete.

CDOT's inspection report contains a wealth of information about the structure; the summary that follows simply highlights some key findings. The pedestrian underpass is in great condition. Similarly, the wingwalls, headwalls, and associated stone façade treatments are performing well too. The top slabs of the CBC show light longitudinal cracking, some of which actively leak. Weep holes were drilled in the top slab in three of the four cells; these holes all show active leakage. Landscaping was planted atop the outlet end.

The inspection report does not recommend any particular maintenance items for the foreseeable future.

Off-System Bridge: Bridge carrying Wildernest Road over Blue River

Structure Description

The bridge carrying Wildernest Road over the Blue River is an off-system bridge that is maintained by the Town of Silverthorne. Constructed in 1983, the structure measures 49.50 feet wide and approximately 92.50 feet long. The bridge achieves this total length with a single span and has a 90-degree skew.

Although horizontal curves exist on both approaches, Wildernest Road crosses the bridge on a horizontal tangent. Vertically, the highway crosses on a sloping tangent. An aluminum tube and post system constitutes the bridge rail on both sides of the structure. The system does not correspond to any CDOT pre-approved bridge rails currently in use. The plans refer to the railing as the "Maine 600-1 System" and

[5] This structure is on a four-year inspection cycle, not the standard two-year cycle.

the FHWA Bridge Rail Guide (2005) identifies the system as the "Foothills Parkway Aluminum Bridge Rail".

Regardless of the name, the space between the rails is currently configured with a 38-feet wide region for vehicles and an 8.33-feet wide sidewalk on the north. Two traffic lanes share the 38-feet wide space. Beneath the structure, the Blue River occupies the majority of the clear space and flows in a relatively straight alignment to the northwest. Land not inundated during normal flow is covered with rocks that generally armor the abutments.

The superstructure consists of 12 prestressed concrete box girders placed side-by-side. These girders are topped with an 8-inch thick cast-in-place concrete deck. An asphalt overlay covers the bare concrete deck. Cast-in-place, seat-type abutments support the 35-inch deep girders. Spread footings transfer the resulting loads to the ground.

Beyond routine maintenance, the most significant structural work has been deck repair and installation of an asphalt overlay. Completed in the summer of 2010, the work removed the original thin-bonded overlay, repaired damaged deck concrete, and applied a new waterproofing membrane + asphalt overlay to the deck.

Structure Assessment

Last inspected in May 2009, this structure received a sufficiency rating of 83.3. The structure was neither structurally deficient nor functionally obsolete.

Just like CDOT's inspection reports, this document also contains a wealth of information about the structure. The summary that follows simply highlights some key findings. Light, longitudinal cracking is visible on the western ends of girders; however, the upstream girder has a 3-feet spall region with exposed reinforcing / prestressing steel. Both the abutments and wingwalls exhibit light vertical cracking. The inspection report addresses some deck deficiencies, but those items were addressed in the summer of 2010 repairs.

Excluding the already addressed deck rehabilitation, the May 2009 inspection report recommends three repair items – installing AASHTO-approved bridge and approach railing, patching the spall on the upstream girder, and cleaning debris from the sidewalk. A target completion date is not specified but the work is estimated to cost $28,900.

Off-System Bridge: Bridge carrying Stephens Way over Straight Creek

Structure Description

The bridge carrying Stephens Way over Straight Creek is an off-system bridge that is maintained by the Town of Silverthorne. Constructed in 1989, the structure measures approximately 30.5 feet wide and 47.20 feet long. The bridge achieves this total length with a single span and lacks a skew.

Although horizontal curves exist on both approaches, Stephens Way crosses the bridge on a horizontal tangent. A sloping tangent carries the vertical profile. Bound by Type 3 Bridge Rails on each side of the deck, the roadway is currently configured with two 12-feet wide traffic lanes, and a 2-feet wide shoulder on each side

Beneath the structure, Straight Creek occupies approximately half of the clear space during normal flow conditions. Riprap consisting of two- to three-feet diameter rocks was used to armor the areas around each abutment. Straight Creek approaches the structure from the northeast and is oriented approximately 45-degrees from the roadway centerline. Immediately before encountering the upstream face of the bridge, the creek turns and flows under the structure in a relatively straight line that is essentially perpendicular to the roadway.

The superstructure consists of four prestressed concrete double-tee girders placed side-by-side. These girders support a 6-inch thick cast-in-place concrete deck, which in turn has a protective epoxy polymer coating. Cast-in-place, seat-type abutments support the 30-inch deep girders. Spread footings transfer

the resulting loads to the ground. A façade of ornamental stone hides the two edges of the superstructure, while stone fascia covers the exposed faces of the abutments and wingwalls.

As a relatively new structure, the bridge has only been subject to routine maintenance work. There have been no major renovations or rehabilitation.

Structure Assessment
Last inspected in May 2009, this structure received a sufficiency rating of 80.2. Despite this high sufficiency rating, the bridge is categorized as functionally obsolete. Substandard deck geometry and inadequate transition railing appear to be the reasons for the functional shortcoming.

Just like CDOT's inspection reports, this document also contains a wealth of information about the structure. The summary that follows simply highlights some key findings. Moderate to heavy cracking is evident throughout the bridge deck and approximately 50% of the epoxy polymer overlay is gone. The precast double tees show some hairline cracking and minor efflorescence at the fillets, but have otherwise held up. The decorative stone fascia has held up well and shows no signs of distress.

The May 2009 inspection recommends one repair item – improve the approach/transition railing to meet AASHTO Guidelines. A target completion date is not specified but the work is estimated to cost $2,500.

Summary
Overall the seven existing structures within the project limits are in good shape. None of the bridges has a sufficiency rating below 80, the first qualification threshold for federal bridge funding. This is particularly impressive for the four steel structures carrying I-70, as they have been in service for 39 years in an environment subject to harsh winters. Although not as old and constructed of concrete, the two off-system bridges have fared well in their 28-year service life as well.

The low sufficiency rating of the CBC structure is due to the seepage and cracking observed in the cells of the original box structure. Even then, the resulting rating is not particularly low and does not call for any immediate replacement. Consideration of the outstanding condition of the new pedestrian underpass, decorative stone veneer, and associated site work further bolsters this conclusion.

While the sufficiency ratings of the structures are good, four of the six bridges are classified as functionally obsolete. Some of the functional shortcomings could be mitigated relatively easily; modifying inadequate approach railing is one example of an easy repair. Other functional violations are much harder to address in a retrofit. The inadequate lateral clearances are one example of difficult repair. Such a problem is usually addressed by a longer bridge. None of the structures were classified as structurally deficient.

Table 1 summarizes the sufficiency ratings and functional classification of the seven structures.

Table 1- Summary of Structural Conditions

Structure	Sufficiency Rating	Functionally Obsolete
WB I-70 over CO 9 (Str. No. F-12-R)	92.9	Yes
EB I-70 over CO 9 (Str. No. F-12-S)	93.3	Yes
WB I-70 over the Blue River, Stephens Way, and South Adams Avenue (Str. No. F-12-X)	84.7	No
EB I-70 over the Blue River, Stephens Way, and South Adams Avenue (Str. No. F-12-Y)	87.9	Yes
CBC and Underpass beneath CO 9 (Str. No. F-12-BP)	65.0	N/A for CBC's
Wildernest Road over the Blue River	83.3	No
Stephens Way over Straight Creek	80.2	Yes

APPENDIX A
STRUCTURE INSPECTION REPORTS

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.380 mi

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Bridge Key: F-12-R **Inspection Date:** 6/16/2009 **Sufficiency Rating:** 92.9 FO

Rgn/Sectn 2E/2M:	15	Hist Signif 37:	5			UW Inspection Date 93B:			
Trans Region 2T	11	Posting status 41:	A			SI Date 93C:			
County Code 3:	117	Service on/un 42A/B:	6	1		Bridge Cost 94:	$ 0		
SUMMIT		Main Mat/Desgn 43A/B:	4	2		Roadway Cost 95:	$ 0		
Place Code 4:	70525	Appr Mat/Desgn 44A/B:	0	0		Total Cost 96:	$ 0		
SILVERTHORNE		Main Spans Unit 45:	4			Year of Cost Estimate 97:			
Rte.(On/Under)5A:	1	Approach Spans 46:	0			Brdr Brdg Code/% 98A/B:			
Signing Prefix 5B:	1	Horiz Clr 47:	42.0 ft			Border Bridge Number 99:			
Level of Service 5C:	1	Max Span 48:	85.3 ft			Defense Highway 100:	1		
Directional Suffix 5E:	0	Str Length 49:	312.0 ft			Parallel Structure 101:	L		
Feature Intersected 6:		Curb Wdth L/R 50A/B:	0.0 ft	0.0 ft		Direction of Traffic 102:	1		
SH 9 ML		Width Curb to Curb 51:	42.0 ft			Temporary Structure 103:			
Facility Carried 7:		Width Out to Out 52:	44.5 ft			Highway System 104:	1		
I 70 ML WBND		Deck Area:	13,884. sq. ft			Fed Lands Hiway 105:	0		
Alias Str No.8A:		Min Clr Ovr Brdg 53:	99.99			Year Reconstructed 106:	0000		
#G-12-E		Min Undrclr Ref 54A:	H			Deck Type 107:	1		
Prll Str No. 8P		Min Undrclr 54B:	17.6 ft			Wearing Surface 108A:	6		
F-12-S		Min Lat Clrnce Ref R 55A:	H			Membrane 108B:	0		
Location 9:		Min Lat Undrclr R 55B:	2.0 ft			Deck Protection 108C:	0		
AT SILVERTHORNE		Min Lat Undrclr L 56:	1.000000012			Truck ADT 109:	8 %		
Max Clr 10:	99.99	Deck 58:	6			Trk Net 110:	1		
BaseHiway Net12:	1	Super 59:	6			Pier Protection 111:	#		
IrsinvRout 13A	000000070A	Sub 60:	6			NBIS Length 112:	Y		
IrssubRout No13B:	00	Channel/Protection 61:	N			Scour Critical 113:	N		
Latitude 16:	39d 37' 43"	Culvert 62:	N			Scour Watch 113M:			
Longitude 17:	106d 04' 04"	Oprtng Rtg Method 63:	1 LF Load Factc			Future ADT 114:	62,832		
Range18A:	78 W	Operating Rating 64:	55.6			Year of Future ADT 115:	2027		
Township18B:	78	Inv Rtng Method 65:	1			CDOT Str Type 120A:	WGCK		
Section18C:	12	Inventory Rating 66:	33.3			CDOT Constr Type 120B:	10		
Detour Length 19:	0.0 mi	Asph/Fill Thick 66T:	003 "in"			Inspection Indic 122A:			
Toll Facility 20:	3	Str. Evaluation 67:	6			Inspection Trip 122AA:			
Custodian 21:	1	Deck Geometry 68:	8			Scheduling Status 122B:			
Owner 22:	1	Undrclr Vert/Hor 69:	3			Maintenance Patrol 123:	43		
Functional Class 26:	11	Posting 70:	5			Expansion Dev/Type124:	P		
Year Built 27:	1971	Waterway Adequacy 7:	N			Brdg Rail Type/Mod 125A/B:	Y	0	
Lanes on 28A:	2	Approach Alignment 72:	8			Posting Trucks 129A/B/C:	0	0	0
Lanes Under 28B:	6	Type of Work 75A:				Str Rating Date 130:	11/4/2005		
ADT 29:	40,800	Work Done By 75B:				Special Equip 133:	-1		
Year of ADT 30:	2007	Length of Improvment 76:	0.0 ft			Vert Clr N/E 134A/B/C:	N	17.92	17.58
Design Load 31:	5	Insp Team Indicator 90B:	White Team (Ric			Vert Clr S/W 135A/B/C:	S	18.42	17.67
Apr Rdwy Width 32:	38.0 ft	Inspector Name 90C:	CHURCHESK			Vertical Clr Date:	6/20/2005		
Median 33:	1	Frequency 91:	24 months			Weight Limit Color: 139	0		
Skew 34:	56.00 °	FC Frequency 92A:	-1			Str Billing Type:	U		
Structure Flared 35:	0	UW Frequency 92B:	-1			Userkey 1 - System:	ONSYS		
Sfty Rail 36a/b/c/d:	1 0 1 1	SI Frequency 92C:	-1			Userkey 7-Update Indic:			
Rail ht36h:	36 "in"	FC Inspection Date 93A:							

Inspector Name: CHURCHESK

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Element Inspection Report

Elm/En	Description	Units	Total Qty	% in 1	CS 1	% in 2	CS 2	% in 3	CS 3	% in 4	CS 4	% in 5	CS 5
13/1	Unp Conc Deck/AC Ovl	(SF)	13,884	100 %	13,884	0 %	0	0 %	0	0 %	0	0 %	0
107/1	Paint Stl Opn Girder	(LF)	1,550	72 %	1,112	25 %	388	3 %	50	0 %	0	0 %	0
205/1	R/Conc Column	(EA)	15	0 %	0	47 %	7	53 %	8	0 %	0	0 %	0
215/1	R/Conc Abutment	(LF)	160	99 %	158	1 %	2	0 %	0	0 %	0	0 %	0
234/1	R/Conc Cap	(LF)	222	100 %	222	0 %	0	0 %	0	0 %	0	0 %	0
306/1	Asphaltic Plg Exp Jt	(LF)	160	100 %	160	0 %	0	0 %	0	0 %	0	0 %	0
311/1	Moveable Bearing	(EA)	20	50 %	10	50 %	10	0 %	0	0 %	0	0 %	0
313/1	Fixed Bearing	(EA)	5	100 %	5	0 %	0	0 %	0	0 %	0	0 %	0
321/1	R/Conc Approach Slab	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
325/1	Slope Prot/Berms	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
326/1	Bridge Wingwalls	(EA)	4	100 %	4	0 %	0	0 %	0	0 %	0	0 %	0
330/1	Metal Rail Uncoated	(LF)	624	25 %	156	75 %	468	0 %	0	0 %	0	0 %	0
338/1	Conc Curbs/SW	(LF)	624	94 %	589	6 %	35	0 %	0	0 %	0	0 %	0
342/1	Sign Attachment	(EA)	3	100 %	3	0 %	0	0 %	0	0 %	0	0 %	0
359/1	Soffit Smart Flag	(EA)	1	0 %	0	0 %	0	100 %	1	0 %	0	0 %	0
530/1	Approach Guardrail A	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0

Elem/Env	Description	Element Notes
13/1	Unp Conc Deck/AC Ovl	2 Inches asphalt at right side, and 4 inches at left. New overlay since last inspection. Looks good.
107/1	Paint Stl Opn Girder	Some rusting on top flange, and little on bottom flange, of Girder 2F due to deck leakage. Very little rust at ends of a few at abutments. Some rusting and peeling paint on Girder 4A. No scrapes seen, see Bridge Notes. Diaphragms (perpendicular) connected to full-height stiffeners; no loose bolts seen, no squeaks heard.
205/1	R/Conc Column	Few minor dings, and gouges. Delaminations and/or spalls at the base of most columns, 1 to 5 s.f. Some exposed rebar at base of Column 2D, and a few rust stains. Conc. barrier(s) between columns, good.
215/1	R/Conc Abutment	Up to 16 inches sand and concrete debris built up on abutment seats from joint replacement. Water stained and continues to get wet (See 2003 Photo), but no major problems. Couple of light vertical cracks. Vertical crack with efflorescence in Bay C at Abutment 5. Some light scale at right end of Abutment 1.
234/1	R/Conc Cap	Light vertical crack at right end of Pier 2. Caps look clean & dry, no joints above. Girder lines directly above columns, good.

Colorado Department of Transportation

Structure Inspection and Inventory Report (English Units)

Elem/Env	Description	Element Notes
306/1	Asphaltic Plg Exp Jt	Plug joints at both abutments. Look good.
311/1	Moveable Bearing	Rockers at Abutment 1 are tipped <5 degrees in expansion position, girder ends are 1 inches to 2 inches from abutment. Some rust around bases due to debris, as high as 1 foot, on seats, mostly from joint replacement. Rockers at Abutment 5 are vertical, girders ends are about 4 inches from abutment, similar rust & debris slightly limiting movement. Pier rockers are vertical, clean and dry.
313/1	Fixed Bearing	Painted steel plates at P3 are clean & dry.
321/1	R/Conc Approach Slab	Covered with asphalt. New overlay since last inspection.
325/1	Slope Prot/Berms	Gabion baskets extend 1/2 way down from abutment caps, then concrete slope adjacent to 8 feet concrete walk at both abutments. All look good. Berm at Abutment 1 is up to 3 inches low.
326/1	Bridge Wingwalls	Light horizontal cracks at cold joints, along with shrinkage cracks. Spall with exposed rebar at corner of #1 Lt. wingwall. Couple spots of light scale on #5 Lt. wing.
330/1	Metal Rail Uncoated	Weathering steel Type Y starting to pit, and oxidize. There is section loss (up to 1/16 inch loss) at base of most posts due to dirt buildup (cleaned prior to 2007 inspection). Color brown, yellow, and black.
338/1	Conc Curbs/SW	Curbs have been repaired at all corners. (See 2009 Photo @ #1 Lt.) Poorly repaired at #5 Rt. and concrete is spalling again with exposed rebar. Spall with exposed rebar on exterior side of right curb above Span 2. (See 2009 Photo) Several areas on both sides have chips & spalls from snow plow gouging curbs. Horizontal cracks in several locations. Typical trans. cracks.
342/1	Sign Attachment	Three small signs attached to bridge rail posts on left side, 5-2007 PHOTO. Some peeling and flaking of paint.
359/1	Soffit Smart Flag	Several light trans. cracks with light efflorescence. Few areas of map cracking in Spans 1 & 2 with efflorescence.
530/1	Approach Guardrail A	Steel bridge rail has older style concrete bridge rail ends that no longer considered adequate per new M & S standards. The transiton sections should have double thrie beam approach rail transition sections.

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
357.01	Bearings	4/12/2001	-1	2012	250

Remove buildup of sand and concrete chunks from bearing seat of both abutments; there is about a foot of it including around the rocker bearings.
This is poor because it retains and releases moisture over a longer period of time, increasing the deterioration of rockers and abutment surfaces.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Bridge Notes

Utility: 6 inch diam. Fiberglass Conduit (contains fiber-optic cables) suspended from left overhang.

Vertical Underclearance report- Clearance was taken from parallel structure F-12-S as being the more restrictive of the two Bridges.
F-12-R (SH 9) and F-12-S (SH 6) listed on a different HIGHWAYS but are parallel.

Inspection Notes

Temperature: 60 Degrees
Time: 2:30
Weather: Cloudy/Overcast

Maintenance activities 356.02, 353.04, and 353.08 were completed prior to this inspection.

Scope:

☑ NBI: ☑ Element: ☐ Underwater: ☐ Fracture Critical: ☐ Other: Type: Regular NBI

Inspector: CHURCHESK **Inspection Team:**

Inspection Date: 06/16/2009

_____
Inspector

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Inspector

	F12R (Exterior side of right curb spalled above Span 2).JPG taken: 2009/06/16 2:33	pos 200
	F12R (Curb on left has been repaired at Abutment 1).JPG taken: 2009/06/16 2:46	pos 200
	F12R signs mounted to left rail.jpg taken: 2007/06/2610:39	pos 200

		
	Inspector photos_8_.JPG taken: 2005/06/17 1:27	pos 200
	Inspector photos_7_.JPG taken: 2005/06/17 1:27	pos 200

	Inspector photos_6_.JPG taken: 2005/06/17 1:27	pos 200
	Inspector photos_5_.JPG taken: 2004/11/244 12:	pos 200
	Inspector photos_4_.JPG taken: 2004/11/244 12:	pos 200

	Inspector photos.JPG taken: 2004/11/244 12:	pos 200
	DTD archives_2_.JPG taken: 2004/11/23 7:27	pos 200

	DTD archives.JPG taken: 2004/11/23 7:27	pos 200
	F-12-R Curb broken at right corner of Abut. 5..JPG taken: 2003/06/308:45	pos 200
	F-12-R Curb broken at left corner of Abut. 5..JPG taken: 2003/06/308:43	pos 200

		
	F-12-R Curb broken at left corner of Abut. 1..JPG taken: 2003/06/308:46	pos 200
	F-12-R Sand & concrete built up on abut. seats (Abut. 1 shown)..JPG taken: 2003/06/308:47	pos 200

DTD archives taken: 1999/09/1011:56

pos
200

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.379 mi

Bridge Key: F-12-S | Inspection Date: 6/16/2009 | Sufficiency Rating: 93.3 FO

Rgn/Sectn 2E/2M:	15	Hist Signif 37:	5	UW Inspection Date 93B	
Trans Region 2T	11	Posting status 41:	A	SI Date 93C:	
County Code 3:	117	Service on/un 42A/B:	6 1	Bridge Cost 94:	$ 0
SUMMIT		Main Mat/Desgn 43A/B:	4 2	Roadway Cost 95:	$ 0
Place Code 4:	70525	Appr Mat/Desgn 44A/B:	0 0	Total Cost 96:	$ 0
SILVERTHORNE		Main Spans Unit 45:	4	Year of Cost Estimate 97:	
Rte.(On/Under)5A:	1	Approach Spans 46:	0	Brdr Brdg Code/% 98A/B:	
Signing Prefix 5B:	1	Horiz Clr 47:	42.0 ft	Border Bridge Number 99	
Level of Service 5C:	1	Max Span 48:	85.3 ft	Defense Highway 100:	1
Directional Suffix 5E:	0	Str Length 49:	297.0 ft	Parallel Structure 101:	R
Feature Intersected 6:		Curb Wdth L/R 50A/B:	0.0 ft 0.0 ft	Direction of Traffic 102	1
US 6 ML		Width Curb to Curb 51	42.0 ft	Temporary Structure 103	
Facility Carried 7:		Width Out to Out 52:	44.5 ft	Highway System 104:	1
I 70 ML EBND		Deck Area:	13,217. sq. ft	Fed Lands Hiway 105:	0
Alias Str No.8A:		Min Clr Ovr Brdg 53:	99.99	Year Reconstructed 106	0000
		Min Undrclr Ref 54A:	H	Deck Type 107:	1
Prll Str No. 8P		Min Undrclr 54B:	17.6 ft	Wearing Surface 108A	6
F-12-R		Min Lat Clrnce Ref R 55A:	H	Membrane 108B:	0
Location 9:		Min Lat Undrclr R 55B:	2.0 ft	Deck Protection 108C:	0
AT SILVERTHORNE		Min Lat Undrclr L 56:	1.00065619	Truck ADT 109:	8 %
Max Clr 10:	99.99	Deck 58:	6	Trk Net 110:	1
BaseHiway Net12:	1	Super 59:	6	Pier Protection 111:	#
IrsinvRout 13A	000000070A	Sub 60:	6	NBIS Length 112:	Y
IrssubRout No13B:	00	Channel/Protection 61:	N	Scour Critical 113:	N
Latitude 16:	39d 37' 42"	Culvert 62:	N	Scour Watch 113M:	
Longitude 17:	106d 04' 03"	Oprtng Rtg Method 63:	1 LF Load Facto	Future ADT 114:	62,832
Range18A:	78 W	Operating Rating 64:	56.5	Year of Future ADT 115	2027
Township18B:	78	Inv Rtng Method 65:	1	CDOT Str Type 120A:	WGCK
Section18C:	12	Inventory Rating 66:	33.8	CDOT Constr Type 120B	0.
Detour Length 19:	0.0 mi	Asph/Fill Thick 66T:	005 "in"	Inspection Indic 122A:	
Toll Facility 20:	3	Str. Evaluation 67:	6	Inspection Trip 122AA	
Custodian 21:	1	Deck Geometry 68:	8	Scheduling Status 122B	
Owner 22:	1	Undrclr Vert/Hor 69:	3	Maintenance Patrol 123	43
Functional Class 26:	11	Posting 70:	5	Expansion Dev/Type124	P
Year Built 27:	1971	Waterway Adequacy 7	N	Brdg Rail Type/Mod 125A/B	Y 0
Lanes on 28A:	2	Approach Alignment 72:	8	Posting Trucks 129A/B/C	0 0 0
Lanes Under 28B:	6	Type of Work 75A:		Str Rating Date 130:	11/4/2005
ADT 29:	40,800	Work Done By 75B:		Special Equip 133:	-1
Year of ADT 30:	2007	Length of Improvment 76:	0.0 ft	Vert Clr N/E 134A/B/C:	E 18.42 17.67
Design Load 31:	6	Insp Team Indicator 90B	Gold Team (Ken	Vert Clr S/W 135A/B/C	W 17.92 17.58
Apr Rdwy Width 32:	38.0 ft	Inspector Name 90C:	RUTHERFORDI	Vertical Clr Date:	6/21/1995
Median 33:	1	Frequency 91:	24 months	Weight Limit Color: 139	0
Skew 34:	56.00 °	FC Frequency 92A:	-1	Str Billing Type:	U
Structure Flared 35:	1	UW Frequency 92B:	-1	Userkey 1 - System:	ONSYS
Sfty Rail 36a/b/c/d:	1 0 1 1	SI Frequency 92C:	-1	Userkey 7-Update Indic	
Rail ht36h:	36 "in"	FC Inspection Date 93A:			

Inspector Name: RUTHERFORDD

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Element Inspection Report

Elm/En	Description	Units	Total Qty	% in 1	CS 1	% in 2	CS 2	% in 3	CS 3	% in 4	CS 4	% in 5	CS 5
13/1	Unp Conc Deck/AC Ovl	(SF)	13,217	100 %	13,217	0 %	0	0 %	0	0 %	0	0 %	0
107/1	Paint Stl Opn Girder	(LF)	1,475	67 %	981	28 %	420	5 %	74	0 %	0	0 %	0
205/1	R/Conc Column	(EA)	15	27 %	4	0 %	0	73 %	11	0 %	0	0 %	0
215/1	R/Conc Abutment	(LF)	159	94 %	149	6 %	10	0 %	0	0 %	0	0 %	0
234/1	R/Conc Cap	(LF)	210	100 %	210	0 %	0	0 %	0	0 %	0	0 %	0
306/1	Asphaltic Plg Exp Jt	(LF)	159	81 %	129	19 %	30	0 %	0	0 %	0	0 %	0
311/1	Moveable Bearing	(EA)	20	70 %	14	30 %	6	0 %	0	0 %	0	0 %	0
313/1	Fixed Bearing	(EA)	5	100 %	5	0 %	0	0 %	0	0 %	0	0 %	0
321/1	R/Conc Approach Slab	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
325/1	Slope Prot/Berms	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
326/1	Bridge Wingwalls	(EA)	4	75 %	3	25 %	1	0 %	0	0 %	0	0 %	0
330/1	Metal Rail Uncoated	(LF)	594	50 %	297	50 %	297	0 %	0	0 %	0	0 %	0
338/1	Conc Curbs/SW	(LF)	594	95 %	567	1 %	5	3 %	17	1 %	5	0 %	0
342/1	Sign Attachment	(EA)	3	100 %	3	0 %	0	0 %	0	0 %	0	0 %	0
359/1	Soffit Smart Flag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
362/1	Traf Impact SmFlag	(EA)	5	100 %	5	0 %	0	0 %	0	0 %	0	0 %	0

Elem/Env	Description	Element Notes
13/1	Unp Conc Deck/AC Ovl	5 inches of asphalt. Looks good.
107/1	Paint Stl Opn Girder	Some R1 corrosion on interior girder ends at abutments, and on exterior girders. Spotted light R1 to R1 corrosion on bottom flanges throughout. (See Tally Sheet). Gir. 1A has pushed into backwall of Abut. 1.
205/1	R/Conc Column	The following columns are cracking, delamed, and some spalled with exp. corr. reinforcement at base of columns: 2A - 5 s.f., 2B - 6 s.f., 2C (PHOTO 6/07) - 8 s.f., 2D - 11 s.f., 2E - 6 s.f., 3A - 2 s.f., 3B - 7 s.f., 3C - 0.5 s.f., 3E - 1.5 s.f., 4D - 2 s.f., and 4E - 6.5 s.f. Most have shrinkage cracks. Minor scuffs on some. All columns protected by short conc. crash walls.
215/1	R/Conc Abutment	Few light vert. and horiz. cracks in breastwalls and backwalls, some with efflor. at A5. Backwalls are waterstained. Horiz. delam. crack in A1 below Girder B. Some light scale on Abutment 1. Up to 6 inches dirt and debris built up on both abutment seats (PHOTO 6/07).
234/1	R/Conc Cap	Look good.
306/1	Asphaltic Plg Exp Jt	At abutments. Overlayed with new asphalt, and cannot inspect.
311/1	Moveable Bearing	Rockers at abutments have R1 to R2 corrosion. Rockers at P2 and P4 rockers are clean and vertical. A1 rockers tipped 4 deg. at 1 E to 12 deg. at 1A. Slightly tipped at A5.
313/1	Fixed Bearing	At Pier 3. Look good.
321/1	R/Conc Approach Slab	No problems seen. New asphalt overlay, and in same condition as deck surface.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Elem/Env	Description	Element Notes
325/1	Slope Prot/Berms	Rock filled gabions at top half of both slopes, look ok. Steep concrete slope pave at bottom of rear slope looks good.6 Inch diam. rock riprap, and retaining wall, at base of fwd. slope looks good. Berm is up to 3 inches low at Abut. 1. New beaver slides with PVC drains along right side of fwd. and rear slopes. Look good.
326/1	Bridge Wingwalls	U-type abut. wings on right. Stub extensions on left. Mod. scale/delam./spall at top of #5 left and right wing.Spall at top #1 right wing, adjacent to expansion joint.
330/1	Metal Rail Uncoated	Type Y weathering steel rail. Up to 1/16 inch section loss to one half of the bridge anchor posts (PHOTO 6/07). Cone. end rails at all corners.
338/1	Conc Curbs/SW	Typ. light vert. cracks. End at #5 right spalled with exp. reinforce. at top (14 L.F.) adjacent to expansion joint. Spalled with exposed rebar at left side (5 L.F.) above Span 2. Spalled with exp. corr. rebar at left rear corner (2 L.F.) at Abut. 1. See 6/2009 PHOTO.
342/1	Sign Attachment	Attached to rail posts on the right side. R1 corr. along all anchor posts (PHOTO 6/07).
359/1	Soffit Smart Flag	Light map and trans. cracks, few trans. cracks with efflorescence. Right edge of deck is spalled with exposed rebar at Abutment 5. Seepage with efflor. at deck haunches near abuts., some with rust.
362/1	Traf Impact SmFlag	IMP - ??/??/??; INSP - 06/21/95; REP - 00/00/00 Minor scrapes on Girders 2B, 2C, 2D, 2E, 3C, and 3D. Girder 3E has been hit at midspan. Bottom flange bent up about 2 inches. Adjacent Diaph. #4 in Bay 3D bent from impact. (See 6/1995 & 6/2007 Photos) Girder 3E also scraped many times.

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
357.01	Bearings	4/12/2001	-1	2012	300

Remove dirt from abutment seats, it is up to 6 inches deep.

358.05	Substr	6/25/2003	-1	2012	1000

Repair damaged concrete curbs.

355.01	Cln & Pnt	4/12/2001	-1	2012	15000

Clean and paint girders, diaphragms, and rocker bearings.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
356.00	Curb & Rl	6/26/2007	-1	2012	2500

Next project provide adequate transition from appr. rail to bridge rail per current M&S Standards.

358.05	Replace	6/16/2009		2012	5000

Repair columns with spalls and exposed rebar.

Bridge Notes

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.379 mi

Inspection Notes

Time: 60 Degrees Temperature: 60 Weather: Cloudy Team Leader: KC

Scope:

☑ **NBI:** ☑ **Element:** ☐ **Underwater:** ☐ **Fracture Critical:** ☐ **Other:** **Type:** Regular NBI

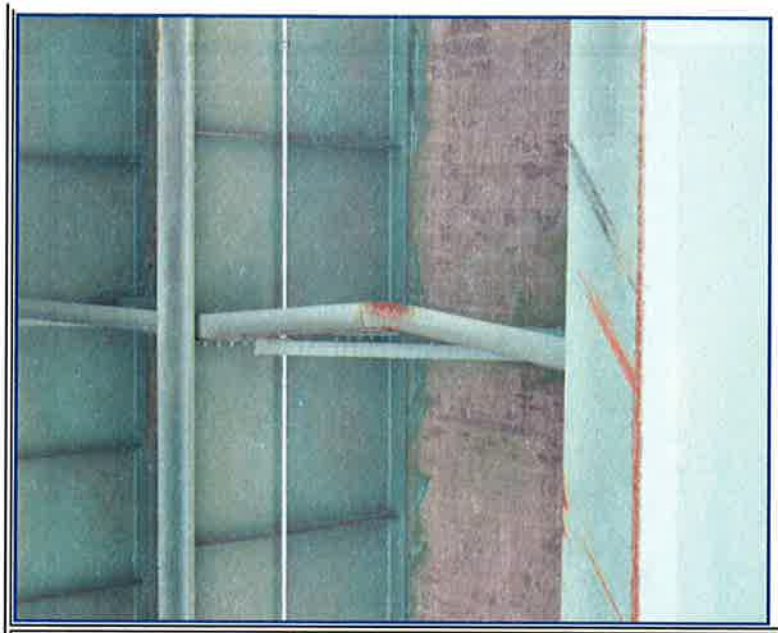
Inspector: RUTHERFORDD **Inspection Team:**

Inspection Date: 06/16/2009

_____
Inspector

_____
Inspector

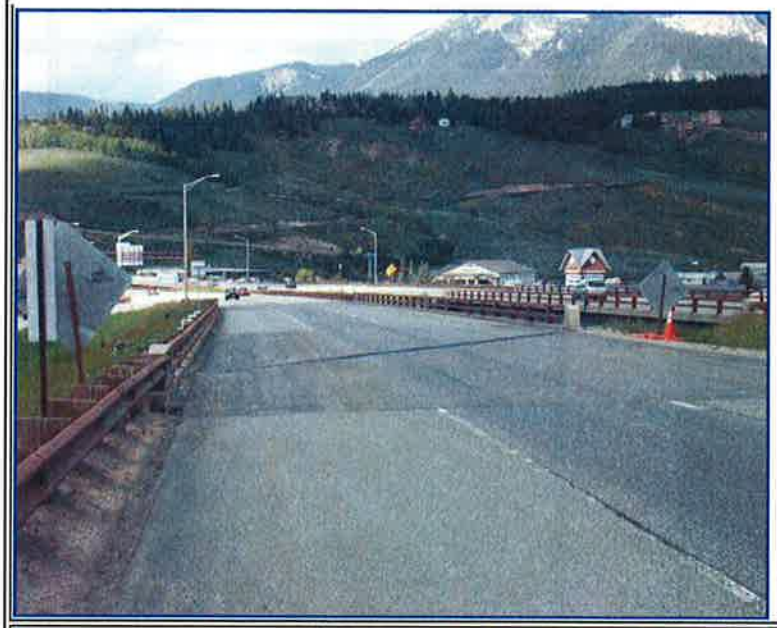
	F12S Broken curb Abut. 1 left..jpg taken: 2009/06/18 8:53	pos 200
	F12S scrapes and slight twist to lower flange of gir 3E.jpg taken: 2007/06/2610:54	pos 200
	F12S Q Bent diaph #4 in bay 3D, has been this way more than 10 years.jpg taken: 2007/06/2610:57	pos 200

		
	F12S Corr at base of rail posts, up to a 16"th loss.jpg taken: 2007/06/26 9:52	pos 200
	F12S Abut 1 seat with ~6" dirt & conc rubble.jpg taken: 2007/06/26 9:39	pos 200

	F12S Spalling with exposed corr rebar in splash zone of col; this is 2C ~8 sf total.jpg taken: 2007/06/2610:31	pos 200
	F12S signs on rail.jpg taken: 2007/06/26 9:32	pos 200
	Inspector photos_8_.JPG taken: 2005/06/17 1:27	pos 200

	Inspector photos_7_.JPG taken: 2005/06/17 1:27	pos 200
	Inspector photos_6_.JPG taken: 2005/06/17 1:27	pos 200

	Inspector photos_5_.JPG taken: 2004/11/244 12:	pos 200
	Inspector photos_4_.JPG taken: 2004/11/244 12:	pos 200
	Inspector photos.JPG taken: 2004/11/244 12:	pos 200

		
	DTD archives_2_.JPG taken: 2004/11/23 7:27	pos 200
	DTD archives.JPG taken: 2004/11/23 7:27	pos 200

	F-12-S Curb broken at Abut. 5, right corner..JPG taken: 2003/06/308:48	pos 200
	DTD archives taken: 1999/09/1011:56	pos 200

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.098 mi

Bridge Key: F-12-X | Inspection Date: 7/23/2009 | Sufficiency Rating: 84.7 Not Eligible

Rgn/Sectn 2E/2M:	15	Hist Signif 37:	5			UW Inspection Date 93B	
Trans Region 2T	11	Posting status 41:	A			SI Date 93C:	
County Code 3:	117	Service on/un 42A/B:	1	6		Bridge Cost 94:	$ 0
SUMMIT		Main Mat/Desgn 43A/B:	4	2		Roadway Cost 95:	$ 0
Place Code 4:	70525	Appr Mat/Desgn 44A/B:	0	0		Total Cost 96:	$ 0
SILVERTHORNE		Main Spans Unit 45:	4			Year of Cost Estimate 97:	
Rte.(On/Under)5A:	1	Approach Spans 46:	0			Brdr Brdg Code/% 98A/B:	
Signing Prefix 5B:	1	Horiz Clr 47:	48.0 ft			Border Bridge Number 99	
Level of Service 5C:	1	Max Span 48:	164.0 ft			Defense Highway 100:	1
Directional Suffix 5E:	0	Str Length 49:	554.1 ft			Parallel Structure 101:	L
Feature Intersected 6:		Curb Wdth L/R 50A/B:	0.0 ft	0.0 ft		Direction of Traffic 102:	1
BLUE RIVER ROAD		Width Curb to Curb 51	48.0 ft			Temporary Structure 103	
Facility Carried 7:		Width Out to Out 52:	50.5 ft			Highway System 104:	1
I 70 ML WBND		Deck Area:	27,975.4 sq. ft			Fed Lands Hiway 105:	0
Alias Str No.8A:		Min Clr Ovr Brdg 53:	99.99			Year Reconstructed 106	0000
		Min Undrclr Ref 54A:	H			Deck Type 107:	1
Prll Str No. 8P		Min Undrclr 54B:	18.1 ft			Wearing Surface 108A	6
F-12-Y		Min Lat Clrnce Ref R 55A:	H			Membrane 108B:	2
Location 9:		Min Lat Undrclr R 55B:	7.0 ft			Deck Protection 108C:	0
IN SILVERTHORNE		Min Lat Undrclr L 56:	0			Truck ADT 109:	8 %
Max Clr 10:	99.99	Deck 58:	7			Trk Net 110:	1
BaseHiway Net12:	1	Super 59:	7			Pier Protection 111:	#
IrsinvRout 13A	000000070A	Sub 60:	7			NBIS Length 112:	Y
IrssubRout No13B:	00	Channel/Protection 61:	8			Scour Critical 113:	5
Latitude 16:	39d 37' 33"	Culvert 62:	N			Scour Watch 113M:	0
Longitude 17:	106d 04' 18"	Oprtng Rtg Method 63:	1 LF Load Factc			Future ADT 114:	62,832
Range18A:	78 W	Operating Rating 64:	53.2			Year of Future ADT 115	2027
Township18B:	78	Inv Rtng Method 65:	1			CDOT Str Type 120A:	WGCK
Section18C:	13	Inventory Rating 66:	31.9			CDOT Constr Type 120B	10
Detour Length 19:	0.6 mi	Asph/Fill Thick 66T:	005 "in"			Inspection Indic 122A:	
Toll Facility 20:	3	Str. Evaluation 67:	7			Inspection Trip 122AA	
Custodian 21:	1	Deck Geometry 68:	4			Scheduling Status 122B	
Owner 22:	1	Undrclr Vert/Hor 69:	4			Maintenance Patrol 123	43
Functional Class 26:	11	Posting 70:	5			Expansion Dev/Type124	D
Year Built 27:	1971	Waterway Adequacy 7	8			Brdg Rail Type/Mod 125A/B	Y 1
Lanes on 28A:	3	Approach Alignment 72:	8			Posting Trucks 129A/B/C	0 0 0
Lanes Under 28B:	4	Type of Work 75A:				Str Rating Date 130:	11/1/2005
ADT 29:	40,800	Work Done By 75B:				Special Equip 133:	1
Year of ADT 30:	2007	Length of Improvment 76:	0.0 ft			Vert Clr N/E 134A/B/C:	X 99.99 0.00
Design Load 31:	5	Insp Team Indicator 90B	BLUE TEAM (M			Vert Clr S/W 135A/B/C	X 99.99 0.00
Apr Rdwy Width 32:	62.0 ft	Inspector Name 90C:	ROSSARTB			Vertical Clr Date:	7/23/2009
Median 33:	1	Frequency 91:	24 months			Weight Limit Color: 139	0
Skew 34:	3.00 °	FC Frequency 92A:	-1			Str Billing Type:	U
Structure Flared 35:	0	UW Frequency 92B:	-1			Userkey 1 - System:	ONSYS
Sfty Rail 36a/b/c/d:	1 1 1 1	SI Frequency 92C:	24			Userkey 7-Update Indic	
Rail ht36h:	36 "in"	FC Inspection Date 93A:					

Inspector Name: ROSSARTB

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.098 mi

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Element Inspection Report

Elm/En	Description	Units	Total Qty	% in 1	CS 1	% in 2	CS 2	% in 3	CS 3	% in 4	CS 4	% in 5	CS 5
14/1	P Conc Deck/AC Ovly	(SF)	28,254	100 %	28,254	0 %	0	0 %	0	0 %	0	0 %	0
107/1	Paint Stl Opn Girder	(LF)	3,312	83 %	2,762	2 %	50	15 %	500	0 %	0	0 %	0
210/1	R/Conc Pier Wall	(LF)	60	75 %	45	25 %	15	0 %	0	0 %	0	0 %	0
215/1	R/Conc Abutment	(LF)	102	55 %	56	45 %	46	0 %	0	0 %	0	0 %	0
234/1	R/Conc Cap	(LF)	161	78 %	126	6 %	10	16 %	25	0 %	0	0 %	0
300/1	Strip Seal Exp Joint	(LF)	100	100 %	100	0 %	0	0 %	0	0 %	0	0 %	0
311/1	Moveable Bearing	(EA)	24	54 %	13	46 %	11	0 %	0	0 %	0	0 %	0
313/1	Fixed Bearing	(EA)	6	100 %	6	0 %	0	0 %	0	0 %	0	0 %	0
321/1	R/Conc Approach Slab	(EA)	2	50 %	1	50 %	1	0 %	0	0 %	0	0 %	0
325/1	Slope Prot/Berms	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
326/1	Bridge Wingwalls	(EA)	4	0 %	0	100 %	4	0 %	0	0 %	0	0 %	0
330/1	Metal Rail Uncoated	(LF)	1,108	92 %	1,018	8 %	90	0 %	0	0 %	0	0 %	0
338/1	Conc Curbs/SW	(LF)	1,108	0 %	1	98 %	1,082	2 %	25	0 %	0	0 %	0
358/1	Deck Cracking SmFlag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
359/1	Soffit Smart Flag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
371/1	Traff Imp Dck SmFlag	(LF)	12	0 %	0	0 %	0	100 %	12	0 %	0	0 %	0
501/1	Channel Cond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
504/1	BankCond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
530/1	Approach Guardrail A	(EA)	141	100 %	141	0 %	0	0 %	0	0 %	0	0 %	0

Elem/Env	Description	Element Notes
14/1	P Conc Deck/AC Ovly	4 to 5 inches of Asphalt surface. Newer Overlay since last inspection. Couple minor potholes on merge lane.
107/1	Paint Stl Opn Girder	Ends of girders and diaphragms at abutments have minor R1 to R2 corrosion. Exterior girders have spots of peeling paint and spots of R1 to heavy R2 on bottom flanges and longitude stiffeners. Right exterior girders also have faded and chalking paint. See 2009 photo. Typical of Vertical, Longitude stiffeners, and Gusset Plates are Sheared edges that were never dressed. Looks like cracks. See 2007 & 2009 photos.
210/1	R/Conc Pier Wall	Shrinkage cracks and slightly rough surface finish. Minor delam at ends. Several areas of rock pockets at P-3 right side. New Drain System is mounted onto the face at Pier 4. See 2009 photo.
215/1	R/Conc Abutment	Backwalls and bearing seats at both abutments have water stains and few light vertical and horizontal cracks. Diagonal cracks in backwalls in end bays; delam. behind girder 1A. Light to Moderate scale and few shallow delams at both breastwalls. Horizontal crack with delam in bays 1D, 1E, 5A, 5B, 5C and 5E in bearing seats. See 2009 photo.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Elem/Env	Description	Element Notes
234/1	R/Conc Cap	Light to moderate scale. Spall, rust stains, and delam with exposed rebar at right ends of risers. Light vertical cracks at tops of all caps. Steel wires are exposed at the bottom of all. Due to the inadequate cover of the concrete. See 2007 photos. Newer Drain system is mounted to the right side behind riser, spans 3 & 4 and at Pier 4. See 2009 photo.
300/1	Strip Seal Exp Joint	Strip seal at both abutments are filled with sand. Open 1.75 inches at A-1, and 1.50 at A-5.
311/1	Moveable Bearing	Rockers at A-1 and A-5 have R1 corrosion, but there is now only little sand and dirt on abutment seats. See 2009 photos. Rockers at P-2 and P-4, well painted and dry.
313/1	Fixed Bearing	At P-3 only, well painted and dry.
321/1	R/Conc Approach Slab	Covered with Asphalt. Low at approach A-5 was repaired. See 2007 & 2009 photos.
325/1	Slope Prot/Berms	Both abutment slopes are covered with cobblestone rock with wire fencing placed over it. A-1 right side erosion trough is about 14 inches deep and A5 right side is forming. See 2009 photos.
326/1	Bridge Wingwalls	U-type abutment wings. All have shrinkage cracks and light to moderate scale. A1 left and right voids along construction joint. Minor to Moderate washing along side of both right and left wings from roadway runnoff. See 2007 & 2009 photos.
330/1	Metal Rail Uncoated	Weathering steel square tube rails, type Y. Pitting rust and R2 at base of posts and rails at posts, probably from snow build up around posts during winter. Normal rust elsewhere. Several areas on the left side have scraped marks. Concrete end posts are deteriorating and have spalls.
338/1	Conc Curbs/SW	Up to 6 inches of sand at tops and sides of both in 2009 inspection. Some vertical cracks, delam, light to moderate scale on half, & scraped in spots by plows. Right curb has a few small areas of spalling with exposed rebar. Gutter steel pans have R4 corrosion, area is starting to spall. Right side span 1 under rail post, area has spalled with exposed rebar. See 2007 photo. Drain system was placed span 3, Pier 3, and span 4 at scuppers. See 2009 photo
358/1	Deck Cracking SmFlag	See Element 14 for comments.
359/1	Soffit Smart Flag	Bottom of deck is map cracked. Spots of trans. cracks with light efflorescence. Deck corner at A1 & A5, right end is spalled off. A1 end of deck repaired in all bays.
371/1	Traff Imp Dck SmFlag	Rail at P2 right side has been damaged by auto impact and 1 post bent out. IMP-MM/??/YY, ISP-09/21/05, REP- 07/23/07.
501/1	Channel Cond	Blue River Wide rocky bottom. Alignment ok. Flow in span 3, well below bridge. Reservoir dam 1/2 mile upstream provides flow control. Span 1 road leads to office buildings and State has Maintenance Yard. Span 4 road leads to factory outlet stores. They both see traffic. Bike & Pedestrian path under span 4. There are 6 to 8 inch diameter trees growing below bridge in span 2.
504/1	BankCond	Rocky. Trees and brush.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Elem/Env	Description	Element Notes
530/1	Approach Guardrail A	A-5 right side rail is damage in several locations for about 71 feet. See 2007 photo. A-5 left side rail is damage at several locations for about 70 feet. See 2009 photo.

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
355.02	Cln & Pnt	9/13/2001	-1	2011	3000

Clean and spot paint girder ends, diaphragms and bearings at both abutments.

356.01	Curb & Rl	7/23/2007	-1	2011	2500

Replace about 71 feet of the Approach Rail that is damage at A-5 right side, and about 70 feet left side of A5.

Bridge Notes

Did not use Snooper in 2009 inspection. Did use bucket from Van.
Used snooper off South side of bridge 2007 inspection, and North side 2005 Inspection.
Utilities: 7 inches PVC pipe hanging from left overhang and 2.5 inch PVC mounted along A1 abutment seat.
Well design Drain System was mounted to right side. 3 Scuppers in span 4 and 1 scupper in span 3. Mounted to the right side of Pier 3.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.098 mi

Inspection Notes

Time: 07:45 Temperature: 60 Degrees F. Weather: Clear

Scope:

☑ NBI: ☑ Element: ☐ Underwater: ☐ Fracture Critical: ☑ Other: **Type:** Regular NBI

Inspector: ROSSARTB

Inspection Team:

Beth Rossarts

Inspection Date: 07/23/2009

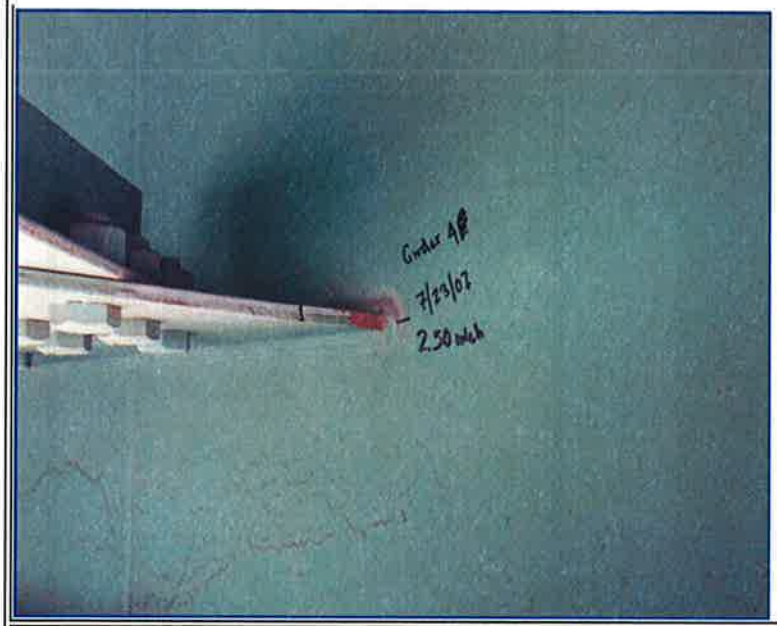
Inspector

Inspector

	F12X 072307 A5 approach with potholes forming along the strip seal.jpg taken: 2007/07/2611:30	pos 200
	F12X 072307 Risers have spalling with exposed rebar on the right side. This is P-3 with two #8 bars exposed.jpg taken: 2007/07/2612:20	pos 200
	F12X 072307 A5 Approach has some settlement, Heavy allgator cracking with potholes forming.jpg taken: 2007/07/2611:28	pos 200

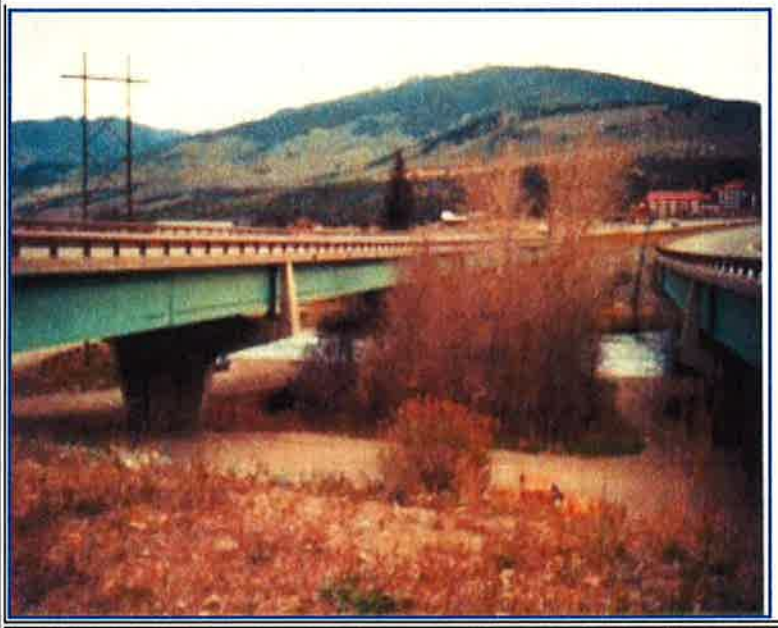
		
	F12X 072307 A5 Approach Bridge Rail is damage.jpg taken: 2007/07/2611:32	pos 200
	F12X 072307 Gutter steel plate has R4 corrosion.JPG taken: 2007/07/2310:22	pos 200

	F12X 072307 Trees are growing under span 2.JPG taken: 2007/07/23 8:13	pos 200
	F12X 072307 A1 left side erosion trough..JPG taken: 2007/07/23 7:58	pos 200
	F12X 072307 Bottom of right corner at A1 with spall, delam, and crack..JPG taken: 2007/07/23 8:00	pos 200

	F12X 072307 This is typical of Girders gusset plates, longitude and vertical stiffeners. Sheared edges were never dressed.JPG taken: 2007/07/23 9:10	pos 200
	F12X 072307 Spalling of concrete under Bridge rail post. This is the right side span 1 with exposed rebar.JPG taken: 2007/07/2310:42	pos 200

	F12X 072307 P-2 Left end with longitude wires exposed. Exposed rebars and rust stains.JPG taken: 2007/07/23 8:09	pos 200
	F12X 072307 P-2 Cap right side with longitude wires exposed. Rust and moderate scale.JPG taken: 2007/07/23 8:07	pos 200
	F12X 072307 A-5 Left wing wall with areas of honey comb and rock pockets. Some hairline vertical cracks.JPG taken: 2007/07/23 8:26	pos 200

		
	F12X 072307 A-5 Abutment seat has horizontal and vertical cracks. Delam and rust stains.JPG taken: 2007/07/23 8:23	pos 200
	DTD archives_2_.JPG taken: 2004/11/23 7:28	pos 200

	DTD archives.JPG taken: 2004/11/23 7:28	pos 200
	F-12-X New strip seal at Abut. 1 (Abut. 5 similar).JPG taken: 2003/10/078:16	pos 200

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.097 mi

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Bridge Key: F-12-Y **Inspection Date:** 7/22/2009 **Sufficiency Rating:** 87.9 FO

Rgn/Sectn 2E/2M:	15	Hist Signif 37:	5	UW Inspection Date 93B	
Trans Region 2T	11	Posting status 41:	A	SI Date 93C:	
County Code 3:	117	Service on/un 42A/B:	1	6	Bridge Cost 94:	$ 3,023
SUMMIT		Main Mat/Desgn 43A/B:	4	2	Roadway Cost 95:	$ 302
Place Code 4:	70525	Appr Mat/Desgn 44A/B:	0	0	Total Cost 96:	$ 4,534
SILVERTHORNE		Main Spans Unit 45:	4	Year of Cost Estimate 97:	2002
Rte.(On/Under)5A:	1	Approach Spans 46:	0	Brdr Brdg Code/% 98A/B:		
Signing Prefix 5B:	1	Horiz Clr 47:	48.0 ft	Border Bridge Number 99:	
Level of Service 5C:	1	Max Span 48:	165.0 ft	Defense Highway 100:	1
Directional Suffix 5E:	0	Str Length 49:	554.0 ft	Parallel Structure 101:	R
Feature Intersected 6:		Curb Wdth L/R 50A/B:	0.0 ft	0.0 ft	Direction of Traffic 102:	1
BLUE RIVER ROAD		Width Curb to Curb 51	48.0 ft	Temporary Structure 103	
Facility Carried 7:		Width Out to Out 52:	50.5 ft	Highway System 104:	1
I 70 ML EBND		Deck Area:	27,977. sq. ft	Fed Lands Hiway 105:	0
Alias Str No.8A:		Min Clr Ovr Brdg 53:	99.99	Year Reconstructed 106	0000
		Min Undrclr Ref 54A:	H	Deck Type 107:	1
Prll Str No. 8P		Min Undrclr 54B:	14.0 ft	Wearing Surface 108A	6
F-12-X		Min Lat Clrnce Ref R 55A:	H	Membrane 108B:	2
Location 9:		Min Lat Undrclr R 55B:	5.0 ft	Deck Protection 108C:	0
10.5 MI E OF JCT SH 91		Min Lat Undrclr L 56:	0	Truck ADT 109:	8 %
Max Clr 10:	99.99	Deck 58:	6	Trk Net 110:	1
BaseHiway Net12:	1	Super 59:	7	Pier Protection 111:	#
IrsinvRout 13A	000000070A	Sub 60:	6	NBIS Length 112:	Y
IrssubRout No13B:	00	Channel/Protection 61:	8	Scour Critical 113:	5
Latitude 16:	39d 37' 33"	Culvert 62:	N	Scour Watch 113M:	
Longitude 17:	106d 04' 17"	Oprtng Rtg Method 63:	1 LF Load Factc	Future ADT 114:	62,832
Range18A:	78 W	Operating Rating 64:	53.5	Year of Future ADT 115	2027
Township18B:	78	Inv Rtng Method 65:	1	CDOT Str Type 120A:	WGCK
Section18C:	13	Inventory Rating 66:	32.1	CDOT Constr Type 120B	10
Detour Length 19:	0.6 mi	Asph/Fill Thick 66T:	005 "in"	Inspection Indic 122A:	
Toll Facility 20:	3	Str. Evaluation 67:	6	Inspection Trip 122AA	
Custodian 21:	1	Deck Geometry 68:	4	Scheduling Status 122B	
Owner 22:	1	Undrclr Vert/Hor 69:	3	Maintenance Patrol 123:	43
Functional Class 26:	11	Posting 70:	5	Expansion Dev/Type124	D
Year Built 27:	1971	Waterway Adequacy 7	8	Brdg Rail Type/Mod 125A/B	Y	0
Lanes on 28A:	3	Approach Alignment 72:	6	Posting Trucks 129A/B/C	0	0	0
Lanes Under 28B:	4	Type of Work 75A:	36	Str Rating Date 130:	11/1/2005
ADT 29:	40,800	Work Done By 75B:	1	Special Equip 133:	1
Year of ADT 30:	2007	Length of Improvment 76:	554.1 ft	Vert Clr N/E 134A/B/C:	X	99.99	0.00
Design Load 31:	6	Insp Team Indicator 90B	Gold Team (Ken	Vert Clr S/W 135A/B/C	X	99.99	0.00
Apr Rdwy Width 32:	38.0 ft	Inspector Name 90C:	RUTHERFORDI	Vertical Clr Date:	7/22/2009
Median 33:	1	Frequency 91:	24 months	Weight Limit Color: 139	0
Skew 34:	0.00 °	FC Frequency 92A:	-1	Str Billing Type:	U
Structure Flared 35:	0	UW Frequency 92B:	-1	Userkey 1 - System:	ONSYS
Sfty Rail 36a/b/c/d:	1	0	1	1	SI Frequency 92C:	-1	Userkey 7-Update Indic	
Rail ht36h:	36 "in"	FC Inspection Date 93A:	

Inspector Name: RUTHERFORDD

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Element Inspection Report

Elm/En	Description	Units	Total Qty	% In 1	CS 1	% In 2	CS 2	% In 3	CS 3	% In 4	CS 4	% In 5	CS 5
14/1	P Conc Deck/AC Ovly	(SF)	27,977	100 %	27,977	0 %	0	0 %	0	0 %	0	0 %	0
107/1	Paint Stl Opn Girder	(LF)	3,312	55 %	1,807	39 %	1,289	6 %	194	1 %	22	0 %	0
210/1	R/Conc Pier Wall	(LF)	60	100 %	60	0 %	0	0 %	0	0 %	0	0 %	0
215/1	R/Conc Abutment	(LF)	100	76 %	75	25 %	25	0 %	0	0 %	0	0 %	0
234/1	R/Conc Cap	(LF)	161	100 %	161	0 %	0	0 %	0	0 %	0	0 %	0
300/1	Strip Seal Exp Joint	(LF)	100	100 %	100	0 %	0	0 %	0	0 %	0	0 %	0
311/1	Moveable Bearing	(EA)	24	50 %	12	50 %	12	0 %	0	0 %	0	0 %	0
313/1	Fixed Bearing	(EA)	6	100 %	6	0 %	0	0 %	0	0 %	0	0 %	0
321/1	R/Conc Approach Slab	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
325/1	Slope Prot/Berms	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
326/1	Bridge Wingwalls	(EA)	4	0 %	0	100 %	4	0 %	0	0 %	0	0 %	0
330/1	Metal Rail Uncoated	(LF)	1,108	86 %	958	9 %	100	5 %	50	0 %	0	0 %	0
338/1	Conc Curbs/SW	(LF)	1,108	95 %	1,053	5 %	50	0 %	5	0 %	0	0 %	0
359/1	Soffit Smart Flag	(EA)	1	0 %	0	100 %	1	0 %	0	0 %	0	0 %	0
371/1	Traff Imp Dck SmFlag	(LF)	40	0 %	0	100 %	40	0 %	0	0 %	0	0 %	0
501/1	Channel Cond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
504/1	BankCond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
520/1	AppRdAlign	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
530/1	Approach Guardrail A	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0

Elem/Env	Description	Element Notes
14/1	P Conc Deck/AC Ovly	5 inches of asphalt. Looks good.
107/1	Paint Stl Opn Girder	Ends of girders and diaphs. at abuts. have light R1 and R1 corr. Bottom flanges have flaking / peeling paint. Exterior girders have spotted light R1 corr. on bottom flanges. Minor scrapes from high loads on 1D,1E, 1F (2005 PHOTOs). Longit. stiffener on exterior of 1F also dinged at same time. Bottom bracing of #3 diaph. in Bay A bent. Gir. 2F at #2 splice plate bottom flange exter. has R2, see 2005 PHOTO and Gir. 3F at #2 splice plate bottom flange and web have R2. 2 nuts are frozen on bolts at diag. cross frame in Bay 3C, Girder D, first connection from Pier 3. The bottom splice plate to bottom flange in Bay 2A, closest to Pier 2, does not have iminent contact, possible pack rust. Did not detect any loose bolts or hear squeaks and generally good green paint. See tally sheet.
210/1	R/Conc Pier Wall	Vertical cracks on both sides of Pier 4, other walls look OK.
215/1	R/Conc Abutment	Backwalls and bridge seat at both abutments have vert. and diag. cracks. Diagonal cracks at corners of abuts. Bridge seats dirty. Heavier build up at #1.
234/1	R/Conc Cap	Light vert. cracks at tops of caps, OK, but shallow delams. on bottom of Pier 2 cap due to insufficient reinf. coverage. Light scale and shrinkage cracks on right end of all caps.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Elem/Env	Description	Element Notes
300/1	Strip Seal Exp Joint	Relatively new joints (2001) at each abutment; proper grade and proper openings of 1 to 2 inches. Dirt in glands, as expected. Concrete end dams look good.
311/1	Moveable Bearing	Rockers at Abut. 1 and Abut. 5 have R1 corr. with spots of R2 corr., espec. 5F but apparently not frozen. Rockers at Pier 2 and Pier 4 look good. Rockers tipped in expansion.
313/1	Fixed Bearing	At Pier 3. Look OK.
321/1	R/Conc Approach Slab	Covered with asphalt. Same elevation as bridge deck.
325/1	Slope Prot/Berms	Rock filled gabions on both abutment slopes, look OK. (Channel is not against either slope). Berms look OK. Mostly dirt at top of Abut. 1. Abut. 5 has large rocks embedded on concrete on 1/2 of slope pave.
326/1	Bridge Wingwalls	All wings have some shrinkage cracks and light scale. Erosion trough at wings at Abut. 1 and Abut. 5, right side.
330/1	Metal Rail Uncoated	Weathering steel square tube rails, Type Y. Posts beginning to corrode deeper than intended at bases, sand has been cleaned from around them. Also, getting corrosion / rust pack at expansion sleeves which will soon interfere with proper movement. Both sides have impact damage per smart flag 371; posts have anchor bolts pulled out; 3 on the left, 1 on the right. Top rail is bent on left, near Abut. 1, right rail bent near Pier 3.
338/1	Conc Curbs/SW	Light trans. cracks throughout, light scale. Scraped and exposed rebars on left side of Span 2.
359/1	Soffit Smart Flag	Spotted map cracking and some with efflor. in Span 2 near Pier 2. Bay 2C about midspan, 2 areas of honey combed conc. on deck bottom. Random areas of trans. and map cracks with efflor. on deck bottom. Overhangs have some random trans. cracks with efflor. and delams.
371/1	Traff Imp Dck SmFlag	IMP-??/??/??, ISP-08/18/99, REP-00/00/00. Right rail hit - bent top tube 8 inches from alignment; 13 feet involved and and 1 post anchorage failed, 9-2005 PHOTO. Left rail hit - bent top tube 1.5 feet from alignment; 36 feet and 3 posts anchorages failed and the curb broke, see 9-2005 PHOTOS. Conc. end post at A1 right was rebuilt from an older crash.
501/1	Channel Cond	Blue River. Rocky bottom. Alignment OK. Flow in Span 3 only at this time. Flow controlled by Dillon Dam. Bridge spans more than this channel, i.e. channel has little effect on bridge. The bridge also spans County Rds., so hydraulic capacity is not an issue.
504/1	BankCond	Rocky with trees and brush. Maintained.
520/1	AppRdAlign	Bridge is on curve at bottom of steep grade. There is also an off ramp just below the bridge causing drivers to change lanes.
530/1	Approach Guardrail A	Some damaged flex beam and timber posts at Abutment 1.

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
356.01	Curb & Rl	9/12/2001	-1	2012	5000

Repair damaged flex beam and timber posts at Abutment 1 on roadway approach and;
Install a couple of nested thrie-beam transition sections because this bridge is on curve at the bottom of a steep grade.
The bridge rail is damaged on both sides requiring replacement of a few square tube sections;
Repairing the broken concrete curb below 3 posts on the left side of Span 1 and then;
Reanchor those 3 Posts on the left and 1 Post on the right.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Maintenance Activity Summary

MMS Activity	Description	Recommended	Status	Target Year	Est Cost
357.01	Bearings	9/12/2001	-1	2012	1000

Remove the 1-2 inches of sand and debris (including concrete chunks) from abutment bearing seats.

355.02	Cln & Pnt	9/21/2005	-1	2012	2000

Clean and spot paint the rockers at the abutments espec. 5F.
Clean and spot paint the exter. lower flanges / base of webs.

Bridge Notes

Snooper used from left side in 2003, right side in 2005, and right side in 2007.
The sand is building up on the right embankment slope of both approaches.
Posted vert. clearance of 13 ft. 9 inches on both sides of Span 1 over road to the CDOT and Summit County Maintenance Shops.

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 0070A 1

Mile Post (ON)11: 205.097 mi

Inspection Notes

Time: 12:45	Temperature: 75 Degrees	Weather: Clear	Team leader: KC

Scope:

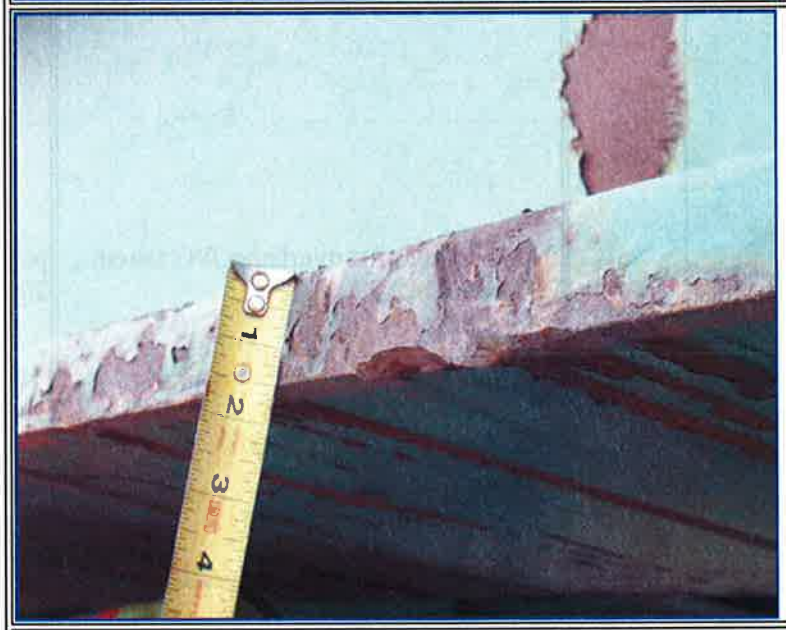
☑ NBI: ☑ Element: ☐ Underwater: ☐ Fracture Critical: ☐ Other: **Type:** Regular NBI

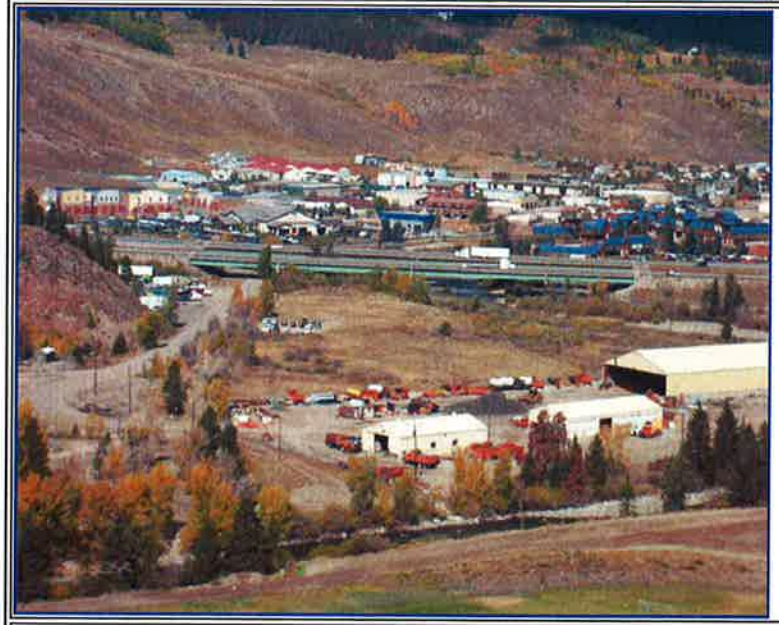
Inspector: RUTHERFORDD **Inspection Team:**

Inspection Date: 07/22/2009

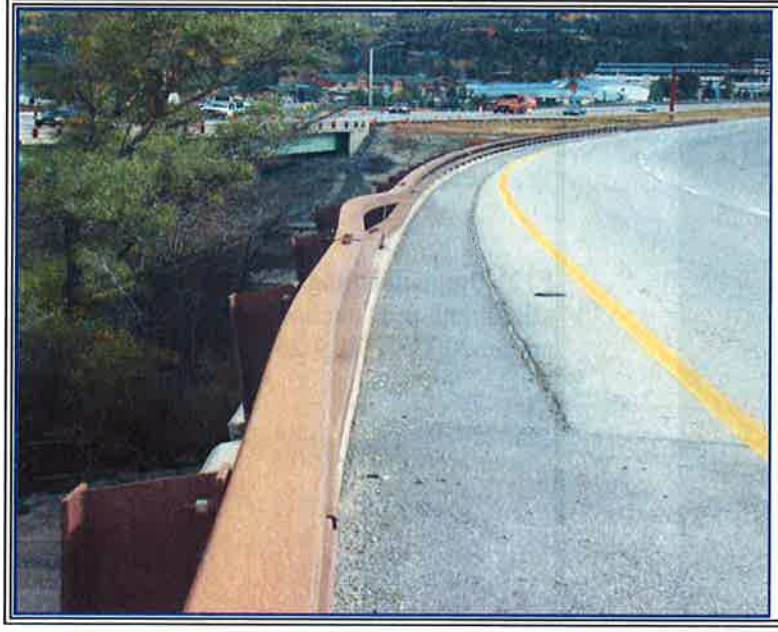
_____
Inspector

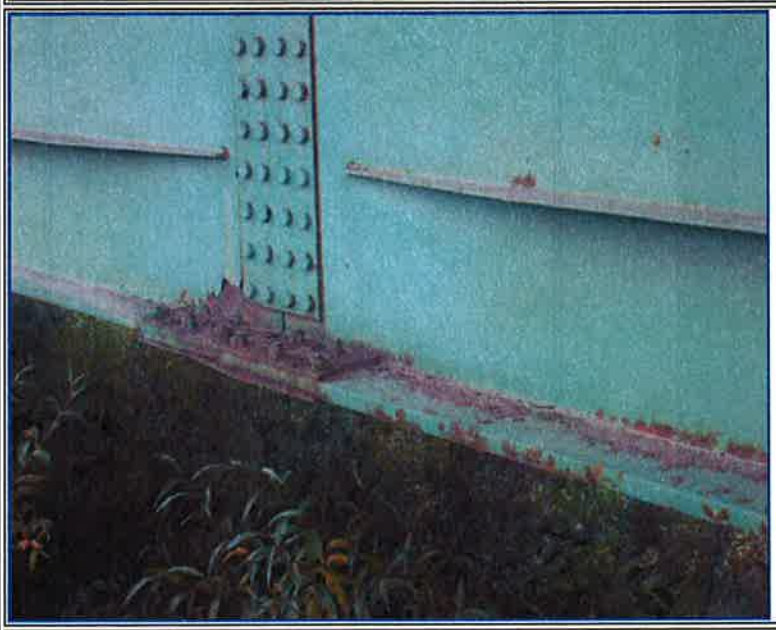
_____
Inspector

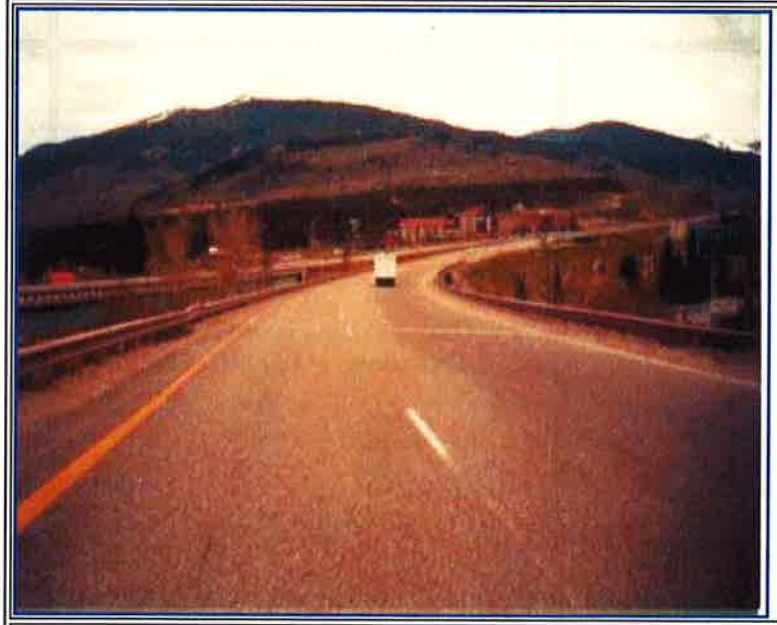
	F12Y uncoated tube rails get rusting at expansion sleeve portions, will inhibit expan-contract.JPG taken: 2005/09/21 9:33	pos 200
	F12Y Worst impact damage to girder - Gir 1F, deformation of flange edge, closeup.JPG taken: 2005/09/2112:10	pos 200
	F12Y Cool diaphragms.JPG taken: 2005/09/21 9:13	pos 200

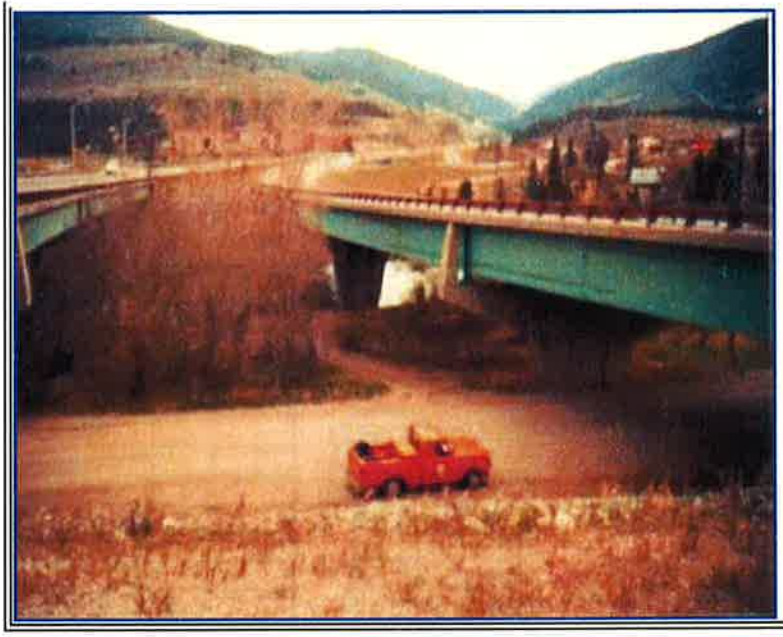
		
	F12Y delam of rt overhang.JPG taken: 2005/09/2112:37	pos 200
	F12Y elevation view with Silverthorne.JPG taken: 2005/09/2110:44	pos 200

	F12Y impact damage to girder 1F.JPG taken: 2005/09/2110:38	pos 200
	F12Y Impact damage to rt rail, 8" from alignment, post anchor bolts failed.JPG taken: 2005/09/21 9:26	pos 200
	F12Y Impact to left rail has broken the curb at base of posts, plus the anchor bolts were pulled out.JPG taken: 2005/09/21 9:50	pos 200

	F12Y Impact to left rail has pulled out anchor bolts at 3 posts and broken the curb.JPG taken: 2005/09/21 9:53	pos 200
	F12Y Impacted left rail alignment now.JPG taken: 2005/09/21 9:54	pos 200

	F12Y increased rusting at splice bottom flange plate, this is gir 2F.JPG taken: 2005/09/2112:33	pos 200
	F12Y spalling and delam of rt overhang.JPG taken: 2005/09/2112:42	pos 200
	F12Y Trees growing up on rt side of span 2.JPG taken: 2005/09/2112:29	pos 200

		
	F12Y Raveled or rutted asphalt exposing previous layer and had to be patched, a little rough now, note unsealed moderate crack taken: 2005/09/21 9:36	pos 200
	DTD archives_2_.JPG taken: 2004/11/23 7:28	pos 200

	DTD archives.JPG taken: 2004/11/23 7:28	pos 200

Colorado Department of Transportation

Structure Inspection and Inventory Report (English Units)

Highway Number (ON) 5D: 009D 1

Mile Post (ON)11: 101.768 mi

Bridge Key: F-12-BP | Inspection Date: 9/11/2007 | Sufficiency Rating: 65.0 Not Eligible

Rgn/Sectn 2E/2M:	15	Hist Signif 37:	5		UW Inspection Date 93B:		
Trans Region 2T	11	Posting status 41:	A		SI Date 93C:		
County Code 3:	117	Service on/un 42A/B:	5	5	Bridge Cost 94:	$ 0	
SUMMIT		Main Mat/Desgn 43A/B:	1	19	Roadway Cost 95:	$ 0	
Place Code 4:	70525	Appr Mat/Desgn 44A/B:	0	0	Total Cost 96:	$ 0	
SILVERTHORNE		Main Spans Unit 45:	5		Year of Cost Estimate 97:		
Rte.(On/Under)5A:	1	Approach Spans 46:	0		Brdr Brdg Code/% 98A/B:		
Signing Prefix 5B:	3	Horiz Clr 47:	38.0 ft		Border Bridge Number 99:		
Level of Service 5C:	1	Max Span 48:	13.1 ft		Defense Highway 100:	0	
Directional Suffix 5E:	0	Str Length 49:	69.0 ft		Parallel Structure 101:	N	
Feature Intersected 6:		Curb Wdth L/R 50A/B:	11.5 ft	11.5 ft	Direction of Traffic 102:	2	
BLUE RIVER		Width Curb to Curb 51:	0.0 ft		Temporary Structure 103:		
Facility Carried 7:		Width Out to Out 52:	138.0 ft		Highway System 104:	0	
SH 9 ML		Deck Area:	9,526.1 sq. ft		Fed Lands Hiway 105:	0	
Alias Str No.8A:		Min Clr Ovr Brdg 53:	99.99		Year Reconstructed 106:	0000	
#F-12-E		Min Undrclr Ref 54A:	N		Deck Type 107:	N	
Prll Str No. 8P		Min Undrclr 54B:	0.0 ft		Wearing Surface 108A:	N	
		Min Lat Clrnce Ref R 55A:	N		Membrane 108B:	N	
Location 9:		Min Lat Undrclr R 55B:	0.0 ft		Deck Protection 108C:	N	
IN SILVERTHORNE		Min Lat Undrclr L 56:	0.0 ft		Truck ADT 109:	7 %	
Max Clr 10:	328.1 ft	Deck 58:	N		Trk Net 110:	1	
BaseHiway Net12:	0	Super 59:	N		Pier Protection 111:	#	
IrsinvRout 13A	0000000000	Sub 60:	N		NBIS Length 112:	Y	
IrssubRout No13B:	00	Channel/Protection 61:	8		Scour Critical 113:	8	
Latitude 16:	39d 37' 40"	Culvert 62:	7		Scour Watch 113M:		
Longitude 17:	106d 04' 16"	Oprtng Rtg Method 63:	5 No rating		Future ADT 114:	36,656	
Range18A:	78 W	Operating Rating 64:	36.0		Year of Future ADT 11:	2028	
Township18B:	78	Inv Rtng Method 65:	5		CDOT Str Type 120A:	CBC	
Section18C:	12	Inventory Rating 66:	36.0		CDOT Constr Type 120B:	0.	
Detour Length 19:	123.7 mi	Asph/Fill Thick 66T:	084 "in"		Inspection Indic 122A:		
Toll Facility 20:	3	Str. Evaluation 67:	7		Inspection Trip 122AA:		
Custodian 21:	1	Deck Geometry 68:	N		Scheduling Status 122B:		
Owner 22:	1	Undrclr Vert/Hor 69:	N		Maintenance Patrol 123:	42	
Functional Class 26:	14	Posting 70:	5		Expansion Dev/Type12:	O	
Year Built 27:	1982	Waterway Adequacy 7:	9		Brdg Rail Type/Mod 125A/B:	X	0
Lanes on 28A:	5	Approach Alignment 72:	8		Posting Trucks 129A/B/C:	0	0 0
Lanes Under 28B:	0	Type of Work 75A:			Str Rating Date 130:	1/1/1901	
ADT 29:	23,200	Work Done By 75B:			Special Equip 133:		
Year of ADT 30:	2008	Length of Improvment 76:	0.0 ft		Vert Clr N/E 134A/B/C:	X	99.99 0.00
Design Load 31:	6	Insp Team Indicator 90B:	GREEN TEAM (		Vert Clr S/W 135A/B/C:	X	99.99 0.00
Apr Rdwy Width 32:	69.0 ft	Inspector Name 90C:	MOSST		Vertical Clr Date:	5/5/1905	
Median 33:	2	Frequency 91:	48 months		Weight Limit Color: 13	0	
Skew 34:	0.00 °	FC Frequency 92A:	-1		Str Billing Type:	U	
Structure Flared 35:	0	UW Frequency 92B:	-1		Userkey 1 - System:	ONSYS	
Sfty Rail 36a/b/c/d:	1 1 1 1	SI Frequency 92C:	-1		Userkey 7-Update Indi:		
Rail ht36h:	30 "in"	FC Inspection Date 93A:					

Inspector Name: MOSST

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Element Inspection Report

Elm/Env	Description	Units	Total Qty	% in 1	CS 1	% in 2	CS 2	% in 3	CS 3	% in 4	CS 4	% in 5	CS 5
241/1	Concrete Culvert	(LF)	690	93 %	645	7 %	45	0 %	0	0 %	0	0 %	0
327/1	Culvert Wingwalls	(EA)	4	100 %	4	0 %	0	0 %	0	0 %	0	0 %	0
335/1	Culvert Headwalls	(EA)	2	100 %	2	0 %	0	0 %	0	0 %	0	0 %	0
501/1	Channel Cond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
504/1	BankCond	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0
510/1	Waterway Adequ.	(EA)	1	100 %	1	0 %	0	0 %	0	0 %	0	0 %	0

Elem/Env	Description	Element Notes
241/1	Concrete Culvert	Cell #1 is walkway only, great cond. Original cells 2-5 have 15 light longit. cracks in top slabs with efflorescence including few stalactites, a couple have active leakage. Downsteam end of wall 2 has spalls, one is at water line 1.5 feet and the other is at the top 4 inches, no rebar exposed. Cells 3, 4,and 5 have apparently had weepholes drilled through the topslabs near the right end. These have active seepage with algae, and rust stains, 9-2007 PHOTO. The right end of the culverts have had bushes planted in dirt on the topslab, 9-2007 PHOTO. Unable to go through all of the cells in 2007 inspection due to the highwater.
327/1	Culvert Wingwalls	2 sets of wings at forward end look great with rock facades & retaining wall at rear still looks new too.
335/1	Culvert Headwalls	Headwall extensions are concrete with stone facade, still in good cond ition with very light shrinkage cracks.
501/1	Channel Cond	Blue River - Mountain river with high spring runoff. Rocky bed for swift flows. Good alignment.
504/1	BankCond	Rock lined channel, good alignment but the culvert constricts.
510/1	Waterway Adequ.	Has flowed near full but would require much more to top roadway.

Bridge Notes

Highway Number (ON) 5D: 009D 1

Mile Post (ON)11: 101.768 mi

Colorado Department of Transportation
Structure Inspection and Inventory Report (English Units)

Inspection Notes

MOSST inspection comments -
Structure F-12-BP -
Date 2007-09-11 -
Previous comments > Time: 08:30 Temperature: 70 Degrees Weather: CLEAR & SUNNY

Scope:

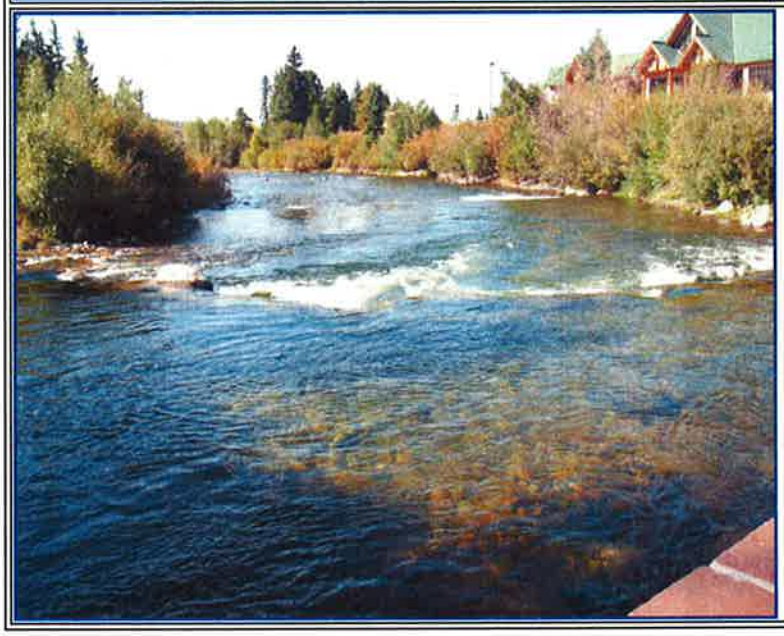
☑ NBI: ☑ Element: ☐ Underwater: ☐ Fracture Critical: ☐ Other: **Type:** Regular NBI

Inspector: MOSST **Inspection Team:**

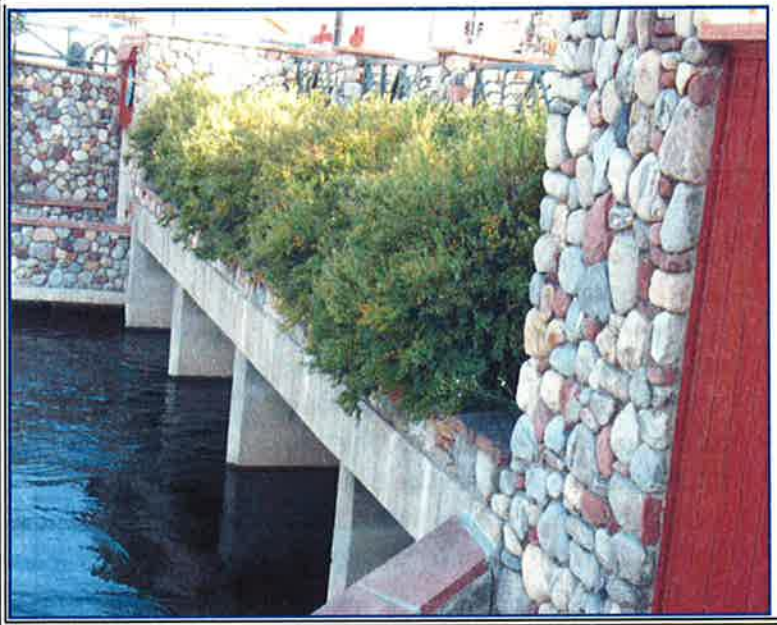
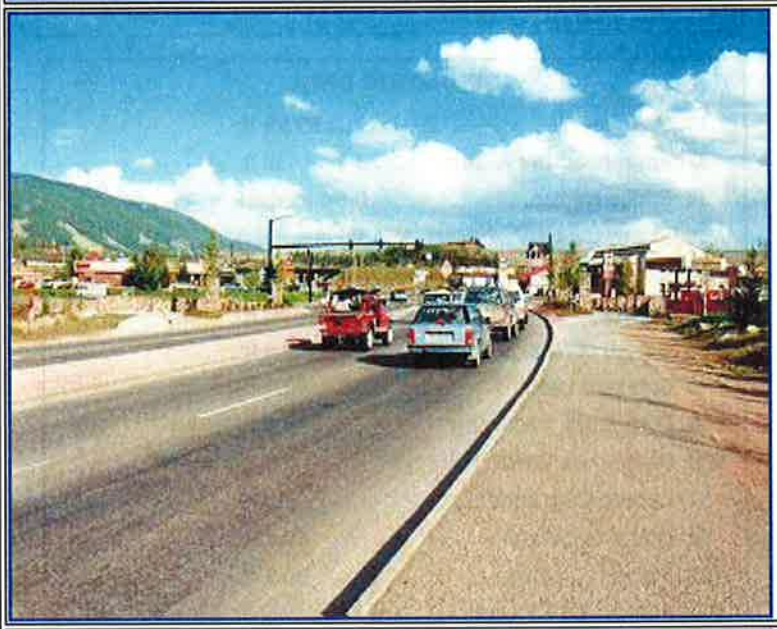
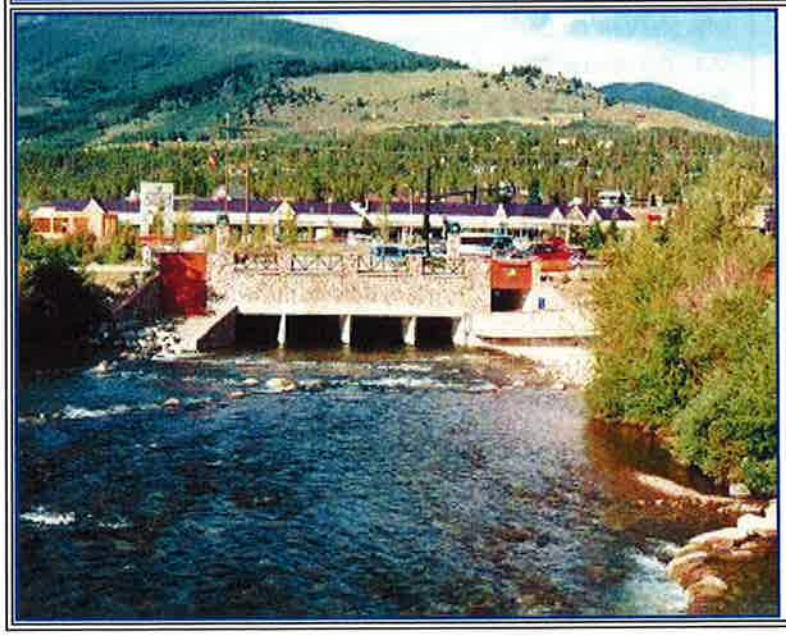
Inspection Date: 09/11/2007

Inspector

Inspector

	F12BP Cell 1 for pedestrians is higher and more widely spaced from the other cells.jpg taken: 2007/09/11 3:15	pos 200
	F12BP Downstream.jpg taken: 2007/09/11 3:27	pos 200

	F12BP Active drainage or seepage from drain holes cut through the right end of the top slabs.jpg taken: 2007/09/11 3:45	pos 200
	F12BP Upstream.jpg taken: 2007/09/11 3:16	pos 200
	F12BP Bushes growing on right end of culvert (outlet end).jpg taken: 2007/09/11 3:59	pos 200

		
	DTD archives_2_.JPG taken: 2004/11/23 7:27	pos 200
	DTD archives.JPG taken: 2004/11/23 7:27	pos 200

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST | Abbr. Str. No: | Inspection Date : 5/19/2009

IDENTIFICATION

1. State:	08 Colorado
2. District:	Reg 1 MSec 5
3. County:	SUMMIT
4. City:	SILVERTHORNE
5A. Route On/Under:	Route On Str
5B. Route Signing Prefix:	5 City Street
5C. Level of Service:	1 Mainline
5D. Route Number:	0
5E. Directional Suffix:	0 N/A (NBI)
6. Feature Intersected:	BLUE RIVER
7. Facility Carried On:	WILDERNEST ROAD
9. Location:	.1 MI W OF STATE HWY 9
11. Mile Post:	0 miles
16. Latitude:	39 d 37 ' 36.4 "
17. Longitude:	106 d 4 ' 17.6 "
18A. Survey Range:	-
18B. Survey Township:	-
18C. Survey Section:	-
98. Border Bridge Code:	(N/A)
99. Neighboring State Code:	(N/A)
% of Responsibilty:	0%

CLASSIFICATION

20. Toll Facility:	3 On free road
21. Custodian:	City/Municipal Hwy Agenc
22. Owner:	City/Municipal Hwy Agenc
26. Function Class:	08 Rural min Collector
37. Historical Sign.:	5 Not eligible for NRHP
100. Defense Hwy:	0 Not a STRAHNET hwy
101. Parallel Str:	No ll Bridge Exists
102. Dir of Traffic:	2 2-way traffic
103. Temporary Str:	Not a Temporary Structure
104. Highway Sys:	0 Not on NHS
112. NBIS Length:	Yes

GEOMETRIC DATA

10. Max. Ver Clr :	99.99 ft.
32. Appr. Roadway Width:	38 ft.
33. Bridge Median:	0 No median
34. Skew:	0 degree(s)
35. Structure Flared:	Structure Not Flared
47. Horizontal Clr	38 ft.
48. Length of Max. Span:	90.3 ft.
49. Structure Length:	92.5 ft.
50A. Curb/Sdwlk Width (lt):	9.4 ft.
50B. Curb/Sdwlk Width (rt):	0.5 ft.
51. Curb to Curb Width:	38 ft.
52. Out to Out Width:	49.8 ft.
53. Min Vert Clr Over:	99.9 ft.
54A. Ref Min Ver Clr Und:	Not a Highway or RR
54B. Min Vert Clr Und:	0 ft.
55A. Ref Min Lat Clr Und:	Not a Highway or RR
55B. Min Lat Clr Under (rt):	99.9 ft.
56. Min Lat Clr Under (lt):	0 ft.
Deck Area:	4607 sq. ft.

STRUCTURE TYPE AND MATERIALS

43A. Main Span Material:	5 Prestressed Concrete
43B. Main Span Design:	05 Multiple Box Beam
44A. Approach Material:	0 Other
44B. Approach Design:	00 Other (NBI)
45. No of Main Spans:	1
46. No of App. Spans:	0
107. Deck Type:	1 Concrete-Cast-in-Place
108A. Wearing Surface:	9 Other
108B. Membrane:	3 Epoxy
108C. Deck Protection:	0 None
120A. Structure Type:	CBGP
120B. Construction Type:	3

INSPECTION

91. Frequency:	24	90. Inspection Date:	5/19/2009	Next Inspection:	5/19/2011
92A. FC Frequency:	N	93A. FC Inspection Date:	-	Next FC Inspection:	-
92B UW Frequency:	N	93B. UW Inspection Date:	-	Next UW Inspection:	-
92C. Sp. Frequency:	N	93C. Sp. Inspection Date:	-	Next Sp. Inspection:	-
Elem Insp Freq:	24	Elem Insp Date:	5/19/2009	Next Elem Inspection:	5/19/2011
		Inspector:	TRIPLETTJ	Signature:	_____

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST | Abbr. Str. No: | Inspection Date : 5/19/2009

NAVIGATION DATA

38. Navigation Control:	Permit Not Required
39. Vertical Clearance:	0 ft.
40. Horizontal Clearance:	0 ft.
111. Pier Protection:	Not Applicable (P)
116. Lift Bridge Ver. Clr:	0 ft.

AGE AND SERVICE

19. Detour Length:	1 miles.
27. Year Built:	1983
28A. Lanes On:	2
28B. Lanes Under:	0
29. Avg. Daily Traffic:	7438
30. Year of ADT:	2009
42A. Service Type On:	5 Highway-pedestrian
42B. Service Type Under:	5 Waterway
106. Year Reconstructed:	0
109. Truck ADT:	5%
114. Future ADT:	17852
115. Year of Future ADT:	2029

PROPOSED IMPROVEMENTS

75. Type of Work:	-
76. Length of Improvement:	0 ft.
94. Bridge Cost:	0
95. Roadway Cost:	0
96. Total Cost:	0
97. Year of Cost Estimate:	0

Sufficiency Rating:	83.3
SD/FO Indicator:	Not Deficient

APPRAISAL

36A. Bridge Rail:	0 Substandard
36B. Transition:	0 Substandard
36C. Approach Rail:	0 Substandard
36D. Appr. Rail on End :	0 Substandard
36H. Rail Height :	47.0 in.
66T. Asphalt Thickness :	0.0 in.
67. Structure Evaluation :	5 Above Min Tolerable
68. Deck Geometry :	5 Above Tolerable
69. Und. Clr. Ver. & Hor.:	N Not applicable (NBI)
71. Waterway Adequacy:	8 Equal Desirable
72. Approach Alignment:	8 Equal Desirable Crit
113. Scour Critical:	8 Stable Above Footing

CONDITION

58. Deck:	5 Fair
59. Superstructure:	5 Fair
60. Substructure:	7 Good
61. Channel/ Channel Prot.:	8 Protected
62. Culvert:	N N/A (NBI)

LOAD RATING AND POSTING

31. Design Load:	5 MS 18 (HS 20)
41. Posting Status:	A Open, no restriction
63. Operating Rating Mthd:	1 LF Load Factor
64. Operating Rating:	71.7 tons.
65. Inventory Rating Mthd:	1 LF Load Factor
66. Inventory Rating:	47.5 tons.
70. Posting:	5 At/Above Legal Loads
129. Truck Load:	0 0 0 tons.
130. Rating Date:	11/15/1985

Bridge Notes:

Inspection Notes:

Date 5/19/2009 -

Temp: 45 Degrees Time: 7:00 AM Weather: Partly cloudy, calm

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST Abbr. Str. No: Inspection Date : 5/19/2009

MAINTENANCE ACTIVITY

Activity No. : 306.02 Priority : S-P2
Description : Railin Rep & Repl
Install Adequate Bridge & Approach Rail
Detail of Work: Install bridge rails, transitions, approach rails and rail ends to meet AASHTO guidelines.

Bridge Rail:	186 Feet X 100 / Feet X 1	=	18600.00
Approach Rail:	200 Feet X 50 / Feet X 1	=	10000.00
	(Quantity X Rate X Adjustment Factor) Total Activity Cost	=	28600.00

Activity No. : 353.04 Priority : P-P1
Description : Bridge Deck Repair
Patch delams / spalls / potholes in surface
Detail of Work: Replace epoxy overlay on deck or seal with concrete deck sealer and overlay.

Concrete Deck Sealer:	510 Sq.Yd. X 9 / Sq.Yd. X 1	=	4590.00
	(Quantity X Rate X Adjustment Factor) Total Activity Cost	=	4590.00

Activity No. : 354.02 Priority : P-P1
Description : Superstructure
Repair girder / Truss (non-collision)
Detail of Work: Patch spall at east end of Girder L.

Epoxy Concrete Patch:	1 Each X 100 / Each X 1	=	100.00
	(Quantity X Rate X Adjustment Factor) Total Activity Cost	=	100.00

Activity No. : 352.2 Priority : M-P2
Description : Cleaning and Washing
Remove dirt / gravel from decks / curbs H&GR
Detail of Work: Clean soil and gravel from sidewalk at north rail.

Labor:	8 Hours X 25 / Hours X 1	=	200.00
	(Quantity X Rate X Adjustment Factor) Total Activity Cost	=	200.00
		Total Bridge Cost =	$33,490.00

PRIORITY DEFINITIONS:
1 S – P1 = Safety – Priority 1
2 U = Urgent
3 S – P2 = Safety – Priority 2
4 P – P1 = Programmed – Priority 1
5 P – P2 = Programmed – Priority 2
6 M – P1 = General Maintenance – Priority 1
7 M – P2 = General Maintenance – Priority 2

NOTE: The suggested maintenance activities were noted by the inspection crew on the date of inspection and consist of those deemed most critical to preserve the integrity of the bridge. Items are listed in the order of importance, with the first Maintenance Activity considered most important. Estimated costs are based upon approximate quantities and should not be relied upon for establishing funding. It is recommended that a qualified representative of the owning entity review this report at the bridge site, and using costs based upon personal knowledge, local conditions, availability of labor and materials and entity preferences, establish a revised estimate to accomplish the suggested work.

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST | Abbr. Str. No: | Inspection Date : 5/19/2009

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Decks/Slabs									
18 (5)	P Conc Deck/Thin Ovl	1	4607	(SF)	0	0	4607	0	0
	Large area near southwest corner was repaired prior to 2005 inspection. Deck surface has moderate to heavy cracks throughout which was covered by an epoxy polymer coating placed 6/2005. Coating deteriorated prior to 2007 inspection and coating 90% gone at 2009 inspection. Sounding yields delamination at southeast corner less than 2% of total. Heavy map cracking at southeast quadrant and west abutment.								
338 (4)	Conc Curbs/SW	1	186	(LF)	46	93	47	0	0
	S1 scaling on curb face on north side throughout. Several cracks in sidewalk on north side. South curb was restored prior to 2005 inspection. Thin epoxy coating applied to sidewalk - Coating beginning to peel, approximately 5% of total. Coating applied to south curb is cracked and spalled, approximately 50% of south curb. Soil and gravel along north rail.								
Superstructure									
104 (4)	P/S Conc Box Girder	1	1116	(LF)	1087	26	3	0	0
	3 ft spall and delamination with R3 rust on exposed strand and rebar at east end of Girder L was patched prior to 2005 inspection. Patch completely delaminated. Longitudinal cracks some with light efflorescence at west end of Girders C, F, G, I and K and east end of Girders D-L. Light to moderate efflorescence leaks between boxes at various locations near abutments.								
334 (5)	Metal Rail Coated	1	186	(LF)	186	0	0	0	0
	Scrapes throughout south rail, minor scrapes on north rail.								
340 (3)	Superstr Cnc Coating	1	1	(EA)	0	1	0	0	0
	Peeling on outside of south curb and east end of Girder L.								
Substructure									
215 (4)	R/Conc Abutment	1	100	(LF)	96	4	0	0	0
	Light vertical cracks at both abutments.								

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST | Abbr. Str. No: | Inspection Date : 5/19/2009

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Substructure									
326 (3)	Bridge Wingwalls	1	4	(EA)	4	0	0	0	0
	Light cracks and light S1 scaling.								
341 (3)	Substr Conc Coating	1	1	(EA)	0	0	1	0	0
	Moderate water stains at abutments. Paint peeling about 50% of abutments.								
Bearings									
310 (3)	Elastomeric Bearing	1	48	(EA)	48	0	0	0	0
	(2) neoprene pads at ends of each girder.								
Other Elements									
501 (2)	Channel Cond	1	1	(EA)	1	0	0	0	0
	Cobble and boulder lined channel.								
502 (2)	ChannProtMatCond	1	1	(EA)	1	0	0	0	0
	Riprap drop structures on upstream side.								
504 (2)	BankCond	1	1	(EA)	1	0	0	0	0
	Cobbles, grass, bushes and trees on banks.								

Bridge Inspection Report (English Units)

Structure No: SILVTH-WILDRNST | Abbr. Str. No: | Inspection Date : 5/19/2009

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Other Elements									
530 (2)	Approach Guardrail A	1	1	(EA)	1	0	0	0	0

No transitions, approach rails to short and ends are flared.

Bridge Inspection Report (English Units)

Structure No: SILVTH-STEPHENS | Abbr. Str. No: | Inspection Date : 5/19/2009

IDENTIFICATION

1. State:	08 Colorado
2. District:	Reg 1 MSec 5
3. County:	SUMMIT
4. City:	SILVERTHORNE
5A. Route On/Under:	Route On Str
5B. Route Signing Prefix:	5 City Street
5C. Level of Service:	1 Mainline
5D. Route Number:	0
5E. Directional Suffix:	0 N/A (NBI)
6. Feature Intersected:	STRAIGHT CREEK
7. Facility Carried On:	STEPHENS STREET
9. Location:	NEAR FACTORY OUTLET
11. Mile Post:	0 miles
16. Latitude:	39 d 37 ' 40.3 "
17. Longitude:	106 d 3 ' 59.3 "
18A. Survey Range:	-
18B. Survey Township:	-
18C. Survey Section:	-
98. Border Bridge Code:	(N/A)
99. Neighboring State Code:	(N/A)
% of Responsibilty:	0%

CLASSIFICATION

20. Toll Facility:	3 On free road
21. Custodian:	City/Municipal Hwy Agenc
22. Owner:	City/Municipal Hwy Agenc
26. Function Class:	09 Rural Local
37. Historical Sign.:	5 Not eligible for NRHP
100. Defense Hwy:	0 Not a STRAHNET hwy
101. Parallel Str:	No ll Bridge Exists
102. Dir of Traffic:	2 2-way traffic
103. Temporary Str:	Not a Temporary Structure
104. Highway Sys:	0 Not on NHS
112. NBIS Length:	Yes

GEOMETRIC DATA

10. Max. Ver Clr :	99.99 ft.
32. Appr. Roadway Width:	28 ft.
33. Bridge Median:	0 No median
34. Skew:	0 degree(s)
35. Structure Flared:	Structure Not Flared
47. Horizontal Clr	28.1 ft.
48. Length of Max. Span:	45 ft.
49. Structure Length:	47.2 ft.
50A. Curb/Sdwlk Width (lt):	0 ft.
50B. Curb/Sdwlk Width (rt):	0 ft.
51. Curb to Curb Width:	28.1 ft.
52. Out to Out Width:	30.7 ft.
53. Min Vert Clr Over:	99.9 ft.
54A. Ref Min Ver Clr Und:	Not a Highway or RR
54B. Min Vert Clr Und:	0 ft.
55A. Ref Min Lat Clr Und:	Not a Highway or RR
55B. Min Lat Clr Under (rt):	99.9 ft.
56. Min Lat Clr Under (lt):	0 ft.
Deck Area:	1453.1 sq. ft.

STRUCTURE TYPE AND MATERIALS

43A. Main Span Material:	5 Prestressed Concrete
43B. Main Span Design:	04 Tee Beam
44A. Approach Material:	0 Other
44B. Approach Design:	00 Other (NBI)
45. No of Main Spans:	1
46. No of App. Spans:	0
107. Deck Type:	1 Concrete-Cast-in-Place
108A. Wearing Surface:	9 Other
108B. Membrane:	3 Epoxy
108C. Deck Protection:	0 None
120A. Structure Type:	CDTPG
120B. Construction Type:	21

INSPECTION

91. Frequency:	24	90. Inspection Date:	5/19/2009	Next Inspection:	5/19/2011
92A. FC Frequency:	N	93A. FC Inspection Date:	-	Next FC Inspection:	-
92B UW Frequency:	N	93B. UW Inspection Date:	-	Next UW Inspection:	-
92C. Sp. Frequency:	N	93C. Sp. Inspection Date:	-	Next Sp. Inspection:	-
Elem Insp Freq:	24	Elem Insp Date:	5/19/2009	Next Elem Inspection:	5/19/2011
		Inspector:	TRIPLETTJ	Signature:	_____

Bridge Inspection Report (English Units)

Structure No: SILVTH-STEPHENS | Abbr. Str. No: | Inspection Date : 5/19/2009

NAVIGATION DATA

38. Navigation Control:	Permit Not Required
39. Vertical Clearance:	0 ft.
40. Horizontal Clearance:	0 ft.
111. Pier Protection:	Not Applicable (P)
116. Lift Bridge Ver. Clr:	0 ft.

AGE AND SERVICE

19. Detour Length:	1 miles.
27. Year Built:	1989
28A. Lanes On:	2
28B. Lanes Under:	0
29. Avg. Daily Traffic:	8101
30. Year of ADT:	2009
42A. Service Type On:	1 Highway
42B. Service Type Under:	5 Waterway
106. Year Reconstructed:	0
109. Truck ADT:	4%
114. Future ADT:	19443
115. Year of Future ADT:	2029

PROPOSED IMPROVEMENTS

75. Type of Work:	-
76. Length of Improvement:	0 ft.
94. Bridge Cost:	0
95. Roadway Cost:	0
96. Total Cost:	0
97. Year of Cost Estimate:	0

Sufficiency Rating:	80.2
SD/FO Indicator:	Functionally Obsolete

APPRAISAL

36A. Bridge Rail:	1 Meets Standards
36B. Transition:	0 Substandard
36C. Approach Rail:	1 Meets Standards
36D. Appr. Rail on End :	1 Meets Standards
36H. Rail Height :	29.0 in.
66T. Asphalt Thickness :	0.0 in.
67. Structure Evaluation :	7 Above Min Criteria
68. Deck Geometry :	2 Intolerable - Replace
69. Und. Clr. Ver. & Hor.:	N Not applicable (NBI)
71. Waterway Adequacy:	8 Equal Desirable
72. Approach Alignment:	6 Equal Min Criteria
113. Scour Critical:	8 Stable Above Footing

CONDITION

58. Deck:	6 Satisfactory
59. Superstructure:	7 Good
60. Substructure:	7 Good
61. Channel/ Channel Prot.:	8 Protected
62. Culvert:	N N/A (NBI)

LOAD RATING AND POSTING

31. Design Load:	5 MS 18 (HS 20)
41. Posting Status:	A Open, no restriction
63. Operating Rating Mthd:	1 LF Load Factor
64. Operating Rating:	59.3 tons.
65. Inventory Rating Mthd:	1 LF Load Factor
66. Inventory Rating:	36 tons.
70. Posting:	5 At/Above Legal Loads
129. Truck Load:	0 0 0 tons.
130. Rating Date:	12/4/1995

Bridge Notes:

Inspection Notes:

Date 5/19/2009 -
Temp: 45 Degrees Time: 7:40 AM Weather: Partly cloudy, calm

Bridge Inspection Report (English Units)

Structure No: SILVTH-STEPHENS | Abbr. Str. No: | Inspection Date : 5/19/2009

MAINTENANCE ACTIVITY

Activity No. : 306.05 | Priority : S-P2

Description : Railin Rep & Repl

Install adequate Approach Rail

Detail of Work: Install double nested flex beam at transitions to meet AASHTO guidelines.

Approach Rail:	50 Feet X 50 / Feet X 1	=	2500.00
	(Quantity X Rate X Adjustment Factor) Total Activity Cost	=	2500.00
	Total Bridge Cost	=	$2,500.00

PRIORITY DEFINITIONS:

1 S – P1 = Safety – Priority 1
2 U = Urgent
3 S – P2 = Safety – Priority 2
4 P – P1 = Programmed – Priority 1
5 P – P2 = Programmed – Priority 2
6 M – P1 = General Maintenance – Priority 1
7 M – P2 = General Maintenance – Priority 2

NOTE: The suggested maintenance activities were noted by the inspection crew on the date of inspection and consist of those deemed most critical to preserve the integrity of the bridge. Items are listed in the order of importance, with the first Maintenance Activity considered most important. Estimated costs are based upon approximate quantities and should not be relied upon for establishing funding. It is recommended that a qualified representative of the owning entity review this report at the bridge site, and using costs based upon personal knowledge, local conditions, availability of labor and materials and entity preferences, establish a revised estimate to accomplish the suggested work.

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Decks/Slabs									
18 (5)	P Conc Deck/Thin Ovl	1	1453	(SF)	0	0	1453	0	0
	Moderate to heavy cracks throughout with small areas of delaminated and spalled concrete. Moderate wear, some large aggregate exposed. Deck was covered with an epoxy polymer coating placed prior to 2005 inspection. Coating peeling off, approximately 50% of total.								
338 (4)	Conc Curbs/SW	1	94	(LF)	47	47	0	0	0
	Stone fascia on the top and exterior sides of curb. Scrape marks and S1 scaling along curb faces at various locations.								
Joints									
300 (3)	Strip Seal Exp Joint	1	31	(LF)	31	0	0	0	0
	At east abutment. Covered up prior to 2005 inspection - Coating fills joint, metal rails visible during 2007 and 2009 inspections.								

Bridge Inspection Report (English Units)

Structure No: SILVTH-STEPHENS | Abbr. Str. No: | Inspection Date : 5/19/2009

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Superstructure									
109	(4) P/S Conc Open Girder	1	376	(LF)	370	6	0	0	0
	Hairline fillet cracks, some with light efflorescence.								
334	(5) Metal Rail Coated	1	94	(LF)	94	0	0	0	0
	Weathering steel flex beam rail.								
Substructure									
215	(4) R/Conc Abutment	1	62	(LF)	62	0	0	0	0
	Concrete with stone fascia.								
325	(3) Slope Prot/Berms	1	2	(EA)	2	0	0	0	0
	Riprap at abutments.								
326	(3) Bridge Wingwalls	1	4	(EA)	4	0	0	0	0
	Concrete with stone fascia.								
Other Elements									
321	(4) R/Conc Approach Slab	1	2	(EA)	0	2	0	0	0
	Moderate longitudinal cracks and wear. Approach slabs partially covered by an epoxy polymer coating.								

Bridge Inspection Report (English Units)

Structure No: SILVTH-STEPHENS | Abbr. Str. No: | Inspection Date : 5/19/2009

ELEMENT DATA COLLECTION

Element Number	Element Name	Env.	Total Qty	Unit	Quantity by State 1	2	3	4	5
Other Elements									
501 (2)	Channel Cond	1	1	(EA)	1	0	0	0	0
	Cobbles, boulders and sand.								
504 (2)	BankCond	1	1	(EA)	1	0	0	0	0
	Boulders, grass, bushes and trees on banks.								
520 (2)	AppRdAlign	1	1	(EA)	1	0	0	0	0
	Horizontal and vertical curves at both approaches with a slight speed reduction.								
530 (2)	Approach Guardrail A	1	1	(EA)	1	0	0	0	0
	Rail transitions are not double nested.								

View of Bridge Side Elevation Looking Upstream

View Down Centerline Bridge Roadway Looking Upstation

View Looking Upstream, Left Bank

View Looking Upstream, Right Bank

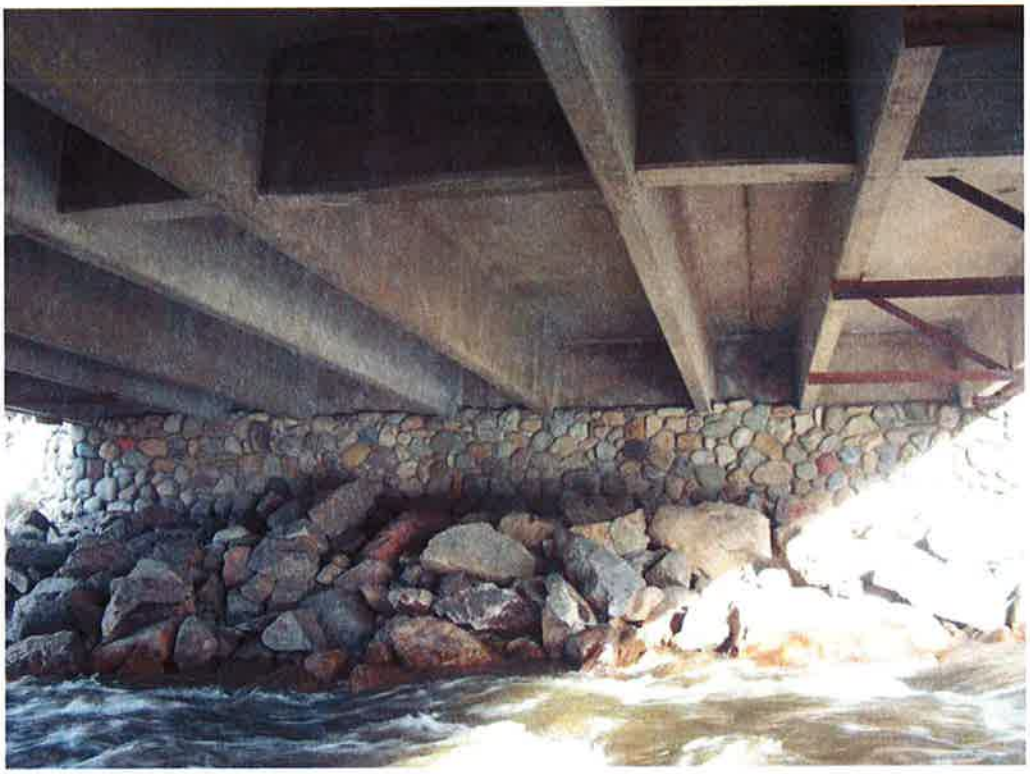
View Looking Downstream, Left Bank

View Looking Downstream, Right Bank

View Showing Polymer Coating Peeling Off of Deck Surface

View Showing Cracks on Surface of Deck

View Showing Joint at East Abutment Filled with Polymer Coating



General View of Underside of Bridge Looking Downstation

I-70 Silverthorne/Dillon Interchange

Existing Drainage and Floodplain Report

Prepared by Jacobs Engineering

February 2011

Existing Drainage and Floodplain Report

Identification of the Existing Drainage Structures and
Floodplain Boundaries within the Project Limits

I-70 Silverthorne/Dillon Interchange Project
CDOT Project Number IM 0703-341

Prepared by Jacobs Engineering
February 2011

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Appendix A: FEMA Flood Insurance Rate Map ..... Appendix A

PROJECT OVERVIEW

The Colorado Department of Transportation (CDOT) has undertaken this project to reconstruct the existing interchange between I-70 and U.S. 6 / CO 9. A new interchange will offer increased vehicle capacity and improved safety. To maximize the effectiveness of limited transportation funding, CDOT must consider replacement versus rehabilitation / retrofit of existing drainage components. Such an assessment first requires the identification of existing drainage components within the project limits. This document provides a brief description of the existing drainage structures and floodplains that could be impacted by the project.

Sources of Information

Jacobs researched aerial photography, photos, CDOT's and Silverthorne's bridge inventory, as-built plans for the intersection (References 1 and 2), and staff knowledge of the area to identify the major drainage structures within the project limits. FEMA floodplain maps and Flood Insurance Studies for Summit County (References 3 and 4 respectively) were also reviewed for details on floodplains, peak flow rates, and water surface elevations.

Project Location

The Town of Silverthorne is in the center of Summit County, in north-central Colorado, approximately 70 miles west of Denver, on Interstate Highway 70 (I-70). Silverthorne lies at the elevation of 8,790 feet and is located just downstream of the Dillon Reservoir on the Blue River. Straight Creek parallels the interstate on the south side of I-70 and is a tributary to the Blue River from the east. The confluence of the Blue River and Straight Creek occurs on the southwest quadrant of the interchange. Colorado State Highway 9 (CO 9) runs north from the interchange and generally parallels the Blue River. U.S. Route 6 (US 6) runs south from the interchange, over Straight Creek and towards the Dillon Reservoir.

Major Basin Description

The Blue River flows north through Silverthorne and is the main drainage basin in Summit County. It has a drainage basin of 377 square miles at the north end of town, approximately 1.8 miles north of the interchange. The discharge of the Blue River through Silverthorne is regulated by the Dillon Reservoir at the south end of town, approximately 0.8 miles south of the interchange The average annual peak discharge downstream of the reservoir is approximately 1,103 cubic feet per second (Reference 5).

Straight Creek is a tributary of the Blue River flowing west along the south side of I-70. It is approximately 8.5 miles long and has a drainage basin of 20 square miles at its confluence with the Blue River.

Flooding along the Blue River and Straight Creek normally occurs from April to July as a result of snow melt. The rainfall that occurs during these months usually has a minor effect on the runoff. After the snow melt peak, rainfall usually increases runoff, but rarely causes flood flows. There have been no serious flood problems in Silverthorne since the Dillon Reservoir began operating in 1963 (Reference 4).

FEMA Floodplains

The Blue River and Straight Creek were studied by FEMA as part of the Flood Insurance Study for the Town of Silverthorne in 2001 (Reference 4). A Flood Insurance Rate Map was also created by FEMA to delineate the 100-year floodplain and floodway boundaries of the Blue River and Straight Creek (Reference 3). Both waterways are Zone AE, meaning they have been hydraulically analyzed in detail to determine peak flows, water surface elevations and floodplain and floodway widths.

Peak flows along the Blue River for this FEMA study were taken from a previous report (Reference 6) that considered the total inflow to the Dillon Reservoir and its routing through the reservoir to obtain the 10-, 50-, and 100-year discharges. FEMA used USGS regional regression equations to determine the peak flows from Straight Creek.

Information from the FEMA Flood Insurance Rate Map can be viewed in Appendix A.

A summary of peak discharges and water surface elevations for the major drainage structure crossings of both the Blue River and Straight Creek within the limits of this project can be viewed in Table 1.

Existing Major Drainage Structures with a Structure Number

A major drainage structure is defined for this project as a concrete box culvert or a bridge structure designed to carry a roadway prism over a FEMA regulated floodplain. Seven major drainage structures fall within the project limits and may be impacted by the interchange reconstruction project:

1. Concrete box culvert at US 6 along Straight Creek
2. Bridge on Stephens Way over Straight Creek
3. Structure on River Road over Straight Creek
4. Bridge on EB I-70 over the Blue River (Str. No. F-12-Y)
5. Bridge on WB I-70 over the Blue River (Str. No. F-12-X)
6. Bridge on Wildernest Road over the Blue River
7. Concrete box culvert at CO 9 along the Blue River (Str. No. F-12-BP)

1. The drainage structure for Straight Creek at US 6 is an 8'x8' concrete box culvert that was extended in 1969 due to the widening of US 6 through this area. It is in fairly good condition and has a pedestrian bridge crossing directly upstream of the inlet.

2. The bridge carrying Stephens Way over Straight Creek was constructed in 1989 and is maintained by the Town of Silverthorne. The structure measures approximately 30.5 feet wide and 47.20 feet long. The bridge achieves this total length with a single span and lacks a skew.

3. The drainage structure for Straight Creek at River Road is assumed to be a concrete box culvert and has a pedestrian bridge crossing directly downstream of the exit. The size and maintenance authority are currently unknown and will need to be further investigated.

4. The EB I-70 bridge structure over the Blue River is maintained by CDOT as Structure Number F-12-Y. The bridge carries the eastbound lanes of Interstate 70 over Stephens Way, the Blue River, and South Adams Avenue. Constructed in 1971, the structure measures 50.5 feet wide and approximately 554 feet long. The bridge achieves this total length with a four span configuration of 110.00 feet, 165.00 feet, 165.00 feet, and 110.00 feet. The structure has a skew angle of 90 degrees.

5. The WB I-70 bridge structure over the Blue River is maintained by CDOT as Structure Number F-12-X. The bridge carries the westbound lanes of Interstate 70 over Stephens Way, the Blue River, and South Adams Avenue. Constructed in 1971, the structure measures 50.5 feet wide and approximately 554 feet long. The bridge achieves this total length with a four span configuration of 110.00 feet, 165.00 feet, 165.00 feet, and 110.00 feet. The structure has a skew angle of 90 degrees.

6. The Wildernest Road bridge structure over the Blue River is an off-system bridge that is maintained by the Town of Silverthorne. Constructed in 1982, the structure measures 49.50 feet wide and approximately 92.50 feet long. The bridge achieves this total length with a single span and has a 90-degree skew.

7. The CO 9 drainage structure for the Blue River is maintained by CDOT as Structure Number F-12-BP. The structure is a combination concrete box culvert (CBC) and pedestrian underpass that carries State Highway 9 over the Blue River and the associated pedestrian trail. Constructed in 1982, the culvert portion of the structure measures 53.75 feet wide and 136.00 feet long. A large corrugated metal pipe (102-inch equivalent) was installed along the pedestrian trail alignment during this initial construction operation. Both of these entities were installed with a skew angle of 90 degrees, with respect to the highway above.

Figure 1 on the next page shows the locations of the seven major drainage structures.

For more detailed information on the existing bridge structures, see the Silverthorne Interchange - Existing Structures Report (Reference 7).

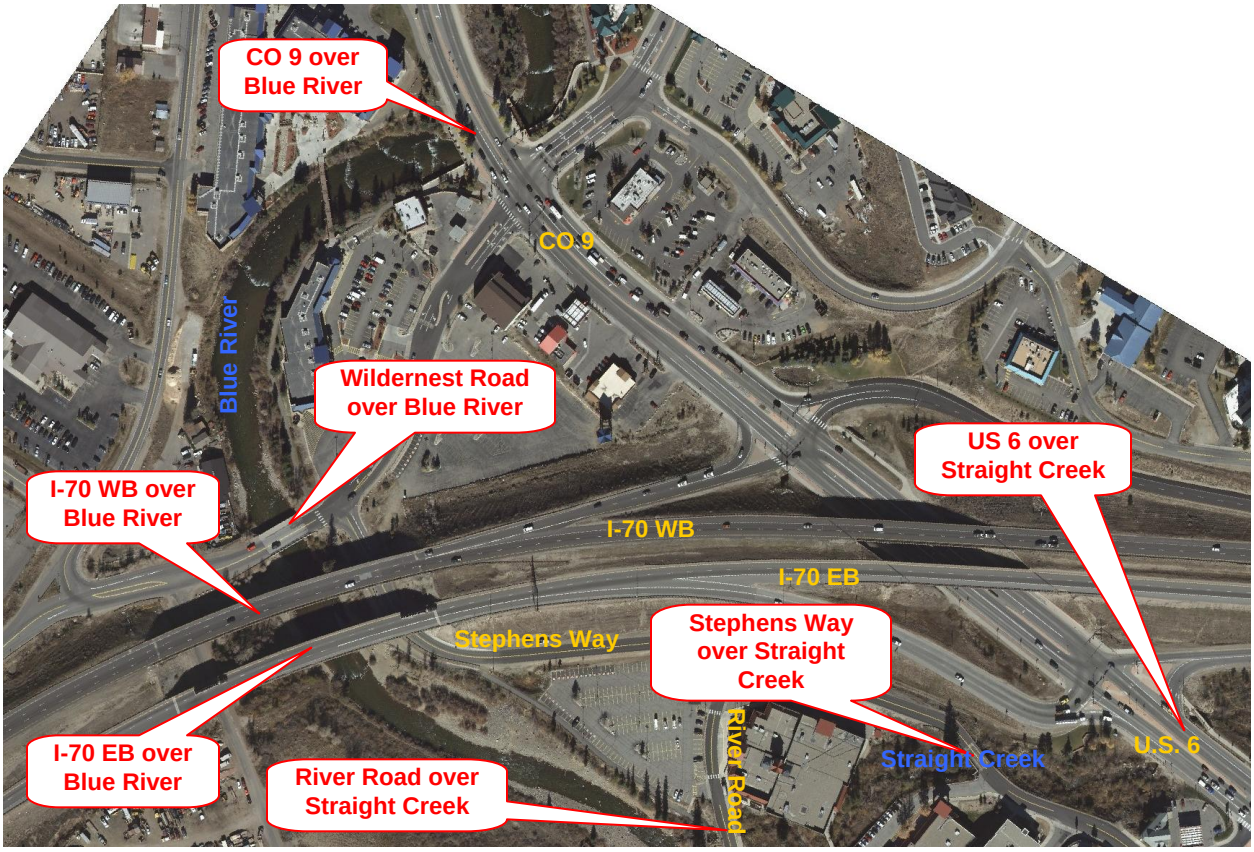


Figure 1 – Major Drainage Structures within Project Limits

Table 1. Major Structure Floodplain Summary

Structure	FEMA 10-YR FLOW	FEMA 10-YR WSEL	FEMA 50-YR FLOW	FEMA 50-YR WSEL	FEMA 100-YR FLOW	FEMA 100-YR WSEL
	(CFS)	(FT)	(CFS)	(FT)	(CFS)	(FT)
CBC at US6 along Straight Creek	393	8810.0	504	8813.5	550	8814.0
Bridge on Stephens Way over Straight Creek	393	8794.0	504	8795.0	550	8796.0
Structure on River Road over Straight Creek	393	8710.0	504	8780.0	550	8781.0
Bridge on EB I-70 over the Blue River (Str. No. F-12-Y)	2620	8764.2	3260	8765.1	3520	8765.5
Bridge on WB I-70 over the Blue River (Str. No. F-12-X)	2620	8764.2	3260	8765.1	3520	8765.5
Bridge on Wildernest Road over the Blue River	2620	8762.7	3260	8763.7	3520	8764.1
CBC at SH9 along the Blue River (Str. No. F-12-BP)	2620	8759.0	3260	8760.2	3520	8761.0

WSEL – Water Surface Elevation

Existing Minor Drainage Structures

Minor drainage structures including, but not limited to, inlets, culverts, riprap rundowns and stilling basins are also present within the limits of this project. The inlets, culverts and rundowns work together to capture runoff from the impervious pavement within the interchange and transport it to the Blue River or Straight Creek via grass lined median ditches. According to the as-built plans from 1994 (Reference 2), there is also a stilling basin on the southeast corner of the intersection between EB I-70 and Straight Creek and two sedimentation basins on the northeast corner of the intersection on either side of the west bound off ramp.

More information on inlet types, pipe sizes and culvert inverts, stilling/sedimentation basin capacities as well as any other miscellaneous drainage structures will be collected from survey work associated with this project. Impacts to the existing minor drainage structures due to the design and construction of this project will need to be evaluated and remediated to continue the use of existing drainage patterns wherever possible.

Water Quality

Permanent water quality features as needed for any additional impervious areas added as a result of the new interchange layout as well as construction erosion control devices and best management practices (BMP's) shall be considered and designed in a future phase of this project. Water quality features, BMP's, and erosion control devices will be designed per CDOT or local municipality requirements, whichever is more stringent.

Existing Pedestrian Bridge Crossings

The area around the Silverthorne Interchange is a high pedestrian traffic area. Numerous retail facilities exist on both sides of I-70 and four pedestrian bridge crossings were found within the project limits to facilitate pedestrian mobility.

The first pedestrian bridge is located on Straight Creek directly upstream of the concrete box culvert at US 6. The second and third bridges are located on Straight Creek just upstream and downstream of the structure at River Road. The fourth pedestrian bridge is located on the Blue River approximately 200 feet upstream of the concrete box culvert at SH 9.

All but the US 6 pedestrian bridge are included in the FEMA Flood Insurance Study.

Summary

Hydraulically the seven major drainage structures function very well. According to the FEMA Flood Insurance Study water surface profiles (Reference 4), none of the structures are overtopped by the 100-year storm event. The construction of the Dillon Reservoir has vastly improved flooding conditions along the Blue River through the Town of Silverthorne. The limits of the 100-year floodplain, as seen in Appendix A, are mostly confined to the river section. Some overtopping of the banks occurs in isolated areas, mostly along Straight Creek, which is not controlled by the Dillon Reservoir.

The majority of the Blue River and Straight Creek 100-year floodplains are also considered to be part of the floodway. Therefore encroachment into the floodplain with any new construction is not permitted by FEMA. This limitation will need to be considered during evaluation of interchange improvement alternatives.

The location of existing minor drainage structures and pedestrian bridges will also need to be considered during the alternative evaluation process. Where possible existing drainage patterns and pedestrian movements should be maintained or improved.

Potential locations for water quality structures should also be considered in the different alternatives, to compensate for any additional pavement surface that may need to be treated before flows are released into the Blue River or Straight Creek.

References

1. *Plan and Profile of Proposed Federal Aid Project No. I70-3(66)212;* State Highway No. 70, Summit County; Colorado Department of Transportation; 1969.

2. *Plan and Profile of As Constructed Federal Aid Project No. IM-NH-I(CX)-CX 070-2(176);* State Highway NO's. 70 & 9, Summit County; Colorado Department of Transportation; 1994.

3. *Flood Insurance Rate Map: Town of Silverthorne, Colorado, Summit County;* Community Panel Number 0802010014 B; Federal Emergency Management Agency (FEMA); August 2001.

4. *Flood Insurance Study: Town of Silverthorne, Colorado, Summit County;* Federal Emergency Management Agency (FEMA); August 2001.

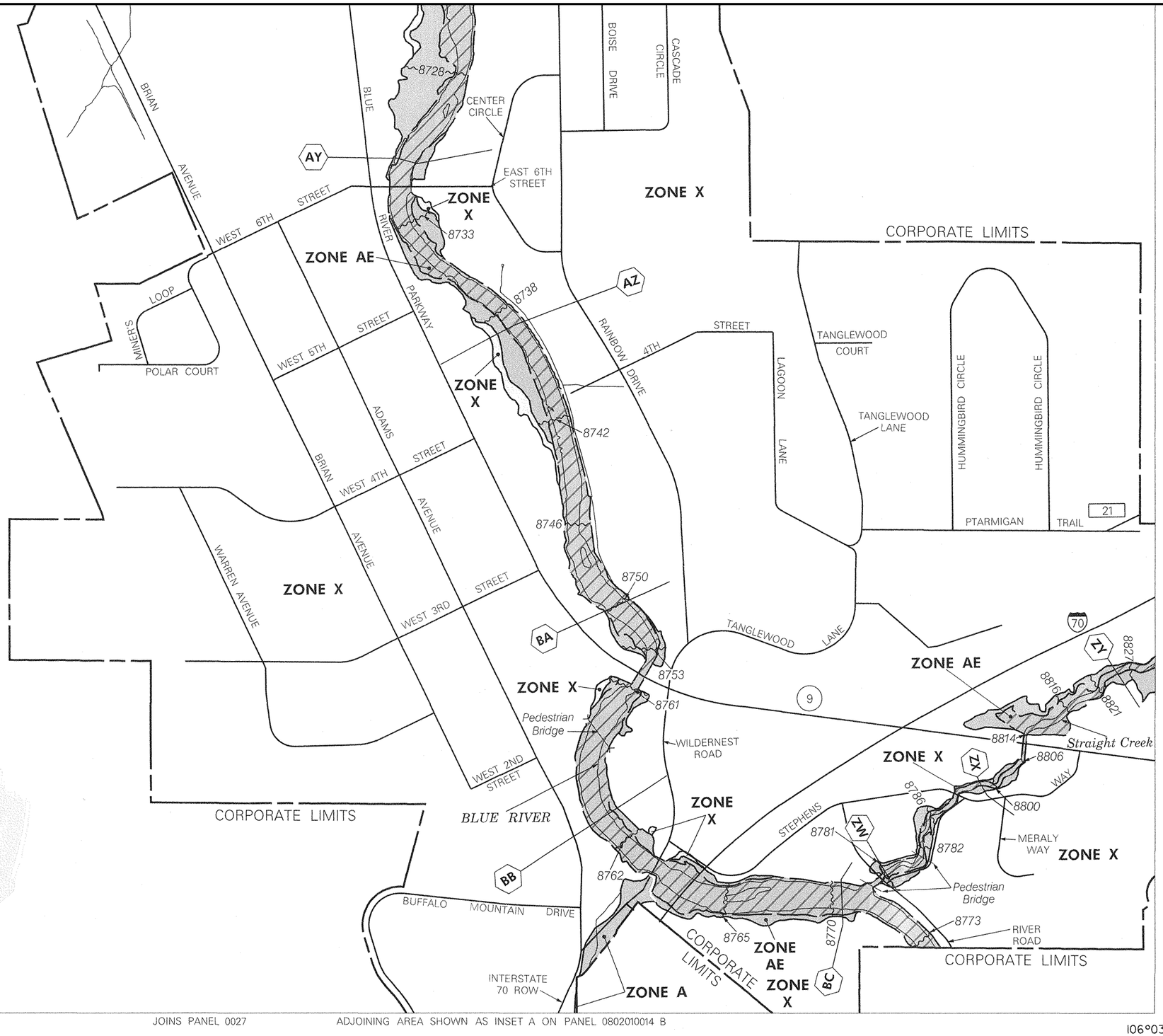
5. *Water Resources Data for Colorado, Part 1, Surface Water Records;* U.S. Department of the Interior, Geological Survey; 1963-1976.

6. *Hydrology Report, Blue River Downstream of Dillon Reservoir, Summit County, Colorado;* Gingery Associates, Inc.; September 1978.

7. *Silverthorne Interchange Project - Existing Structures Report;* Jacobs Engineering; September 2010.

APPENDIX A

FEMA Flood Insurance Rate Map



JOINS PANEL 0027 ADJOINING AREA SHOWN AS INSET A ON PANEL 0802010014 B

APPROXIMATE SCALE IN FEET
500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
SILVERTHORNE,
COLORADO
SUMMIT COUNTY

PANEL 14 OF 50
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY–PANEL NUMBER
0802010014 B

MAP REVISED:
AUGUST 9, 2001

Federal Emergency Management Agency

I-70 Silverthorne/Dillon Interchange
Existing Transit Services

Prepared by Ordonez and Vogelsang, LLC

February 2011

EXISTING TRANSIT SERVICES

Introduction

This section reviews the existing transit service provided within the I-70 Silverthorne/Dillon Interchange study area. This section also includes information on the major providers of airport shuttles and/or taxi service within Summit County.

Summit Stage

The major transit provider located in the project study area is Summit Stage that initiated operation of ski-bus service in 1977. With the increasing demand for intercity and year-round transit service, the County assumed operation of Summit Stage in 1989. (Summit Stage, 2010a). Summit Stage provides free bus service between Summit County communities and ski resort areas with major service hubs located in Silverthorne, Frisco, and Breckenridge. The Frisco Station serves as the central hub for the transit operation.

Bus service is available 7 days a week, 365 days per year between the hours of 6:00 am and 1:30 am, typically on an hourly frequency. Summit Stage operates 40' diesel buses in Keystone and Frisco and 30' buses in Silverthorne.

Figure 1: Summit Stage Bus, Dillon

Source: Summit Stage, 2010.

Fixed-Route Transit Service

Summit Stage operates both Town-to-Town and Residential fixed-routes as indicated below.

Town-to-Town routes

- Breckenridge to Frisco
- Copper Mountain to Frisco
- Silverthorne to Frisco
- Silverthorne to Dillon to Keystone

Residential routes

- Breckenridge: Boreas Pass, Warrior's Mark
- Silverthorne: Wildernest
- Dillon: Summit Cove

Four fixed-routes operate within the project study area including the Silverthorne (S), the Silverthorne-Frisco (S-F), the Wildernest- Silverthorne (W-S) and the Silverthorne-Dillon-Keystone (S-D-K) routes as depicted below in Figure 2. Local bus stops are provided throughout the study area along existing bus routes. Bus stop intervals are approximately every two blocks.

The S Route operates primarily along State Highway 9 (SH 9) from the Silverthorne Elementary School on the northern edge of town to the Target shopping center, the Library and the Recreational Center along Rainbow Drive and to the factory outlet stores located just south of the I-70 interchange. This route also makes a slight jog to residential uses in Ptarmigan. The S Route is the primary circulator for the town of Silverthorne. Service runs on thirty-minute headways. Stops for this routing include the following:

Northbound Service – Silverthorne Transfer Station, Outlet Stores, Ptarmigan, Silverthorne Recreation Center, North Branch Library, Annie Road, Blue River Run and Silverthorne Elementary.

Southbound Service – Willowbrook, Blue River Apartments, Sierra Madre, Target and Silverthorne Transfer Station.

The S-F Route operates out of the Silverthorne Station at Fourth Avenue and travels along SH 9 to I-70 and into Frisco. The S-F Route operates between the Frisco and Silverthorne Station and is heavily used as it connects two major Summit County hubs (Silverthorne and Frisco Stations) (Summit Stage, 2010b). Service runs on thirty minute headways. Stops for this routing include the following:

- Westbound Service to Frisco – Silverthorne Transfer Station, Walmart, Frisco Transfer Station
- Eastbound Service to Silverthorne – Frisco Transfer Station, Silverthorne Transfer Station

The S-D-K Route generally runs along SH 9 and U.S. Highway 6 (US 6) between Silverthorne and Keystone. The S-D-K Route, however, is the local route that also provides service between the Silverthorne Transfer Station at Fourth Avenue, the residential areas in Dillon Valley East and the Dillon City offices and residential and commercial areas in the Dillon Town Center. Service runs on thirty-minute headways. Stops for this routing include the following:

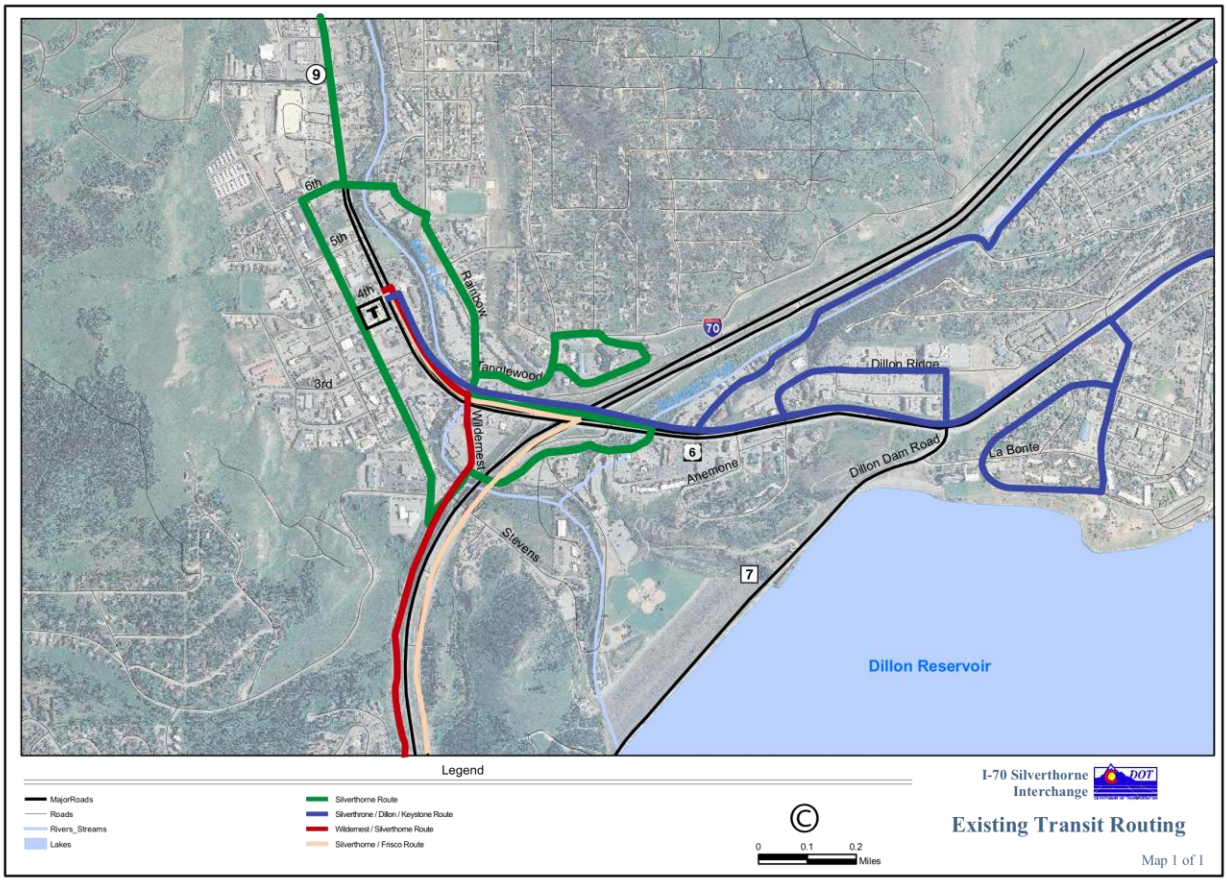
- Southbound Service to Keystone – Silverthorne Transfer Station, Summit Place, Dillon Ridge, Dillon Valley East, Dillon Valley West,Church, La Bonte Street, Lake Dillon Drive, Lake Dillon Fire Authority, Corinthian Hills, Summit Cover, Keystone Lodge & Spa, Rasor Drive and River Run
- Northbound Service to Silverthorne – River Run, Rasor Drive, Tenderfoot, Sunrise, Summit Cover, Corinthian Hills, Elkhorn, La Bonte Street, Lake Dillon Drive, Lake Dillon Fire Authority, Dillon Valley East, Dillon Valley West, Church, Dillon Ridge, 1st Bank, and Silverthorne Transfer Station.

The W-S Route travels between the Silverthorne Transfer Station at Fourth Avenue and residential uses in Wildernest, utilizing Wildernest Road and SH 9. Service runs on thirty-minute headways and stops for this routing include the following:

- Westbound Service to Wildernest – Silverthorne Transfer Station, Wildernest Center, North Side Circle, Cutty Sark, Timber Ridge and the Trailhead.
- Eastbound Service to Silverthorne – Buffalo Ridge, Snowscape, Tree House, Silver Queen West, Aspen Shadows, Saltlick, Sundance, Silver Queen East and Silverthorne Transfer Station.

It should be noted that none of the Summit Stage routes use the I-70/Silverthorne Interchange to head east of the interchange along I-70 (Summit Stage, 2010a).

Figure 2: Study Area Routes and Stations



The Silverthorne Transit Station is located on the corner of Fourth Street and Adams Avenue and is the hub for routes to Frisco, Dillon, Dillon Valley, Keystone, Silverthorne and Wildernest.

At the Silverthorne Transfer Station a public parking area containing 24 standard spaces and one van accessible space, along with a restroom facility, is adjacent to the site across Adams Avenue. This facility serves as a park and ride for the Summit Stage and public parking for the Town of Silverthorne community (Town of Silverthorne, 2008).

Bus stops are located along SH 9 and US 6. The 1st Bank Stop along the S-D-K route on US 6 is heavily used despite the lack of pedestrian facilities to the stop and adjoining destinations.

Accessible Service / Mountain Mobility Program

Summit Stage fixed-route service is complemented by year-round paratransit service to residents and visitors. Paratransit service is available to anyone with a disability to travel anywhere within Summit County. To obtain transportation on the paratransit system, a rider must call at least 24 hours before transportation is needed to make reservations. Reservations are accepted on a first-come, first-served basis (Summit Stage, 2010a).

Service Schedules

Bus service is available 7 days a week and 365 days a year. Table 1 below presents the general frequency (headways) of service for the four bus routes that operate within the project study area. The winter service (November – March) frequency increases to every 30 minutes throughout the entire day, compared to non-peak hour frequencies offered during the summer season (April – November) (Summit Stage, 2010).

Table 1: Project Study Area Transit Route Headways

Routes S, S-F, W-F & S-D-K	Time AM	Headway	Total Daily Trips
Summer (Apr. – Nov.)	6:00 am – 9:00 am 3:00 pm – 6:00 pm	30 minutes	27 per route
	9:00 am – 3:00 pm 6: 00 pm – 1:00 am	60 minutes	
Winter (Nov. – Mar.)	6:00 am – 1:00 am	30 minutes	32 per route

Source: Summit Stage, 2010.
S = Silverthorne Route (this is a circular route)
S-F = Silverthorne-Frisco Route (this route includes use of the I-70/Silverthorne Interchange)
W-S = Wildernest Silverthorne service
S-D-K = Silverthorne-Dillon-Keystone Route

Ridership Information

The Summit Stage System total annual ridership is estimated to be 1.75 million riders (Summit Stage, 2010). The S-D-K route is the most heavily used route in the Summit Stage transit system (Summit Stage, 2010) with a total annual ridership of 456,572 riders, or 26% of total system ridership. The annual ridership on the S and S-F routes is 128,764 riders and 288,081 riders, respectively. Combined ridership in the Silverthorne area is 873,417 total annual riders. (Summit Stage, 2010). (Wildernest-Silverthorne route ridership is not available at this time)

It should be noted that ridership on this system is substantially higher during the winter season compared to the summer season, due to the higher demand to access the area during the ski season and the greater demand for employee travel to and from residential areas and resort employment. For example, last year the winter season ridership on the three Silverthorne area routes was 521,832 riders, while the summer season ridership was 351,585 riders. (Summit Stage, 2010) Table 2 illustrates boardings at the two highest demand stops. Boarding counts are not available from Summit Stage at all designated bus routes at this time.

Table 2: Ridership at Stations within the Project Study Area

Station	Route	Location	Daily Boardings Summer	Daily Boardings Winter
Silverthorne Station	S, S-F, and S-D-K	4th Street/Adams Avenue	922	1,881
1st Bank Bus Stop	S-D-K	Stephens Way/US 6	32	35

Source: Summit Stage, Pers. Comm., 2010.
S = Silverthorne Route
S-F = Silverthorne-Frisco Route
S-D-K = Silverthorne-Dillon-Keystone Route
N/A = Not Applicable

Future Considerations

Per Summit Stage staff, the S-D-K route is currently operating at capacity, both in terms of ridership capacity for the operating vehicle type, and the ability to retain headways and on-time performance for current routing configuration. Additional stops are not being considered for this route at this time. Summit Stage staff is currently evaluating the option of creating additional circulator routes that would serve off-highway areas and connect to the mainline S-D-K route to reduce out-of-direction travel and minimize travel time for the S-D-K route.

Other Providers

Colorado Mountain Express (CME)

CME is a private for-profit transportation serviced based in Vail, has been operating since 1984. CME expanded its fleet and service when it purchased its competitor, Airport Shuttle of Colorado, in 1996. The company primarily provides long-haul trips, and also operates scheduled shuttle service and private charters. The company operates approximately 175 ten-passenger vans and 15 Suburbans. The company also provides private charters that include a driver and ten-passenger vans to be driven to any location in Colorado. The scheduled shuttle services provide one-way rides to about 15,000 passengers between the Eagle Airport and Aspen/Snowmass, and an additional 15,000 one-way rides between DIA and Aspen/Snowmass (LSC, 2008a). A CME Silverthorne office is located at 273 Warren Avenue and it is likely that trips generated from the Silverthorne office area frequently use the I-70/Silverthorne Interchange. According to CME staff in Silverthorne, approximately 12 trips a day in the Vail area are generated during the summer season and Summit County daily trips total 8-9 trips during this same time frame, with 2-3 daily trips generated to the Aspen area. During the winter months, it is estimated that CME generates approximately 260 trips a day throughout Colorado (CME, 2010).

Greyhound Bus Lines

Greyhound Bus Lines provides regularly scheduled service to and from Summit County. Three daily departures are available from Denver that serve western destinations. From Grand Junction, three daily departures serve eastern destinations. Service is provided to Glenwood Springs, Frisco, Idaho Springs and Vail, along the I-70 Corridor (Greyhound, 2010).

453-Taxi

453-Taxi operates private transportation services 24 hours a day primarily throughout Summit and Eagle Counties. They serve any trip in the state along with shuttles provided between Denver International Airport to Vail, Beaver Creek, Breckenridge, Keystone, Copper Mountain, Dillon, Frisco, Silverthorne, Avon, Edwards and all major ski area resorts. The company also serves all Colorado airports.

References:

Colorado Mountain Express. 2010. Personal Communication with Crystal Young, via telephone, October 1.

Greyhound. 2010. https://www.greyhound.com

LSC Transportation Consultants. 2008a. *Intermountain 2035 Regional Transportation Plan.*

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Town of Silverthorne. 2008. *Silverthorne Comprehensive Plan 2008 Update.* October.

I-70 Silverthorne/Dillon Interchange

Pedestrian and Bicycle Facilities Report

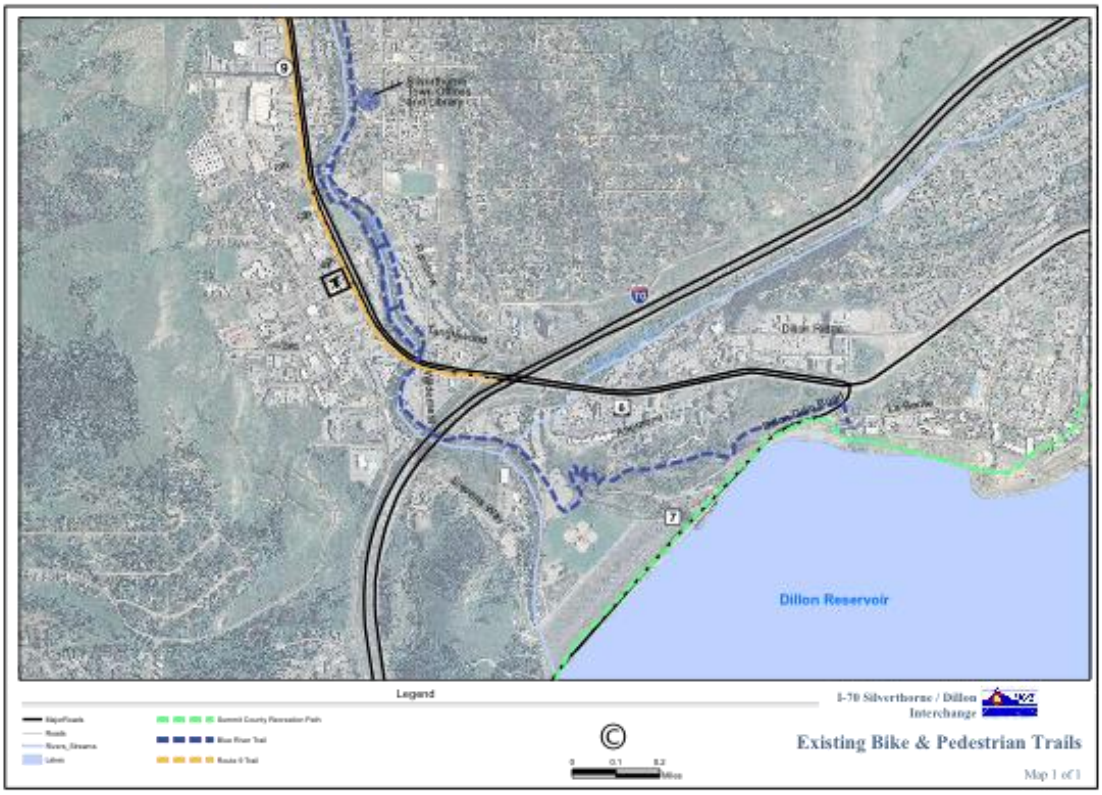
Prepared by Ordonez and Vogelsang, LLC

February 2011

EXISTING BIKE AND PEDESTRIAN FACILITIES

There are several key recreational pedestrian and bike facilities located within the project study area. The Summit County Recreational Trail runs along Dillon Dam Road and adjacent to Lake Dillon through the Dillon Town Center. This trail links to the Silverthorne Blue River Trail near Dillon Dam Road, creating a continuous path through the core of Silverthorne. Additionally, State Highway 9 (SH 9) is a designated bike route and multi-use route and is part of the "Transamerica Bicycle Trail." Figure 1 highlights the key trails within the project study area.

Figure 1 – Existing Bike and Pedestrian Trails



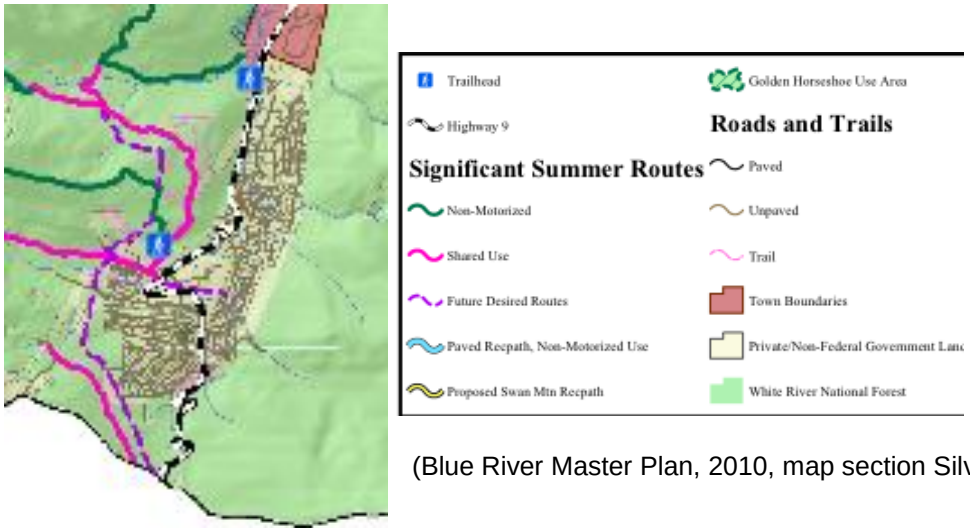
The majority of Summit County, Silverthorne and Dillon bike and pedestrian trail improvements are recreational facilities that link the communities, provide access between jurisdictions and create access to Dillon Lake. These facilities bypass existing retail and commercial uses found within Dillon and Silverthorne. Sidewalk facilities within the project study area are concentrated primarily on the north side of I-70, east of SH 9. Sidewalks also exist just south of the interchange along US Highway 6 (US 6) in Silverthorne, and north of the interchange along SH 9 to approximately 6th Avenue. These facilities are the primary pedestrian connections between local land uses.

Summit County

Recreation is a significant activity in the Blue River Basin. One of the key recreational attractions is the Blue River, classified as a Gold Medal trout fishery and the Eagles Nest and Ptarmigan Peak Wilderness areas. Typical recreational activities in the Basin are camping, fishing, hunting, boating and hiking. Trail networks within the Basin are also an important recreational resource for Summit County. A number of key public trails and trailheads are found on the edge of development and in other areas along the national forest and wilderness areas, such as the Gore Range Trail.

The Significant Summer and Winter Routes Map (Summit County, 2010) shows trails identified by the community and future desired trails and connections, illustrated in Figure 2. The routes are intended to provide recreational or transportation access for neighborhoods or the general public, offer high quality recreational experiences, or provide access to public lands. The significant routes map is a starting point from which the County's extensive recreational trail and road network can be planned and protected.

Figure 2: Upper Blue Basin, Significant Summer Routes Map, 2010, Summit County



(Blue River Master Plan, 2010, map section Silverthorne area)

The County's Blue River Master Plan identifies several policies relevant to bike and pedestrian facilities located within or adjacent to the project study area.

> Policy/Action 1 – Ensure that access to significant trails and trailheads on the Significant Summer and Winter Route Map is secured and maintained.
>
> Policy/Action 7 – Create functional trail networks in current wildland/urban interface areas that accommodate higher concentrations of use. Work cooperatively with property owners, the Town of Silverthorne and land management agencies to retain loop opportunities in wildland/urban interface areas.

Policy/Action 8 – Work cooperatively with property owners and the Town of Silverthorne to connect neighborhood subdivisions to regional trail systems.

Policy/Action 10 – Work with CDOT to ensure a suitable shoulder for bicyclists is included in future State SH 9 improvement projects where a grade-separated trail along the Blue River is not feasible.

The County plans for and maintains the sections of trail that lie within the County and outside of the jurisdictional areas of Silverthorne and Dillon. Segments of trails that lie within these neighboring jurisdictions are maintained by those entities.

Town of Silverthorne

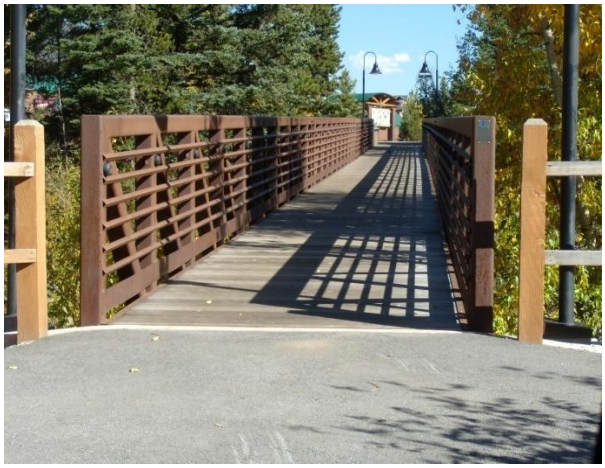
In 2001, the Town of Silverthorne adopted a Parks, Trails, and Open Space Master Plan. This plan identified a number goals specifically related to trail and pedestrian facilities, including the following:

- Develop an integrated network of multi-use trails
- Develop a variety of trail length and experiences
- Grade separate trails from street traffic using safe underpasses and overpasses traversing SH 9 and other traffic routes
- Link the trail network system into town center and regional trails
- Develop an on-street bikeway and sidewalk system that ties to the trail network
- (Silverthorne Parks, Trails and Open Space Master Plan, 2001)

The Town of Silverthorne recognizes that local pedestrian and bicycle movement requires sidewalk or travel lane facilities to encourage that movement. The town addresses the need for these facilities in the Silverthorne Comprehensive Plan 2008 Update which states:

> "Walking and cycling are popular modes of travel in the Town of Silverthorne. The Town is working to meet this demand with the development of a system of off-street bicycle and pedestrian facilities to interconnect the commercial core and the Town civic center with residential areas."

Sidewalks



The majority of Silverthorne's pedestrian facilities are concentrated north of the I-70 interchange within the Silverthorne Core District, The Silverthorne Comprehensive Plan identifies the Silverthorne Core District as the primary pedestrian-oriented activity area within town located between SH 9 and Rainbow Dr., from I-70 to roughly 6th Avenue. The retail and commercial land uses in this district are to be accessible by auto, bike and pedestrian facilities. Today, sidewalks along local streets and pedestrian bridges link land uses in the area and a new

pedestrian underpass under SH 9 at Wildernest/Rainbow links land uses on either side of the highway north of I-70.

The Silverthorne Core District is accessible by sidewalks on either side of SH 9, extending from the I-70 interchange north to 6th Avenue. Near the I-70 interchange, there are numerous vehicular access points or driveways that cross the sidewalks due to the concentration of land uses adjacent to the interchange. These vehicular access points create pedestrian-vehicular conflicts during peak demand periods. The demand for the fast food and gas station uses at this location generates a high level of turning movement into and out of these facilities. Further north along SH 9, however, vehicular access points are limited allowing for continuous pedestrian facilities with fewer vehicular-pedestrian conflicts. Pedestrian facilities continue north along the east side of SH 9 to 6th Avenue, and along the west side of SH 9 to about 11th Street.

Sidewalk along west side of SH just north of I-70 Interchange.

Sidewalk along east side of SH 9, north of Wildernest/Rainbow intersection.

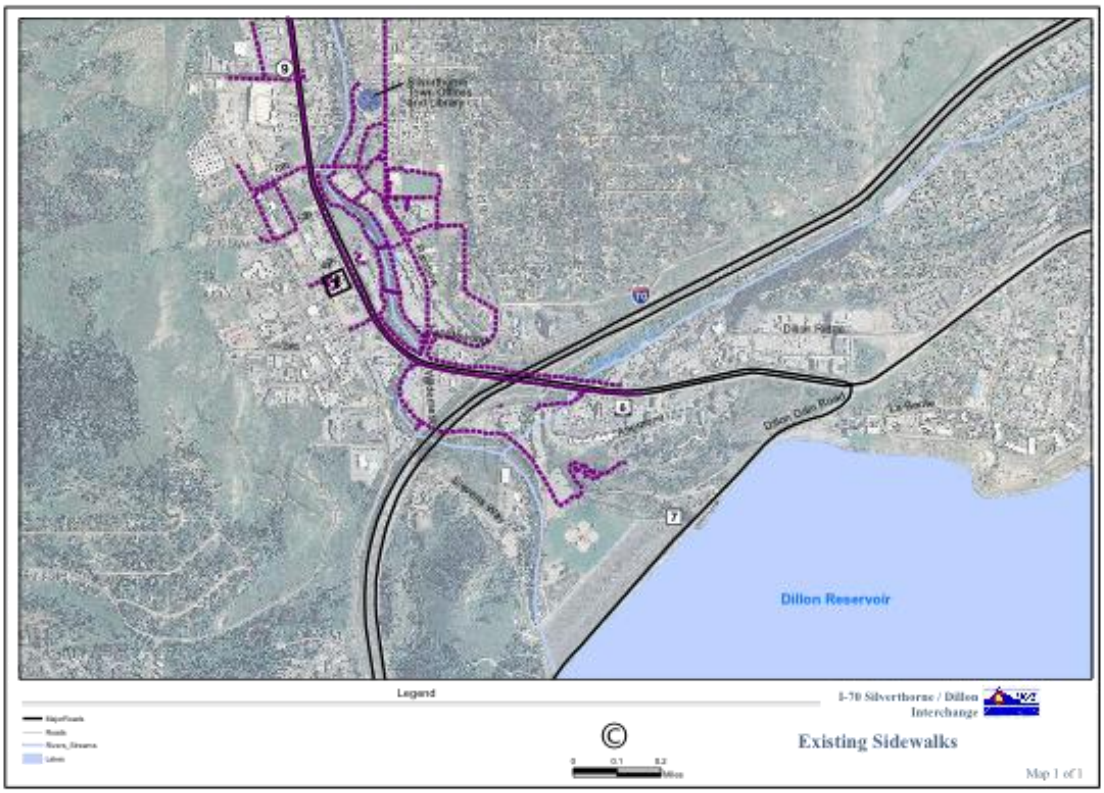
Sidewalk along the east side of US 6, south of I-70 Interchange.

Sidewalks continue along both the east and west sides of SH 9, cross under the I-70 Interchange and continues south along US 6 allowing pedestrians to cross at-grade the I-70 eastbound off-ramps and the westbound on ramps. These facilities continue south along both sides of US 6 serving retail and commercial uses along SH 6 to the intersection with County Road 53. South of this intersection, sidewalk continues only along the west side of the highway and dirt social paths are used along hte east side of US 6.

There is a fairly consistent level of pedestrian activity and demand by pedestrians to move between land uses on either side of the interchange, and between uses located in this section of US 6.

Figure 4 illustrates the sidewalks and paths that exist today within the Town limits.

Figure 4: Existing Sidewalks



(Resource: Town of Silverthorne sidewalk inventory, 2010)

The existing sidewalks or paths in the Town of Silverthorne are supplemented by informal social paths made by pedestrians in areas where sidewalks do not exist but demand for pedestrian movement does. For instance, in the area just north of the I-70 Interchange, adjacent to the westbound off-ramps, there is significant demand for pedestrian movement between the hotel area, neighboring restaurant uses and land uses on the south side of the I-70 interchange. Social paths throughout this quadrant are indicative of the need for pedestrian facilities linking visitors to supporting uses in

Silverthorne.

Trails

The Silverthorne Trails, Parks and Open Space Master Plan identifies class of trails, purpose, and standards for the the urban trail facilities found within town including:

- Route 9 (along the Highway) Blue River Parkway Path - 4.8 miles; Roadside Multi-use Pathway located on the west side of Route 9 from Summit Place Shopping Center to Maryland Creek. Provides major non-motorized route through town; facilitates bicycle and pedestrian transportation along highway, separated from auto traffic where feasible; 10'-12' wide paved surface

- Willowbrook Trail - .8 miles; multi-use path along Willowbrook Road from SH 9 to the western end of the Willowbrook subdivision. (north of project study area)

- The Willow Creek Highlands Trail Head - .5 miles; located at the top of Willowbrook Road. The Willow Creek trail leads hikers into the White River National Forest trail system. The Angler Mountain Ranch Trail Head - 2.5 miles; climbs 1,200 vertical feet from the valley floor where it meets the Ptarmigan trail and continues an additional 2,500 feet in elevation.

- Eagle's Nest - .8 miles; paved and non-paved trail/sidewalk system at Eagle's Nest along the edge of Golden Eagle Road; provides non-motorized circulation through the residential area. (north of project study area)

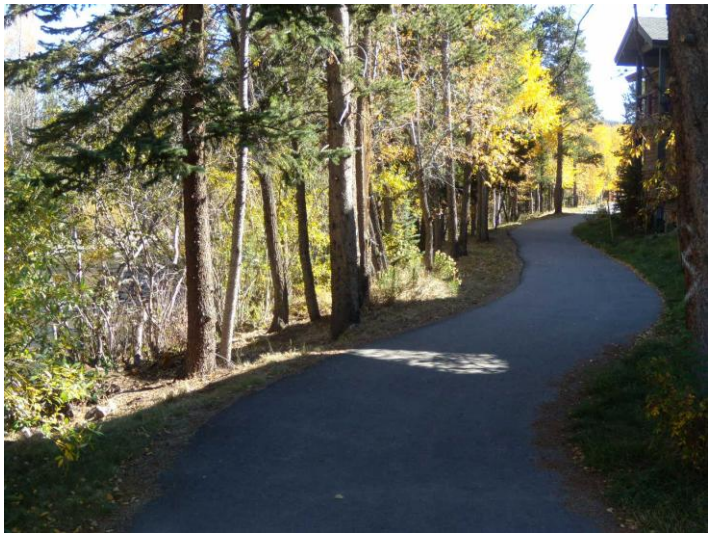
- The Blue River Way -5.6 miles; Greenway along the Blue River from Dillon Dam to Maryland Creek, parallel and east of SH 9. The Blue River Way forms a central recreational and open space spine in the community of Silverthorne.

- Blue River Trail - 1.5 miles; multi-use trail, interconnected off-street recreational and transportation right-of-way system serving a variety of users

Pedestrian crossing of Blue River Trail at Wildernest Road.

Facilities along the Blue River Way near Stevens Way and Wildernest Road.

The Blue River Trail runs along the scenic corridor of the Blue River from the Silverthorne Elementary School to Dillon Dam. The trail is a paved 10' wide ADA accessible trail open to non-motorized use, comprised of the Blue River Path, an off-street facility that runs along the east side of the Blue River and connects from the central part of Town and Blue River Park to the commercial core near the I-70interchange. The trail is being built in phases as outlined in the Blue River Trail Master Plan, 2004.



In 2007 the Town installed an additional Blue River Pedestrian Bridge at the Town Center and a trail around the Pavilion. In 2007, the trail was realigned and repaved along Stevens Way making a safer route through that section. The Town is working with property owners to acquire easements that would allow the extensions of the trail to be constructed on the riverbank, instead of over the river itself. (Dan Gietzen Silverthorne Town Engineer; Summit Daily News, 2008) Until then, there will be segments of the trail that utilize sections of sidewalk or roadway. The entire length of the Blue River Trail is expected to be completed by 2015, although current segments do allow users to travel all the way from the Dam to the school without crossing SH 9.

The Blue River Trail is Silverthorne's link to the county-wide paved trail system that spans from Keystone to Glenwood Springs. This multi-purpose trail provides user access to the Summit County Trail system via a connection that was constructed in 2003. This trail segment runs from the cul de sac on West Anemone Trail to the County ball fields located at the base of the dam. From the ball fields, the trail continues north through the Town of Silverthorne along the Blue River corridor and currently concludes just north of Town Hall, as shown in Figure 5.

Figure 5: Blue River Trail Path

Source: Town of Silverthorne, 2010.

There are several Silverthorne area parks or open space facilities that lie adjacent to or within the project study area, including:

<u>Rainbow Park</u>
Rainbow Park, located on Rainbow drive, is a 12-acre community park, with five acres of the park currently undeveloped. The park contains a soccer field

(improved in 2000), two tennis courts, two volleyball courts, a basketball court, two horseshoe pits, a playground, picnic shelters, an 11,300 square foot skateboard park, and public restrooms. The soccer field lies below the level of the rest of the park and can serve as an amphitheater for spectator events and festivals.

Cottonwood Park
Although currently undeveloped, this 17-acre parcel across SH-9 from the Eagles Nest subdivision has been identified as a future multi-use community park. A portion of this parcel has also been designated for a future Public Works facility.

Blue River Park (Summit County Park)
Blue River Park is a 21-acre Summit County regional park located adjacent to the Town of Silverthorne at the base of Dillon Dam. The major feature of the community park is the Spider Stephens Memorial Softball Complex with four softball fields. This park is a venue for the Summit County Softball Leagues, Rodeo Arena, and youth soccer program.

Town of Dillon

The Dillon Parks and Recreation Master Plan, 2007, identifies the existing inventory of bike and pedestrian facilities within the town limits of Dillon and provides the framework for improving future facilities within the community.

Existing Bike and Pedestrian Facilities

The hard surface trail system in Dillon runs along Dillon Reservoir and connects to the Summit County Pedestrian and Bike Path system that ties all areas of the County together. The Summit County system connects with Dillon from Silverthorne on a path that runs along US 6, from Frisco on a path that runs along the Dam Road, and from Keystone on a path that runs along the lake. The main path along the lakefront in Dillon is designated a pedestrian path only, and bicyclists are routed along Lodgepole Street instead.

While Dillon is served by access to a fairly extensive recreational trail system, there are many local points where connectivity is lacking. The Dillon Parks and Recreation Master Plan and Planning staff have identified the following key issues with today's bike and pedestrian facilities in Dillon:

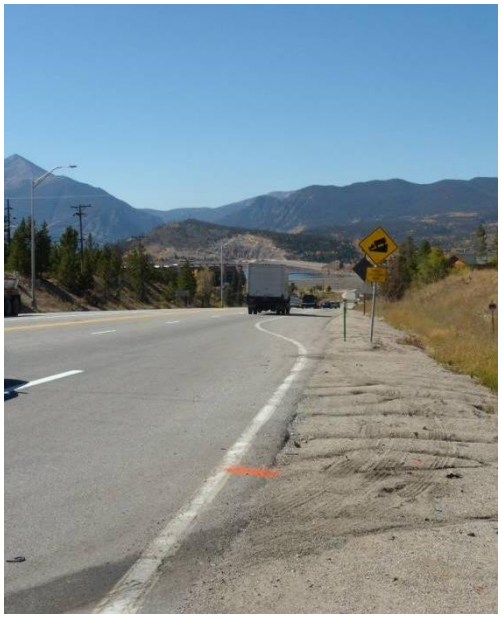
- SH 9, US 6 and I-70 are barriers that discourage walking within the community.
- The bicycle system is not complete, including an area near the east entrance of Dillon (Tenderfoot Street/Gold Run Circle) connecting the Summit County bike path to the path near Lake Dillon.
- Residential neighborhoods north of US 6, east of downtown Dillon (Tenderfoot Addition and Corinthian Hill) have no safe ways to cross US 6 at Lake Dillon Drive and at Dillon Dam Road. Pedestrian paths are not clearly defined, and in the winter it is somewhat difficult to access the signal activation system for pedestrian movements. Improved crossings/markings are needed.
- Within the Town Center there are very few sidewalks that radiate outward from the Town center into the adjacent residential neighborhoods. Facilities are discontinuous and pedestrians often walk in the street. The Town needs better linkages between the lakefront and the Town core.
- Pedestrian access into the Dillon Market Place shopping center from the west is difficult.

- There is a high level of pedestrian and bike activity at US 6 and Town Center Drive. The signalized crossings allows for pedestrian movement, however, the lack of continuous sidewalk facilities on either side of the intersection make pedestrian activity difficult.

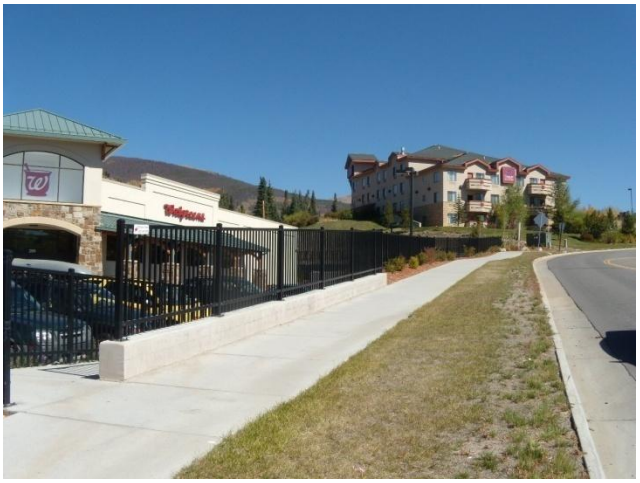
- Pedestrian movement along US 6 is also difficult due to the lack of sidewalks or bike lanes along the highway. Town planners note that there are a number of pedestrians that attempt to walk along the highway to access the Market at Dillon Ridge and bus stops further north in Silverthorne. Development at the Market at Dillon Ridge has included pedestrian linkages between uses so that pedestrian access within the development is possible.

Looking west across Highway 6 toward Town Center Drive.

Looking east across Highway 6 from Town Center Drive.



US 6 northbound between Dillon and Silverthorne. Lack of pedestrian facilities results in social paths along the highway.

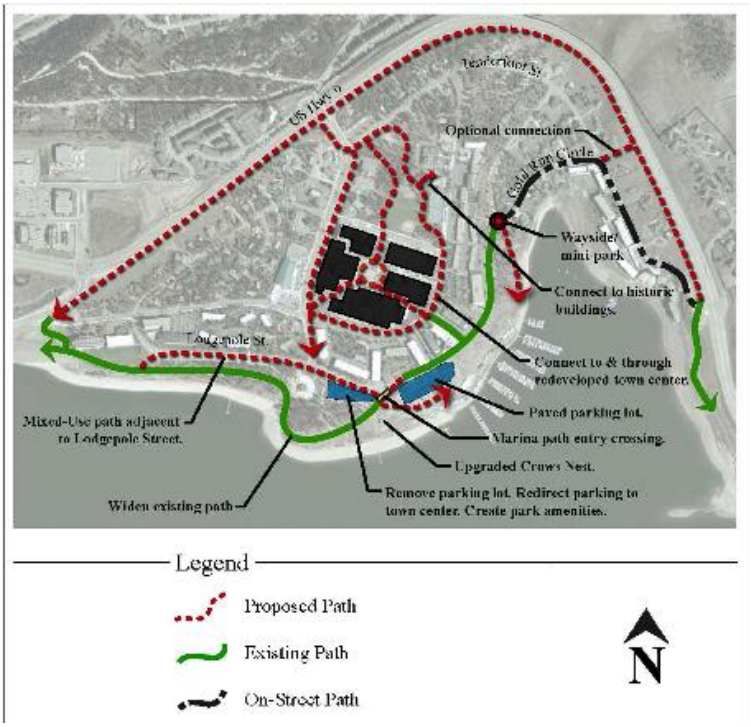


Sidewalk improvements between new retail and hotel uses in Dillon Ridge.

.

The Dillon plan identifies proposed bike and pedestrian paths along US 6 and within the Town Center, better connecting movement between residential areas north of US 6, Town Center and the lakefront, as illustrated in Figure 7.

Figure 7: Town of Dillon Existing and Proposed Pedestrian Facilities



Public Land and Open Space

The Town of Dillon is surrounded by open space owned by other public entities, which lends itself toward recreational facilities and opportunities.

The Denver Water Board (DWB) owns four large, open space parcels within the Town boundaries. These areas includes parcels near the Dam, zoned Mixed Use; the caretaker's parcel to the west of Corinthian Hill, zoned Urban Reserve; the parcel east of Corinthian Hill, zoned Urban Reserve; and a parcel adjacent to the Dillon Nature Preserve to the east, zoned for 14 units of residential density. A fifth parcel is northeast of the Town boundary that is being held in reserve by the DWB for a possible future water diversion structure from Straight Creek. These parcels total 274 acres.

The United States Forest Service (USFS) land is located on the eastern fringe of Dillon, and includes the unpaved Oro Grande and Tenderfoot Trails.

Summit County operates the ballfields and a Rodeo Arena at the base of Dillon Dam Road.

Bicycle and Pedestrian Facility References:

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I-70 Silverthorne/Dillon Interchange

Environmental Technical Report

February 2011

INTRODUCTION

The I-70 Silverthorne/Dillon Interchange study area is located in Summit County, Colorado and within the Town of Silverthorne and Town of Dillon municipal limits. A variety of environmental issues and considerations are present in the study area. The following discussions provide information about the following resources:

- Biological Resources
- Air Quality
- Noise
- Surface Water, Groundwater and Water Quality
- Archaeology, History Paleontology, and Native American Resources
- Social and Economic Values and Conditions
- Visual Quality and Aesthetics
- Section 4(f), Section 6(f)
- Emergency Services
- Energy
- Hazardous Waste

The information for each topic is organized as follows:

- **Key Issues:** A summary of I-70 Mountain Corridor (I-70 corridor) and project related key issues
- **Existing and Future Conditions:** Information from existing documents, site reconnaissance, and initial agency, stakeholder and public consultations
- **Existing Commitments, Requirements and Mitigation Measures**: Measures that are already in place with the Colorado Department of Transportation (CDOT) to avoid, minimize and mitigate potential effects
- **Additional Data and Information Requirements**

The Revised Draft Programmatic Environmental Impact Statement (RDPEIS) for the I-70 corridor and the associated technical reports are the primary sources for the data and information presented herein. Many of the discussions include direct excerpts from the RDPEIS and adaptations of the RDPEIS discussions. The intention of using the RDPEIS in this manner is to maximize the value of the Tier 1 process and RDPEIS documentation and to streamline what is needed for the interchange project.

The RDPEIS discussions are supplemented with other available information the results of Launch Phase research and site reconnaissance and initial consultation and coordination with the public and key public agencies Appendix 2 provides a summary the public and agency outreach effort.

One primary objective of this report is to define what data and information is needed that not already available. Each discussion concludes with a summary of the data and information that will be needed in the next step of the interchange development.

A complete Environmental Overview and Alternatives Analysis Study will be prepared as part of the Evaluate Phase of the Interchange project. The appropriate NEPA documentation will be determined in the next phase of the alternative development once an interchange alternative is identified.

NATURAL RESOURCES

BIOLOGICAL RESOURCES

Key Issues

A wide range of biological issues, laws, regulations, and permit processes are addressed in the RDPEIS for the I-70 corridor. Some, but not all, of these issues are applicable at the I-70 Silverthorne/Dillon Interchange. Some key issues to consider include the presence or absence of protected species and habitats, invasive species/noxious weeds, wildlife crossings, fisheries and the Mountain Pine Beetle infestation.

Some key questions for the I-70 Silverthorne/Dillon Interchange project include:

- Will construction and operation of the interchange improvements adversely impact biological resources such as wetlands and aquatic habitats or create additional barrier for wildlife?

- Will implementation of existing I-70 corridor CSS commitments and RDPEIS mitigation measures adequately address potential biological effects from interchange improvements?

Existing and Future Conditions

Vegetation

The majority of the project area is comprised of previously developed or disturbed areas. Areas of existing natural vegetation communities are located along the edges of the Blue River and Straight Creek (Figure 1). Along the Blue River, vegetation consists of narrow corridors ranging from approximately 30 to 75 feet wide of forested riparian habitat on each side of the river, totaling 6.39 acres (Figure 1). Common species present in this area include quaking aspen (*Populous tremuloides*), narrow-leaf cottonwood (*Populus angustifolia*), thinleaf alder (*Alnus incana*), mountain maple (*Acer glabrum*), lodgepole pine (*Pinus contorta latifolia*), Colorado blue spruce (*Picea pungens*), Englemann spruce (*Picea englemanii*), Limber pine (*Pinus flexilis*), wild rose (*Rosa woodsii*), wild gooseberry (*Ribes inerme*), common juniper (*Juniperus communis alpina*), rubber rabbitbrush (*Chrysothamnus naseosus*), and willow (*Salix spp.*)

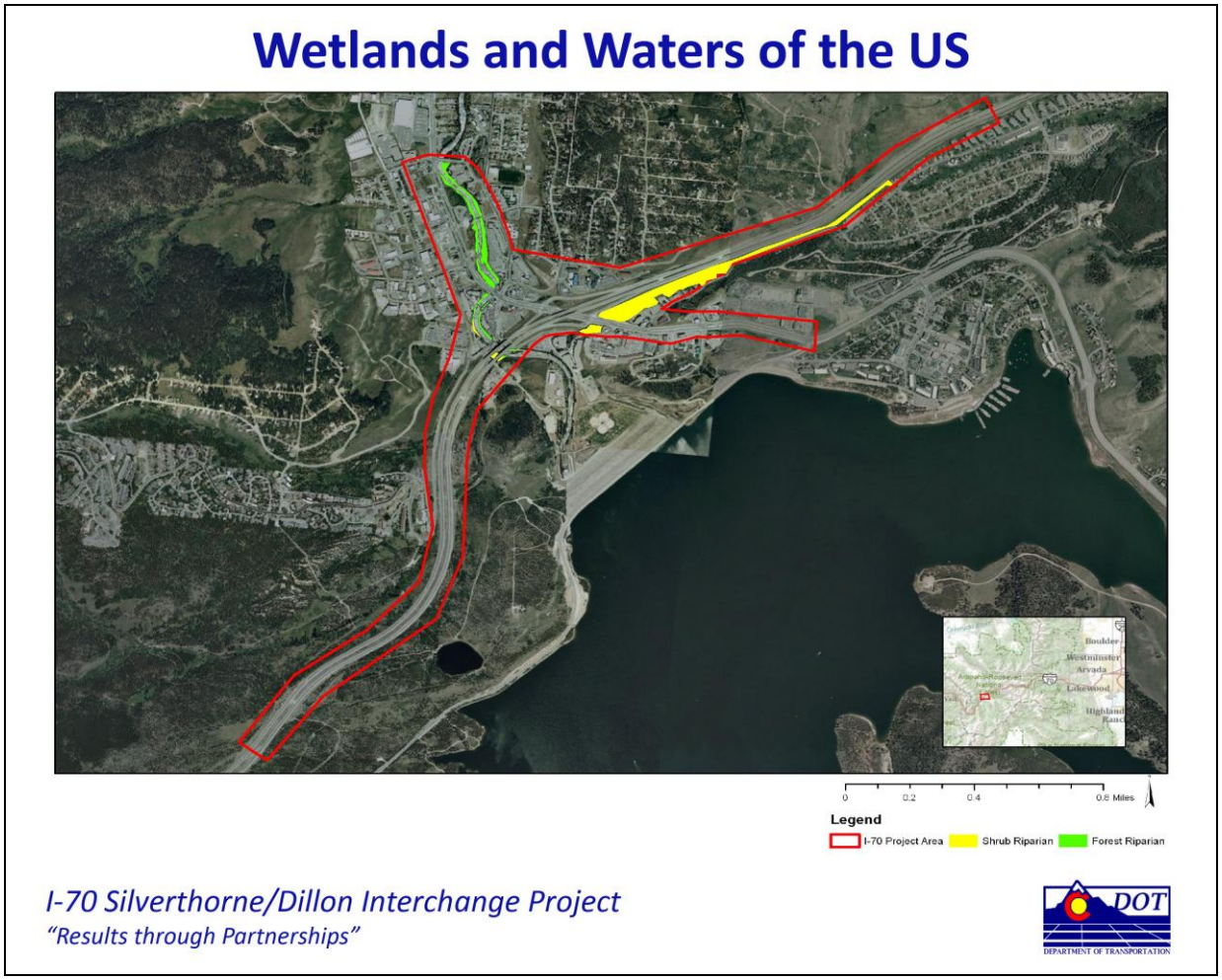
Along Straight Creek, vegetation is dominated by willow and other shrubby riparian species, totaling 14.61 acres (Figure 1). Common species present in this area include willow dock (*Rumex triangulivalvis*), prickly currant (*Ribes montigenum*), black sedge (*Carex ebenea*), Rocky mountain sedge (*Carex scopulorum*), wild gooseberry, wild rose, common horsetail (equisetum arvense), cornhusk lily (*Veratrum tenuipetalum*), and Idaho fescue (*Festuca idahoensis*).

Threatened & Endangered Plant Species

One federally listed plant species has the potential to occur in the study area (USFWS 2010a). This species is protected under the Endangered Species Act (ESA) and managed by the United States Fish and Wildlife Service (USFWS).

- Penland alpine fen mustard (*Eutrema penlandii*) – Federally Threatened. This plant species occurs in Summit County in alpine tundra and moss covered peat fens from 12,300 to 13,100 feet in elevation (USFWSa). No habitat for this species occurs within the study area.

Figure 1
Shrub Riparian and Forest Riparian Habitat



Special Status and Sensitive Species

The Colorado Natural Heritage Program (CNHP) also lists several plant species with potential to occur in the study area as sensitive, which have not been designated as special status species by the state or federal government. On September 28, 2010 a formal request for sensitive plant occurrence data was sent to CNHP. On October 13, 2010 CNHP responded to this request with a report of sensitive species occurrence data within the project area. The results of this report show no sensitive plant occurrences within the project area.

Special Status and Sensitive Vegetation Communities

CHNP lists eight vegetation communities that exist within Summit County as sensitive (Table 1). The results of the October 13, 2010 CNHP I-70 Silverthorne Sensitive Species Report contains no occurrences of these vegetation communities within the study area. The nearest occurrence of sensitive vegetation communities is located approximately one mile to the north of the project area along the Blue River.

Table 1. Sensitive Vegetation Communities Potentially Occurring within Project Area

Vegetation Type	Community	Present in Project Area
Western Slope Sagebrush Shrublands	*Artemisia tridentata ssp. vaseyana / Festuca thurberi Shrubland*	No
Mesic Graminoids Shrubland	*Betula nana / Mesic Forbs*	No
Persistent Lodgepole Pine Forests	*Pinus contorta / Shepherdia canadensis Forest*	No
Montane Riparian Forests	*Picea pungens / Alnus incana Woodland*	No
Montane Riparian Forest	*Populus angustifolia / Alnus incana Woodland*	No
Montane Riparian Forest	*Populus angustifolia - Picea pungens / Alnus incana Woodland*	No
Montane Willow Carrs	*Salix geyeriana - Salix monticola / Calamagrostis canadensis Shrubland*	No
Montane Riparian Willow Carr	*Salix monticola / Mesic Forbs Shrubland*	No
Subalpine Riparian Willow Carr	Salix planifolia / Carex aquatilis Shrubland	No
Populus tremuloides / Alnus incana Forest	Montane Riparian Forests	No

Noxious Weeds

Pursuant to § 35-5.5-101, et seq., C.R.S., The Colorado Noxious Weed Act, the state of Colorado has mandated that "a countywide plan must be implemented by every county to prevent further damage by these noxious weed species (Summit County 2009). Within the study area, multiple noxious weed species occur in disturbed areas. Table 2 provides a list of noxious weed species known to occur in Summit County and identifies species that were observed within the study area.

Table 2. Noxious Weeds of Summit County and Species Observed within the Study Area

Common Name	Scientific Name	Observed in Study Area
List A		
Myrtle Spurge	*Euphorbia myrsinintes*	
Orange Hawkweed	*Hieracium Aurantiacum*	
Purple Loosestrife	*Lythrum salicaria*	
List B		
Absinth Wormwood	*Artemisia absinthium*	
Black Henbane	*Hyoscayamus niger*	
Bull Thistle	*Cirsium vulgare*	X
Canada Thistle	*Cirsium arvense*	
Chamomile	*Matricaria perforata*	X
Chinese Clematis	*Clematis orientalis*	

Common Name	Scientific Name	Observed in Study Area
Common Tansy	*Tanacetum vulgare*	
Dalmation Toadflax	*Linaria dalmatica*	X
Dame's Rocket	*Hesperis matronalis*	
Diffuse Knapweed	*Centaurea diffusa*	X
Hoary Cress	*Cardaria draba*	X
Houndstongue	*Cynoglossum officinale*	
Leafy Spurge	*Euphorbia esula*	
Musk Thistle	*Carduus nutans*	
Oxeye Daisy	*Chrysantheum leucanthemum*	X
Perennial Pepperweed	*Lepidium latifolium*	
Plumeless Thistle	*Carduus acanthiodes*	X
Russian Knapweed	*Centaurea repens*	X
Russian Olive	*Elaeagnus angustifolia*	
Salt Cedar	*Tamarix spp.*	
Scotch Thistle	*Onopordum acanthium*	
Spotted Knapweed	*Centaurea maculosa*	X
Sulfur Cinquefoil	*Potentilla recta*	
Yellow Toadflax	*Linaria vulgaris*	
Wild Caraway	*Carum carvi*	
List C		
Common Mullein	*Verbascum thapsus*	X
Downy Brome	*Bromus tectorum*	X
Field Bindweed	*Convolvulus arvensis*	X
Poison Hemlock	*Conium maculatum*	

Wetlands and Navigable Waters

Clean Water Act of 1972

"Waters of the U.S". as defined under the Clean Water Act of 1972 are those waters that can or have historically been used in interstate commerce as well as tributaries and associated wetlands. The Rappanos case provides the United States Army Corps of Engineers (USACE) with further guidance to include "traditional navigable waters". The Blue River and Straight Creek are tributaries to traditional navigable waters and would be considered jurisdictional. In addition, adjacent to Straight Creek, on the south side of I-70, there is a small complex of seasonally flooded shrub-scrub wetlands that can be designated as navigable waters. These areas are subject to regulation and management under Sections 301, 306, 307, 311, and 404 of the CWA (McCall and McCutchen 2009). Section 301 prohibits any non-compliant discharges into navigable waters. Sections 306 and 307 determine limitations to be imposed on any authorized and regulated discharges. Section 404 establishes a permit program governing the discharge of dredged material into navigable waters. Projects that include activity in or spanning navigable waters are required to comply with all applicable sections of the CWA.

CDOT, FHWA and the USACE have developed a collaborative process to identify and develop methodologies for alternative analysis in the NEPA process. The resulting agreement is referred to as

the "National Environmental Policy Act / Clean Water Act Section 404 Merger Process and Agreement for Transportation Projects in Colorado." Under the merger agreement, alternative screening and evaluation processes should be developed in a manner that complies with NEPA, provides evidence that CDOT has not appropriately eliminated the "Least Environmentally Damaging Practicable Alternative (LEDPA) from further consideration. When alternatives for the I-70 Silverthorne/Dillon Interchange become available, merger agreement processes and methodologies will be applied.

CDOW Wildlife Certification

Colorado Senate Bill 73-40 (§*33-5-101-107*, *Colorado Revised Statute 1973* as amended) requires any agency of the state to obtain wildlife certification from the Colorado Division of Wildlife (CDOW) when the agency plans construction in any stream or on any stream bank. A stream is considered to come under the jurisdiction of SB40 if it meets any one or more of the following four criteria:

- All perennial streams represented by solid blue lines on U.S. Geological Survey 7.5' Quad maps.
- Segments of ephemeral and intermittent streams providing live water beneficial to fish and wildlife.
- Segments of streams at which 25 percent or more of the vegetation is comprised of riparian vegetation, such as cottonwood, willow, alder, sedges, or other plants dependent on groundwater. Such segments shall be within 300 feet upstream or downstream of the project. The 300-foot distance shall be measured along the length of the stream.
- Segments of streams having wetlands present within 600 feet upstream or downstream of the project. The 600-foot distance shall be measured along the length of the stream.

Both the Blue River and Straight Creek fall under the jurisdiction of SB40. Further information concerning CDOW certification under SB40 can be found in the 2003 Memorandum of Agreement between CDOT and CDOW.

Fens

Fens are recognized as an irreplaceable resource in the southern Rocky Mountain region due to the functional and biological values they provide (Cooper 1996, Jones at al. 2009). Fens are one of the most important wetland resources in Colorado. Fens provide special habitats and often support threatened and endangered species. Fens take centuries to form and their losses are essentially irreparable. In recognition of these facts, the US Fish and Wildlife Service has elevated fens to a the most protected "Resource Category 1" and the US Army Corps of Engineers has exempted fens from the Nation Wide 26 permit coverage.

No fens occur within the study area. The nearest fen location is approximately 6 miles to the northeast on Straight Creek, near I-70.

Wildlife

CDOW's Natural Diversity Information Source (NDIS) database (NDIS 2010) and the USFWS Threatened and Endangered Species List (USFWS 2010a) were consulted to determine the species of federal concern that may occur within or downstream of the study area. Based on preliminary review of existing databases, ten federally listed species were determined to potentially occur in Summit County (Table 3).

Table 3. Special Status Species and their Potential to Occur within the Project Area

Common Name	Scientific Name	Status*	Habitat	Potential to Occur in Project Area
Birds				
Mexican Spotted Owl	*Strix occidentalis lucida*	FT, ST	Mature montane forest	No habitat present
Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	FC, SC	Open woodlands near streams and lakes	Habitat present, no documented occurrences
Greater Sage Grouse	*Centrocercus urophasianus*	FC, SC	Sagebrush shrublands	Habitat present adjacent to project area, no documented occurrences
Mammals				
Canada Lynx	*Lynx canadensis*	FT, SE	Coniferous forest	Habitat present adjacent to project area, no documented occurrences
Invertebrates				
Uncompahgre Fritillary Butterfly	*Boloria acrocnema*	FE	Snow willow above 12,000 feet	No habitat present
Fish				
Greenback Cutthroat Trout	*Oncorhynchus clarki stomias*	FT	Arkansas and Platte Rivers, Dry Creek, Bard Creek, Clear Creek	No habitat present, occurs downstream of project area
Bonytail Chub	*Gila elegans*	FE	Lower Colorado River watershed	No habitat present, occurs downstream of project area
Colorado Pikeminnow	*Ptychocheilus lucius*	FE	Green River, Lower Colorado River watershed	No habitat present, occurs downstream of project area
Humpback Chub	*Gila cypha*	FE	Lower Colorado River watershed	No habitat present, occurs downstream of project area
Razorback Sucker	*Xyrauchen texanus*	FE	Lower Colorado River watershed	No habitat present, occurs downstream of project area

(* FE = Federally Endangered, FT = Federally Threatened, SE = State Endangered, ST = State Threatened, SC = State Species of Concern)

On September 28, 2010, letters requesting concurrence with this list were sent to Susan Linner, the USFWS Region 6 Field Supervisor, and Lyle Sidener, CDOW Area 9 Wildlife Manager.

Threatened & Endangered Species

Five federally listed wildlife species are identified as potentially occurring within the study area. Five federally listed aquatic species are identified as potentially occurring in downstream waters. These species are managed under the ESA by USFWS.

Birds

- Mexican Spotted Owl (*Strix occidentalis lucida*) – Federal and State Threatened. The Mexican Spotted Owl occurs in a variety of habitats consisting of mature montane forests, shady canyons, and steep canyons. Their range includes the central and southern Rocky Mountains of Colorado. According to NDIS, the Mexican spotted owl is known to occur in Summit County. Suitable habitat for the species does not occur within the study area or in other immediately adjacent areas.

- Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) – Federal Candidate Species and State Species of Concern. The Yellow-billed Cuckoo prefers open woodlands with clearings and a dense shrub layer. It is often found in woodlands near streams, rivers, or lakes. This species is an uncommon local summer resident in western valleys, mountain parks, and foothills (NDIS 2010). This species is not known to occur in Summit County according to NDIS; however, is included because of its federal listing in Summit County.

  Suitable habitat for the Yellow-billed Cuckoo may occur within the study area along the Blue River, south of the I-70 interchange and east of SH 9. This habitat consists of 6.39 acres of forested riparian vegetation that is located adjacent to the Blue River Recreation Trail and existing urban retail developments. Due to the small size of this habitat and its proximity to urban development, it is unlikely that the Yellow-billed Cuckoo occurs in this area.

- Greater Sage Grouse (*Centrocercus urophasianus*) – Federal Candidate Species and State Species of Concern. Sage grouse are found only in areas where sagebrush is abundant. Sagebrush is a critical component for sage grouse, providing both food and cover. This species is known to occur in Summit County (NDIS 2010).

  Suitable habitat for the Greater Sage Grouse does not occur within the study area. Suitable habitat for the species does occur adjacent to the study area on the west side of the town of Silverthorne. This habitat is comprised of approximately 150 acres of mountain sagebrush (*Artemisia tridentata vaseyana*) intermixed with stands of quaking aspen (*Populus tremloides*). The suitability of this habitat for the Greater Sage Grouse is decreased by the high densities of rubber rabbitbrush (*Ericameria nauseosus*) present in the area. The nearest known occurrence of the species in Summit County is located approximately 20 miles to the northwest, near Green Mountain Reservoir (NDIS 2010). Due to the small size and decreased suitability of sagebrush habitat adjacent to the study area, it is unlikely that the Greater Sage Grouse will be impacted by construction activities associated with the interchange.

Mammals

- Canada Lynx (*Lynx canadensis*) – Federal Threatened and State Endangered. The Canada lynx prefers northern coniferous forests with uneven-aged stands with relatively open canopies, and

well developed vegetative understories. This species is rare, although known to occur in Summit County (NDIS 2010).

Suitable habitat for the Canada lynx does not occur within the study area, but may occur in areas adjacent to the western end of the study area. Forested habitats suitable to lynx exist on both sides of I-70, immediately west of the town of Silverthorne. Lynx may utilize these areas as foraging and denning habitat. Due to the increased human presence from residential developments in this area and disturbance from I-70, it is unlikely that Canada lynx would occur in high densities.

Invertebrates

- Uncompahgre Fritillary Butterfly (*Boloria acrocnema*) – Federal Endangered. All known populations are associated with large patches of snow willow above 12,400 feet, which provide food and cover (USFWS 2010b). The species has been found only on northeast-facing slopes, which are the coolest and wettest microhabitats available. This species is known to occur in Summit County (USFWS 2010b).

  Suitable habitat for this species is not present within or adjacent to the study area. It is unlikely that this species occurs within the study area.

Fish

Five species of federally listed fish species may occur in downstream waters, which could be affected by depletions of Summit County waters.

- Greenback cutthroat trout (*Oncorhynchus clarki stomias*) – Federal Threatened. The study area does not contain suitable habitat for this species and is not located within its historic range (NDIS 2010). Current greenback cutthroat populations are located in watersheds east of the Continental Divide and therefore would not be impacted by depletions of Summit County waters or construction activities.

- The federally endangered bonytail chub (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*) occur in habitats downstream from the study area and may be impacted by Summit County water depletions on the Blue River. Section 7 consultations with the USFWS are required for all federal actions resulting in water depletions in the Colorado River watershed or impacts to water quality resulting from construction activities (USFWS 1999).

State Species of Concern

The State of Colorado also designates Species of Concern under the management of CDOW. Species of Concern include species that have been removed from state listing within the last five years, species proposed for federal listing under ESA, and those that have experienced a downward population trend statewide and warrant evaluation.

Birds

- Bald Eagle (*Haliaeetus leucocephalus*) – State Species of Concern. Bald Eagles may occur within the study area due to the fact that foraging and nesting habitat is present along Blue River. Due to the high level of disturbance from adjacent urban development along the Blue River, it is unlikely that Bald Eagles would frequently utilize this area as nesting habitat. A known Bald Eagle

roost is located approximately 0.5 mile to the southwest of the I-70 interchange in NW NE Section 13 T5S R78W (NDIS 2010).

- American Peregrine Falcon (*Falco peregrines anatum*) – State Species of Concern. In Colorado, peregrine falcons can be found from the Front Range to the state's western border. Peregrine falcons inhabit open spaces usually associated with high cliffs and bluffs overlooking rivers and surface waters (NDIS 2010). The species is known to occur in Summit County.

  Suitable habitat for the species exists in the areas of higher elevation adjacent to the study area, above the town of Silverthorne. Due to the increased human presence and disturbance resulting from urban development, it is unlikely for Peregrine Falcon to occur within the study area.

- Greater Sandhill Crane (*Grus Canadensis*) – State Species of Concern. Migrating cranes occur on mudflats around reservoirs, in moist meadows, and in agricultural areas. Breeding birds are found in parks with grassy hummocks and watercourses, beaver ponds, and natural ponds lined with willows or aspens (NDIS 2010). The Greater Sandhill Crane is known to occur in Summit County.

  Potential habitat for the species occurs within the study area along the Blue River and Straight Creek. Cranes may potentially utilize these areas for foraging and stopover habitats during migration. Due to the increased human presence and disturbance resulting from urban development, it is unlikely for the Greater Sandhill Crane to occur within the study area in high densities or to utilize the area as breeding habitat.

Mammals

- Northern Pocket Gopher (*Thomomys talpoides*) – State Species of Concern. Northern pocket gophers occur across central and western Colorado in areas above 5,000 feet in elevation. They are found in many different habitat types, including agricultural and pasture lands, shrublands, and grasslands at lower elevations, and in alpine tundra at higher elevations (NDIS 2010). The northern pocket gopher is known to occur in Summit County.

  Due to the wide array of habitat types suitable for the northern pocket gopher, it is likely that the species occurs in the study area along drier upland areas along the Blue River and Straight Creek. It is also possible that the northern pocket gopher occurs in small patches of grassland, shrubland, and bare or disturbed habitats within the study area.

- Northern River Otter (*Lutra Canadensis*) – State Species of Concern. River otters inhabit riparian habitats that traverse a variety of other ecosystems, ranging from semidesert shrublands to montane and subalpine forests. The species requires permanent water of relatively high quality and with an abundant food base of fish or crustaceans (NDIS 2010). Northern river otters are known to occur in Summit County.

  Potential habitat occurs within the study area along the Blue River. Due to its small size, Straight Creek may provide habitat for northern river otters during periods of increased flows.

Big Game Species

Habitat for big game species is present adjacent the study area and is of particular management concern to by the Colorado Division of Wildlife (CDOW).

- Elk (*Cervus elaphus*) – The study area is located in the overall range for elk (NDIS 2010). Elk winter range is located adjacent to the western end of the study area near Ryan Gulch Road. Elk severe winter range is located adjacent to the eastern end of the study area, approximately 0.5 mile east of Ptarmigan Trail Road.

- Mule Deer (*Odocoileus hemionus*) – Mule deer are known to occur within the study area along Straight Creek, Salt Lick Gulch, and at the northern end of the study area near 6th Street (NDIS 2010). These areas likely consist of winter concentration areas for mule deer that have migrated to lower elevations in search of edible forage.

- Bighorn Sheep (*Ovis canadensis*) – No suitable habitat for bighorn sheep exists within the study area (NDIS 2010). The closest suitable habitat is located approximately 2 miles west on Buffalo Mountain.

- Moose (*Alces alces*) - The study area is located in the overall range for moose (NDIS 2010). Moose winter range is located adjacent to the western end of the study area near Ryan Gulch Road. Moose may utilize foraging habitat within the study area along Straight Creek. Due to the high level of urban development and disturbance, it is unlikely that moose occur in high densities within the study area.

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918, which legislates that no one may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter; any migratory bird, or their parts, nests, or eggs of such a bird except under the terms of valid permit issued pursuant to Federal regulations. Numerous species of migratory birds protected under this act are likely to use habitat within the study area for nesting and foraging.

Bald and Golden Eagle Protection Act of 1940

This act provides for the protection of the Bald Eagle and the Golden Eagle (*Aquila chrysaetos*). Bald Eagles and Golden Eagles may occur within the study area due to the fact that foraging and nesting habitat is present along Blue River and adjacent to Dillon Reservoir. Due to the high level of disturbance from adjacent urban development along the Blue River, it is unlikely that Bald or Golden Eagles would frequently utilize the study area as nesting habitat.

Protected Fisheries

A 35-mile section of the Blue River, from Dillon Reservoir to the town of Kremmling, is designated as a "Gold Medal Fishery" by CDOW. Gold Medal streams provide outstanding opportunities for angling large trout, high quantity/quality of fish populations, and recreational value.

Wildlife Crossings and Linkages

Laskey Gulch, located to the east of the study area between I-70 mileposts 207 and 210, was identified as a Wildlife Linkage Interference Zone in the I-70 Mountain Corridor Revised Draft Programmatic Environmental Impact Statement (RDPEIS) of 2010. These linkage zones are key connections for wildlife habitat impacted by the barrier effects of I-70.

Mountain Pine Beetle Infestation

Areas infected by the recent mountain pine beetle epidemic are located adjacent to the study area. Lodgepole pines only occur in low densities within the project area along the Blue River corridor. It is unlikely that project activities will adversely impact lodgepole pine forests adjacent to the project area. Depending on the scope of the chosen alternative for the I-70 Interchange project, potential impacts may be significant enough to warrant future consideration.

Existing Commitments, Requirements and Mitigation Measures

The commitments, requirements and mitigation measures from the RDPEIS process applicable to potential I-70 Silverthorne/Dillon Interchange project effects include:

- Wetland impacts will be mitigated on a one-to-one per acre basis, regardless of whether the wetland is jurisdictional or non-jurisdictional.

- Vegetation and habitat impacts will be minimized by constructing new facilities in the existing right-of-way to the greatest extent possible and identifying areas of potential habitat restoration, in coordination with the U.S. Forest Service and local entities.

- Removal of trees and shrubs will be done during the non-nesting periods per the Migratory Bird Treaty Act.

- Clearing and earthmoving operations will be managed to minimize the potential for weeds to infest new areas and/or increase in abundance through the construction disturbance area. This includes the application of best management practices to all construction sites to manage open soil surfaces and topsoil stockpiled for reuse, including landscape and planning designs that incorporate the use of native vegetation and integrated noxious weed controls. A Noxious Weed Management Plan will be prepared.

- The effects of winter maintenance will be addressed by controlling the runoff of contaminants and winter maintenance materials to the greatest extent possible. Measure that will decrease the use of deicers and traction sand will be used where appropriate. Project strategies will be designed to be complementary to the existing Sediment Control Action Plan for Straight Creek.

- The processes outlined in the “A Landscape Level Inventory of Valued Ecosystem” (ALIVE) Memorandum of Understanding will be implemented to reduce animal vehicle collisions and increase habitat connectivity throughout the I-70 corridor. This includes, but is not limited to, the use of underpasses or overpasses dedicated to wildlife movement, fencing, berms and vegetation to guide wildlife to crossing structures, as well as signage to alert motorists of wildlife presence.

- The processes outlined in the SWEEP Memorandum of Understanding and best management practices will be implemented to reduce soil losses, soil inundation, and sedimentation in areas adjacent to construction areas and provide sufficient cross-slope drainage structures during new construction to allow natural hydrologic conditions to be maintained on both sides of the right-of-way. Fish habitat will be restored and replaced, as needed, using photo documentation to help return these areas to previous conditions.

- The SWEEP Committee and the ALIVE Committee will identify and recommend appropriate mitigation strategies, including design, implementation and monitoring, for anticipated environmental impacts.

Additional Data and Information Requirements

The waters of the US and wetlands should be delineated so the potential impacts of the alternatives can be compared and to the extent possible, the alternative with the Least Environmentally Damaging Practicable Alternative (LEDPA) can be identified.

AIR QUALITY

Key Issues

Air pollution affects human, plant, and wildlife health, visibility, and global climate change and is a concern to I-70 corridor residents and visitors. Key pollutants include: ozone (0_3), carbon monoxide (CO), oxides of nitrogen (NO_x), Mobile Source Air Toxics (MSATs), and particulate matter (PM). Visibility and greenhouse gas emissions are also identified as key issues in the I-70 corridor. Key questions for the I-70 Silverthorne/Dillon Interchange project include:

- Will construction and operation of the interchange improvements change anticipated pollutant emissions, concentrations or visibility relative to the findings in the RDPEIS?

- Will implementation of existing CSS commitments and RDPEIS mitigation measures adequately address potential air quality effects interchange improvements?

Existing and Future Conditions

The Clean Air Act requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants, referred to as criteria pollutants, considered harmful to public health and the environment. Most of the I-70 corridor meets NAAQS, with the exception of the east end of the I-70 corridor in Jefferson County, which, along with the rest of the Denver metropolitan area, exceeds air quality standards for ozone. The I-70 corridor, except the east end in Jefferson County in the Denver metropolitan area, meets NAAQS for all criteria pollutants. No violations of air quality standards have been recorded outside Jefferson County. Visibility is an issue in the White River National Forest's Class I Eagles Nest Wilderness Area near Vail.

EPA has not set standards for allowable levels for MSATs or greenhouse gases (GHG). EPA, Federal Highway Administration (FHWA), and Colorado agencies (CDOT and the Colorado Department of Public Health and Environment (CDPHE) are working to develop MSAT and GHG information and guidelines. These issues, particulate matter, and visibility are addressed in a regional and substantive manner in the RDPEIS.

However, despite findings in the RDPEIS indicating that Summit County and Silverthorne are not critical areas for air quality effects, the RPDEIS states that air quality is a growing concern because of increasing development, construction, and traffic along the I-70 corridor, combined with windblown dust from street

maintenance activities, mine tailings, sand and gravel mining operations, and wood burning activities. Communities are also concerned about global climate change and the effects that the transportation projects may contribute to this issue. Temperature inversions and dry climates exacerbate these air quality and visibility concerns throughout the I-70 corridor.

The RDPEIS states that the I-70 corridor alternatives are not anticipated to cause or result in violations of any National Ambient Air Quality Standards (NAAQS), so most mitigation measures for air quality center on controlling fugitive dust during construction, operations, and maintenance.

Based on these conditions, the primary Summit County and Silverthorne air quality conditions relevant to the I-70 Silverthorne/Dillon Interchange project are incremental and cumulative pollutant emission contributions to regional, statewide, national and global conditions rather than specific impacts air pollutant concentrations in the vicinity of the interchange and PM is the key issue for project-specific mitigation. PM issues have already been considered in the RDPEIS process and are addressed through existing commitments, requirements and mitigation measures.

Existing Commitments, Requirements and Mitigation Measures

The commitments, requirements and mitigation measures from the RDPEIS process applicable to potential I-70 Silverthorne/Dillon Interchange project include:

- The improvements should: provide capacity within the interchange study area to provide future Levels of Service that minimize idling and overall motor vehicle emission reductions, and minimize the need for traction sand and include features that would aid removal of sand and dirt on roadways within the study area to minimize re-entrained dust.

- The construction specifications should: include preparation and implementation of a fugitive dust control plan, encourage bidders to use construction equipment and vehicles that use the cleanest fuels available and other techniques to reduce emissions, require that construction equipment be well maintained to ensure that exhaust systems are in good working order, thereby reducing emissions and limit earthmoving operations on days with high winds to minimize windblown dust.

Additional Data and Information Requirements

Up to date information regarding the current status of air quality conditions will be needed to validate that existing and future conditions have not changed and to make sure that additional measures are not applicable to avoid, minimize and mitigate project-related effects.

NOISE

Key Issues

The RDPEIS suggests that noise impacts from construction and operations along the I-70 corridor are substantial issues on sensitive receptor within close proximity to construction areas and travel corridors.

Construction generates noise from equipment and vehicles that may impact nearby residences and businesses. Nighttime construction noise also may occur. Construction noise at sensitive receptor locations usually depends on the loudest one or two pieces of equipment operating nearby and when the noise occurs. Noise levels from diesel-powered equipment range from 80 dBA to 95 dBA at a distance of 50 feet. Impact equipment such as rock drills and pile drivers could generate louder noise levels. Construction noise is subject to local ordinances. Most of the towns in the I-70 corridor have only "nuisance" codes in place and do not specifically address construction noise. There are no local noise nuisance codes applicable at the interchange.

Traffic noise is an important issue to residents living near I-70. I-70 carries large volumes of high-speed traffic, but traffic congestion (and, therefore, speed) is erratic and does not produce consistent noise levels. Many trucks use the I-70 corridor, some of which use engine compression brakes that produce intermittent and very loud noises. Topography and other constraints mean that many residences sit close to or above the noise sources, where mitigation is difficult to achieve.

Noise is defined as unwanted sound and is most commonly measured on the decibel (dB) scale, ranging from 0 dB (threshold of human hearing) to 140 dB (where sound causes pain). An "A-weighted decibel," or dBA, is used for impact assessment because it mimics the varying sensitivity of humans to sounds at different frequencies. Noise levels of 40 to 50 dBA are typical of a quiet neighborhood, while 70 to 80 dBA might be heard adjacent to a busy urban street or highway. An increase or decrease in noise by 5 dBA is readily noticeable by most people. The human ear perceives an increase or decrease in noise by 10 dBA as twice or half as loud, respectively.

New highway and rail facilities must consider their noise effects on sensitive receptors, such as residences, schools, parks, and businesses. In addition to the National Environmental Policy Act (NEPA), state and federal regulations specific to transportation noise also apply to the I-70 corridor. FHWA regulations governing highway noise appear in 23 Code of Federal Regulations Part 772. CDOT established procedures that implement the federal regulations in the *CDOT Noise Analysis and Abatement Guidelines* (December 2002). Federal Transit Administration (FTA) and Federal Railroad Administration (FRA) regulations apply to transit noise, regulating vibration and horn noise assessment for transit facilities.

CDOT considers a noise impact to occur when the loudest hour of noise is at or above 66 dBA or when there is an increase of 10 dBA or more affecting a noise receptor. Noise levels of less than 3 dBA) are generally considered imperceptible to humans. Increases of 3 to 5 dBA are considered noticeable, and increases of 10 dBA are perceived as a doubling of loudness. These threshold hold true only when there is no change to the character of noise.

Existing and Future Conditions

The lead agencies analyzed existing and future noise levels at select locations within seven representative communities along the I-70 corridor. The Dillon Valley was one of those communities. Based on this approach, noise levels in the I-70 corridor were determined to vary between the mid 50s dBA to the low 70s dBA, depending on how close the recipient of the noise is to the highway. The Preferred Alternative noise increases range between 1 dBA to 5 dBA, similar to those of the other Action Alternatives.

The Federal Highway Administration Traffic Noise Model (TNM) was used to estimate the increase in noise levels expected due to projected (2035) traffic volume increases. Specifically, predicted noise levels were compared to CDOT's Noise Abatement Criteria (NAC); FTA and FRA impact criteria were not employed. Colorado Department of Transportation NAC consider noise-sensitive receptors such as residences, parks, or schools impacted if noise levels during the loudest hour of the day equal or exceed 66 dBA, or if future noise levels exceed existing levels by 10 dBA or more. These regulations apply to all noise analyses conducted in Colorado despite I-70 corridor objections. With the exception of Dowd Canyon, noise levels are currently at or above the impact threshold of 66 dBA for at least one location in every community sampled.

Future noise levels in the Dillon Valley (before construction of noise wall) were:

- East side of residential area 66
- West side of residential area 61
- Church 69

Relatively new noise walls are in place in this location (east of the interchange). Earthen berms are also proposed closer to the interchange.

Existing Commitments, Requirements and Mitigation Measures

Based on the results of the RDPEIS, the following construction noise measures should be part of the proposed action at the I-70 Silverthorne/Dillon Interchange.

- Work hours should be limited to the extent practical
- Equipment should be required to be well maintained so that it runs as quietly as possible
- Noise levels from vehicle and equipment back up alarm systems should be reduced to low levels that are within acceptable safety guidelines
- Haul roads should be designated in areas that avoid sensitive receptors
- Public outreach should be provided to evaluate noise impacts

The lead agencies do not propose any specific mitigation strategies in the RDPEIS for transportation noise, but the RDPEIS states that a full range of mitigation options should be considered in Tier 2 processes to reduce highway noise for impacted communities. Mitigation options to be considered include:

- Noise walls
- Noise berms
- Concrete barriers
- Creation of noise buffer areas
- Enforcing engine compression brake muffler use
- Noise insulation of buildings
- Pavement type
- Active noise control
- Cut and cover tunnels
- Adjusting vertical and horizontal alignments

The FHWA does not consider pavement type as noise mitigation at this time, because the long-term effectiveness of pavement types in noise mitigation has not yet been proven. Active noise control and cut and cover tunnels are also not considered as noise mitigation by FHWA, although CDOT may consider them in addition to other federally-approved noise mitigation measures.

The lead agencies are required to follow I-70 corridor CSS Aesthetic Guidelines and consider landscaping and vegetated berms for noise mitigation during design. CDOT is required to work with local planning agencies to minimize noise effects on planned development in the I-70 corridor.

Additional Data and Information Requirements

The RDPEIS states the following about Tier 2 noise requirements.

Tier 2 processes are required to include a more robust analysis of potential noise impacts and mitigation based on the configuration of proposed highway improvements, associated traffic projections, and refined field noise measurements taken at potentially affected receptor locations. Noise studies will be conducted in accordance with appropriate regulatory standards; that is, following CDOT noise impact assessment methodology for highway improvements, and FTA noise impact assessment methods for rail improvements. Information about noise studies, methodologies, and modeling results will be included in any public involvement efforts associated with Tier 2 processes.

CDOT noise policies suggest that a quantitative analysis of construction noise be considered for large, complex projects. CDOT should conduct such an analysis as part of any future Tier 2 environmental processes. CDOT should also analyze construction vibration as part of Tier 2 environmental processes.

More specifically, during Tier 2 processes, CDOT will:

- Develop best management practices specific to each project
- Adhere to any new laws and regulations that may be in place when Tier 2 processes are underway, including new regulations regarding noise abatement criteria expected to go into effect in July 2011.

Generally, the most practical noise mitigation strategy to avoid or reduce direct effects includes the construction of noise barriers. In some areas, topography may reduce the effectiveness of noise barriers—for example, when receptors sit higher than the road—and Tier 2 processes will conduct project-specific noise analyses to determine where noise barriers can offer effective mitigation. Other strategies to mitigate noise impacts, such as land acquisition for buffer zones and altering the horizontal and vertical alignment, are effective but may be less practical because of topographic and development constraints.

SURFACE WATER, GROUNDWATER AND WATER QUALITY

Key Issues

Surface water and groundwater are sources for drinking water and irrigation water and support plant, wildlife and fish habitats. Some surface waters also provide opportunities for recreation (boating, swimming and fishing).

Surface water and groundwater are the subject of a wide range of laws, regulations, policies and practices. Specific protections are provided by:

- CWA;
- State water quality standards; and
- The Source Water Assessment and Protection program, which assesses potential water quality issues for public water supplies mandated by the Safe Drinking Water Act.

Primary pollutants include:

- Suspended solids (such as sediments that can carry other pollutants)
- Phosphorus (found in sediment and winter maintenance materials used on I-70 and in fertilizers)
- Chloride (from rock salt and liquid magnesium chloride deicers)
- Copper (from moving engine parts, brake linings and fungicides/insecticides)
- Zinc (from tire wear, motor oil and grease)
- Other hazardous materials (from past and ongoing releases into the soil or groundwater)

Other relevant causes for potential effects include:

- Increases in impervious surface area
- New construction disturbances
- Stream channelization, impedance or blockage of flows
- Leaking storage tanks, waste disposal practices and spills

Examples of impacts include:

- Siltation of lakes, reservoirs and streambeds
- Loss of wetlands that help filter the water system in natural ways.
- Sedimentation from traction sand getting into streams, which can degrade habitat, impede spawning by blanketing the streambed, and reduce populations of macro invertebrates on which fish feed.
- Changes in hydrological regime and water quality can cause changes in plant dispersal and survival, leading to plant community shifts over time and resulting in effects on an entire ecosystem's function.

Key questions for the I-70 Silverthorne/Dillon Interchange project include:

Will construction and operation of the interchange improvements change the amount or flow of surface water and/or alter groundwater recharge or current uses and availability local groundwater?
Will construction, operation and maintenance of the interchange improvements degrade surface water or groundwater quality?

Existing and Future Conditions

Surface Water

The study area is located just below the Dillon Reservoir dam. Completed in September 1963, Dillon Reservoir is the largest water storage facility in the Denver Water system. The dam was built to divert water from the Blue River Basin through the Harold D. Roberts Tunnel under the Continental Divide into the South Platte River Basin. Dillon Dam is an earth-fill dam, 5,888 feet long by 231 feet above the Blue River streambed. Dillon Reservoir's surface area of 3,233 acres and 26.8 miles of shoreline support many recreational activities.

The Blue River begins at the Dillon dam outlet located south of the interchange. Straight Creek and its watershed are located along the south side of I-70. Straight Creek is a tributary to the Blue River. The confluence of Straight Creek and the Blue River is located in the study area. The waters of the Blue River support a plant, wildlife, fish and other aquatic habitats and provide water for other uses downstream. Straight Creek supports plant, wildlife, fish and other aquatic habitats east of the study area and provides the water supply to Dillon and Dillon Valley.

Erosion and sedimentation caused by road construction and other development, the use of liquid deicer and traction sand along Straight Creek, and the contribution of contaminants in stormwater associated with road salt, automobile use, accidental spills, and urban area runoff contribute to water quality conditions in Straight Creek and the Blue River.

Section 303(d) of the federal CWA requires states to identify waters where effluent limitations mandated by Section 301(b)(1)(A) and Section 301(b)(1)(B) are not stringent enough to attain water quality standards. These waters are compiled into the Section 303(d) list of impaired waters. The Colorado Section 303(d) List identifies those water bodies, which are impaired by one or more pollutants. Straight Creek has been placed on the 303(d) list of water quality impaired streams for sediment which requires monitoring and evaluation to meet stream water quality targets or goals.

The RDPEIS states that phosphorus loads are expected to increase seven percent in the Blue River Watershed as a result of planned land use changes through 2025 (estimated from the EPA's Better Assessment Science Integrating Point and Nonpoint Sources [BASINS] model). County planning does not have substantially different projections beyond 2025 so there is no need to project out to 2035 for this phosphorous load estimate. Impacts from the existing I-70 highway are generally included in the changes from existing to planned development in the BASINS modeling study.

CDOT is leading an effort to define and accomplish water quality and water resource mitigation strategies. As mentioned previously, this is called the Stream and Wetland Ecological Enhancement Program (SWEEP). The SWEEP program focuses on efforts to integrate water resource needs (such as water quality, fisheries, wetlands, and riparian areas) with design elements for construction activities and long-term maintenance and operations of the transportation system. The working group developed a Memorandum of Understanding (MOU) among the lead agencies and the U.S. Fish and Wildlife Service, the U.S. Forest Service, the U.S. Bureau of Land Management, the Colorado Division of Wildlife, Clear Creek County, Clear Creek Watershed Foundation, Upper Clear Creek Watershed Association, Eagle River Watershed Council, and Colorado Trout Unlimited. The MOU establishes the management framework to assure protection of water resources throughout the life cycle of projects in the I-70 corridor. The lead agencies are working to have the MOU finalized to include with the Final I-70 Mountain Corridor

Programmatic EIS (FPEIS). The RDPEIS concludes that implementation of mitigation strategies associated with the Action Alternatives will improve water quality conditions to levels above No Action levels.

Based on these conditions and the project's location and study area limits, the primary conditions relevant to the I-70 Silverthorne/Dillon interchange project are pollutant contributions from construction, operation and maintenance within the study area and their incremental and cumulative effects downstream. These issues have been considered in the RDPEIS process thought the SWEEP program, which establishes a comprehensive set of commitments, requirements and mitigation measures for any action at the I-70 Silverthorne/Dillon Interchange.

Groundwater

Groundwater is present at various depths along the alignments of Straight Creek and the Blue River. This groundwater supports wetlands and is recharged from infiltration in undeveloped areas, and from natural runoff and stormwater entering Straight Creek and the Blue River.

The RDPEIS does not identify the location of active water supply wells along the I-70 corridor or in the project study area. Groundwater may be encountered as part of foundation excavation or other construction activities. If this occurs, dewatering may be needed which would involve discharges into Straight Creek and/or the Blue River.

A permit for the discharge would be required from the Colorado Department of Public Health and Environment (CDPHE). This would require water analyses, removal of specific contaminants to CDPHE and Environmental Protection Agency approved levels, and lowering of total suspended solids to acceptable levels. Groundwater treatment would be accomplished by filtration, air stripping for volatile compounds, or stage dewatering methods. The potential for contamination of groundwater from hazardous waste sources such as underground storage tanks and spills is addressed under hazardous waste.

Existing Commitments, Requirements and Mitigation Measures

The commitments, requirements and mitigation measures from the RDPEIS process applicable to potential I-70 Silverthorne/Dillon Interchange project effects include:

CDOT is required to develop and implement specialized and tailored measures to avoid, minimize and mitigate potential effects and improve No Action conditions. These measures will be developed in coordination with the SWEEP Committee and the Straight Creek Cleanup Committee and will include appropriate measures from local watershed initiatives and the corresponding Sediment Control Action Plan for Straight Creek.

CDOT is required to mitigate construction impacts primarily through the implementation of a Stormwater Management Plan that proposes appropriate best management practices for erosion and sediment control according to the *CDOT Erosion Control and Storm Water Quality Guide* (CDOT, 2002). Appropriate water quality protection best management practices must be in place to protect water quality before construction begins and remain until the site is stabilized and vegetation has regrown.

Key project features and potential impacts to be addressed by these measures include:

- Total maximum daily load (TMDL) thresholds set for Straight Creek (and the Blue River, if applicable)

- Designs for snow storage areas, catchment basins, and stormwater drainage outfalls that minimize sedimentation and water quality degradation

- Deicing and traction sand procedures to minimize water quality degradation and sedimentation

- Better training for snowplow staff so they know when they can minimize the use of sand or deicers.

- Requirements to minimize impacts on water quality and other water resources by refining placement of roadway and road piers to avoid impacts when feasible.

The project process will be in full compliance with CWA (See Section 4.1.4).

Additional Data and Information Requirements

The RDPEIS states that Tier 2 environmental review process should evaluate impacts from Straight Creek runoff on the Blue River. In addition, it states that the process should include:

- Analysis of any stream channel effects such as placement of piers or foundations within channels or catchment basins beside or near channels.

- Analysis of permanent stormwater best management practices.

- Identification and evaluation of permanent mitigation measures for specific issues.

- Compliance with the CWA that requires Section 404 permitting of temporary and permanent impacts on stream flow and channels.

- Evaluation of water rights issues in the context of water law for new groundwater discharges.

- Evaluation of impacts associated with washout of sand onto bike paths

- Development of detailed specifications for how the SWEEP MOU mitigation strategies will be incorporated in the project design.

CULTURAL RESOURCES

ARCHAEOLOGY AND HISTORY

Key Issues

Archaeological resources and historical resources are affected by the alternatives when and if resources are disturbed by construction activities or future improvements and effects. Archaeological resources and

historical resources are the subject of Section 106 of the Natural Historic Preservation Act and the activity and responsibilities of the State Historic Preservation Officer (SHPO) in Colorado and the Advisory Council on Historic Preservation (ACHP).

Existing and Future Conditions

An Office of Archaeological and Historic Preservation (OAHP) records search was performed on September 29, 2010. A total of 14 previously conducted surveys were identified. A total of ten sites of significance were identified in the area. The only potential sites reported to occur within the study area included two I-70 segments and the Blue River to Summit Transmission Line. Nine of the ten sites in the area were originally classified as ineligible for inclusion in the National Historic Register. The one site that was classified as eligible for inclusion in the National Historic Register was site number 5ST.745 (Blue River to Summit Transmission Line). This finding was made under a 1998 survey. An updated 2009 survey has since designated this site as ineligible for inclusion in the National Historic Register.

Existing Commitments, Requirements and Mitigation Measures

None.

Additional Data and Information Requirements

None.

PALEONTOLOGY

Key Issues

Paleontological resources are affected by the alternatives when and if sensitive geologic formations are disturbed by construction activities.

Existing and Future Conditions

The I-70 corridor includes 40 mapped geologic units. Of these, three are classified as highly sensitive for paleontological resources, and 19 are classified as moderately sensitive. The remaining 18 geologic units have little or no potential for important paleontological resources. Sensitive areas in the I-70 corridor, west to east, generally include the first 42 miles from Gypsum to Vail Pass, the 6.6 miles between Frisco to Dillon, and the last 1.6 miles of the Hogback near C-470.

Existing Commitments, Requirements and Mitigation Measures

All construction in areas of moderate or high paleontological sensitivity will include preconstruction survey and evaluation, construction monitoring, implementation of a Worker Awareness Training Program, and spot-check monitoring of sensitive formations during construction. All work will be overseen by the CDOT staff paleontologist or other qualified and permitted paleontologist and will follow CDOT's *Paleontology Analysis and Documentation Procedures* (CDOT, 2006). In the event of discovery of unanticipated fossil remains, such as unexpected concentrations of fossils, unusually large specimens, or unexpected

discoveries in sediments, all ground disturbances in the area will cease immediately. The qualified paleontologist and appropriate project personnel will be notified immediately to assess the find and make further recommendations.

Mitigation will follow the Society of Vertebrate Paleontology Standard Guidelines (Society of Vertebrate Paleontology, 1995) for treatment of sensitive paleontological resources and CDOT Paleontology Analysis and Documentation Procedures (CDOT, 2006).

Additional Data and Information Requirements

None.

NATIVE AMERICAN RESOURCES: CONSULTATION AND COORDINATION

There are no known Native American resources of concern in the vicinity of the I-70 Silverthorne/Dillon interchange (i.e., no archaeological sites eligible for the National Register of Historic Places) and no resources or issues that Tribes identified during the I-70 corridor EIS process. Formal consultation will occur if a NEPA EA or EIS is prepared for the project.

OTHER RESOURCES AND ISSUES

SOCIAL CONDITIONS: DEMOGRAPHIC CHARACTERISTICS AND RELATIONSHIP TO ENVIRONMENTAL JUSTICE ISSUES

Key Issues

Environmental justice promotes the fair treatment and meaningful involvement of all people in the decision-making process for transportation projects. Environmental justice seeks to avoid disproportionately high and adverse impacts on low-income and minority populations. The I-70 corridor extends 144 miles through diverse communities and socioeconomic conditions. The lead agencies analyzed environmental justice to determine if the impacts and benefits of the Action Alternatives disproportionately affect minority or low-income populations.

Environmental justice requirements stem from the Civil Rights Act of 1964; Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations issued in 1994; and U.S. Department of Transportation and FHWA procedures for compliance with EO 12898.

During the study process, the lead agencies coordinated with county and municipal staff and the EPA to collect information and concerns regarding minority and low income populations in the I-70 corridor. These agencies expressed concerns about:

- Displacement of low-income and minority residents
- Separation of neighborhoods
- Affordable housing
- Access to public transportation

- Commute times for I-70 corridor residents
- Adverse effects for residents living close to new transportation facilities and construction

Existing and Future Conditions

Existing minority and low-income populations are scattered throughout the I-70 corridor communities, and no concentrations of minority or low-income populations were identified through U.S. Census data or local research. However, additional identification of "pockets" of low-income and minority populations is still being conducted in order to solicit comments from these communities on the Draft PEIS. This information will be included in the Final PEIS. Tier 2 processes will evaluate impacts to neighborhoods or other subgroups of communities along the I-70 corridor to determine effects of specific designs on minority or low-income populations.

Existing Commitments, Requirements and Mitigation Measures

At the I-70 corridor level, no disproportionate adverse impacts on minority or low-income populations were identified, but mitigation strategies for social and economic resources will apply to all communities in the I-70 corridor and also will benefit minorities and low-income populations.

If Tier 2 processes conclude that disproportionately high or adverse impacts will occur on low-income or minority populations, CDOT will work to avoid, minimize, or mitigate such impacts. Tier 2 processes that occur in populated areas will consider pockets of minority and/or low income populations that may require additional attention and/or mitigation for issues such as:

- Localized air quality impacts
- Noise impacts
- Shading from elevated structures or walls
- Residential and business relocations
- Changes in access or travel patterns
- Loss of community cohesion

Additional Data and Information Requirements

The RDPEIS process provided an overview of the minority and low-income populations from an I-70 corridor perspective. Local municipalities highlighted particular areas of concern that will be evaluated on a local level in Tier 2 processes. Most, if not all, of the Tier 2 processes can and will reference updated U.S. Census data as the 2000 U.S. Census is replaced with the 2010 U.S. Census.

Tier 2 processes will use the most current data and guidance, including updated data on affordable housing, to analyze impacts on minority and low-income populations. During Tier 2 processes, CDOT will:

- Develop specific and more detailed mitigation strategies and measures
- Develop best management practices specific to each project
- Adhere to any new laws and regulations that may be in place when Tier 2 processes are underway
- Continue to directly coordinate with local government entities and social services to identify low income populations along the I-70 corridor

- Coordinate with the Colorado Minority Business Office to obtain a listing of minority-owned business enterprises that register with the office in Colorado and are located along the I-70 corridor

Tier 2 processes will develop public involvement to ensure full and fair participation by all potentially affected communities in the transportation decision-making process.

SOCIAL AND ECONOMIC VALUES AND CONDITIONS

Key Issues

Social and economic values reflect the economic setting of the counties and communities in the I-70 corridor and the social setting relating to housing, income, employment, and commuting. CDOT evaluates these values to determine the effects of a transportation action on a community and its quality of life. I-70 plays an important role in the economic activity and quality of life of surrounding counties. It is the primary access to communities and the abundant recreation resources in the I-70 corridor, both for local residents and for the Denver metropolitan area and out-of-state visitors. Tourism, the primary industry in the I-70, generates 41 percent of jobs and 38 percent of income; these numbers are even higher in the resort counties of Eagle and Summit. Visitor access to I-70 corridor counties strongly influences the economy, and the lead agencies must analyze changes to the I-70 transportation system for potential economic effects.

Existing and Future Conditions

The RDPEIS provides a wide range of regional information for the overall I-70 corridor and some information for Summit County and other counties. Summit County is characterized as having 40 percent or more of its jobs related to tourism and representing almost 25 percent of the 9-county region's gross regional product in 2035. This and other information is important, but the available information does not provide existing and future economic conditions directly relevant to the issues to be addressed at the I-70 Silverthorne/Dillon interchange.

The interchange related economic conditions are best characterized by defining the social and economic conditions in the immediate vicinity and their regional, county and local importance. The interchange and the development that exists and is planned along SH 9 and US 6 within a mile of the interchange is vital to the economic health of Summit County, the Town of Dillon and the Town of Silverthorne. This development and the related economic activity serves as a gateway to the region and a primary commercial center providing important access to a wide range of attractions east of the continental divide. The area is a primary shopping center for local residents and visitors. Various details about this area are compiled by local governments, the Chamber of Commerce and local business associations.

Existing Commitments, Requirements and Mitigation Measures

The phased approach of the Preferred Alternative allows ongoing opportunities to avoid and minimize economic impacts, establish effective mitigation, and employ I-70 corridor CSS. I-70 corridor-wide coordination, state involvement and support, and localized efforts to control growth and maintain quality of

life would improve the ability of I-70 corridor communities to maintain and protect and social and economic values.

The lead agencies will coordinate a variety of construction mitigation strategies with Clear Creek and other I-70 corridor counties. This may include the development of a Tier 2 Public Involvement and Marketing Plan. Tier 2 processes will also include strategies to avoid and minimize construction impacts on Clear Creek communities. These measures do not apply directly to the I-70 Silverthorne/Dillon interchange, but reflect possible methods of avoiding, minimizing and mitigating potential effects during construction of future improvements. Examples of possibilities include:

- Limiting construction activities during ski season weekends
- Providing adequate accessibility to local businesses
- Developing a site-specific signage plan
- Requiring contractors to demonstrate that there is no reasonable alternative to a proposed lane closure and providing advanced notice to the public of planned lane closures.
- Maintaining community and business access to the highest degree possible.
- Determining an appropriate scheduling approach for day versus night work
- Considering public concerns about local mobility in traffic control strategies.
- Holding public meetings at critical construction phases to provide information and discuss mitigation strategies.
- Including as public information strategies media advisories, variable message signs, advance signs, a telephone hotline, real-time web cameras, the use of intelligent transportation systems and technology in construction work zones, a construction project website, and alternate route advisories.
- Working with communities to identify community representatives. These persons will partner in the construction traffic control program and provide assistance/feedback to the traffic control team.
- Coordinating with local chambers and town economic offices to help develop promotional strategies during construction.

Additional Data and Information Requirements

The lead agencies will conduct further analysis of local county economic impacts during future project specific Tier 2 processes, and will develop information about county-level travel demand, project phasing, time-phased estimates of capital expenditures, worksite locations and scheduling, and sourcing of materials, equipment, services, and labor for use in the analysis. The REMI® model, which has the ability to incorporate travel demand data with a robust economic impact analysis engine, could be useful for local economic modeling during Tier 2 processes if it is used. With regard to construction impacts, Tier 2 processes will provide information about work duration, detours, lane closures, and other disturbances that would occur. The I-70 corridor CSS Guidance will be followed during Tier 2 processes.

During Tier 2 processes, the lead agencies will:

- Develop specific and more detailed mitigation strategies and measures,
- Develop best management practices specific to each project, and
- Adhere to any new laws and regulations that may be in place when Tier 2 processes are underway.

VISUAL QUALITY AND AESTHETICS

Key Issues

Visual resource or scenic impacts are generally defined in terms of a project's physical characteristics and potential visibility, and the extent to which that project's presence changes the perceived visual character and quality of the environment surrounding it. Sightseeing is one of the activities that engage a high percentage of Colorado's recreationalists, indicating the importance of visual character to I-70 corridor visitors and residents; visual resources need protection for both economic and aesthetic purposes.

Visual or scenic resources are the natural and built features of the landscape contributing to the public's experience and appreciation of an environment.

Existing and Future Conditions

The study area includes developed and undeveloped public and private land. Some of the undeveloped land is managed by the United States Forest Service (USFS). This land is located west of the interchange on the south side of I-70.

CDOT coordinated the approach for the visual resource assessment with federal land managers, consistent with the Bureau of Land Management (BLM) and the USFS visual analysis methodologies. CDOT examined county and municipal land use plans to understand established viewsheds and visual resources identified for preservation. CDOT also coordinated with staff and citizens from the I-70 corridor communities to understand each community's values and identity.

CDOT inventoried the existing visual environment by examining the character of the landscape and identifying potential viewers (also called sensitive receptors) within the viewshed of the I-70 corridor. The "peak to peak" viewshed considers all views and viewers located in between the northern and southern ridgelines through which the interstate passes. CDOT organized landscape characteristics and sensitive receptor locations into 27 distinct scenery analysis units or landscape units throughout the I-70 corridor. The inventory also identified gateway views, focal views, and canyon views.

Following the BLM Visual Resource Management Program and USFS Scenery Management System of landscape classifications, CDOT evaluated each landscape unit to determine the overall landscape scenic attractiveness and visibility of the I-70 corridor from sensitive viewpoints. The visual designations established by the BLM and USFS for their lands remained as determined by those agencies.

The I-70 Silverthorne/Dillon Interchange is located at the center of a "Scenic Analysis Unit." Unlike nearby Scenic Analysis Units, the Scenic Analysis Unit covering the study area does not have the following view designations:

- Focal Views - Dramatic views dominated by a central identifying feature, providing a notable landmark.
- Gateway Views - Provide a sense of entry or arrival to key portions of the I-70 corridor.
- Representative Views - Provide a sense of the typical natural or cultural character of different sections of the I-70 corridor.

Again, unlike neighboring areas to the east and west along I-70, the interchange area is characterized by relatively high density housing and commercial development. Undeveloped naturally scenic areas are located at the east and western ends of the study and beyond the study area boundaries.

Existing Commitments, Requirements and Mitigation Measures

The relevant RDPEIS mitigation strategies for visual resources include application of the I-70 Mountain Corridor CSS Aesthetic Guidelines and the requirement to prepare a site-specific Aesthetic Plan and Lighting Plan. In addition, a Visual Impact and Mitigation Plan may be needed depending on the project's visual impacts and past visuals impacts and scarring.
Specific measures that may be applicable include:

- Minimal use of signage, light poles, guard rails, or other infrastructure elements, where safety permits.
- Use of vertical and horizontal alignments to preserve views of items such as rivers, canyons, etc.
- Use of minimum amounts of road cuts, fills, turnarounds, etc.

Additional Data and Information Requirements

A more detailed and localized analysis of visual resources is needed to define further important visual elements and assess potential effects of the project. Additional analysis of direct impacts to visual resources may determine the impact type (temporary or permanent) and description. Visual simulations may be needed to accurately illustrate the visual changes. CDOT is required to develop specific and more detailed mitigation strategies and measures, as well as establish best management practices for the project. As stated previously, the project will apply the I-70 Mountain Corridor CSS Aesthetic Guidelines and will include a site-specific Aesthetic Plan and Lighting Plan.

SECTION 4(f) RESOURCES

Key Issues

The Department of Transportation Act (DOT Act) of 1966 included a special provision - Section 4(f) - which stipulated that the FHWA and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible and prudent alternative to the use of land and the action includes all possible planning to minimize harm to the property resulting from use.

Section 4(f) applies to:

- Significant publicly owned public parks and recreational areas that are open to the public
- Significant publicly owned wildlife and waterfowl refuges, irrespective of whether these areas are open to the public or not, since the "major purpose" of a refuge may make it necessary for the resource manager to limit public access.
- All historic sites of national, state or local significance, whether or not these sites are publicly owned or open to the public. Except in unusual circumstances, only historic properties on or

eligible for inclusion on the National Register of Historic Places (NRHP) are protected under Section 4(f).

Section 4(f) resources are presumed to be significant unless the official having jurisdiction over the site or resource concludes that the entire site is not significant. Even if this is done, FHWA must make an independent evaluation to assure that the official's finding of significance or non-significance is reasonable.

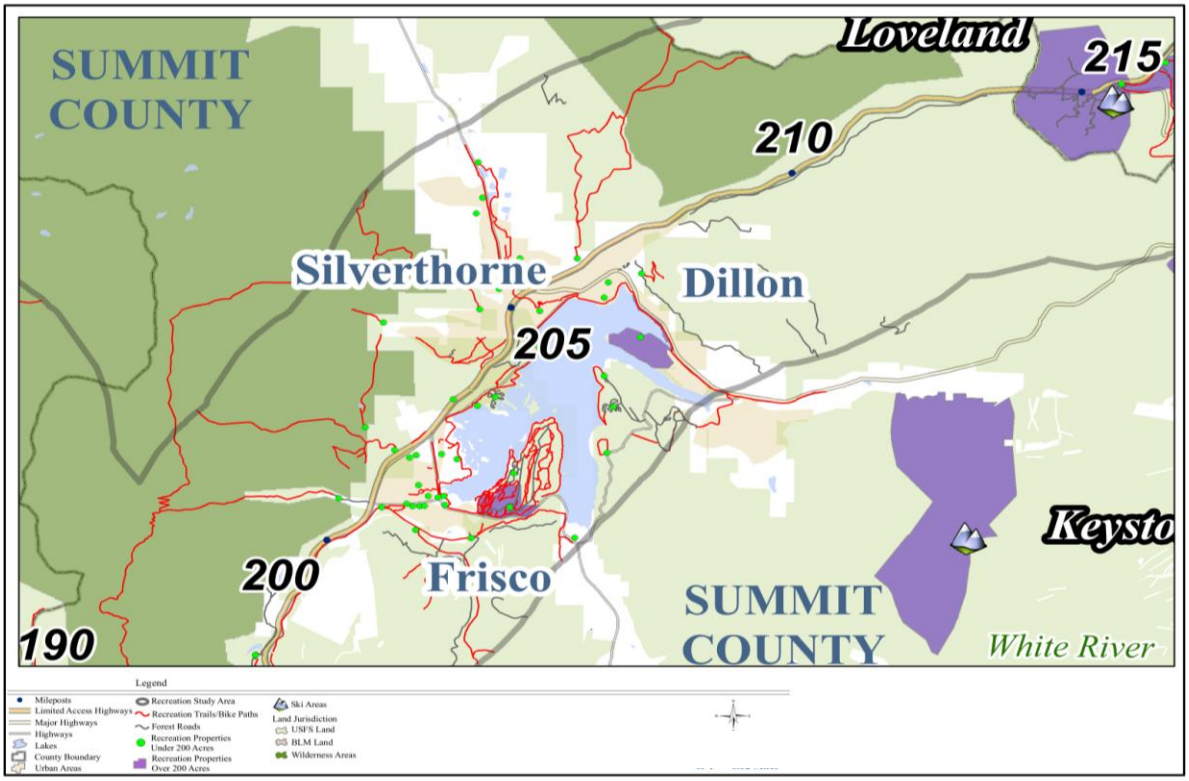
Existing and Future Conditions

Map 9 of 14 in the Section 4(f) Technical Report of the RDPEIS identifies potential Section 4(f) resources in and near the I-70 Silverthorne/Dillon Interchange study area (See Figure 2). These resources are identified and described in Table 4.

There are no significant publicly owned wildlife and waterfowl refuges in the study area. The public land areas involving Straight Creek and the Blue River are not designated wildlife or waterfowl refuges by CDOW. These lands are in owned by the Town of Silverthorne as part of private land development negotiations. In some locations, these areas provide buffers between development and roads and the channels, banks and vegetated slopes associated with Straight Creek and the Blue River. Some of these buffer areas provide some protection to aquatic habitats and wetlands, but would not be considered significant refuges because of their small size and the highly developed urban conditions completely surrounding these areas.

Figure 2

Recreation: Section 4(f) and Section 6(f)



I-70 Silverthorne/Dillon Interchange Project
"Results through Partnerships"

Table 4. Potential Section 4(f) Resources in and near the I-70 Silverthorne/Dillon Interchange Study Area

Resource Identification	Resource Name	Section 4(f) Status	Notes
ID 342	Silverthorne Open Space	Potential 4(f) Property: Parks and Recreation Areas	In study area, the area is managed for recreation under the Silverthorne Parks, Trails and Open Space Master Plan, January 2001
ID 158	Blue River Trail	Potential 4(f) Property: Parks and Recreation Areas	In study area
ID 5ST.648	Old Dillon Reservoir, Old Dillon Ditch and Associated Structures	NRHP Eligible	May be beyond western limit of I-70 Silverthorne/Dillon Interchange study area
ID 5ST.745	Blue River to Summit Transmission Line (overhead power line)	NRHP Eligible	In study area, follows I-70 alignment from the west, then follows State Highway 9
ID 5ST.892.1	I-70 Segments	NRHP Eligible	Includes all of I-70 alignment from west to east
-	Rainbow Park (Expanded Rainbow Community Park)	Not referenced	-

Existing Commitments, Requirements and Mitigation Measures

FHWA and CDOT cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible and prudent alternative to the use of land and the action includes all possible planning to minimize harm to the property resulting from use. There are no other or site specific commitments, requirements or mitigation measures applicable to the Section 4(f) resources within the study area.

Additional Data and Information Requirements

It appears that Section 4(f) resource applicability analyses do not need to be performed to verify whether the potential Section 4(f) resources are in fact subject to the requirements of Section 4(f). The next step is to determine if there is use of Section 4(f) properties and/or if any direct or indirect effects can be considered de minimus or whether a Section 4(f) Evaluation would be needed.

SECTION 6(F) RESOURCES

Key Issues

Section 6(f) of the Land and Water Conservation Fund Act protects recreational lands planned, acquired or developed with Land and Water Conservation Act funds. CDOT must mitigate impacts to Section 6(f) resources with replacement lands of equal value, location and usefulness as the impacted lands.

Existing and Future Conditions

The RDPEIS identifies 17 recreation sites adjacent to I-70 that are Section 6(f) resources. Two of these resources are located in the study area:

- Rainbow Park (Expanded Rainbow Community Park)
- Blue River Trail

Existing Commitments, Requirements and Mitigation Measures

CDOT must mitigate impacts to Section 6(f) resources with replacement lands of equal value, location and usefulness as the impacted lands. There are no other or site specific commitments, requirements or mitigation measures applicable to the Section 6(f) resources within the study area.

Additional Data and Information Requirements

It appears that Section 6(f) resource applicability analyses do not need to be performed to verify whether the potential Section 6(f) resources are in fact subject to the requirements of Section 6(f). The next step is to determine if there are any direct or indirect effects on these properties.

EMERGENCY SERVICES: AMBULANCE, EMERGENCY CARE, POLICE AND FIRE

Key Issues

Ambulances and emergency care services and facilities are limited. I-70 corridor communities are called to respond to crashes and medical issues on I-70. Road conditions directly influence crash rates. Road improvements, design changes and maintenance can address safety issues. In addition, changes to a roadway network during construction or as a long term change can influence emergency response times for police, sheriff, and fire department vehicles.

Existing and Future Conditions

The RDPEIS addresses emergency services in terms of overall responses to crashes along I-70. The only data relevant to the I-70 Silverthorne/Dillon Interchange shows that I-70 accounts for 13 percent of medical emergency calls in Eagle County and 25 percent of calls in both Summit and Clear Creek counties.

In Dillon and Silverthorne, adequate police and fire protection is provided on both sides of I-70. Intersection congestion can delay emergency service within and travel times through the study area.

Existing Commitments, Requirements and Mitigation Measures

There are no applicable commitments, requirements or mitigation measures for interchange related emergency services. However, CDOT is committed to minimize construction period traffic delays, which will minimize potential incremental increases in emergency response times.

Additional Data and Information Requirements

The proposed project is expected to improve circulation and increase access and mobility to and from I-70 and along SH 9 and US 6. Basic data and information about emergency service providers is needed to address this issue.

ENERGY

Key Issues

Energy is used during the construction and operation of transportation facilities. The energy used in the construction of various facilities is inclusive of the manufacture and transport of materials and equipment and operation of construction equipment. Operational energy consumption is the fuel and electricity used to power the vehicles using the transportation facility. This total energy is based on the vehicle mix and vehicle miles of travel for each alternative evaluated. Traffic volumes and large elevation changes make energy an important issue in the I-70 corridor. The potential for congestion and inefficient operations makes energy an important issue at the I-70 Silverthorne/Dillon interchange.

The past several years were tumultuous ones for world energy markets, with oil prices soaring through the first half of 2008 and diving in its second half. The downturn in the world economy had an impact on energy demand, and the near-term future of energy markets is tied to the downturn's uncertain depth and persistence.

The RDPEIS cites the following key global energy issues identified by the Department of Energy (DOE):

- Higher but uncertain world oil prices;
- Greenhouse gas emissions;
- Increasing renewable fuel use;
- Increasing production of unconventional natural gas;
- Shift in transportation fleet to more efficient vehicles; and Improved efficiency in end-use appliances.

Existing and Future Conditions

Existing and future energy conditions at the I-70 Silverthorne/Dillon interchange are not provided in the RDPEIS. This information is not currently available, but can be calculated using traffic data and accepted methods.

Existing Commitments, Requirements and Mitigation Measures

Mitigation strategies for energy impacts will be developed and refined in Tier 2 processes in the context of a specific project. However, mitigation strategies that typically apply to construction projects to reduce impacts are addressed below. The RDPEIS states that construction and operational impacts of Tier 2 projects will be mitigated through implementation of appropriate best management practices and defines conceptual mitigation strategies for Tier 2 projects.

The measures relevant to the construction phased of I-70 Silverthorne/Dillon interchange project include:

- Limiting the idling of construction equipment;
- Encouraging employee carpooling or vanpools for construction workers;
- Encouraging the use of the closest material sources (for example, aggregate or concrete);
- Locating construction staging areas close to work sites;
- Using cleaner and more fuel-efficient construction vehicles (for example, low sulfur fuel,
- biodiesel, or hybrid technologies);
- Using alternative fuels and asphalt binders; and
- Implementing traffic management schemes that minimize motorist delays and vehicle idling.

Some of the conceptual techniques for mitigation of operational impacts apply more appropriately to the I-70 corridor and region, but could be adapted to apply to the interchange project. These I-70 corridor measures include:

- Carrying out maintenance activities during periods of reduced traffic volumes;
- Encouraging greater use of transit through measures such as incentive programs;
- Working with chambers of commerce or tourist organizations to encourage resort operators to offer incentives for visitors who use transit or who use low emission or alternative fuel vehicles; and
- Promoting carpooling for regular facility users.

Additional Data and Information Requirements

CDOT will conduct more detailed analyses of energy impacts during future Tier 2 processes, which will use the most current data and guidance available. Tier 2 processes will include additional analysis of construction and operational impacts based on the specific improvements and mode(s) selected. Tier 2 processes will also include development of specific best management practices for each project.

HAZARDOUS WASTE

Key Issues

The RDPEIS includes a discussion of Regulated Materials and Historic Mining. Regulated materials are hazardous substances, hazardous waste, or petroleum products. CDOT evaluated the potential for harm from these regulated materials by identifying the presence or likely presence of an existing or past release of hazardous materials on a property in the I-70 corridor. Historic mining is included in the discussion of regulated materials because there are mine tailings and other mining waste contamination in the Corridor

Encountering contaminants in soils, groundwater, and surface water can:

- Increase worker health and safety requirements,
- Result in project delays,
- Increase construction costs due to remediation and disposal, and
- Increase land purchase liability.

Some key questions for the I-70 Silverthorne/Dillon Interchange project include:

- Are there records indicating the possible presence or actual presence of hazardous materials in the soil or groundwater in the study area?

- Will construction activity encounter contaminate soil or water?

Existing and Future Conditions

A review of federal and state databases containing information regarding hazardous material sources within the study area and a 0.25-mile buffer was conducted by Environmental Data Resources (EDR) on October 12, 2010. The EDR report compiles data from 47 federal, 19 state, and 5 Native American tribal databases. The EDR report satisfies the American Society for Testing and Materials (ASTM), Government Environmental Database Search Standard (ASTM E1527-05, section 7.2.1.1).

Applicable regulatory statutes include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). Regulated materials under these statutes include hazardous wastes, hazardous substances, petroleum products, hazardous medical wastes, mine tailings, dredge spoils, and mineralized rock. Facilities that are subject to compliance with CERCLA and RCRA are those that generate, store, or dispose of any of these substances. These facilities commonly include mines, chemical and material storage facilities, gas stations, underground storage tanks, medical facilities, manufacturing plants, and any other facility involving hazardous materials.

Six of the 47 federal databases searched contained records and information regarding sites within the project area information. The databases returning information and the number of records returned are described below. Tables 5 and 6 present the EDR federal, state and local database report records.

1. CORRACTS Database – A list of handlers with RCRA Corrective Action Activity. *(1 record)*

2. RCRA-SQG Database – RCRA Info is EPA's comprehensive information system, providing access to data supporting the RCRA of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month. *(1 record)*
3. RCRA-CESQG Database – The database includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. *(4 records)*
4. RCRA-NonGen Database – The database includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Non-Generators do not presently generate hazardous waste. *(8 records)*
5. ERNS Database – The Emergency Response Notification System (ERNS) records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA. *(5 records)*
6. FINDS Database – The Facility Index System (FINDS) contains both facility information and "pointers" to other sources of information that contain more detail. *(18 records)*

Table 5. EDR Federal Database Report Results

Database	Site Name	Address	Map ID	Page*
CORRACTS	Cooks Welding	249 Adams Avenue	19	41
RCRA-SQG	Silverthorne Auto Body Inc.	363 3rd Street	18	39
RCRA-CESQG	Target #1525	715 Blue River Parkway	1	3
RCRA-CESQG	PSCO – Summit CO OPS	200 West 6th Street	4	7
RCRA-CESQG	Global Collision	240 Brian Avenue	24	58
RCRA-CESQG	Federal Express Corp.	209 Brain Avenue	29	65
RCRA-NonGen	Jim Hudson Chevrolet Inc.	441 Blue River Parkway	8	18
RCRA-NonGen	Silverthorne Texaco	I-70 and Colorado State Route 9	11	23
RCRA-NonGen	Colorado Mountain Cleaners	330 Warren Avenue	14	30
RCRA-NonGen	Waste Management of the Rockies	314 3rd Street	16	31
RCRA-NonGen	Cooks Welding	249 Adams Avenue	19	41
RCRA-NonGen	Groendyke Transportation	190 US Highway 6	23	51
RCRA-NonGen	Summit Ford	201 Buffalo Mountain Road	33	83
RCRA-NonGen	Formby Ford Mercury	201 Buffalo Mountain Boulevard	33	85
ERNS	I-70 Silverthorne Interchange	I-70 Silverthorne Interchange	22	49
ERNS	I-70 Silverthorne Interchange	I-70 Silverthorne Interchange	22	49
ERNS	I-70 Silverthorne Interchange	I-70 Silverthorne Interchange	22	49
ERNS	I-70 Silverthorne Interchange	I-70 Silverthorne Interchange	22	49
ERNS	180 Stephens Way	180 Stephens Way	31	67
FINDS	PSCO – Summit CO OPS	200 West 6th Street	4	7
FINDS	Jim Hudson Chevrolet Inc.	441 Blue River Parkway	8	18
FINDS	Silverthorne Texaco	I-70 and Colorado State Route 9	11	23
FINDS	Sav O Mat	299 Blue River Parkway	13	27
FINDS	Waste Management of the Rockies	314 3rd Street	16	31
FINDS	Bold Petroleum Inc.	171 Blue River Parkway	17	36
FINDS	Suncor	190 Highway 9	17	36
FINDS	Southland 7-11	201 Blue River Parkway	17	37
FINDS	Silverthorne Auto Body Inc.	363 3rd Street	18	39
FINDS	Cooks Welding	249 Adams Avenue	19	41
FINDS	Groendyke Transportation	190 US Highway 6	23	51
FINDS	Global Collision	240 Brian Avenue	24	58
FINDS	Federal Express Corp.	209 Brain Avenue	29	65
FINDS	TPI Petroleum Inc.	180 Stephens Way	31	68
FINDS	Summit Ford	201 Buffalo Mountain Road	33	83
FINDS	Buffalo Mountain MD	204 Wildernest Road	34	88
FINDS	Rex Oil Co.	11 Fawn Court	35	90

*****Page number refers to EDR Report

Eight of the 19 state and local databases searched contained records and information regarding sites within the study area information. The databases returning information and the number of records returned are described below.

1. LUST Database – The Leaking Underground Storage Tank (LUST) incident reports contain an inventory of reported leaking underground storage tank incidents. The data comes from the Department of Health's Leaking Underground Storage Tank List. *(22 records)*
2. LUST TRUST Database – Reimbursement Application Package. The 1989 Colorado General Assembly established Colorado's Petroleum Storage Tank Fund. The Fund reimburses eligible applicants for allowable costs incurred in cleaning up petroleum contamination from underground

and aboveground petroleum storage tanks, as well as for third-party liability expenses. Remediation of contamination caused by railroad or aircraft fuel is not eligible for reimbursement. The Fund satisfies federal Environmental Protection Agency financial assurance requirements. Monies in the Fund come from various sources, predominantly the state environmental surcharge imposed on all petroleum products, except railroad or aircraft fuel. *(8 records)*

3. UST – The Underground Storage Tank (UST) database contains registered USTs. USTs are regulated under Subtitle I of RCRA. The source is the State Oil Inspector's Office's Tank List. *(20 records)*
4. LAST Database – A listing of Leaking Aboveground Storage Tank (LAST) sites.(1 record)
5. AST Database – The Aboveground Storage Tank (AST) database contains registered ASTs. The source is the State Oil Inspector's Office's Tank List. *(10 records)*
6. CO ERNS Database – A list of state reported spills. *(3 records)*
7. AIRS Database – A listing of Air Pollution Control Division permits and emissions data. *(5 records)*
8. ASBESTOS Database – Asbestos abatement and demolition projects. *(2 records)*

Existing Commitments, Requirements and Mitigation Measures

CDOT will take the following steps to minimize and avoid potential environmental impacts resulting from regulated materials:

- CDOT will minimize property acquisition and disturbance adjacent to or within active/inactive leaking underground storage tank sites
- Should contamination be discovered, construction activities will be temporarily halted until characterization/storage/disposal/ cleanup requirements can be discussed with the Division of Oil and Public Safety or a professional familiar with Division of Oil and Public Safety procedures and requirements.
- CDOT will manage contaminated soil and groundwater under applicable CDPHE, EPA, Division of Oil and Public Safety, and CDOT regulations and guidance
- CDOT procedures and other applicable guidance for storage and handling of regulated materials during construction activities will be followed
- CDOT will work cooperatively with various local, state, and federal agencies and local watershed groups to avoid further impacts on and possibly improve water quality
- Any soil removed during trenching or augering will be conducted in accordance with specified health and safety regulations concerning the handling of soils with heavy metal content.

Table 6. EDR State and Local Database Report Results

Database	Site Name	Address	Map ID	Page*
LUST	Gillett Property	591 Blue River Parkway	2	5
LUST	Summit County Op Center	200 West 6th Street	4	8
LUST	US West Communications	507 Center Circle	5	10
LUST	Eddie Bears Store	523 Blue River Parkway	6	11
LUST	Freese Oil Co.	491 Blue River Parkway	7	11
LUST	Hudson Chevrolet	441 Blue River Parkway	8	21
LUST	Sav-O-Mat #14	229 Blue River Parkway	13	25
LUST	Hawkinson Property	330 Warren Avenue	14	29
LUST	Acorn Food Store	171 Blue River Parkway	17	34
LUST	Acorn #3301	171 Blue River Parkway	17	36
LUST	AMOCO	120 Blue River Parkway	21	46
LUST	Murray Distributing	265 Brian Avenue	20	44
LUST	Coastal Mart #1284	190 US HWY 6	23	58
LUST	Colorado Mountain Express	273 Warren Avenue	25	61
LUST	Burger King	185 Stephens Way	31	67
LUST	Shamrock 4142	180 Stephens Way	31	67
LUST	Diamond Shamrock 4142	180 Stephens Way	31	69
LUST	Not Reported	180 Stephens Way	31	81
LUST	Buffalo Mountain Metro	100 Adams Avenue	32	82
LUST	Gateway Mazda	201 Buffalo Mountain Drive	33	87
LUST	Rexoco #37	11 Fawn Court	35	89
LUST TRUST	Gillett Property	591 Blue River Parkway	2	5
LUST TRUST	Freese Oil Co.	491 Blue River Parkway	7	11
LUST TRUST	Sav-O-Mat #14	229 Blue River Parkway	13	25
LUST TRUST	Silverthorne Shell	120 Blue River Parkway	21	47
LUST TRUST	Shell Silverthorne	190 US Hwy 6	23	52
LUST TRUST	Colorado Mountain Express	273 Warren Avenue	25	61
LUST TRUST	Shamrock 4142	180 Stephens Way	31	67
LUST TRUST	Gateway Mazda	201 Buffalo Mountain Drive	33	87
UST	Gillett Property	591 Blue River Parkway	2	5
UST	Summit County Op Center	200 West 6th Street	4	8
UST	US West Communications	507 Center Circle	5	10
UST	Freese Oil Co.	491 Blue River Parkway	7	11
UST	Jim Hudson Chevrolet Inc.	441 Blue River Parkway	8	20
UST	Schroeder Dirt Work	347 Adams Street	12	24
UST	Sav-O-Mat #14	229 Blue River Parkway	13	25
UST	Hawkinson Property	330 Warren Avenue	14	29
UST	King Soopers CM 420	336 US Hwy 6	15	31
UST	Waste Management of the Rockies	314 3rd Street	16	31
UST	Acorn Food Store	171 Blue River Parkway	17	34
UST	Southland 7-11	201 Blue River Parkway	17	38
UST	Murray Distributing	265 Brian Avenue	20	44
UST	Skelly Texaco	I-70 Dillon Exit	21	45
UST	Silverthorne Shell	120 Blue River Parkway	21	47
UST	Shell Silverthorne	190 US Hwy 6	23	52
UST	Shamrock 4142	180 Stephens Way	31	68
UST	Buffalo Mountain Metro	100 Adams Avenue	32	82
UST	Gateway Mazda	201 Buffalo Mountain Drive	33	87
UST	P&H Klein Inc.	11 Fawn Court	35	89
LAST	Colorado Mountain Express	273 Warren Avenue	25	61
AST	Gillett Property	591 Blue River Parkway	2	5
AST	Eddie Bears	523 Dillon Avenue	3	6
AST	Summit County Op Center	200 West 6th Street	4	8
AST	Wagner Rents	461 Adams Avenue	9	22
AST	Waste Management of the Rockies	314 3rd Street	16	31
AST	Rental Service Corp.	249 Adams Avenue	19	44
AST	Silver Thorne Maintenance Dept.	264 Brian Avenue	20	45

Database	Site Name	Address	Map ID	Page*
AST	Colorado Mountain Express	273 Warren Avenue	25	62
AST	Comcast Cable	249 Warren Avenue	26	63
AST	United Rentals	191 Adams Avenue	27	63
CO ERNS	Not Reported	229 Blue River Parkway	13	28
CO ERNS	Not Reported	297 Summit Place	28	64
CO ERNS	Not Reported	180 Stephens Way	31	81
AIRS	Freese Oil Co.	491 Blue River Parkway	7	11
AIRS	Sav-O-Mat #14	229 Blue River Parkway	13	28
AIRS	Bold Petroleum	171 Blue River Parkway	17	34
AIRS	Southland 7-11	201 Blue River Parkway	17	37
AIRS	Valero Diamond Metro	180 Stephens Way	30	66
ASBESTOS	Not Reported	457 Blue River Parkway	8	21
ASBESTOS	Not Reported	720 Little Beaver Trail	10	22

*****Page number refers to EDR Report

Additional Data and Information Requirements

The sites listed in Tables 5 and 6 should be included in a Phase I Environmental Site Assessment of potential hazardous material sites within the study area. Most of these sites may eventually be excluded from further Phase II analysis and testing.

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