

3.0 AFFECTED ENVIRONMENT, IMPACTS, AND MITIGATION

This chapter describes the natural, cultural, and social resources in the study area and identifies the potential beneficial and adverse effects that the No Action Alternative and Build Alternative may have on those resources. Analysis includes direct, indirect, and cumulative impacts, defined as follows:

This chapter describes the socioeconomic and natural resources in the study area and identifies the potential beneficial and adverse effects that the No Action Alternative and Build Alternative may have on those resources.

- ❖ Direct impacts are caused by the action and occur at the same time and place (40, Code of Federal Regulations [CFR], Part 1508.8).
- ❖ Indirect impacts “are caused by an action and are later in time or further removed in distance but are still reasonably foreseeable” (40 CFR 1508.8).
- ❖ Cumulative impacts “result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1508.7)

Minimization and mitigation measures are identified for each resource in its respective section.

3.1 Visual Resources

This section summarizes the methodology used to evaluate changes to visual resources within the study area and analysis results. The *Visual Impact Assessment Technical Report* (Jacobs, 2014) provides more detail.

The study team followed the Federal Highway Administration’s (FHWA) manual entitled, *Visual Impact Assessment for Highway Projects* (FHWA, 1988) in the evaluation of potential visual impacts that may occur as a result of the proposed project. Impacts were assessed and are presented according to the following steps:

- ❖ Analyzing existing visual resources and viewer response to determine existing visual quality.
- ❖ Depicting the visual appearance of the Build Alternative.
- ❖ Assessing the visual quality impacts of the Build Alternative.
- ❖ Proposing methods to mitigate adverse visual impacts.

3.1.1 Existing Conditions

Overall Visual Setting

The study area is located within the historic mountain town of Glenwood Springs on the Colorado River at the mouth of Glenwood Canyon. It is located in the city's developed downtown area on both sides of the Colorado River, on the comparatively flatter topography found along the Colorado River corridor and the Roaring Fork Valley (Valley) that stretches south of the city. Sparsely vegetated and rock-faced mountains, including the entry to Glenwood Canyon, can be seen rising up in the near distance, almost entirely surrounding the city. Although the mountains block distant views from most of the study area, more distant views can be experienced looking down the Valley and river corridor. The historic Denver & Rio Grande Railroad tracks run along the south side of the Colorado River and continue to be regularly used. Interstate 70 (I-70) follows along the north side of the river through Glenwood Springs. It is a nationally known scenic interstate highway through Glenwood Canyon that serves as a major regional transportation corridor. The existing Grand Avenue Bridge and adjacent pedestrian bridge link the two sides of the city separated by river, railroad tracks, and I-70.

The view of the Grand Avenue Bridge and pedestrian bridge as seen by I-70 motorists is the principal viewshed within the study area.



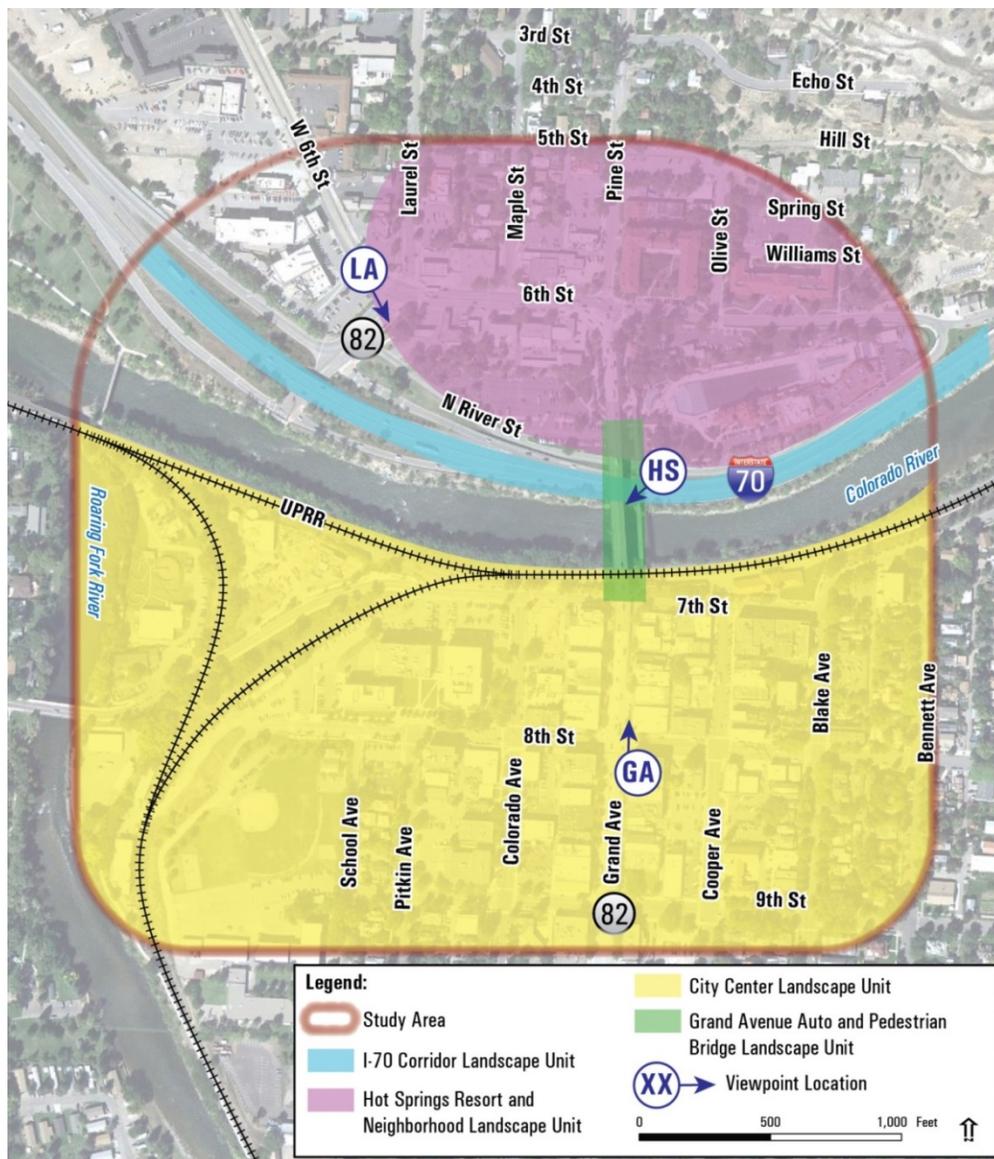
Source: TSH

Regional Setting: Aerial view of study area, looking south.

Existing Visual Resources

The study area’s visual environment can be divided into distinct areas where physical elements like rivers, topography, city skyline, vegetation, roads, and bridges form a visual pattern that affects how people feel about the landscape. The study area’s visual environment was divided into four areas called Landscape Units, which are shown on Figure 3-1 and described in Table 3-1.

FIGURE 3-1. LANDSCAPE UNITS AND SELECTED VIEWPOINTS



Source: Jacobs 2014

TABLE 3-1. DESCRIPTION OF LANDSCAPE UNITS

 <p>View from Grand Avenue and 8th Street looking north toward Grand Avenue Bridge.</p>	<p>City Center Landscape Unit:</p> <ul style="list-style-type: none"> • Within the historic town center south of the Colorado River. • Characterized by views of one- to three-story historic and modern-era commercial buildings and tree-lined streets. • Multistoried buildings transition to one-story residential neighborhoods at the unit's south edge. • Grand Avenue creates a physical and visual barrier through the landscape unit, which has been visually softened by urban design elements like pavers at crosswalks. • Views of the Colorado River are limited by flat topography and dense riverbank vegetation.
 <p>View from the pedestrian bridge northeast toward Glenwood Hot Springs.</p>	<p>Hot Springs Resort and Neighborhood Landscape Unit:</p> <ul style="list-style-type: none"> • Historic Hotel Colorado, Hot Springs, and Lodge combined with park-like mature landscaping create a "resort campus" with unified, vivid, and iconic structures. • Neighborhood northwest of resort area consists of single- and multifamily residential buildings and mature landscaping. • Visual unity disintegrates farther west on 6th Street due to the presence of parking lots, motels, retail shops, and restaurants with mixed contemporary architectural styles. • I-70 introduces a visual intrusion along the south edge of the unit.
 <p>View from 7th Street south of Colorado River looking toward the pedestrian bridge and Grand Avenue Bridge.</p>	<p>Grand Avenue Auto and Pedestrian Bridges Landscape Unit:</p> <ul style="list-style-type: none"> • Grand Avenue Bridge and adjacent pedestrian bridge crossing over 7th Street, the railroad tracks, I-70, and the Colorado River. • Characterized by views of human-made linear transportation structures and the movement of cars and pedestrians across the Colorado River • The bridges offer views of the river, I-70, railroad tracks, Glenwood Hot Springs, Hotel Colorado, and surrounding mountains.
 <p>View from North River Street looking southwest toward Grand Avenue Bridge.</p>	<p>I-70 Corridor Landscape Unit:</p> <ul style="list-style-type: none"> • I-70 highway crosses east-west through the study area. • The highway is wedged between the Colorado River and Glenwood Hot Springs and confined by highway elements, such as guardrails and fencing. • I-70 creates a visual and physical barrier between the historic city center south of the river and historic buildings and neighborhood north of the river.

Viewing Audience

Viewer groups identified in the study are described in Table 3-2, listed from highest to lowest in terms of visual sensitivity. Visual sensitivity is dependent on the frequency and duration of views, as well as visual expectations and relationship to the visual resource.

TABLE 3-2. VIEWER GROUP VISUAL SENSITIVITY

Highest Sensitivity	Residents	Residents view the project for a longer period of time than other viewers. Visual quality of their living environment affects their quality of life.
	Owners/employees/patrons of local commercial/retail/hotel businesses	This group would view the study area while engaging in routine shopping or work commuting activities. Visual quality is important because scenic and historic views attract tourists and generate business.
	Tourists	This group is in the study area for the purpose of sightseeing and recreation.
	River recreationists	The recreation experience of this group is influenced by visual quality.
	Pedestrians and bicyclists	This group views the study area for a long period of time and their experience may be influenced by visual quality.
Lowest Sensitivity	I-70, SH 82, and local motorists	Least sensitive viewers because motorists travel through the study area at higher speeds.

To predict viewers’ response to the Build Alternative visual effects, the study team reviewed plans to identify community goals and policies concerning visual resources in the study area. Key plans and policies are included in Table 3-3 and discussed in more detail in the *Visual Impact Assessment Technical Report* (Jacobs, 2014).

The study team reviewed plans to identify community goals and policies concerning visual resources in the study area.

TABLE 3-3. ADOPTED PLANS WITH VISUAL GOALS AND POLICIES

Adopted Plans	Summary of Visual Goals and Policies
<i>Glenwood Springs Comprehensive Plan</i> (Glenwood Springs, 2011)	This plan acknowledges the value of Glenwood Springs’ scenic natural setting and small town character by implementing zoning, lighting, and land conservation policies to preserve the area’s high visual quality.
<i>Garfield County Comprehensive Plan 2030</i> , (Garfield County, 2010)	This plan recognizes the importance of preserving the visual quality of the county for its residents and visitors with policies and guidelines that protect natural and scenic resources, wildlife and native vegetation. It also includes policies to minimize light pollution and ensure compatibility of new developments with adjacent land uses.
<i>A Redevelopment Strategy for the Confluence Area</i> (City of Glenwood Springs, 2003)	This report notes the importance of protecting the area’s river resources and mountain views, which are important community amenities.
<i>I-70 Mountain Corridor Aesthetic Guidance</i> (CDOT 2013)	This guidance provides an aesthetic vision for the entire I-70 corridor to guide the design of future interstate highway improvements. The proposed project is not part of the I-70 Mountain Corridor project; however, because the Grand Avenue Bridge and adjacent pedestrian bridge cross over I-70, the guidelines, goals, and objectives in the guidance are relevant, including the following excerpts: <ul style="list-style-type: none"> Glenwood Springs is a gateway that provides a sense of entry or arrival to key portions of the I-70 corridor. The east entrance to Glenwood Springs serves as a “front door” to Glenwood Springs, a community destination. Special features of Glenwood Springs include dramatic views across Glenwood Springs and close range views into Glenwood Canyon; historic buildings and accommodations, such as the Glenwood Hot Springs; the city’s railroad and mining history; and the shift in I-70 views from a rural to urban environment.

The study team also reviewed comments received from agencies and members of the public. Comments indicated that views of surrounding mountains are important, new bridges should be attractive and fit in with the area's look and historic context, and areas under bridges should be pleasant and inviting.

Existing Visual Quality

Because it is not feasible to analyze all the views from which the proposed project would be seen, it is necessary to select key viewpoints that represent landscape units, consider views of sensitive viewers, and clearly display the visual changes resulting from the proposed project. Three key views were selected: Grand Avenue (GA), Hot Springs (HS), and Laurel Street (LA). These views are shown on Table 3-4.

Visual quality for the three key viewpoints was ranked on a scale of very low to very high, as shown on Table 3-4. Then, viewpoint rankings were combined to determine the overall existing visual quality in the study area. The quality rating was measured by the strength of the visual vividness, intactness, and unity, as defined below:

- ❖ **Vividness** is the extent to which a landscape is memorable. For example, the Space Needle in the Seattle skyline or the granite domes in Yosemite are vivid elements in the landscape.
- ❖ **Intactness** is the integrity of visual order in a landscape. For example, the visual repetition of trees along a city block provides visual order and contributes to the visual intactness. Missing trees or non-unified tree species may degrade intactness.
- ❖ **Unity** is visual coherence and harmony. A modern bridge in an historic district may be a visual intrusion, but sensitive design may help it to harmonize with the existing landscape.

Based on the visual quality ratings for the representative viewpoints, the study area's overall existing visual quality was assessed as Moderately High.

3.1.2 Visual Impacts

This section describes anticipated changes to visual quality as a result of the No Action and Build Alternatives. Note that the visual simulations presented in this section were created during the development of the Build Alternative and shared with the public and stakeholders to gain input on the options and determine what was liked and not liked about the options. The project materials, light fixtures, colors, and other aesthetic features shown in the visual simulations are not necessarily representative of the final bridge design. However, they do represent examples of aesthetic treatment options that would be considered during the final design process to mitigate visual impacts.

TABLE 3-4. VISUAL QUALITY AT KEY VIEWPOINTS

	<p>Grand Avenue Viewpoint (Viewpoint GA) This viewpoint illustrates typical views of owners/employees/patrons of local commercial/retail/hotel businesses, tourists, pedestrians and bicyclists, local motorists looking north toward the Grand Avenue Bridge.</p> <p>Quality:</p> <ul style="list-style-type: none"> • <u>Moderately High vividness</u>: distinct historic architecture, unique street pattern (bridge touchdown), and distinctive mountain background. • <u>Moderate/Average intactness</u>: human-made elements visually encroach on undisturbed hillside background, roadway is well-defined, but the buildings along the roadside present a mixed pattern. • <u>Moderate/Average unity</u>: natural hillsides combined with commercial development and road pavement do not form a coherent harmonious visual pattern.
	<p>Hot Springs Viewpoint (Viewpoint HS) This viewpoint illustrates the view of employees and tourists at the Glenwood Hot Springs, bicyclists and local motorists traveling on North River Street, and westbound I-70 motorists.</p> <p>Quality:</p> <ul style="list-style-type: none"> • <u>High vividness</u>: pedestrian bridge superstructure is unique and memorable, linear lines of the pedestrian bridge contrast with distant hillsides but bridge color blends with hillside color to minimize intrusion; hillside views are striking and memorable. • <u>High intactness</u>: hillside is undisturbed; highway elements visually encroach on that pattern, although the pedestrian bridge color blends with the hillside; landscaping presents a defined visual pattern. • <u>High unity</u>: natural hillside and highway elements do not form a coherent visual pattern; however, the roadway draws the eye toward the hillsides in the distance, and the trees soften the linear lines of the bridge and create a visual link to the natural landscape.
	<p>Laurel Street Viewpoint (Viewpoint LA) This viewpoint illustrates views of local motorists, employees/patrons of area commercial and retail establishments, tourists, and bicyclists/pedestrians in the western area of the Hot Springs Resort and Neighborhood Landscape Unit.</p> <p>Quality:</p> <ul style="list-style-type: none"> • <u>Moderately/Average vividness</u>: roads, commercial landscaping, commercial buildings, and background views of the hills are very typical and not particularly memorable or striking. • <u>Moderate/Average intactness</u>: human-made elements contrast with the undisturbed hillside in the background, although, large mature landscaping helps blend natural and urban elements. • <u>Moderate/Average unity</u>: urban elements visually intrude on hillside views, but landscaping helps link the contrasting elements.

No Action Alternative

The No Action Alternative would not result in direct or construction visual impacts beyond those associated with implementation of future urban development and redevelopment. Indirect visual effects resulting from the No Action Alternative would include views of congested traffic on the Grand Avenue Bridge, at the Pine Street/6th Street intersection, and the Laurel Street/6th Street (6th and Laurel) intersection as traffic continues to increase over time.

Indirect visual effects resulting from the No Action Alternative would include views of increased traffic congestion.

Build Alternative

The Build Alternative design would include aesthetic treatments to blend with the historic and mountain context of the study area (illustrations of aesthetic treatments are in Section 3.1.4). However, visual impacts were assessed based on basic forms and color, and Build Alternative elements were assumed to have a concrete (or neutral) color with no design enhancements, such as earth-tone finishes and texture. This allowed for an objective assessment of the different bridge structure types considered based on worst case scenarios. Refer to the *Visual Impact Assessment Technical Report* (Jacobs, 2014) for details.

The major visual elements of the Build Alternative are:

- ❖ **Replace the existing Grand Avenue Bridge** with a wider highway bridge with four lanes and shoulders. The new Grand Avenue Bridge would curve west as it crosses the Colorado River, moving its northern touchdown point to the west near the proposed roundabout intersection at 6th and Laurel. The bridge would have solid concrete side barriers approximately 32 inches in height. Shielding may be used on side barriers for the portion of the bridge approaching and along Grand Avenue to prevent splash back from the bridge on sidewalks and pedestrians along Grand Avenue, with the added benefit of noise reduction. The new Grand Avenue Bridge would not have an overhead structure, and the existing bridge pier located in the river would be removed. Design of the Grand Avenue Bridge would focus on simplicity and functionality.
- ❖ **Replace existing pedestrian bridge with a new bridge** that would cross the Colorado River in a similar location as the existing bridge, with the northern touchdown point located slightly west of the existing touchdown point. The new bridge would be flatter and wider than the existing bridge with a concrete surface, and would have no piers in the center of the river. It would not have above deck truss structures like that on the existing pedestrian bridge. The deck of the new bridge would be approximately the same height as the existing bridge. The bridge would include pedestrian overlooks, either solid or open rail type of approximately eight feet high

per requirements of the American Association of State Highway and Transportation Officials (AASHTO) requirements, and lighting along the bridge and at bridge connections. The connection at 7th Street would be a stairway and dual elevators east of the bridge, and 6th Street would connect to the bridge via ramps.

- ❖ **Replace the existing 6th and Laurel intersection** with a new roundabout intersection that would accommodate traffic on Laurel Street, 6th Street, I-70 exit, and the new Grand Avenue Bridge.



Photo simulation of aerial view of new highway and pedestrian bridges, and 6th and Laurel roundabout, looking east.

Source: TSH

Anticipated visual changes to the study area's Landscape Units are described in Table 3-5.

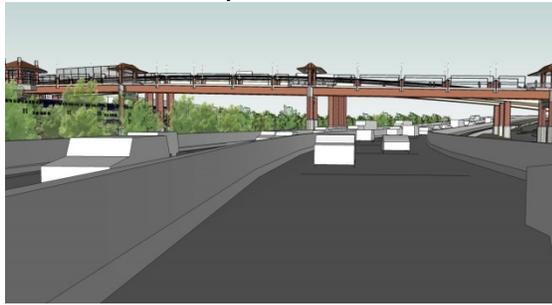
3.1.3 Visual Quality Rating Changes for Selected Viewpoints

The study team evaluated visual changes at the selected viewpoints within the Landscape Units to assess visual impacts. The visual impacts for each viewpoint are described in Table 3-6.

TABLE 3-5. VISUAL CHANGES BY LANDSCAPE UNIT

<p>City Center Landscape Unit</p>  <p>Rendering of view under the Grand Avenue Bridge at 7th Street looking south. Source: Jacobs.</p>  <p>Visual simulation of pedestrian view from west side of Grand Avenue looking northeast toward bridge. Source: 200 Inc. and Jacobs.</p>	<p>The Build Alternative would introduce visual changes and new visual elements to this landscape unit, but overall the proposed improvements would have minimal visual changes and would enhance visual quality.</p> <ul style="list-style-type: none"> ▪ 7th Street at Grand Avenue: New Grand Avenue Bridge design options include changes in pier location and flattening of slope under bridge adjacent to 7th Street to create a more open area under the bridge. Also, the existing Grand Avenue wing street east of the bridge would be removed to accommodate the wider bridge and create a wider pedestrian/sidewalk area along the east side of Grand Avenue. These proposed changes would create more open and improved views under Grand Avenue Bridge at 7th Street, improving visual quality and providing opportunities for the City of Glenwood Springs to develop plaza areas and aesthetic improvements (see simulation to the left). ▪ Pedestrian views on Grand Avenue: A slightly higher bridge structure along Grand Avenue would block views across Grand Avenue to a greater degree than the existing bridge. The wider bridge and roadway would move closer to the commercial buildings north of 8th Street along both sides of Grand Avenue, resulting in narrower sidewalks and making the bridge a more dominant visual feature for tourists, bicyclists and pedestrians, and employees/patrons. ▪ Resident Views along Grand Avenue between 7th and 8th Streets: would change for upper-story residents living above the commercial businesses along Grand Avenue near 7th Street. The new bridge curving to the west would partially block views of the river and riverbank vegetation, and create views of a longer bridge. The new pedestrian bridge would have a stronger visual presence than the existing pedestrian bridge.
<p>Hot Springs Resort and Neighborhood Landscape Unit</p> <p>(No rendering prepared)</p>	<p>The Build Alternative would increase the visual separation between the park-like atmosphere of this landscape unit and the Grand Avenue transportation facilities. The Build Alternative would strengthen the visual cohesion of the Hot Springs Resort and Neighborhood Landscape Unit and improve its visual quality overall.</p> <ul style="list-style-type: none"> ▪ Resident Views on North Side of River. Grand Avenue Bridge would partially block views of the river for upper-story residents along 6th Street, degrading the visual quality for these viewers. ▪ Grand Avenue Bridge Current North Touchdown Area. The Build Alternative would replace views of the northern end of the existing bridge to views of a more pedestrian-scale and pedestrian-friendly area, improving views of this area for bicyclists and pedestrians, tourists, and patrons/employees at area establishments.

TABLE 3-5. VISUAL CHANGES BY LANDSCAPE UNIT

<p>Grand Avenue Auto and Pedestrian Bridges Landscape Unit</p>  <p>Rendering of new Grand Avenue Bridge from west side of bridge looking east. Source: Jacobs.</p>	<p>The new bridges would become more visually prominent in this landscape unit. The aesthetic and context-sensitive elements that would be incorporated into the design of the new bridges would improve the overall visual quality of this area.</p> <ul style="list-style-type: none"> ▪ Grand Avenue Bridge. Would create views of a wider highway bridge. The approximately 32-inch-high solid side barrier would not block motorists' views from the bridge. Simpler design makes bridge visually subordinate to new pedestrian bridge. Overall visual quality of the Grand Avenue Bridge would improve. ▪ New Pedestrian Bridge. Views of historic buildings, the river, distant hills, and Glenwood Canyon entrance would improve because the new bridge would not have above deck truss structures like that on the existing pedestrian bridge and pedestrian overlooks would be provided. Dual elevators/stairway at south bridge connection would result in minimal visual changes to viewers along 7th Street. They would not intrude on existing views across the river, and views of distant hills and Glenwood Canyon entrance would be largely unaffected. ▪ River Recreationist Views. Removal of highway bridge pier in middle of river would improve views for river recreationists.
<p>I-70 Corridor Landscape Unit</p>  <p>Visual simulation of I-70 traveler views of bridges looking west. Source: TSH</p>	<p>The visual quality of this landscape unit overall would improve as a result of the Build Alternative.</p> <ul style="list-style-type: none"> ▪ I-70 Highway. I-70 would remain visually intact as a linear highway, continue to contrast with its natural surroundings, and continue to create a visual and physical barrier between the areas of the city north and south of the river. ▪ Pedestrian Bridge. The new pedestrian bridge would create a gateway to Glenwood Springs for I-70 motorists and train passengers.
<p>Visual Elements in Multiple Landscape Units</p> <p>(No rendering prepared)</p>	<ul style="list-style-type: none"> ▪ Landmarks. Changed views to and from historic buildings along Grand Avenue between 7th and 8th streets due to taller bridge. Pedestrian bridge would be slightly more visually prominent to historic landmarks. Views of new Grand Avenue Bridge would be reduced for Glenwood Hot Springs and Lodge and Hotel Colorado employees and visitors because it would curve away from these historic landmarks. ▪ Cut and Fill Walls. Walls would be located in at the new Grand Avenue Bridge touchdown areas, the pedestrian bridge abutments, pedestrian bridge accesses north of the river, pedestrian tunnel southeast of the roundabout, and along the I-70 on ramp. These walls would be located within several landscape units and would be seen by all viewer groups to varying degrees. Walls range between 2.5 feet and 25 feet in height, and 15 feet to 562 feet in length. ▪ Nighttime Lighting or Glare. Lighting on bridges and street lighting at new 6th and Laurel roundabout intersection would potentially increase light glare and sky glow during nighttime hours over current conditions.

SH 82 GRAND AVENUE BRIDGE

TABLE 3-6. VIEWPOINTS VISUAL QUALITY RATINGS

Viewpoint GA – Grand Avenue and 8th Street looking north toward Grand Avenue Bridge: Before View



Source: TSH.

Viewpoint GA – Grand Avenue and 8th Street looking north toward Grand Avenue Bridge: After View



Source: 200 Inc.

Grand Avenue Viewpoint Visual Quality Rating

- Visual change would be barely discernible.
- Views of the historic buildings and distant hillsides would remain memorable and unchanged.
- Improvements would not change existing visual patterns.
- Vividness, intactness, and unity would not change.
- Overall visual quality rating would remain moderate/average.
- Viewer response is predicted to be neutral.

TABLE 3-6. VIEWPOINTS VISUAL QUALITY RATINGS

Viewpoint HS – North River Street looking southwest toward Grand Avenue Bridge: Before View



Source: Jacobs.

Viewpoint HS – North River Street looking southwest toward Grand Avenue Bridge: After View



Source: Jacobs.

Hot Springs / I-70 Traveler Viewpoint Visual Quality Rating

- Minimal visual change.
- The new pedestrian bridge design would be unique and memorable.
- The new pedestrian bridge would continue to be visually prominent and intrude on views of distant hills similar to the existing bridge.
- Background hillsides would continue to dominate the view.
- Vividness would remain high, and the intactness and unity would be slightly reduced but remain high.
- Would remain a high overall visual quality rating.
- Viewer response is predicted to be neutral.

TABLE 3-6. VIEWPOINTS VISUAL QUALITY RATINGS**Viewpoint LA** – 6th Street and Laurel Street looking southeast toward proposed roundabout: Before

Source: Jacobs.

Viewpoint LA – 6th Street and Laurel Street looking southeast toward proposed roundabout: After View

Source: Jacobs.

6th Street and Laurel Street Viewpoint Visual Quality Rating

- Roadways would continue to dominate the view.
- Removal of landscaping would remove visual link to natural hillsides in the background, but would open up more views of the hillsides.
- Distant hillside and roadway would continue to be competing visual elements, but to a greater degree than existing conditions.
- Vividness and intactness would remain moderate/average, and unity would be reduced to moderately low.
- Visual quality rating would be reduced but remain moderate/average.
- Overall visual quality would remain moderately high.
- Viewer response is predicted to be neutral.

Based on the visual quality ratings for each of the selected viewpoints, the study team determined that, with implementation of mitigation measures outlined in Section 3.1.4 *Visual Mitigation*, the Build Alternative would result in a moderate visual change. A moderate visual change means that a moderate negative change to the visual resource with moderate viewer response would occur, and that the visual impact can be mitigated within five years using the conventional practices described in Section 3.1.4 *Visual Mitigation*. Therefore, the study area’s overall existing visual quality would remain Moderately High after construction of the Build Alternative.

Consistency with Area Plans and Public and Agency Comments

The Build Alternative would be consistent with area plans and public and agency comments, as shown in Table 3-7.

TABLE 3-7. CONSISTENCY WITH AREA PLANS AND PUBLIC AND AGENCY COMMENTS

Consistency with Area Plans	The Build Alternative would be consistent with visual and scenic preservation policies in area plans because it would have minimal visual intrusion on views of surrounding hillsides, Glenwood Canyon entrance, and historic structures, and would include aesthetic treatments for the pedestrian bridge that are compatible with the area’s small town character and historic setting that will be considered during final design. Vegetated areas will be protected during construction and disturbed areas will be revegetated and restored. Wildlife and river resources will be protected during construction. Further, lighting fixtures that minimize nighttime glare and sky glow will be considered in the final design. As such, the area’s scenic views and small town character would be preserved and light pollution minimized. The design of the pedestrian bridge would be consistent with I-70 Mountain Corridor Aesthetic Guidance to create sense of entry or arrival into Glenwood Springs.
Consistency with Public/Agency Comments	The Build Alternative would be consistent with public and agency comments for the following reasons: <ul style="list-style-type: none"> ▪ It would minimally intrude upon views of surrounding mountains and Glenwood Canyon entrance, and would maintain scenic views. ▪ Views from Grand Avenue businesses under or adjacent to the bridges were considered by minimizing the bridge width in the 700 block of Grand Avenue and creating more open space under the bridge at 7th Street. This also addressed public comments requesting that the area underneath the bridges be pleasant and inviting. ▪ The pedestrian bridge would create a gateway to Glenwood Springs. During final design, aesthetic treatments that are compatible with the historic setting of the area will be considered.

Indirect and Construction Impacts

Indirect and construction impacts from the Build Alternative are expected, as described in Table 3-8.

TABLE 3-8. INDIRECT AND CONSTRUCTION IMPACTS

<p>Indirect Impacts</p>	<ul style="list-style-type: none"> ▪ City Center Landscape Unit. Would provide opportunities for the City of Glenwood Springs to develop plaza areas and aesthetic improvements at 7th Street and Grand Avenue, which would improve views under the Grand Avenue Bridge in this area. ▪ Hot Springs Resort and Neighborhood Landscape Unit. Would result in more open views of pedestrian movement and reduced views of traffic at the new 6th and Laurel roundabout intersection. Reduced views of traffic at the existing Grand Avenue Bridge northern touchdown point. ▪ Grand Avenue Auto and Pedestrian Bridges Landscape Unit. Continued views of vehicular and pedestrian traffic moving across bridges. Viewers west of existing bridge would have increased views of bridge traffic; viewers east of existing bridge would have decreased views of bridge traffic. ▪ I-70 Corridor Landscape Unit. Indirect effects from nighttime lighting and glare, as described below. ▪ Visual Elements in Multiple Landscape Units. <ul style="list-style-type: none"> – <u>Landmarks.</u> Viewers from Hotel Colorado and Glenwood Hot Springs and Lodge would experience reduced views of traffic at the Pine Street/6th Street intersection. – <u>Nighttime lighting and glare.</u> Increased car headlight glare at 6th and Laurel intersection. Reduced headlight glare on bridge for Hotel Colorado and Glenwood Hot Springs and Lodge area viewers; increased headlight glare for viewers west and east of the new highway bridge.
<p>Construction Impacts</p>	<ul style="list-style-type: none"> ▪ All viewer groups would experience temporary visual effects from new views of construction equipment operations, construction activities, dust, construction material stockpiling, removal of existing vegetation in construction areas, and light from nighttime construction. ▪ Viewers would experience visual changes caused by construction and use of causeways built to cross the river during construction. In the vicinity of the bridge construction area, river views would change because of removal of existing vegetation along the river bank during construction. ▪ During the approximately 90-day full bridge closure, viewers along the SH 82 Detour route would experience increased views of traffic and increased glare from vehicle headlights. Once the Grand Avenue Bridge is reopened, viewers along the detour route would experience temporary views of construction activities and signage while the detour route is returned to preconstruction conditions.

3.1.4 Visual Mitigation

The Colorado Department of Transportation (CDOT) will use the following measures to minimize and mitigate any adverse visual impacts associated with the Build Alternative.

- ❖ Using the established Context-Sensitive Solutions (CSS) process, CDOT has and will continue to work with stakeholders to identify opportunities for aesthetic treatments in the design of the bridge, roadway, and sidewalk elements to reflect the materials and architectural style of Glenwood Springs' small town character and historic structures, as well as the visual and aesthetic goals and objectives provided in the I-70 Mountain Corridor Aesthetic Guidance.
- ❖ Use open rail type side barriers on the pedestrian bridge to preserve views from the bridge.
- ❖ Preserve existing vegetation where practicable, and revegetate riverbanks with native species as soon as practicable upon construction completion.

- ❖ Use materials and/or aesthetic treatments on bridges to blend with the historic and mountain context of the study area. This would include, but not be limited to, consideration of the following design elements:
 - ◆ Use earth-tone paints and stains and select paint finishes with low reflectivity.
 - ◆ Use natural appearing forms to complement landscape.
 - ◆ Take advantage of natural screening.



View of dual elevators with clock tower aesthetic treatment currently being considered, looking northwest from 7th Street. A preliminary level of design is shown and is subject to modification.

Source: Studio INSITE

- ❖ Develop a lighting plan that balances sometimes conflicting needs, such as:
 - ◆ Compliance with CDOT, Garfield County, and City of Glenwood Springs design standards.
 - ◆ Incorporating lighting fixtures that minimize nighttime glare and sky glow. Where new light fixtures are added, use lamps and/or light shields that direct glare away from the street, buildings, or the sky to minimize glare and sky glow, in accordance with local ordinances. These measures will not preclude any aesthetic ambient lighting features that may be included in the project design.
 - ◆ Incorporating bridge and highway lighting as part of aesthetic treatments.
- ❖ Incorporate landscaping, monuments, entryways, and/or other aesthetic features into the design of the 6th and Laurel roundabout intersection areas to soften views of transportation facilities and create an urban visual environment.
- ❖ Minimize light glare during nighttime construction activities by taking measures to direct the light inward toward the construction site and minimize glare for motorists, pedestrians, and hot springs visitors in the vicinity of the construction site.

Aesthetic treatments for the Build Alternative were developed during the EA process following public and agency input, as shown on Figure 3-2 through Figure 3-6. Some limited variation of the designs shown could still occur depending on EA input, final design evaluations, funding availability, and other project criteria. CDOT's intent is to keep the design as close to that shown as reasonable based on additional input and evaluation.

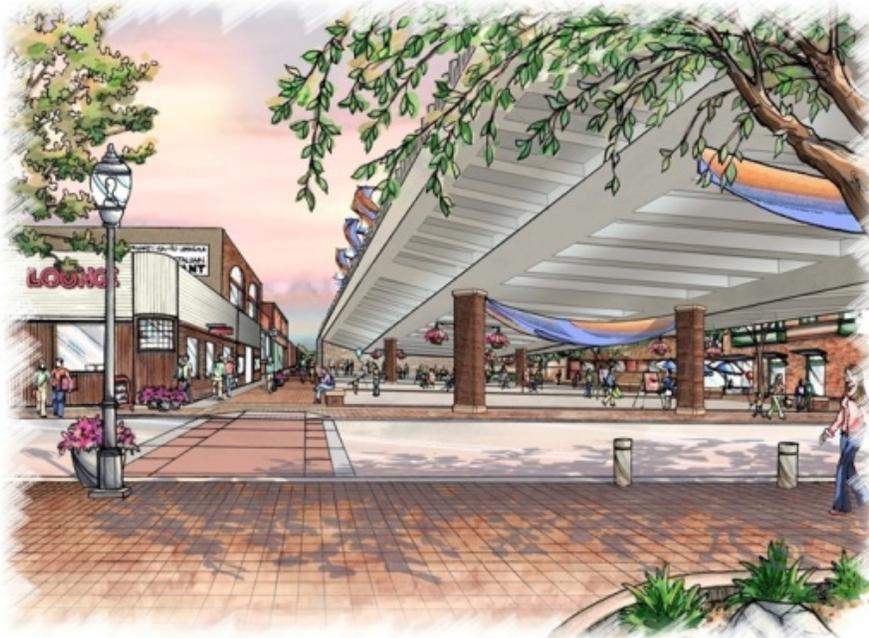
SH 82 GRAND AVENUE BRIDGE

FIGURE 3-2. AESTHETIC TREATMENTS CONSIDERED AT SOUTHERN BRIDGE TOUCHDOWN

View near bridge touchdown area on Grand Avenue.



View from 7th Street looking south along Grand Avenue.



A preliminary level of design is shown and is subject to modification.
Source: Jacobs

FIGURE 3-3. AESTHETIC TREATMENTS CONSIDERED FOR ELEVATOR AND STAIRS

Aesthetic treatment for elevator and stairs at southern pedestrian bridge connection
View Looking North



Aerial View Looking Southeast

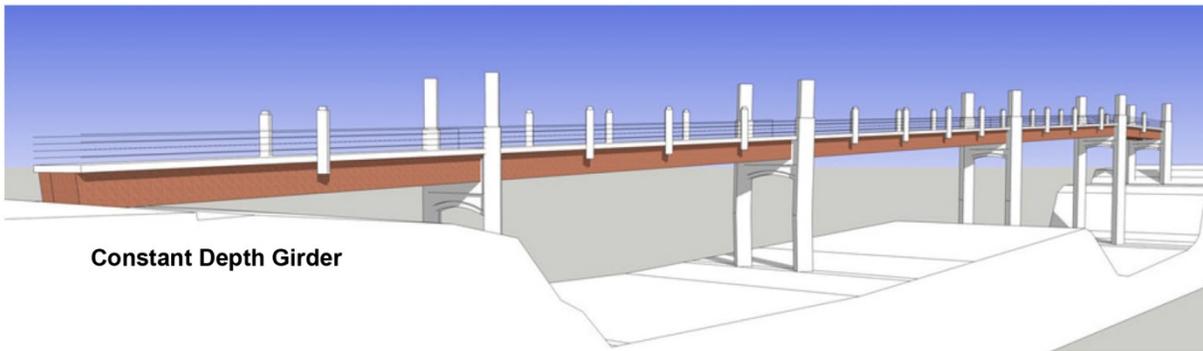


A preliminary level of design is shown and is subject to modification.

Source: Studio INSITE

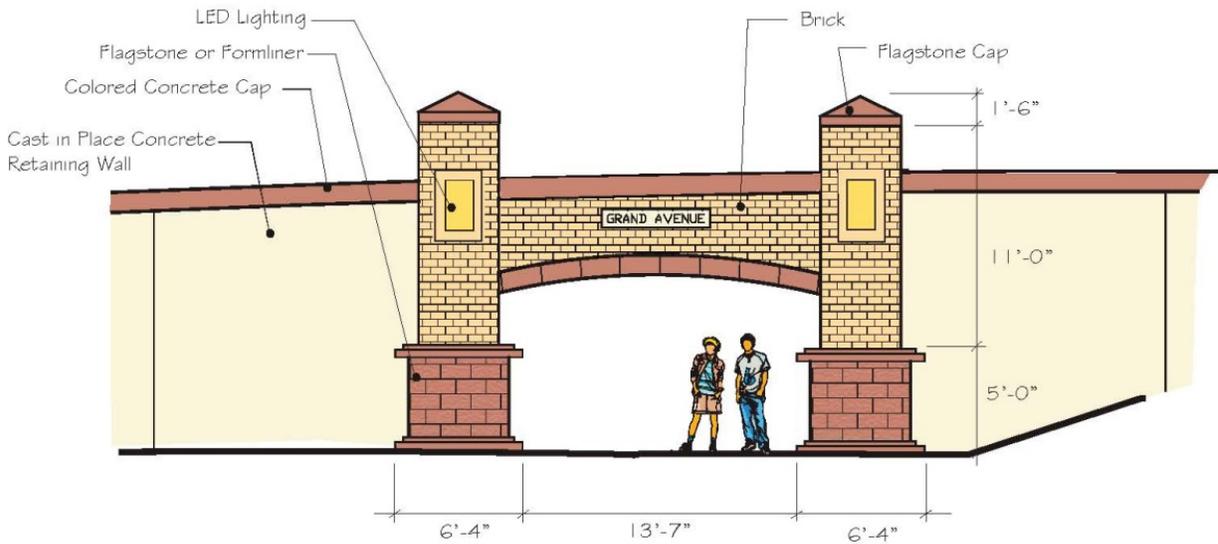
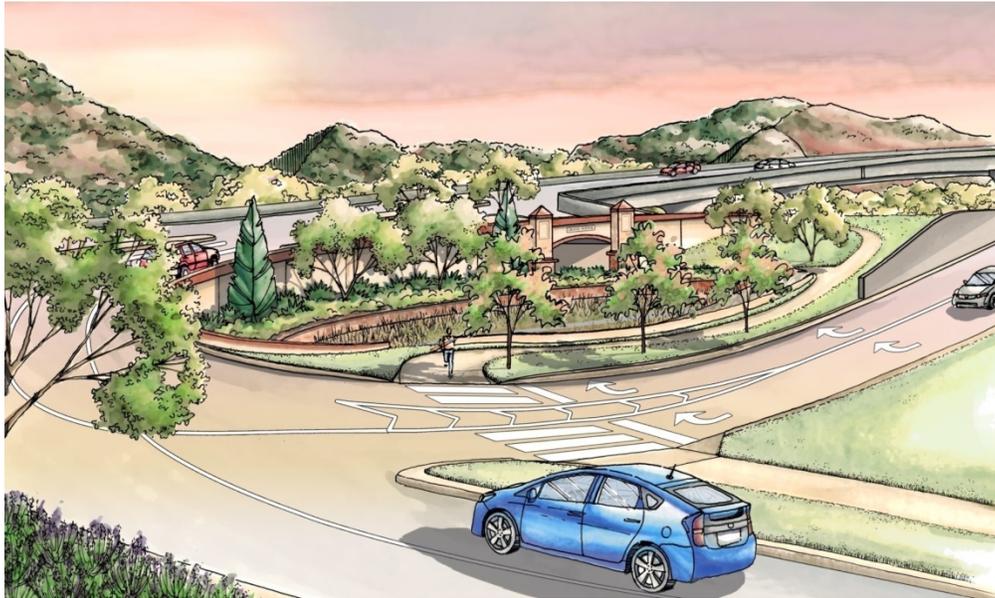
SH 82 GRAND AVENUE BRIDGE

FIGURE 3-4. AESTHETIC TREATMENTS CONSIDERED FOR PEDESTRIAN BRIDGE



A preliminary level of design is shown and is subject to modification.
Source: Studio INSITE

FIGURE 3-5. AESTHETIC TREATMENTS CONSIDERED FOR PEDESTRIAN UNDERPASS



A preliminary level of design is shown and is subject to modification.

Source: Jacobs

FIGURE 3-6. AESTHETIC TREATMENTS CONSIDERED FOR RETAINING WALLS

Natural stone wall



Stone wall or storm form liner



Glenwod Canyon form liner or sandblast



Source: Jacobs

3.2 Transportation

This section describes the existing and future transportation conditions for the study area. It describes existing and future traffic demand, the permanent transportation impacts of the No Action Alternative and the Build Alternative, their compatibility with existing transportation plans, and proposed mitigation.

3.2.1 Existing Conditions

Roadways

Major roadways in the study area are shown in Figure 3-7 and include:

- ❖ State Highway (SH) 82 /Grand Avenue
- ❖ US 6 (W. 6th Street)
- ❖ 6th Street
- ❖ I-70
- ❖ Midland Avenue
- ❖ 27th Street
- ❖ North River Street
- ❖ Laurel Street
- ❖ Maple Street
- ❖ Pine Street
- ❖ 7th Street
- ❖ 8th Street
- ❖ Grand Avenue wing street (Where Grand Avenue begins to rise up to cross over the railroad tracks and river, a narrow northbound lane of Grand Avenue remains at-grade and runs along the east side of the bridge to provide access to 7th Street. This lane is locally referred to as “wing street,” and is called the Grand Avenue wing street throughout this document.)

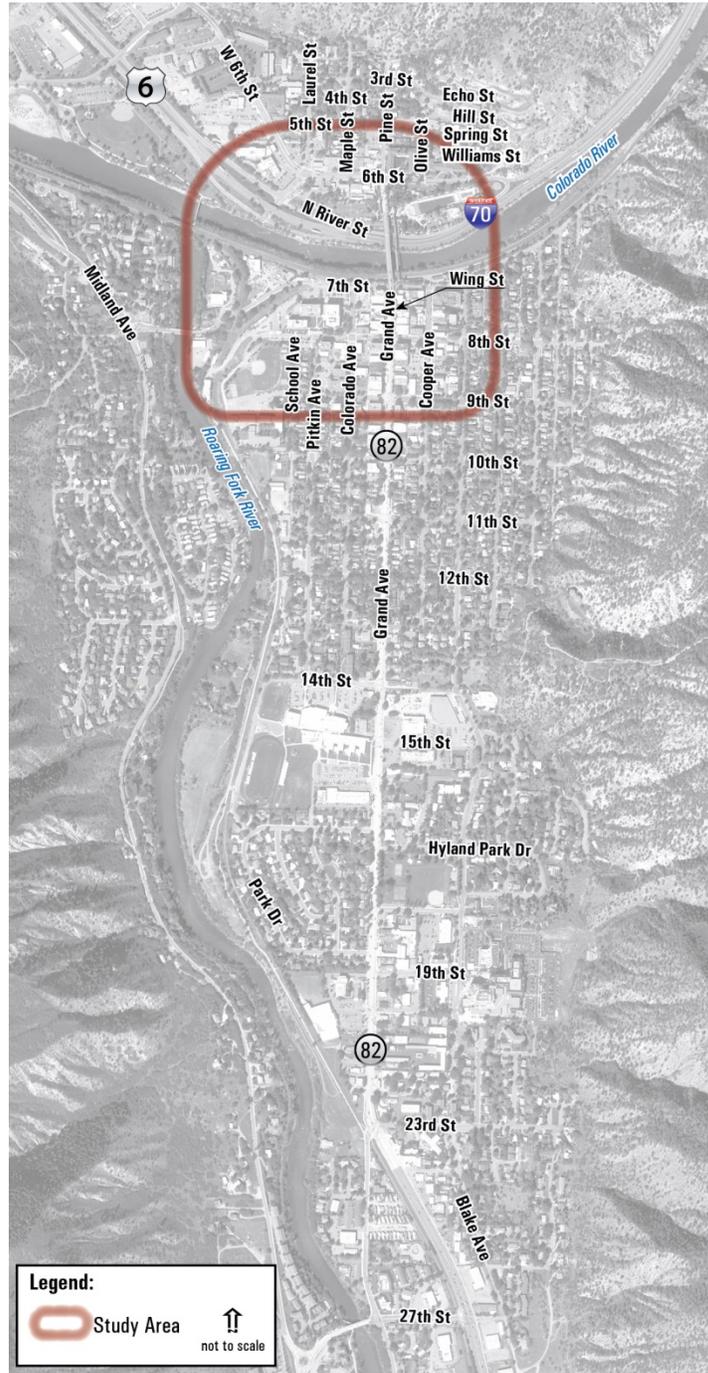
2012 Existing Traffic and Traffic Operations Analysis

Existing peak hour traffic counts were collected for 2012 conditions for the intersections in the study area. Peak hour refers to the hours when the highest levels of traffic occur (for this study area, from 7:00 a.m. to 8:00 a.m. and 5:00 p.m. to 7:00 p.m.). Traffic and turn movement counts were collected at the following intersections:

- ❖ 6th Street/Pine Street
- ❖ 6th Street/Laurel Street
- ❖ North River Road/North River Street

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-7. STUDY AREA ROADWAYS



Source: Jacobs, 2014.

- ❖ I-70 Westbound Ramps/SH 82
- ❖ I-70 Eastbound Ramps/SH 82
- ❖ 8th Street/Grand Avenue

The traffic operations analysis is based on level of service (LOS) calculations conducted in accordance with the *Highway Capacity Manual 2010*

(Transportation Research Board, 2010). LOS is a term used to describe the operating performance of an intersection or roadway. The operation is described by a letter designation from "A" to "F," with LOS A representing essentially uninterrupted flow with minimal delays and LOS F representing a breakdown of traffic flow with excessive congestion and delay. Typically, operations at LOS D or better for peak periods are considered to be operating acceptably, while intersections and roadways operating at LOS E or F are in need of improvement. Figure 3-8 shows the LOS categories for signalized and unsignalized/roundabout intersections.

Typically, operations at LOS D or better for peak periods are considered to be operating acceptably.

Existing traffic conditions (2012) were analyzed using Highway Capacity Software 2010. The results of the analyses and existing turn movement counts are presented in Figure 3-9. Intersections currently operate at acceptable LOS, ranging from LOS A to LOS C. Freeway and ramp merge/diverge operations also operate well at LOS A or B. However, the traffic LOS analysis does not reflect some existing issues with the I-70 Exit 116 ramps to and from the east. On some afternoons in the summer season, traffic queues on the westbound off ramp spill onto the I-70 mainline. This is caused by queues farther downstream on SH 82, particularly at the 6th and Laurel intersection. Refer to *Safety* section below, Figure 3-10, and the *I-70 Exit 166 Off Ramp Queueing* memo in Appendix B for more information.

Also, the piers adjacent to the eastbound I-70 shoulder limit the length of the on ramp and the merge/taper area, resulting in insufficient distance to merge onto I-70 eastbound. This problem is worsened by reduced sight lines caused by the horizontal and vertical curves of mainline I-70 and the on ramp. Currently, the distance from the end of the ramp to the bridge piers is approximately 300 feet, making the acceleration/merge area less than 150 feet. This length only allows a driver about four to five seconds to decide if there is acceptable space to merge into I-70 traffic. This distance is about half of the current standard, which is a minimum of 300 feet of acceleration/merge distance for a 50 mph design speed.

FIGURE 3-8. INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

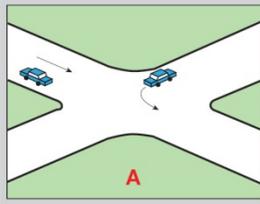
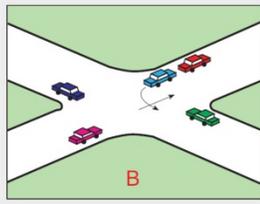
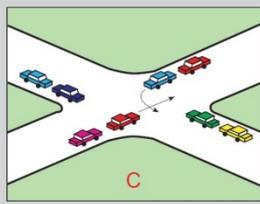
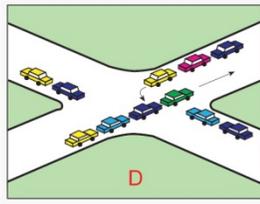
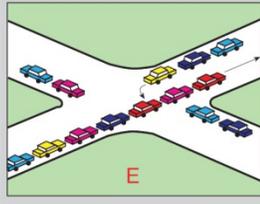
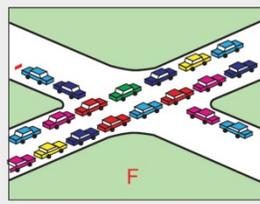
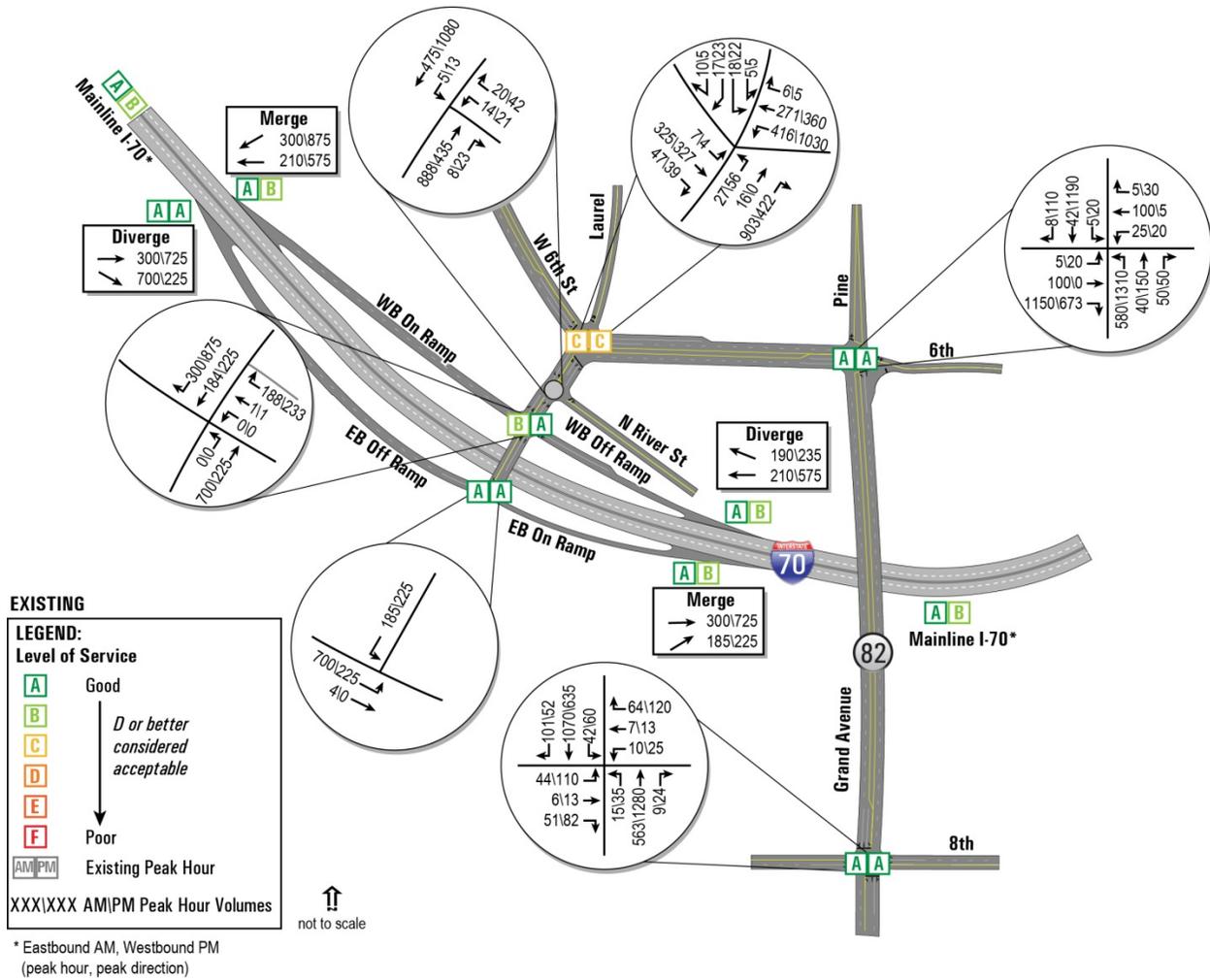
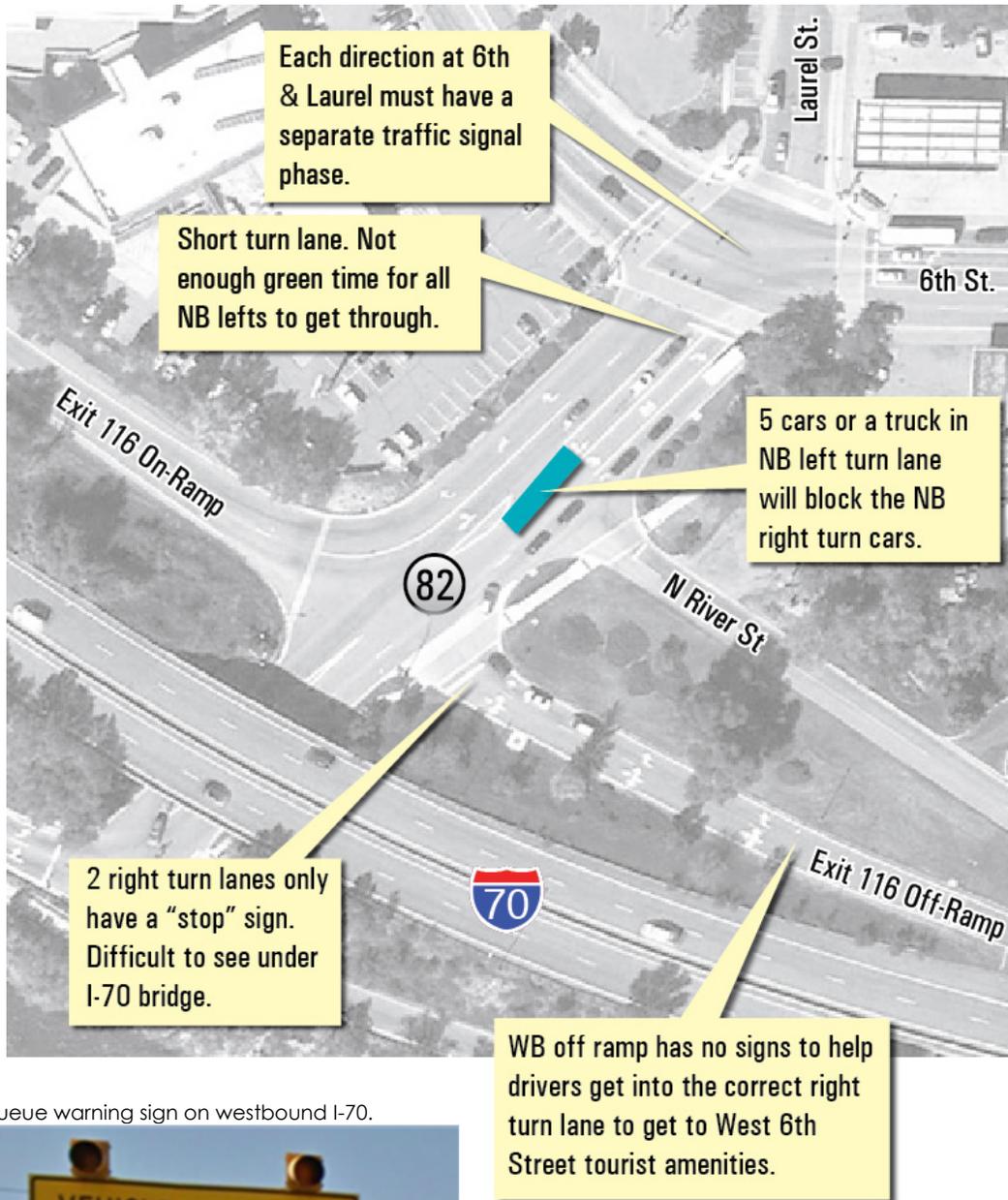
LOS	Unsignalized / Roundabout Intersections	Signalized Intersections	
A	No delays at intersections with continuous flow of traffic. High frequency of gaps available for turning traffic. No observable queues. AVERAGE VEHICLE DELAY OF 0-10 SECONDS.	No vehicle waits longer than one signal indication. AVERAGE VEHICLE DELAY OF 0-10 SECONDS.	
B	Similar to LOS A, with slightly longer average delays. AVERAGE VEHICLE DELAY OF 10-15 SECONDS.	On a rare occasion, vehicles wait through more than one signal indication. AVERAGE VEHICLE DELAY OF 10-20 SECONDS.	
C	Moderate delays at intersections with satisfactory to good traffic flow. Light congestion; infrequent backups on critical approaches. AVERAGE VEHICLE DELAY OF 15-25 SECONDS.	Intermittently, vehicles wait through more than one signal indication, occasionally backups may develop, traffic flow still stable and acceptable. AVERAGE VEHICLE DELAY OF 20-35 SECONDS.	
D	Probability of delays along every approach. Significant congestion on critical approaches, but intersection functional. Moderate queues observed. AVERAGE VEHICLE DELAY OF 25-35 SECONDS.	Delays at intersections may become extensive, but enough cycles with lower demand occur to permit periodic clearance, preventing excessive backups. AVERAGE VEHICLE DELAY OF 35-55 SECONDS.	
E	Heavy traffic flow condition. Heavy delays probable. Very limited available gaps for cross-street traffic or main street turning traffic. Limit of stable flow. AVERAGE VEHICLE DELAY OF 35-50 SECONDS.	Very long queues may create lengthy delays. AVERAGE VEHICLE DELAY OF 55-80 SECONDS.	
F	Unstable traffic flow. Heavy congestion. Traffic moves in forced flow condition. Average delays greater than one minute highly probable. AVERAGE VEHICLE DELAY OF MORE THAN 50 SECONDS.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a "gridlock" condition. AVERAGE VEHICLE DELAY OF MORE THAN 80 SECONDS.	

FIGURE 3-9. EXISTING (2012) PEAK HOUR TRAFFIC CONDITIONS



SH 82 GRAND AVENUE BRIDGE

FIGURE 3-10. WESTBOUND OFF RAMP QUEUEING ISSUES



Queue warning sign on westbound I-70.



Safety

CDOT performed an assessment of the existing safety conditions in the study area. The complete assessment is included in Appendix B.

The assessment area included the intersections and roadways evaluated for traffic operations—SH 82 from the Exit 116 I-70 interchange south across the existing Grand Avenue Bridge, and ending at 9th Street. Crash data for five years (2008 to 2012) was used to assess safety issues. Along the study segment, there were 361 crashes reported (approximately 70 to 75 per year); 2.5 percent of these resulted in injuries, and there were no fatalities. The number of crashes is high when compared to other similar type facilities. The most notable crash types include rear end crashes and side swipes.

Existing physical conditions that contribute to the higher-than-average crash rate in this segment of SH 82 include:

- ❖ The existing Grand Avenue Bridge carries four traffic lanes in a paved width of less than 40 feet (9-foot, 4-inch lanes). Many large vehicles take up both lanes when crossing the bridge because of the narrow lanes. The narrow lane widths contribute to the Side-Swipe (Same Direction and Opposite Direction) and Fixed-Object crashes.
- ❖ The two turns on the SH 82 route require double-right or double-left turns in a constrained area. Trucks, buses, and other large vehicles often use both lanes when making these turns, which contributes to the Side-Swipe (Same Direction and Opposite Direction) and Fixed-Object crashes.

The Exit 116 off ramp length is constrained by the existing Grand Avenue Bridge pier, so the vehicle queue has spilled into the right mainline lane of I-70. The bridge pier also obstructs the view of this queue because of the I-70 curve. CDOT installed a warning sign about 0.5-mile in advance of this queue location, and the crash data for 2008 to 2012 shows only one crash that

Along the study segment, an average of 70 to 75 crashes was reported per year from 2008 through 2012; this is high when compared to other similar transportation facilities.

Trucks struggle to maintain their lane.



Parking lot bridge debris warning.





SH 82 GRAND AVENUE BRIDGE

may have been attributed to this vehicle queue issue. However, the situation is still inherently unsafe regardless of the warning sign. The issues that contribute to these queues are illustrated in Figure 3-10.

- ❖ Structural issues related to the age of the bridge. Pieces of bridge deck and of the metal bridge railing have fallen in the Glenwood Hot Springs parking lot. When this happens, Glenwood Hot Springs closes portions of parking directly beneath the bridge and posts warning signs.

Traffic Forecasts

As stated in Chapter 1.0 *Purpose and Need*, plans to replace or rehabilitate the aging Grand Avenue Bridge extend back to the early 1990s, and the bridge has been a subject of numerous plans in the meantime.

Also, during the course of this study, the City of Glenwood Springs (City) and CDOT adopted the *SH 82 Access Control Plan* (City of Glenwood Springs, 2013) to define future (upon redevelopment) property access points along the SH 82 corridor. The study team coordinated closely with the SH 82 Access Control Plan team to ensure compatibility between the two projects.

Transit

Two Roaring Fork Transportation Authority (RFTA) bus lines currently serve the study area – the Ride Glenwood Springs route and Valley Bus Service. The Ride Glenwood Springs route provides local service within the City and has a stop within the study area at 6th Street and Maple Street. The Valley Bus Service route has stops just outside the study area, but uses Grand Avenue south of the river and Grand Avenue wing street to access 7th Street and west Glenwood Springs.

3.2.2 Transportation Impacts

Traffic Projections

Travel demand forecasts and historic trends were used to develop traffic projections for 2035. The year 2035 is the planning horizon for this *SH 82 Grand Avenue Bridge Environmental Assessment* (EA), meaning that the improvements proposed as part of the Build Alternative have been designed to accommodate travel demand at least until 2035. In 2006 and 2010, CDOT and the City produced 2030 travel demand forecasts for the *SH 82 Corridor Optimization Study* (<http://www.ci.glenwood-springs.co.us/departments/publicworks/engineering/SH%2082%20COS%20Final%20Report.pdf>) (City of Glenwood Springs, 2006) and the *SH 82 Corridor Optimization Plan* (<http://www.ci.glenwood-springs.co.us/departments/publicworks/Engineering/10-12->

Grand Avenue Bridge carries 24,000 vpd; the study team forecasted the 2035 AADT volume of 38,000 vpd.

[14%20Final%20SH%2082%20COP.pdf](#)) (City of Glenwood Springs et al., 2010). In 2012 and 2013, the forecasts developed for the *SH 82 Corridor Optimization Plan* were reevaluated and determined to be appropriate because the recent economic downturn delayed growth in the projected level of traffic volumes to 2035. The 2035 forecasts for both the Glenwood Springs roadways and for the I-70 mainline equate to about a two percent per year growth rate, or an increase of about 50 percent in traffic by 2035.

Between 1988 and 2011, the annual average daily traffic (AADT) across the Colorado River in Glenwood Springs grew from about 22,000 (Grand Avenue Bridge only) to 34,000 (Grand Avenue and Midland Avenue bridges, combined). The annual growth rate was just under two percent. Assuming that growth rate going forward, the Grand Avenue Bridge, which carries 24,000 vehicles per day (vpd), is forecasted to carry 38,000 vpd in 2035.

No Action Alternative

Under the No Action Alternative, motorists and pedestrians would continue to use the same or similar travel routes to their destinations. However, increases in traffic volumes make congestion and access issues worse in the study area.

Without improvements, the intersection of 6th and Laurel is projected to operate at a poor rating of LOS E in the PM peak hour in 2035.

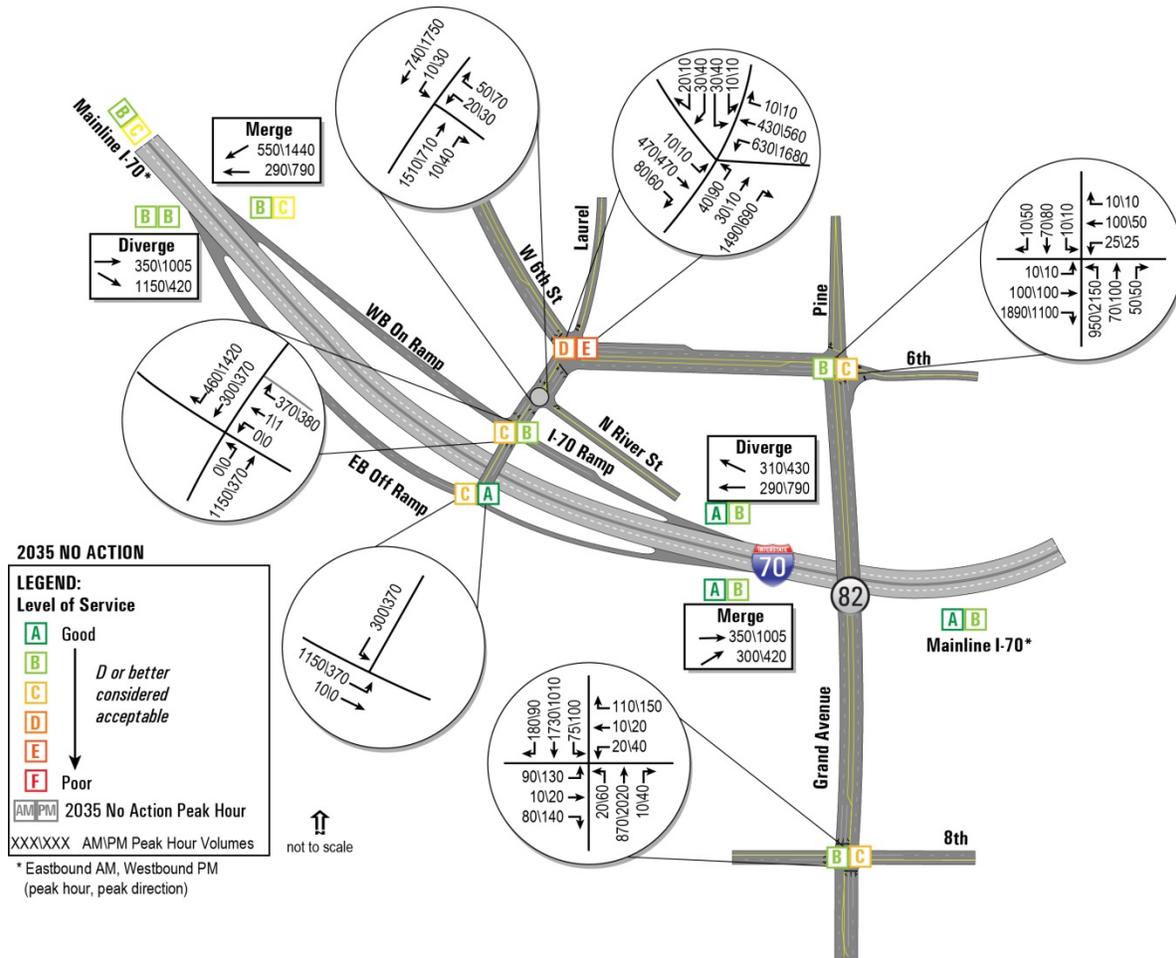
Traffic Volumes and Vehicle Miles Traveled. The AM and PM peak hour traffic forecasts, based on growth rates, for the 2035 No Action Alternative are shown in Figure 3-11. Another commonly used measure of travel in an area – vehicle miles of travel (VMT) – was calculated for the study area. 2035 VMT for the No Action Alternative is approximately 20,000 per day on SH 82 between the I-70 interchange and 8th Street.

Level of Service. LOS under the No Action Alternative would worsen from the existing LOS presented in Figure 3-9 because of the additional traffic forecasted for the area. The LOS results are presented along with turn movements in Figure 3-11. Without improvements, the intersection of 6th and Laurel is projected to operate at a poor rating of LOS E in the PM peak hour in 2035. I-70 would operate relatively well under the No Action Alternative; the worst LOS is C for the merge of the westbound I-70 on ramp in the PM peak hour. Increased traffic would also worsen the observed queuing issues on the westbound off ramp. Refer to the *I-70 Exit 166 Off Ramp Queuing* memo in Appendix B for more information.

Under the No Action Alternative, anticipated growth would amount to a 58 percent increase in crashes by 2035, or about 110 to 120 crashes per year.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-11. NO ACTION ALTERNATIVE PEAK HOUR TRAFFIC FORECASTS (2035)



Source: Jacobs 2014

Safety. The forecasted number of crashes in 2035 under the No Action Alternative would likely increase by a similar rate to the forecasted traffic increase by 2035. A two percent per year growth in crashes is projected. This growth would amount to a 58 percent increase in crashes by 2035, or about 110 to 120 crashes per year.

The No Action Alternative could include modifications normally made in ongoing maintenance of SH 82 and I-70, including improved lighting, signals, and signage. These would result in a minor reduction in crashes in the study area, but these items do not address the other numerous crash and safety issues caused by traffic congestion, narrow lanes, and deterioration of the bridge structure and resulting falling debris hazard.

Compatibility with Local Transportation Plans. The No Action Alternative is inconsistent with the *City of Glenwood Springs Long Range Transportation Plan 2003-2030* (City of Glenwood Springs, 2013), the *SH 82 Access Control Plan* (City of Glenwood Springs, 2013), the *Intermountain Transportation Planning Region 2035 Regional Transportation Plan* (CDOT, 2008) and the *Statewide Transportation Improvement Program Fiscal Years 2012-2017* (CDOT, 2011). Each of these plans include the replacement of the Grand Avenue Bridge.

Transit. There are no planned changes to transit services in the study area.

Build Alternative

Traffic Volumes and Vehicle Miles Traveled. Improvements proposed as part of the Build Alternative would affect the way traffic moves through the system, but are not expected to alter the overall demand for the corridor from that projected in the No Action Alternative. Therefore, while the intersection configurations and turn movement traffic projections are different under the Build Alternative, the overall level of traffic through the study area is expected to remain the same.

However, 6th Street volumes are expected to decline dramatically without SH 82 traffic, down to between 3,000 and 4,000 vpd, from 35,000 to 40,000 vpd in the No Action Alternative. Daily volumes are not expected to drastically change on the other major roadways in the study area, including SH 82. Peak hour turn movement volumes for the Build Alternative for the opening day (2017) and planning horizon (2035) are presented in Figure 3-12 and Figure 3-13.

The Build Alternative would reroute traffic through the study area. In general, the heaviest traffic movements would travel shorter, more efficient paths. 2035 VMT were calculated on SH 82 between the I-70 interchange and 8th Street, and on 6th Street. In general, despite serving the same numbers of motorists, the Build Alternative would reduce 2035 VMT by approximately 4,000 VMT per day relative to the No Action Alternative (from 20,000 to 16,000). This reduction is due to the shorter path most of the traffic on SH 82 would travel under the Build Alternative.

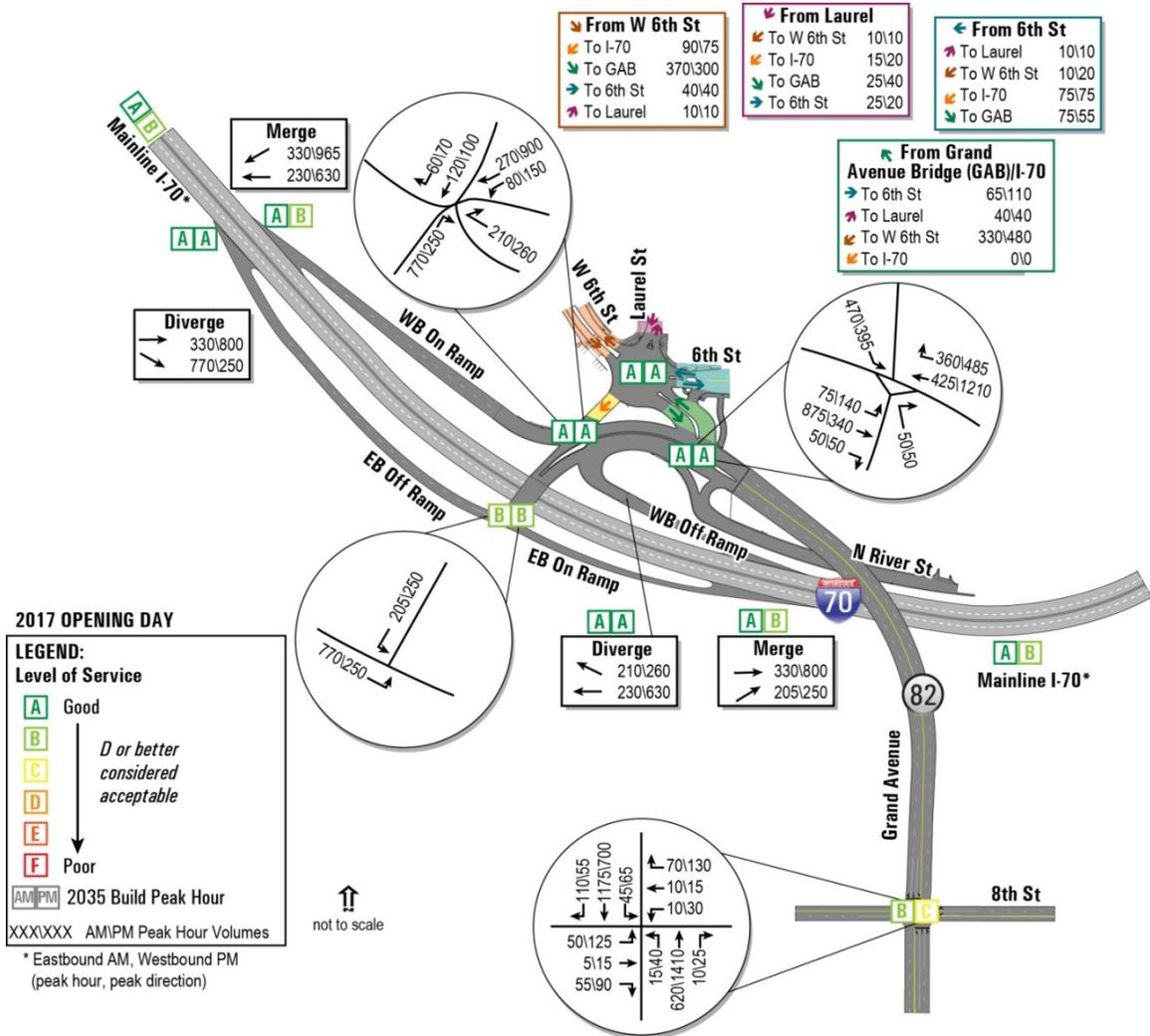
The Build Alternative would reduce 2035 VMT by approximately 4,000 VMT per day relative to the No Action Alternative (from 20,000 to 16,000).

Level of Service. Peak hour traffic forecasts and LOS results for the Build Alternative at opening day (2017) and planning horizon (2035) are shown in Figure 3-12 and Figure 3-13.

All intersections in the study area are projected to operate at LOS C or better in the Build Alternative in 2035.

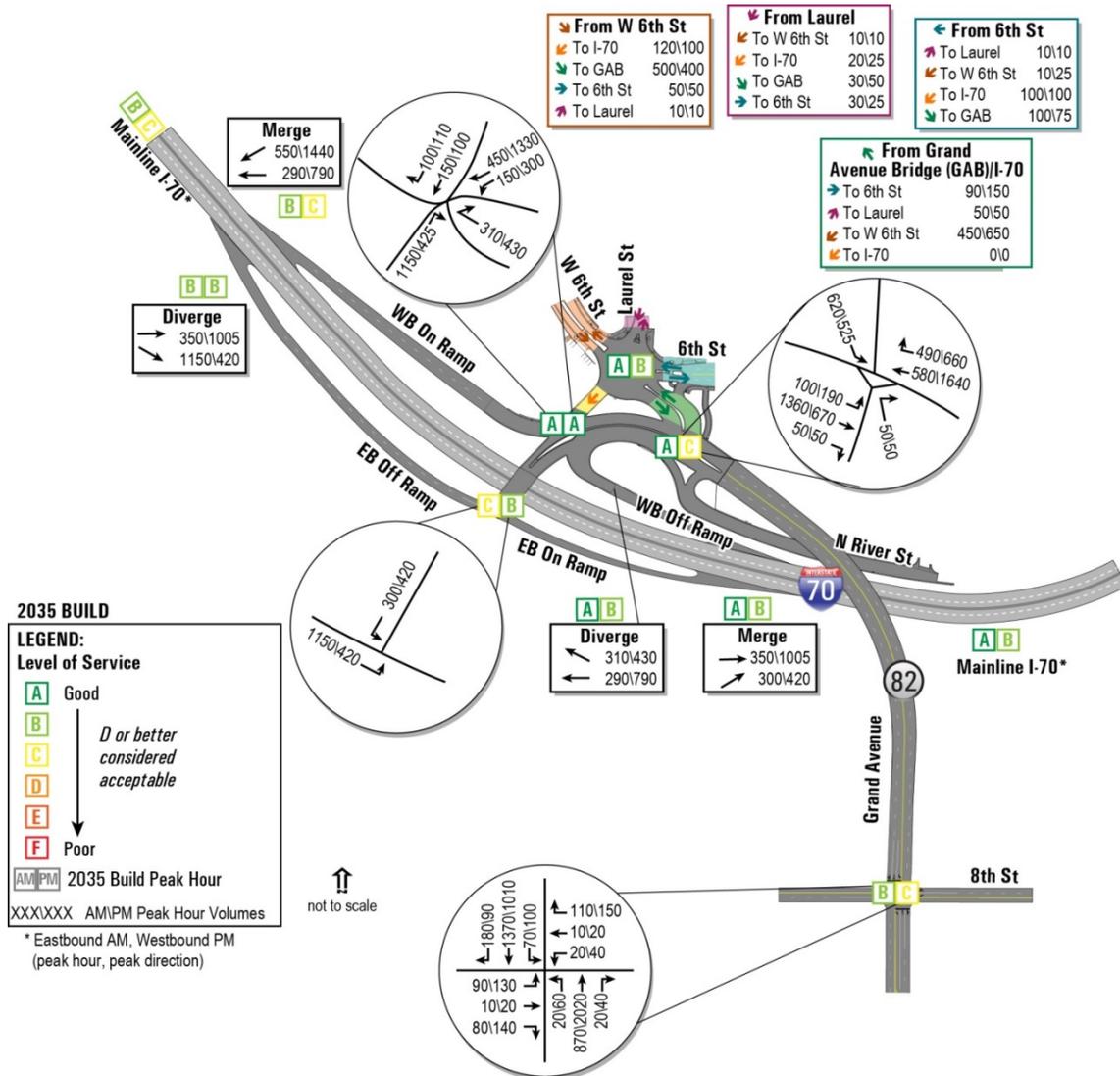
SH 82 GRAND AVENUE BRIDGE

FIGURE 3-12. BUILD ALTERNATIVE PEAK HOUR TRAFFIC FORECASTS (2017)



Source: Jacobs 2014

FIGURE 3-13. BUILD ALTERNATIVE PEAK HOUR TRAFFIC FORECASTS (2035)



Source: Jacobs 2014

All intersections in the study area are projected to operate at LOS C or better in the Build Alternative in both 2017 and 2035. In particular, the 6th and Laurel intersection is projected to operate at LOS E in the 2035 PM peak hour under the No Action Alternative; under the Build Alternative, the reconfigured roundabout and intersections with local streets would have a LOS C or better in 2035. This is because the Build Alternative would reroute the major regional movements (SH 82 to I-70) that currently use the 6th and Laurel intersection to the new alignment, and the reconfigured intersection would primarily serve local traffic. In addition, motorists accessing the commercial properties along W. 6th Street, 6th Street, and the Glenwood Hot Springs would experience less delay.

LOS for I-70 and I-70 ramp merge/diverge areas is also good for the Build Alternative. The Build Alternative would not change any traffic characteristics on I-70 or the ramps; therefore, no change in LOS from the No Action alternative would occur. The Build Alternative would improve the geometry of the westbound off ramp and eastbound on ramp to meet criteria for deceleration and acceleration.

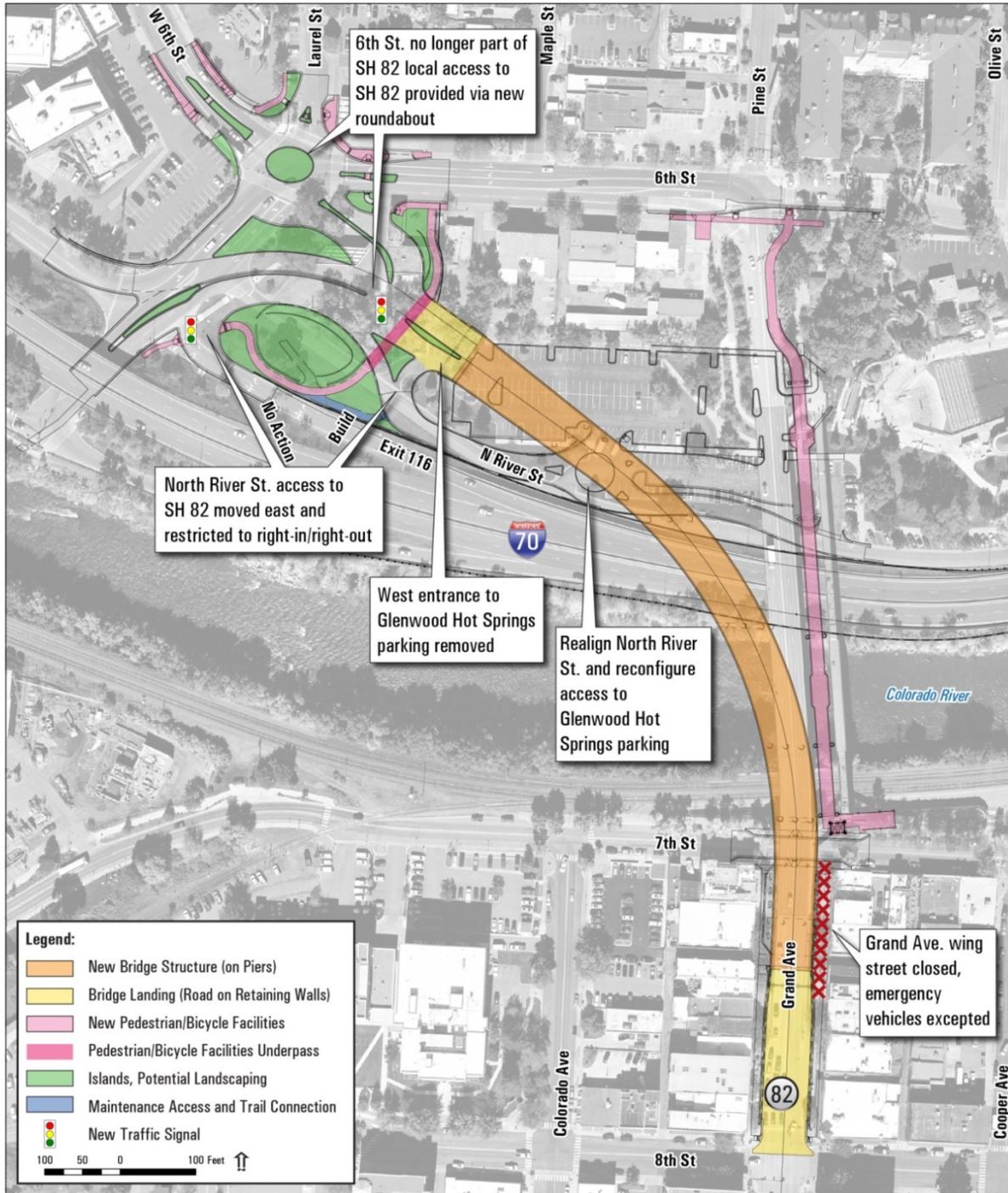
The proposed changes to the SH 82 intersection with the Exit 116 westbound off ramp intersection, along with lengthening the westbound off ramp by removing the bridge pier, would address queuing issues shown in Figure 3-10. The new off ramp would be signalized, signing would be improved, and the local access intersection (SH 82 and 6th Street) that replaces 6th/Laurel would operate like a standard T intersection with simplified signal phasing. The flashing warning sign on westbound I-70 could be removed when the new Grand Avenue Bridge is opened.

Access. The Build Alternative would result in the changes to access shown in Figure 3-14. Chapter 2.0 *Alternatives* and Section 3.6 *Economic Conditions* have further descriptions of access changes and business impacts.

Safety. The Build Alternative would result in safety differences in 2035 when compared with the No Action Alternative because of the new roadway/bridge alignment, different intersections and accesses, and improvement on SH 82 to meet current design standards. Improvements incorporated in the Build Alternative and their safety benefits include:

- ❖ The I-70 to SH 82 route, which would carry most of the traffic volume, would be continuous rather than making turns at two intersections. This alignment would potentially reduce the occurrence of side-swipe crashes at intersections and would reduce traffic congestion, which could reduce the number of Rear-End crashes.
- ❖ Access to SH 82 north of the Colorado River would be consolidated to a single local access intersection (6th Street), which could reduce broadside or approach turn crashes at driveways and intersections.

FIGURE 3-14. BUILD ALTERNATIVE ACCESS MODIFICATIONS



Source: Jacobs, 2014.

- ❖ At-grade pedestrian crossings of SH 82 would be eliminated north of 8th Street. Most pedestrian activity would remain on 6th Street, which would no longer carry SH 82 traffic, and on the pedestrian underpass below SH 82 that would connect the Two Rivers Park with the 6th Street area.
- ❖ The new bridge structure would meet current design standards with between 11- and 12-foot lane widths, as well as shoulders and a median (striped median on bridge, physical median north of bridge). These improvements could reduce side-swipe (same direction and opposite direction) crashes and fixed-object crashes.
- ❖ The replacement of the existing Grand Avenue Bridge would remove the existing piers that constrain the I-70 ramp lengths. The Exit 116 eastbound on ramp and westbound off ramp would be lengthened to provide a standard merge/diverge and taper area, which could reduce side-swipe and rear-end crashes at those ramps.
- ❖ The lengthening of the westbound off ramp, simplifying the ramp intersection, and realigning SH 82 would eliminate the vehicle queue issues that result in queues spilling onto mainline I-70.
- ❖ The number of access points on the SH 82 corridor would decrease considerably, since all the businesses along 6th Street would now be accessed via a local street.
- ❖ Speeds in the study area may increase slightly, but the effect of increased speeds is expected to be small. The roadway would be designed to current standards and consistent with the urban area at posted 25 mph and with the roadway at either end of the bridge. This would mean that inconsistent speeds, which contribute to more crashes than simply higher speeds, would be reduced. Further, as motorists travel south across the bridge, lane widths would taper from 12 to 11 feet at bridge touchdown points to tie into the existing roadway width and minimize impacts. This tapering, along with the stoplight at 8th Street and curvature of the bridge, will work to slow vehicles entering the downtown area, resulting in a traffic calming effect.

Altogether, these changes incorporated into the Build Alternative would address the safety issues that are forecasted to result in about 35 to 40 crashes per year (out of the total of 110 to 120) in 2035. While this 33 percent reduction in crashes is not certain, the number of crashes should decrease so that, upon completion of the project, crash occurrences would be closer to the average level for this type of facility.

Under the Build Alternative, the number of crashes would be substantially reduced by about 35 to 40 crashes per year.

Compatibility with Local Plans. The Build Alternative would be consistent with the *SH 82 Access Control Plan* (City of Glenwood Springs, 2013), the *Intermountain 2035 Regional Transportation Plan* (Intermountain Transportation Planning Region, 2008), and the *Statewide Transportation Improvement Program Fiscal Years 2012-2017* (CDOT, 2011). It also would be compatible with the *I-70 Mountain Corridor Programmatic Environmental Impact*

Statement (PEIS) (CDOT, 2011) in that it would allow improvements to be made at the I-70 and SH 82 interchange area, including lengthening the ramps.

Transit. The Build Alternative would impact the Ride Glenwood Springs bus stop at 6th and Maple, necessitating either the elimination of that stop or the provision of a new stop in the vicinity. During final design, CDOT will continue to coordinate with RFTA to determine the best options.

The Build Alternative would also remove the Grand Avenue wing street that parallels northbound Grand Avenue between 7th and 8th Streets. This would impact the routing of the RFTA bus service. RFTA has indicated that the Grand Avenue wing street connection can be rerouted to either Cooper Avenue to the east or Colorado Avenue to the west, resulting in a modest travel time increase along that route. CDOT will continue to coordinate with RFTA during final design and construction. No permanent impacts to transit ridership are expected as a result of the Build Alternative.

Construction Impacts. Transportation impacts during construction would be experienced by both regional traffic and local traffic. During the approximately 90-day full closure of Grand Avenue Bridge, traffic impacts would occur on SH 82, on I-70, and within Glenwood Springs around construction staging areas and the detours. It is likely that motorists using the detour route during peak hours would experience considerable delays and substantially increased travel times. These impacts would affect residents, visitors, emergency service providers, transit service, and commuters who travel to work north and south of the Colorado River in the study area. Travelers would be required to travel out-of-direction and otherwise adjust their travel behaviors during construction. Without a substantial reduction in peak hour auto travel demand through voluntary trip reductions, trip time adjustments, alternative mode shifts, and other means, motorists would likely experience severe congestion and increased travel times during construction.

During construction, severe congestion along detour routes is likely without substantial changes to travel demand patterns.

During the full closure of Grand Avenue Bridge, local traffic that normally uses Midland Avenue to access shopping areas, community facilities, and residential areas would experience higher traffic volumes. Also, although the signed detour route would be on 8th Street, Midland Avenue between 8th and 27th Streets also would experience traffic increases because some motorists would use this as an option. During peak hours, motorists in this area might have difficulty entering Midland Avenue from adjacent neighborhoods and houses.

The two local RFTA bus routes serving the study area would be impacted during construction throughout the study area. Routes that currently use the Grand Avenue Bridge would not be able to cross during the approximately 90-day full bridge closure.

The SH 82 Detour along 8th Street would require a temporary open cut of the Aspen Branch spur or “wye” used to store or turn around train cars, for which the Union Pacific Railroad (UPRR) has a freight rail easement. The rail lines are owned by RFTA and infrequently used. To construct the SH 82 Detour, a four-month closure of this section of the railroad is anticipated.

During the approximately 90-day full bridge closure, 7th Street would be fully closed to provide a safe environment for motorists, bicyclists, and pedestrians. At other times during the construction period, 7th Street would be reduced to one lane, with access maintained as either a one-way westbound or alternating direction one-way operation that would be controlled by flagging or other traffic control measures. The number of parking spaces available along 7th Street would be temporarily reduced during this time.

3.2.3 Transportation Mitigation

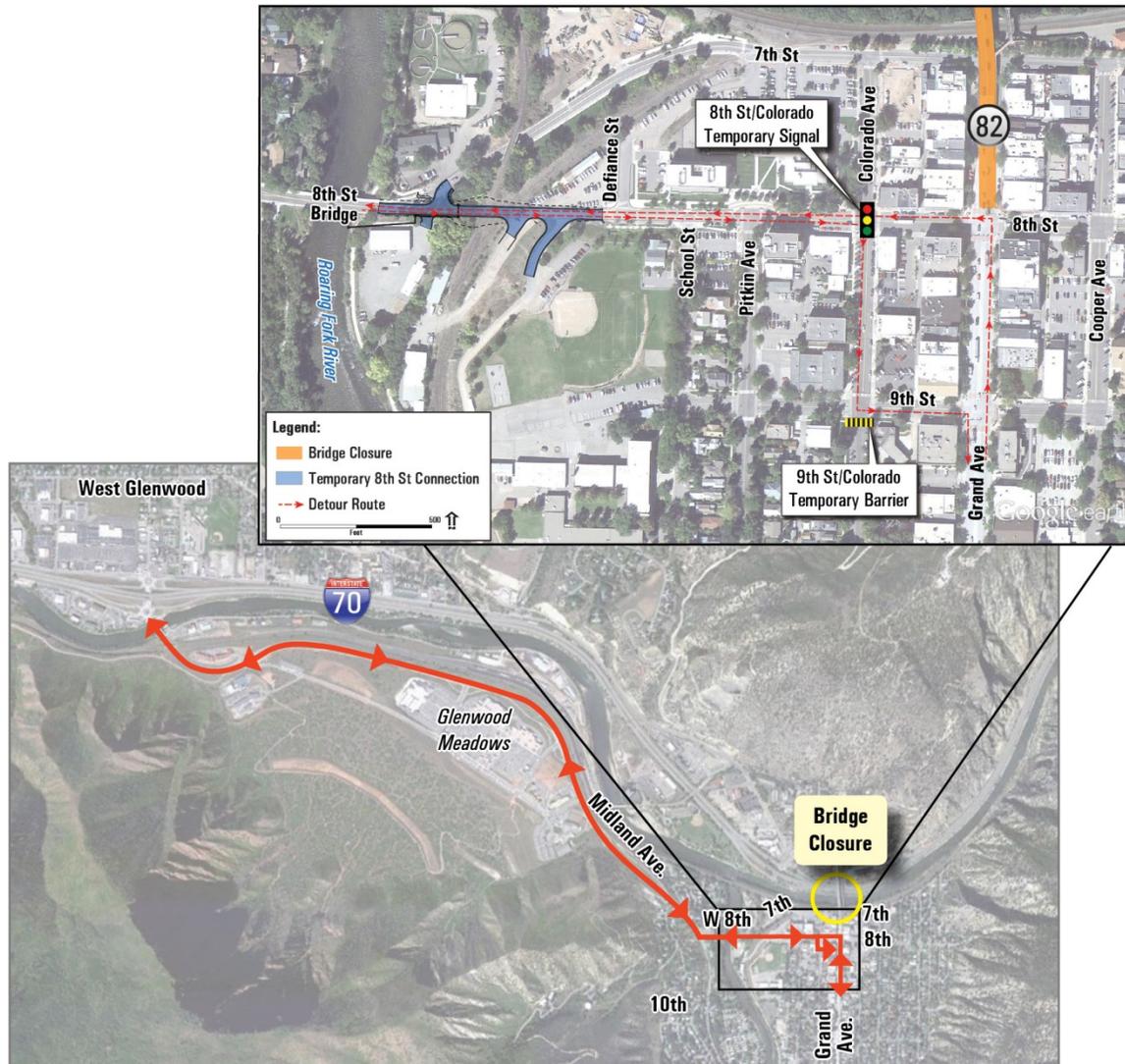
For impacts to the 6th and Maple bus stop, CDOT will coordinate with RFTA during final design on a solution. Because the remaining permanent transportation impacts associated with the Build Alternative are positive, no additional permanent mitigation measures are needed.

Several measures are proposed to mitigate for the temporary impacts described in Section 3.2.2 *Transportation Impacts*. In coordination with the City and stakeholders, CDOT has designed detour routes to reduce travel demand and provide other means of accommodating transportation needs during construction. CDOT will also maintain access and local connectivity throughout construction activities as much as possible. The SH 82 Detour route is shown in Figure 3-15 and detailed in Section 2.4 *Construction*.

Additional temporary measures to mitigate transportation impacts during construction are outlined below:

- ❖ **Railroad Closure.** CDOT will coordinate with the UPRR and RFTA on details of the Aspen Branch railroad temporary closure and will restore the railbed and track after the new Grand Avenue Bridge is reopened.
- ❖ **Grand Avenue.** Access will be maintained to businesses and properties along both sides of Grand Avenue.

FIGURE 3-15. SH 82 DETOUR ROUTE



- ❖ **7th Street.** 7th Street will be fully closed during the approximately 90-day full bridge closure. To maintain access on 7th Street during other times of the construction period, 7th Street will be converted to either one-way westbound or alternating direction one-way operations that will be controlled by flagging or other traffic control measures.
- ❖ **Midland Avenue.** In residential areas along Midland Avenue, particularly the denser residential areas between 8th and 27th Streets, CDOT will monitor traffic during the full bridge closure and respond with appropriate measures to mitigate traffic impacts. These measures could include temporarily reducing the number of accesses onto

Midland Avenue from neighborhoods with more than one access, and/or using flaggers or intersection controls during peak travel periods.

- ❖ **8th Street.** As part of the SH 82 Detour, 8th Street will be temporarily extended to connect to the 8th Street Bridge over the Roaring Fork River during the approximately 90-day full bridge closure.
- ❖ **Downtown Grid.** During the approximately 90-day full bridge closure, a “square about” would be implemented as part of the SH 82 Detour that would consist of a temporary one-way loop on 8th Street, Colorado Avenue, 9th Street, and Grand Avenue. A temporary signal will be installed at the 8th Street and Colorado Avenue intersection to facilitate pedestrian crossings and address higher traffic volumes. A temporary physical barrier will be placed at the 9th Street and Colorado Avenue intersection to force detour traffic to turn east toward Grand Avenue and keep detour traffic from continuing south on Colorado Avenue.
- ❖ **6th and Laurel Intersection.** When closures are required, the date and time will be widely communicated through the construction phase public information program and signage so motorists can plan. If needed, alternate route information also will be provided. Some elements of the intersection could be constructed before the Grand Avenue Bridge closure, but the largest part of the reconstruction is expected to occur during the full bridge closure. During the full closure of Grand Avenue Bridge, regional SH 82 and I-70 traffic will be rerouted to the SH 82 Detour, resulting in much lower traffic volumes through this intersection.
- ❖ **Transit.** CDOT will coordinate with RFTA during design and construction to provide adequate detour routes for impacted bus routes and bus stops.
- ❖ **Travel Demand Management Measures.** Based on the capacity analysis of the SH 82 Detour, there would need to be voluntary reductions in vehicle trips during the peak hours of approximately 500 to 600 vehicle trips. This will be accomplished through a public information campaign to educate travelers on travel demand management measures that will maximize the use of the detour route. CDOT will work with local and regional organizations and employers to promote the campaign.

The public information campaign will inform the organizations, employers, and the general public about the upcoming closure and how to plan trips accordingly. The information campaign will include:

- ◆ Timeframe for full closure.
- ◆ Best and worst times to travel.
- ◆ Best routes to travel.
- ◆ Alternative modes of travel available.

Specific measures to reduce travel demand could include:

Bicyclists/Pedestrians

- ◆ Maintain a pedestrian connection over the river during construction.
- ◆ Provide additional information about bicycle and pedestrian routes to commuters and the general public.
- ◆ Provide bike facilities and services – these could include bike depots, bike lockers, and bike rental/sharing services.
- ◆ Provide free – or low fare – pedicab (bicycle taxi) service across the new pedestrian bridge, connecting to roads on either end.

Regional and Local Motorists

- ◆ Inform commuters, recreationists, and tourists, so they could adjust their travel/work schedules during the closure period.
- ◆ Offer incentives for commuters to shift their travel times to off-peak periods, carpool, or use alternative modes, including public transportation, walking, and biking.
- ◆ Provide information targeted to commercial vehicles and companies, such as delivery trucks, on the detour route and less congested travel times.

Transit Users

- ◆ Work with RFTA and the City to:
 - Modify transit routes and increase frequency of operation along those routes to provide a reliable transit alternative during construction.
 - Communicate transit service/schedule information to commuters, tourists, and the general public.
 - Extend the VelociRFTA BRT service or other regional service along the detour route temporarily and/or into downtown, where the stop will be within walking distance of the north side of the river.
 - Provide transit subsidies to commuters and recreationists.
 - Work with local businesses and tourism organizations to distribute passes and/or coupons.
 - Provide a regularly scheduled, free (or very low fare) shuttle along the detour route.

3.3 Land Use

3.3.1 Existing Conditions

The City regulates land use through its zoning ordinance and other land use controls. The City's zoning designation for the study area is generally Commercial Zoning, mixed with some industrial, residential and public land uses, as shown in Figure 3-16.

Figure 3-17 shows that in the north part of the study area, 6th Street is mostly commercial, with some light residential and special purpose use; 5th Street is a residential area. Also to the north, the Glenwood Hot Springs and the Hotel Colorado are popular commercial tourist destinations. South of the Colorado River is a mix of commercial, residential, civic, and special purpose properties (e.g., parking lots) that have gone through the City's special review process.

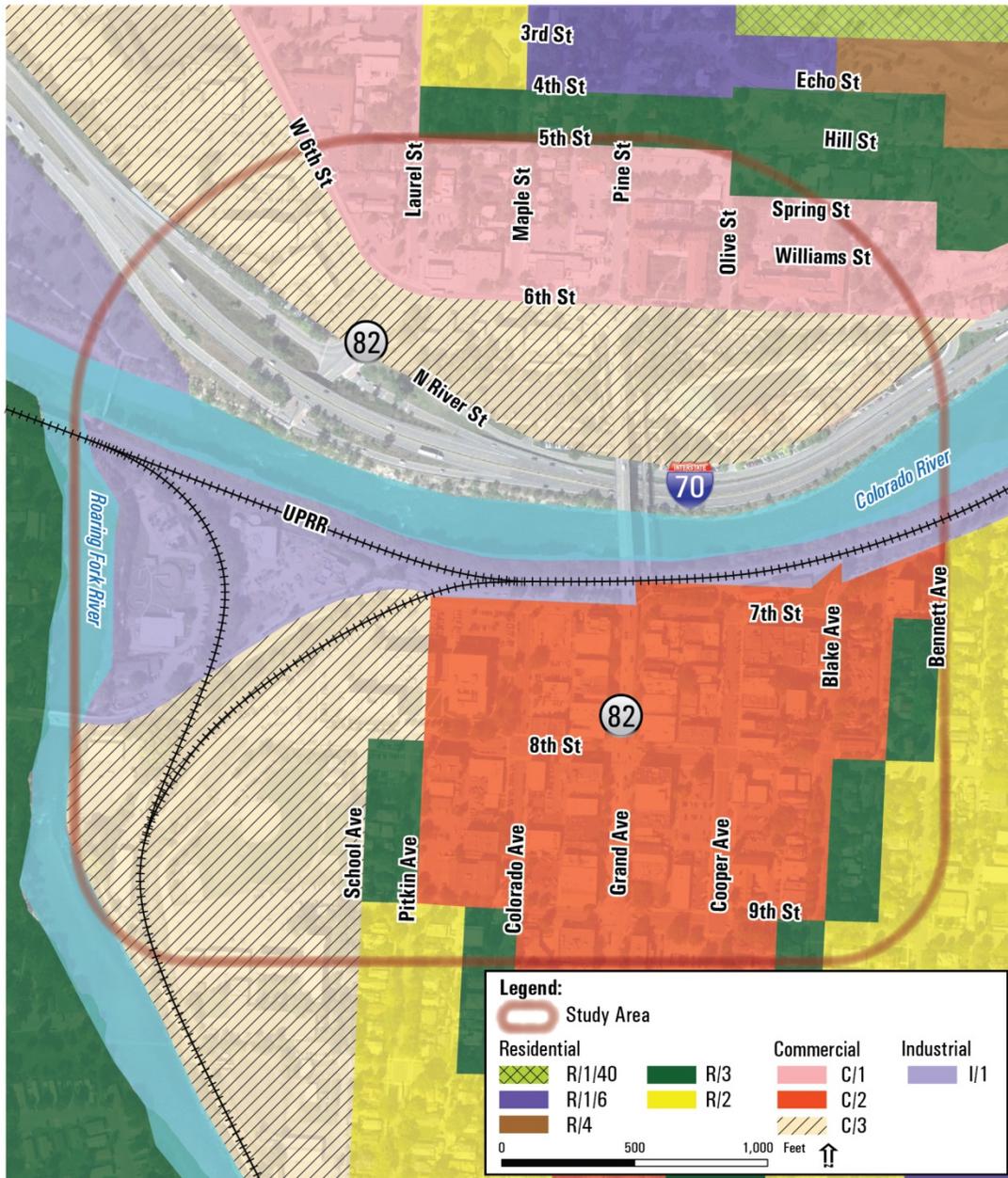
3.3.2 Planned Land Use

In 2011, the City completed the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011) to guide future land use. The plan encourages balanced growth to preserve the small town character. Because of physical constraints, Glenwood Springs' ability to grow is limited. This places a higher emphasis on infill and redevelopment – growing in and up, instead of out. Therefore, the plan encourages redevelopment of existing buildings and additional uses that will strengthen and expand the core of the community, including retail space, offices, restaurants, residences, lodging, and civic uses. Given the built-out nature of the community, future land use designations in the study area are consistent with existing land uses.

In 2003, the City developed *A Redevelopment Strategy for the Confluence Area* (City of Glenwood Springs, 2003) for the area near the confluence of the Roaring Fork and Colorado Rivers. The strategy seeks to develop a diverse, vibrant, mixed-use neighborhood given its proximity to the existing downtown area. The recommended plan includes a mix of residential, mixed-use, commercial, and civic uses, as well as plans for additional parking, a transit center, and a city park. The plan calls for infrastructure improvements in the area, including the possible relocation of SH 82, rail/transit corridors, a transit center, and the extension of 8th Street from Midland Avenue to Grand Avenue.

The Glenwood Springs Downtown Development Authority (DDA) is a tax-funded district established in 2001 that also influences plans for future land use in the study area. The DDA seeks to enhance and broaden the downtown experience for residents and guests through infrastructure, beautification, pedestrian access, and connections to open space, view, and river corridors (City of Glenwood Springs DDA, 2013).

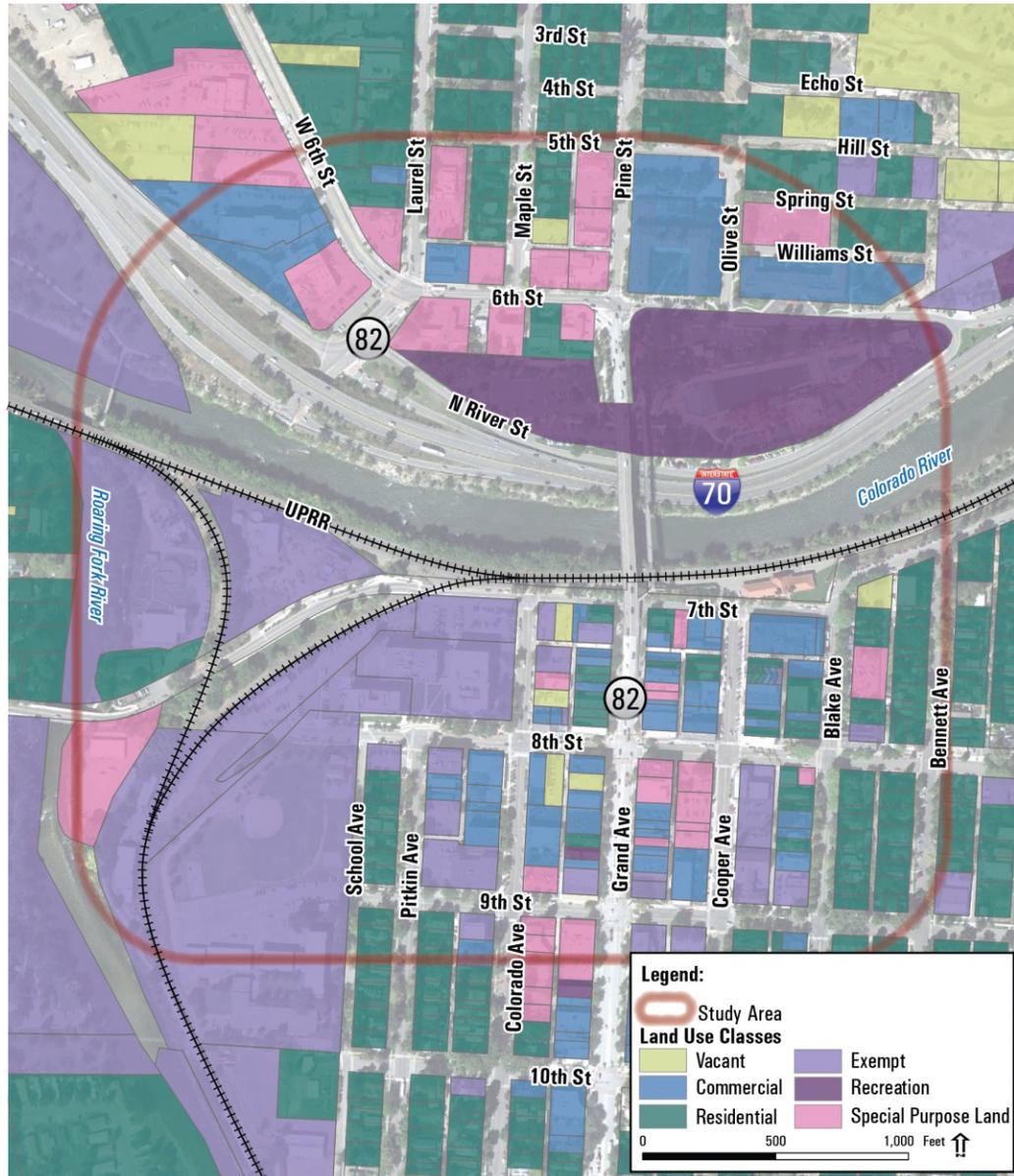
FIGURE 3-16. CITY OF GLENWOOD SPRINGS ZONE DISTRICTS



Source: City of Glenwood Springs Zone Districts Map, 2013.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-17. EXISTING LAND USE



Source: City of Glenwood Springs.

The DDA is planning to redevelop 6th Street and make it more pedestrian-friendly for the many visitors who walk between the hotels on W. 6th Street along 6th Street to the Glenwood Hot Springs and the downtown core.

The DDA is planning to redevelop 6th Street and make it more pedestrian-friendly.

3.3.3 Land Use and Zoning Impacts

No Action Alternative

The No Action Alternative would not impact existing land uses in the study area.

Build Alternative

On the north side of the study area, the Build Alternative would convert portions of adjacent commercial properties to transportation use. The commercial properties include the Shell station at the 6th and Laurel intersection and portions of the Glenwood Hot Springs parking lot west of the existing Grand Avenue Bridge.

The Build Alternative would convert portions of adjacent commercial properties to transportation use on the north side of the study area.

Under the Build Alternative, SH 82 traffic would be rerouted away from 6th Street. This would greatly reduce the traffic along 6th Street and provide opportunities to redevelop 6th Street between North River Street and Laurel Street, consistent with the goals of the DDA's planning process. No additional impacts to existing land uses are anticipated as a result of the Build Alternative.



The DDA envisions more pedestrian-friendly and dense land uses along 6th Street.
Source: Downtown Development Authority, 2013.



The new Grand Avenue Bridge would increase clearance over 7th Street, which could provide opportunities for new uses below the bridge.
Source: Downtown Development Authority, 2013.

The Build Alternative is consistent with the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011), which includes a strategy to “work with CDOT on the SH 82/Grand Avenue bridge replacement.” Other planning studies, such as the *SH 82 Corridor Optimization Plan* (City of Glenwood Springs et al., 2010), include strategies for improving the Grand Avenue Bridge.

The new pedestrian bridge also would be consistent with goals and strategies in the *Glenwood Springs Comprehensive Plan* (Glenwood Springs, 2011) that supports improved access and connectivity for pedestrians and bicyclists. Section 3.18 *Pedestrian and Bicycle Facilities* has more information about planned bicycle and pedestrian facilities.

No construction-related land use impacts would occur as a result of the Build Alternative.

3.3.4 Land Use Mitigation

The Build Alternative is consistent with current zoning and land use plans. Therefore, no mitigation measures are necessary.

3.4 Social Resources

This section describes existing social resources and the Build Alternative’s potential impacts on neighborhoods and community facilities. Public input guided the assessment of community impacts and the development of mitigation measures.

3.4.1 Existing Conditions

Population

Over the last 20 years, population has grown in both Glenwood Springs and Garfield County, as shown in Table 3-9.

TABLE 3-9. POPULATION GROWTH

Area	1990	2000	2010
Glenwood Springs	6,561	7,736	9,614
Garfield County	29,974	43,791	56,389

Source: U.S. Census Bureau, 2010 Census.

Population growth is expected to continue.

Per the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011), the 2035 population of Glenwood Springs is expected to be approximately 15,000, a 56 percent increase from 2010. In that same time period, the Garfield County population is expected to reach approximately 101,000, a 79 percent increase (Colorado Department of Local Affairs [DOLA], 2012).

Neighborhoods and Community Facilities

Residential communities are located to the north (North Glenwood), east, and southwest of the study area, adjacent to downtown. These neighborhoods, some of the oldest in Glenwood Springs, are marked by tree-lined streets and Victorian homes.



Commercial core of Glenwood Springs south of the river and nearby neighborhood.

Community facilities within or nearby the study area are listed below and shown in Figure 3-18.

- ❖ **Schools.** Glenwood Springs Elementary School (915 School Street), Colorado Mountain College (802 Grand Avenue).
- ❖ **Emergency Services.** Glenwood Springs Police Department (101 West 8th Street), Glenwood Springs Fire Department, Fire Station #2 (806 Cooper Avenue), Garfield County Sheriff's Department (107 8th Street).
- ❖ **Library.** Garfield County Public Library Glenwood Springs Branch (413 9th Street). This library offers a variety of classes, internet access, and child and adult reading programs.
- ❖ **Cultural Institutions.** Frontier Historical Society (1001 Colorado Avenue).
- ❖ **Government Services.** U.S. Post Office, (113 9th Street), Garfield County Courthouse (109 8th Street, Suite 104), Glenwood Springs City Hall (101 West 8th Street).
- ❖ **Transportation Hubs.** Glenwood Springs Train Depot (413 7th Street).
- ❖ **Religious Institutions.** Calvary Chapel (825 Grand Avenue), First United Methodist Church (824 Cooper Avenue), Church of Christ (260 Soccer Field Road), Church of Nazarene (1007 Blake Avenue), First Presbyterian Church (1016 Cooper Avenue), Saint Stephens Catholic Church (1885 Blake Avenue), Christian Science Church Services (913 Cooper Avenue).

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-18. COMMUNITY FACILITIES



Source: Jacobs, 2014.

There are no hospitals within the study area. Valley View Hospital, located approximately 1.1 miles south of downtown, is the nearest full-service hospital.

The existing narrow lanes on the Grand Avenue Bridge make it difficult for emergency response vehicles to pass other vehicles on the bridge without entering into oncoming traffic. They also delay emergency response times because there is limited space for vehicles to pull to the side of the bridge and yield.

The existing narrow bridge lanes make it difficult for emergency response vehicles to pass other vehicles on the bridge without entering into oncoming traffic.

Transit buses and commercial carriers, including tour buses and tractor trailers, are wider than the narrow lanes, which causes slowing and queues in the lanes behind them. This occurs several times each hour and hinders access to community facilities.



Examples of large vehicles using two lanes on the existing bridge.

On the south side of the bridge, Grand Avenue serves as the City's "Main Street" through the downtown commercial core of Glenwood Springs. Even though there is heavy traffic, there are adequate sidewalks, crosswalks, and signals to maintain pedestrian connectivity to adjacent neighborhoods. Residents in North Glenwood are somewhat isolated because of the existing roadway and topography, having to cross 6th Street for nearly all trips.

Environmental Justice

Environmental justice was first identified as a national policy in 1994 when President Clinton issued Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The purpose of EO 12898 is to ensure that minority and low-income communities do not receive disproportionately high and adverse human health or environmental impacts as a result of federal actions.

The primary data source used to identify low-income and minority populations was the U.S. Census Bureau. In addition, the study team reviewed the State of Colorado Office of Economic Development and International Trade, Minority Business website (State of

Colorado, 2013). This review did not identify any minority-owned businesses in the study area.

Minority Populations. Minority populations are made up of ethnic and/or racial minorities. For the purposes of this analysis, a minority is a person who is Black, Asian American, American Indian, Native Hawaiian or Other Pacific Islander, Alaskan Native or of Hispanic or Latino origin. Minority populations were identified in census blocks where the percentage of minorities exceeds the City and/or Garfield County population using Census 2010 data.

According to U.S. Census information (U.S. Census Bureau, 2010), the City and Garfield County had minority populations of 34.7 and 31.2 percent, respectively. Of the 45 census blocks within or adjacent to the study area, six contain a higher percentage of minority populations than compared to the City. Two census blocks contained higher percentages than Garfield County and lower percentages of minority populations than the City (Figure 3-19). Most of the blocks with a higher minority percentage are located south of the Colorado River and interspersed throughout the study area.

Low-Income Populations. Low-income populations were defined as households earning less than \$19,879 per year for an average household size of 2.73. This value was determined using income thresholds set annually by the U.S. Department of Housing and Urban Development, Average Median Income at 30 percent. The average household size and household income in the past 12 months was taken from U.S. Census Bureau data. Low-income populations were identified using the five-year American Community Survey data (U.S. Census Bureau, 2007-2011), which is available at the census block group level.

The percent of low-income populations for the City and Garfield County are 16.2 and 11.0 percent, respectively.

Of the four census block groups within the study area, two contain low-income populations. One block group had a higher percentage of low-income population compared to the City, and both block groups contained higher percentages of low-income populations than the County, as shown in Figure 3-19. Both low-income block groups are located adjacent to Grand Avenue and south of the Colorado River.

Linguistically Isolated Households

Linguistically isolated households are households in which no one over 14 years of age is proficient in English, and another language is the primary language. Only Census Tract 9517.02 exceeds the Glenwood Springs and Garfield County percent of linguistically isolated households (U.S. Census, 2012) (Table 3-10). Nearly all of the non-English speaking households within the study area are Spanish speaking. Public outreach efforts

were therefore focused on providing both English and Spanish languages. As described in Chapter 5.0 *Agency Coordination and Public Involvement*, Spanish-speaking interpreters were offered for Public Open House meetings, and two presentations were made to the Club Rotario, one of the Rotary Clubs of Glenwood Springs formed by Anglo and Hispanic members.

TABLE 3-10. PERCENT OF LINGUISTICALLY ISOLATED HOUSEHOLDS

Location	Total Household	Percent Linguistically Isolated Households
Census Tract 9516	1,412	4.6%
Census Tract 9517.01	1,502	3.9%
Census Tract 9517.02	1,519	7.0%
Glenwood Springs	3,711	5.2%
Garfield County	20,272	5.0%

Source: U.S. Census Bureau, 2012 Census.

3.4.2 Social Resources Impacts

No Action Alternative Impacts

The No Action Alternative would have no direct adverse impacts to community facilities and services. However, oversized vehicles would continue to use both lanes on the existing bridge, thereby increasing congestion and impairing mobility. This, coupled with increases in traffic volumes, would slow emergency response. These impacts would occur to all segments of the population regardless of minority or income status.

The No Action Alternative would result in increased congestion and impaired mobility, slowing emergency response.

Build Alternative Impacts

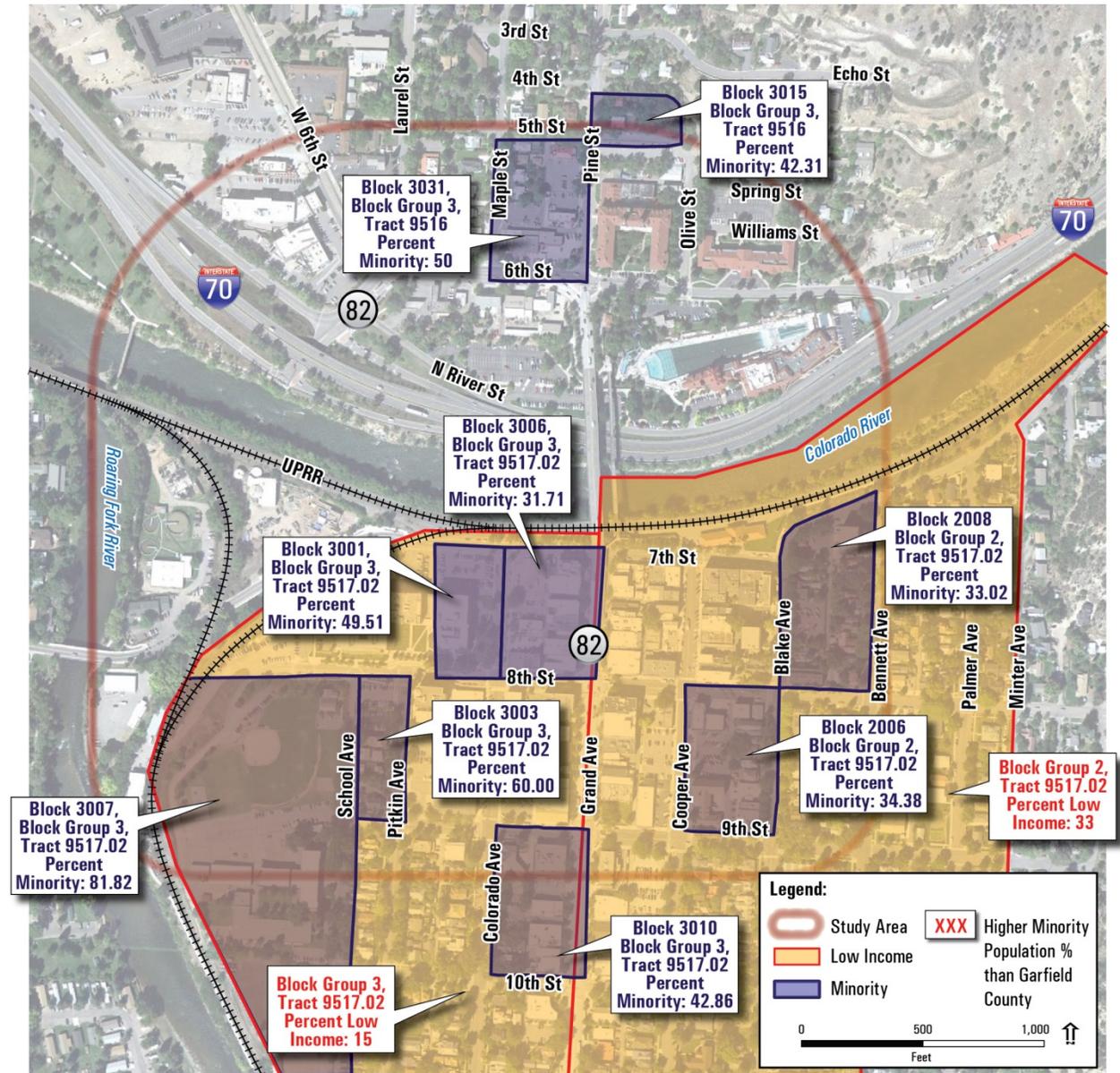
None of the community facilities located within the study area would be displaced or relocated by the Build Alternative. In addition, no residential displacements or other adverse permanent impacts to the residential neighborhoods within the study area would occur.

The Build Alternative would benefit local residents, businesses, regional commuters, and tourists by reducing congestion and improving mobility, safety, and access within the study area. The wider lanes would better accommodate emergency service vehicles, commercial carriers, and buses, which should improve emergency response times and reduce delays associated with traffic queuing.

A potential indirect effect would be redevelopment of 6th Street as envisioned by the Glenwood Springs DDA, described in Section 3.3.3 *Land Use*. This redevelopment would be more pedestrian friendly, have higher-density land uses, and be less automobile-oriented than what currently exists. Should this redevelopment occur, it would increase the connections between the North Glenwood neighborhood and the 6th Street area, thereby increasing community cohesion.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-19. MINORITY AND LOW-INCOME POPULATIONS IN THE STUDY AREA



Source: Jacobs, 2014.

Pedestrian access to downtown from the north would be permanently altered. The new pedestrian bridge would provide a safer and more pleasing experience for pedestrians and bicyclists crossing the river and a benefit to communities in and near the study area. In addition, the roundabout at 6th and Laurel Street and other nearby improvements would increase pedestrian and bicycle connectivity, described in Section 3.17 *Pedestrian and Bicycle Facilities*.

The Build Alternative would not result in any permanent adverse effects to the general population, including minority and low-income populations. In general, project-related benefits and impacts would be evenly distributed and not predominately borne by minority and/or low-income populations. In conclusion, the Build Alternative would not result in disproportionately high and adverse effects on low-income and minority populations.

There are no residential displacements associated with the Build Alternative, and there would be no other permanent impacts to the residential neighborhoods.

Construction Impacts. Construction impacts were factored into the analysis for environmental justice related to noise, traffic, detours, and out-of-direction travel. These impacts would be borne by both low-income populations and the overall community. Temporary construction impacts would include:

- ❖ Because a fire station is located on the north side of the river at School Street, fire and emergency medical service response times for areas north of the Colorado River are not anticipated to be affected during construction.
- ❖ Police response times for areas north of the Colorado River would increase during the approximately 90-day bridge closure. Police would be required to use the 5.5-mile detour route to reach areas that are currently less than 1 mile away.
- ❖ Temporary changes in access to community facilities would occur for motorists accessing community facilities, such as schools, religious and cultural institutions, and municipal institutions via the 5.5-mile detour route.
- ❖ Temporary changes in access to businesses on the south side of the river due to changed traffic patterns along 7th Street because of its conversion to either one-way westbound or alternating direction one-way traffic operations, and due to the one-way grid that is part of the SH 82 Detour.
- ❖ Temporary loss of a small number of parking spaces from the Glenwood Hot Springs parking lot the 6th Street and Laurel intersection area, and along 7th Street. More information on parking impacts during construction of the Build Alternative is in Section 3.6.2 *Economic Impacts*.
- ❖ Temporary increases in traffic volumes and associated increases in traffic noise levels for residents and visitors to businesses and community facilities along the SH 82

Detour route. Community facilities along Midland Avenue between I-70 and 8th Street include the Trinity Church of Glenwood Springs, Yampah Mountain High School, and the Glenwood Springs Community Center. Businesses along the detour route include the hotels and businesses located in the Glenwood Meadows retail development and the Midland Center commercial area. Mitigation measures for temporary traffic impacts along the SH 82 Detour are included in Section 3.2.3 *Transportation Mitigation*; measures to mitigate temporary noise impacts during construction are discussed in Section 3.8.3 *Noise Mitigation*.

3.4.3 Social Resources Mitigation

The Build Alternative would not result in permanent adverse social impacts and would not have disproportionately high and adverse effects on any minority or low-income populations. Therefore, no mitigation for permanent impacts is necessary.

To mitigate for temporary construction impacts, CDOT will:

- ❖ Provide advance notice to emergency service providers, community facilities, local schools, and local businesses of upcoming construction activities that are likely to result in traffic disruption, rerouting, and changes in access.
- ❖ Develop and implement a public information plan for the construction phase. This plan will include information on construction activities and the established detours and associated signage.
- ❖ Offer hotel vouchers to downtown residents most impacted by construction activities during nighttime hours. Section 3.8.3 *Noise Mitigation* has more details on the hotel vouchers.

3.5 Relocation/Right-of-Way

The Build Alternative would require CDOT to acquire some private property. This section describes land ownership in the study area, proposed property acquisition, and mitigation measures for affected property owners.

3.5.1 Existing Conditions

Land ownership in the study area consists of privately owned, commercial parcels; transportation rights-of-way; and publicly owned parcels.

Much of the land north of the river is owned by the Glenwood Hot Springs Lodge and Pool, Inc., whose ownership includes the parking area underneath and to the west of the highway bridge. The UPRR and CDOT own transportation rights-of-way for the railroad and I-70, respectively. CDOT and City of Glenwood Springs own transportation rights-of-way for SH 82. The City of Glenwood Springs owns the transportation right-of-way for the pedestrian bridge. Most other parcels are smaller commercial parcels.

3.5.2 Relocation/Right-of-Way Impacts

No Action Alternative

The No Action Alternative would not require new right-of-way, property acquisitions, or business relocations in the study area.

Build Alternative

The Build Alternative would result in acquisitions and permanent and temporary (construction) easements that would affect 14 parcels; these impacts are shown in Table 3-11 and Figure 3-20.

TABLE 3-11. PARCELS REQUIRING PROPERTY AND EASEMENT ACQUISITION

Map ID	Owner Name	Parcel Size	Full or Partial Right-of-Way Acquisition (acre)	Permanent Easement (acre)	Temporary Easement (acre)
1	Family Restaurants, Inc. (Village Inn)	0.84	0.04	N/A	0.14
2	SGM Springs Properties LLC (Village Inn)	0.84	0.002	N/A	0.005
3	Swallow Family LLLP (Subway Restaurant)	0.38	0.02	N/A	0.05
4	Harvest Moon Monarch, LLC (Shell Station)	0.60	0.60	N/A	N/A
5	Edificio, LLC	0.17	0.02	N/A	0.01
6	Fattor Family Limited Partnership	0.28	N/A	N/A	0.01
7	Glenwood Hot Springs Lodge & Pool Inc.	8.33	0.76	1.40	1.32
8	Union Pacific Railroad	13.18	N/A	0.09	0.17
9	Union Pacific Railroad	1.97	N/A	0.05	1.26
10 ^a	Union Pacific Railroad	TBD	N/A	0.01	0.17
11 ^a	Union Pacific Railroad	TBD	N/A	0.05	0.07
12 ^b	City of Glenwood Springs	2.80	N/A	0.07	0.51
13 ^c	406 West 7th LLC	1.45	N/A	0.13	0.11
14 ^c	Roaring Fork Transportation Authority	8.35	N/A	0.07	0.19
TOTAL		39.19	1.44	1.87	4.02

NOTE: Acreages are estimates based on preliminary design and subject to change as design progresses.
N/A = Not applicable.

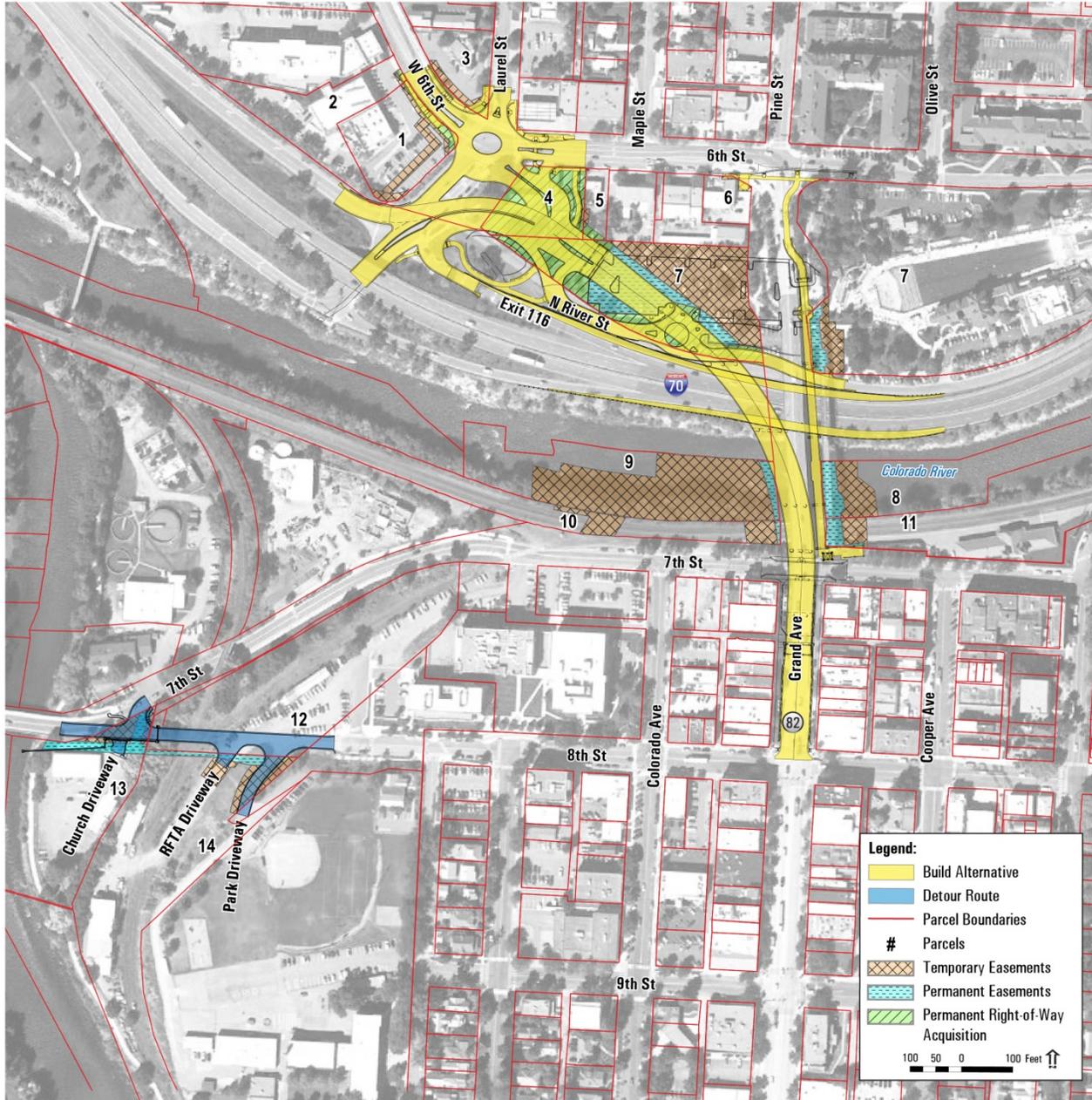
^a Ownership of the existing railroad area spanned by the highway bridge is currently in dispute between UPRR and Glenwood Hot Springs Lodge and Pool, Inc.

^b Per previous resolution and coordination, the City will make its property available to CDOT for project improvements. Therefore, CDOT likely will not seek easements from the City but may formalize property use through other means.

^c Impacts to these properties would occur during the SH 82 Detour from the full closure of Grand Avenue Bridge.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-20. PARCELS REQUIRING PROPERTY AND EASEMENT ACQUISITION



Source: Garfield County Geographic Information Systems; Jacobs, 2014.

As shown in Table 3-11, total property acquisition would be approximately 1.44 acres of right-of-way from 6 parcels. This would involve displacement of the Shell station located on the southeast corner of the 6th and Laurel intersection and parking for the Glenwood Hot Springs. There would be no displacement of other businesses or any residents, public facilities, or non-profit organizations.

CDOT would also acquire permanent easements, totaling approximately 0.2 acre, from the UPRR to widen the Grand Avenue Bridge. These easements would not affect property access, signage, or the property owner's current use of the property.

Construction activities would require approximately 4.02 acres of temporary easements from 13 parcels. Table 3-11 lists the properties affected; Figure 3-20 shows their locations.

Impacts along and adjacent to 8th Street would be temporary and related to the construction detour only. Section 3.6 *Economic Conditions* has information about the potential impacts to businesses in the study area.

Early Right-of-Way Acquisition. Right-of-way acquisition typically occurs after National Environmental Policy Act (NEPA) clearance and final design. However, CDOT plans to initiate early right-of-way acquisition on the Shell station, Hot Springs Lodge and Pool, and the UPRR parcel on the south side of the river, consistent with 23 CFR 710.501. This regulation allows early, state-funded right-of-way acquisition, provided certain conditions and requirements are met. These conditions relate to ensuring the early right-of-way acquisition will meet the conditions found in 40 CFR 1506.1. CDOT provided a certification to FHWA that documented compliance with these federal regulations, to which FHWA concurred. CDOT certified that the early property acquisition would not influence the alternatives process, the decision relative to the need to construct the project, or the selection of the Build Alternative design or location. Appendix D includes this documentation.

3.5.3 Relocation/Right-of-Way Mitigation

All acquisition and relocation will comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act). The Uniform Act is a federal law that applies to all acquisitions of real property or displacements of persons resulting from federal or federally assisted programs or projects. It was created to provide for and ensure the fair and equitable treatment of all such persons. CDOT ensures Uniform Act compliance on any project for which it has oversight responsibility.

Acquisition of property interests will comply fully with the Uniform Relocation Assistance and Real Property Acquisition Policy Act.

CDOT will provide all impacted property owners notification of its intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests being sought. CDOT will provide all displaced persons advisory services and notification of relocation eligibility, as applicable. A Right-of-Way Specialist will be assigned to each property owner to assist them with this process.

All reasonable opportunities to avoid relocations and minimize the impacts of acquisition have been taken in the development of the Build Alternative, and no additional mitigation is necessary.

3.6 Economic Conditions

This section describes existing economic and business activity and the potential impacts on jobs, income, and economic activity. Analysis of economic data and interviews with representatives of key business organizations and the business community guided the impact assessment and the development of mitigation measures. Additional information about the economic conditions assessment is available in the *Economic Conditions Technical Report SH 82 Grand Avenue Bridge Environmental Assessment (Economic Conditions Technical Report)* (ArLand Land Use Economics, 2014).

3.6.1 Existing Conditions

The economic activity centers in Glenwood Springs and within the study area are highlighted on Figure 3-21.

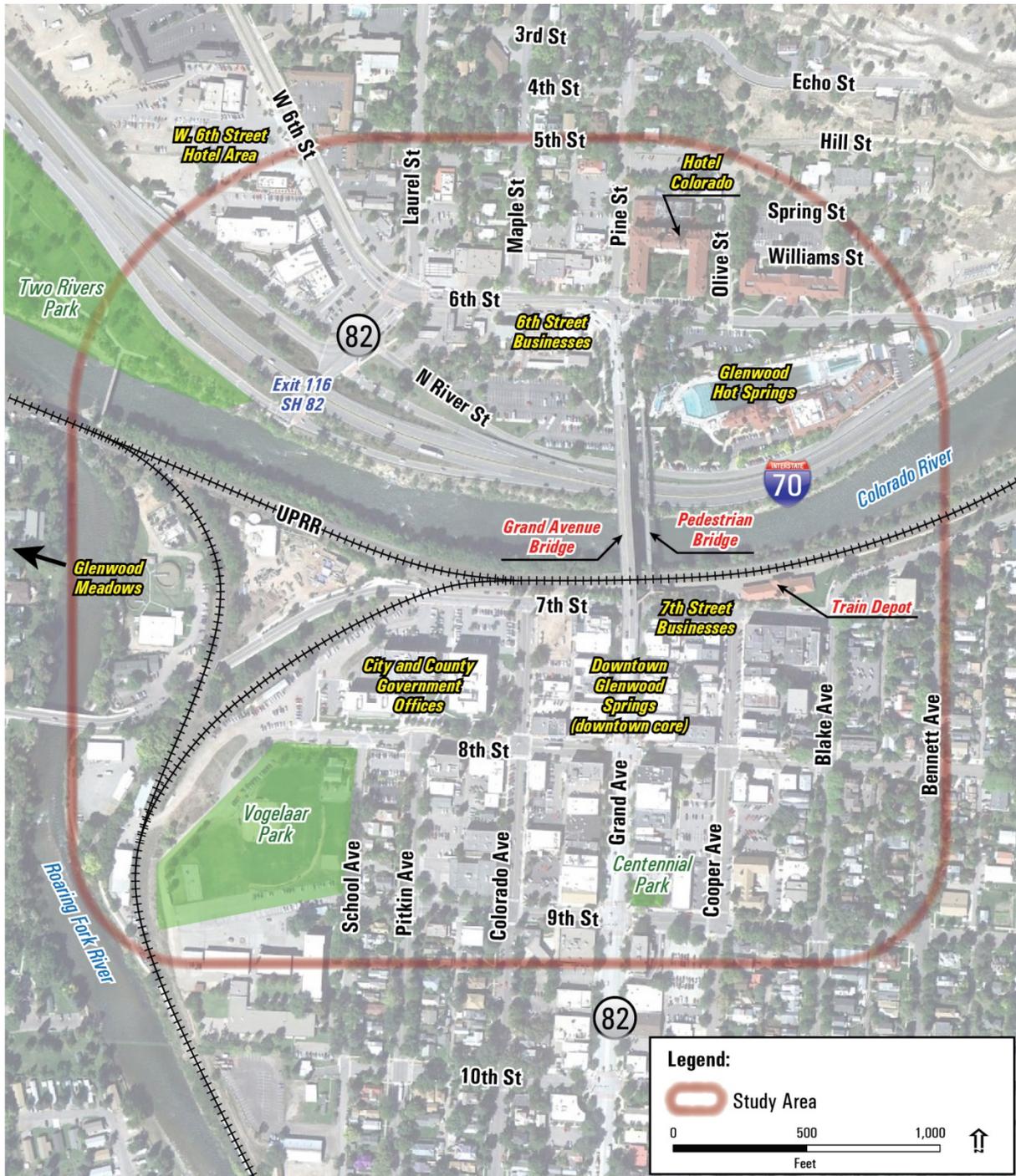
Tourism makes up the largest portion of Garfield County's economic base.

Downtown Glenwood Springs (downtown core) is a retail, restaurant, and entertainment hub for visitors and the local population, but it is also part of a larger regional economy. Glenwood Springs and Garfield County, like much of Colorado, suffered jobs losses during the Great Recession between 2008 and 2011 (Colorado Department of Labor, Historical Labor Market Data).

The area is currently rebounding. The County added over 1,700 jobs between 2010 and 2012; the Mining, Health Care and Social Assistance sectors comprise an increasingly larger portion of County jobs.

However, tourism continues to be a critically important industry to the Roaring Fork Valley, Garfield County, and Glenwood Springs. In a 2007 socioeconomic impact study of Garfield County, BBC Research & Consulting concluded that tourism comprised the largest portion of the County's economic base (BBC Research & Consulting, 2007). According to the Glenwood Springs Chamber of Commerce, Glenwood Springs welcomes an estimated 1.5 million visitors per year attracted by its family-friendly

FIGURE 3-21. GLENWOOD SPRINGS ECONOMIC CENTERS



Source: Jacobs, 2014.

activities and varied schedule of destination events. The Glenwood Hot Springs and the Hotel Colorado estimate that 75 percent of their visitors are from Denver's Front Range. Given the close proximity of the downtown businesses to these businesses, it is highly likely that most customers in the downtown area are also from the Front Range.

Lodging

Many visitors stay in the estimated 1,600 hotel rooms in Glenwood Springs, in addition to bed and breakfasts, lodges, condos, and private homes. There are approximately 800 hotel rooms on the north side of the river, primarily on W. 6th Street, just outside of the study area, but within walking distance of the downtown core area south of the river. The 73-room Hotel Denver is on the south side of the river along 7th Street.

Additional lodging is within a very short distance of the downtown area. Because most visitors stay in facilities north of the river, pedestrian access to the restaurants and other business establishments on the south side is critically important to the health of many of the businesses there.

Lodging in Glenwood Springs suffered during the Great Recession, but lodging tax revenues have begun to climb back from their low point in 2009. Lodging facilities are busiest in the summer. April-May and October-November are consistently the slowest months. According to data analysis and business interviews, from 2006 to 2012, April-May business revenues were slightly higher than October-November revenues.

Retail

Retail businesses in the study area contribute significant sales tax revenue to the City of Glenwood Springs. The combined sales tax revenues from retailers located in the downtown core area and the commercial area along 6th Street and W. 6th Street, which includes the Glenwood Hot Springs and Hotel Colorado, would represent the second highest source of sales tax revenues in the City, behind Glenwood Meadows, a commercial retail development located at the southwest corner of Midland Avenue and Wulfsohn Road. There are an estimated 990 full- and part-time employees at retail and personal services businesses between 7th and 11th Streets, and 520 employees north of the river.

Retail businesses in the study area contribute significant sales tax revenue to the City of Glenwood Springs.

At the time of the analysis, there were 90 commercial businesses (not including many of the professional offices) in the study area. The study area is dominated by restaurant and retail businesses, as shown in Table 3-12; additional uses are government offices and professional and personal services.

North of the river along 6th Street, the Glenwood Shell and the Kum & Go stations are very successful, primarily because they are located near the interchange with I-70. Businesses along 6th Street, such as Springs Liquors and the Flower Mart, appear to be oriented to drive-by traffic, although existing ingress and egress can be challenging. The Mountain Sports Outlet, the Gear Exchange, and the Blue Sky Ski Rental carry sporting goods, and indicated that they are also destination businesses with loyal local repeat customers.

TABLE 3-12. BUSINESSES IN STUDY AREA

Business Type	Number of Businesses
Lodging	4
Fast Food	3
Gas	2
Restaurant	25
Retail	37
Other	20
Total	91

Source: ArLand Land Use Economics, 2014

The main commercial businesses in the northeast quadrant of the study area are the Hotel Colorado and the Glenwood Hot Springs. The historic Glenwood Hot Springs, the largest in the world and renowned for its healing properties, has developed into a major resort destination with a pool, lodge, spa, 1,000-member fitness facility, and supporting retail and commercial services and facilities. The Glenwood Springs Center for the Arts and the Yampah Hot Springs Vapor Caves and Spa are also located in this area.

Businesses along Grand Avenue south of the river between 7th and 9th Streets are primarily retail and restaurants, with some office spaces interspersed. Some of the most popular restaurants in the area are located here. There are commercial businesses in the block between Cooper and Blake Avenues along 7th Street, including the Hotel Denver. The City of Glenwood Springs and Garfield County government offices are located between 7th and 8th Streets. Additionally, the southwest portion of the study area includes the Confluence area where the City has an approved plan in place for the area's future redevelopment. Refer to the *Economic Conditions Technical Report* (ArLand Land Use Economics, 2014) for details on local businesses.

3.6.2 Economic Impacts

No Action Alternative

Under the No Action Alternative, there would be no direct impacts to businesses and services within the study area. Indirect impacts would result from increased traffic volumes and congestion along SH 82 and 6th Street. For example, by 2035, LOS at the 6th and Laurel intersection under the No Action Alternative would worsen to LOS D and E for the morning and afternoon peak hours, respectively. Visitors and the local community would experience back-ups along the study area roadways, and would find it more difficult to access businesses in the downtown area and on 6th Street. The DDA's plans for redeveloping 6th Street would be more difficult to implement.

Build Alternative Impacts

Impacts to Businesses. While downtown Glenwood Springs has undergone repaving and construction projects, the level of construction activity from the Build Alternative would be unprecedented in recent history. Projecting long-term effects to businesses from the anticipated construction activities (including the approximately 90-day full closure of Grand Avenue Bridge) and access changes is difficult and inherently speculative. One way is to review the effects similar projects have had on other business communities.

The study team examined the impacts of construction in similar environments (Arvada, Colorado; St. Croix, Minnesota) to the existing pedestrian bridge maintenance and closure in 2010 in Glenwood Springs, and other projects documented in transportation literature. The complete case studies are included in the *Economic Conditions Technical Report* (ArLand Land Use Economics, 2014) prepared for this EA.

The case studies present a variety of scenarios and lessons learned. They are:

- ❖ Downtown economies reflect the broader regional economies in which they are located.
- ❖ When there are a few businesses that are regional attractions, it is the combined mix of business that makes a downtown area strong.
- ❖ Despite all efforts, businesses do see a drop off in activity, particularly when construction is most heavily impacting them and access is confusing and/or difficult.
- ❖ Businesses that rely heavily on drive-by traffic, such as liquor stores, gas stations, and some restaurants and retail establishments, appear to suffer more than businesses that are more destination oriented.
- ❖ Sometimes, a change in access that is perceived as a potential drawback to businesses can ultimately change the environment and result in positive impacts.
- ❖ Businesses that are suffering already will likely have a particularly challenging time during construction.
- ❖ Maintaining business access with alternative routes and signage, and engaging in constant communication with businesses must be a high priority for the agencies managing project construction.

Under the Build Alternative, SH 82 through traffic would be permanently routed away from many of the businesses on 6th Street, which would reduce their visibility to through traffic.

Based on these case studies, the Glenwood Springs downtown economy should fully recover after construction is complete. Glenwood Springs, as part of the regional economy, is bouncing back from the Great Recession, and improvements that would

enhance the experience of visitors and pedestrians in the retail and lodging areas would attract and keep people in the area to patronize businesses.

Under the Build Alternative, SH 82 through traffic would be permanently routed away from many of the businesses on 6th Street, which would reduce their visibility to through traffic and impact those businesses. Most of the remaining vehicle traffic would be local. Although not proposed as a measure to mitigate the permanent impacts to businesses along 6th Street, the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011), as discussed in Section 3.2 *Land Use*, calls for redeveloping the 6th Street area and creating a walkable environment that connects downtown to 6th Street businesses and the W. 6th Street hotel area. The plan calls for more intensive development of storefront retail, offices, and housing in this area. Should this redevelopment occur, it would likely result in greater property values and tax and other fiscal benefits.

Access to most businesses on W. 6th Street would not change in the long term and, therefore, would have no lasting effects. The proposed 6th and Laurel roundabout intersection would greatly improve traffic operations compared to the No Action Alternative and would reduce back-ups along 6th Street and help customers access those businesses. In the downtown core, the long-term adverse effects are expected to be minor. However, there are concerns about noise, the speed and amount of traffic, the height of the bridge, and decreased visibility. The study team and DDA have been working to ensure that the sidewalk/plaza area south of 7th Street under the bridge remains as wide and as pedestrian-friendly as possible. Further, a gateway concept at the I-70 exit and redevelopment opportunities along 6th Street would provide business opportunities. In addition, the creation of more pedestrian-friendly environments would encourage people to walk to their destinations, thus reducing some parking demand. Therefore, changes to parking are not anticipated to have a great impact on the level of business activity in these areas.

The new Grand Avenue Bridge would be higher and in closer proximity to businesses along Grand Avenue between 7th and 8th Streets than the existing bridge. Businesses on Grand Avenue would remain visible and accessible to motorists and pedestrians, and improvements proposed under the new highway bridge and in the Grand Avenue wing street area would create a more visually pleasing and inviting environment than current conditions. Therefore, businesses along Grand Avenue are not expected to be impacted by the new highway bridge.

Impacts from Land Acquisition. Under the Build Alternative, the Shell station located near the 6th and Laurel intersection would be fully acquired. The Shell station has 10 employees and contributes approximately \$166,500 in City of Glenwood Springs

Under the Build Alternative, the Shell station located near the 6th and Laurel intersection would be fully acquired.

retail sales tax annually (Garfield County Assessor's Office; interview with Shell business owner March 21, 2013; and ArLand Land Use Economics). Because the Shell station is a very successful business, it may be difficult for the owner to replicate its success at an alternate location in Glenwood Springs. Should the owner relocate within the City, the business and employees' contributions to federal and state taxes, employment, and highway users tax funds and fees would remain in the current economy and could potentially be lower. If the owner chooses not to relocate and closes the business, the contributions would potentially be recovered by the Kum & Go station or other gas stations and tire stores in other parts of Glenwood Springs.

The Build Alternative would require partial acquisitions of the Glenwood Hot Springs parking areas. However, because parking impacts would be mitigated (Section 3.6.3 *Economic Mitigation*) and access would be maintained, this is not expected to affect the Glenwood Hot Springs' long-term operations or contributions to the local economy. In addition, the creation of more pedestrian-friendly environments in the study area would encourage people to walk to and from the Glenwood Hot Springs, thus reducing some parking demand.

More details about the properties to be acquired are available in the *Economic Conditions Technical Report* (ArLand Land Use Economics, 2014).

Construction Impacts.

Access and Business Visibility. During the approximately 90-day bridge closure for the SH 82 Detour, business visibility would decrease for certain businesses in the study area. Businesses that primarily rely on drive-by traffic would be impacted more than businesses that are specific destinations. While access to all business in the study area would be maintained, the temporary detour route would result in changes in traffic patterns between the north and south sides of downtown Glenwood Springs. Businesses along Grand Avenue between 7th and 8th Streets, on 7th Street, along 6th Street, and on W. 6th Street adjacent to and west of the 6th and Laurel intersection would be less visible to drive-by-traffic. Also, trips to these businesses by car might require out-of-direction travel along Midland Avenue, which could reduce sales. The increased traffic along Midland Avenue for the temporary SH 82 Detour between 8th Street and Exit 114 would increase the visibility of businesses at Glenwood Meadows. The *Economic Conditions Technical Report* (ArLand Land Use Economics, 2014) has more details.

Noise and Air Quality. Increased construction noise and air quality impacts from construction detour activities could result in customers deciding to visit businesses in other parts of Glenwood Springs. However, a more convenient, direct access route to downtown via 8th Street would help reduce that inclination. Also, businesses on 7th Street, on 6th Street, and in the 6th and Laurel intersection area would experience

increased construction noise and air quality impacts from construction activities, which could negatively influence the number of customers visiting the businesses.

Parking. The Build Alternative would require temporary impacts to parking in the study area. However, as discussed below, changes to parking are not anticipated to have a great impact on the level of business activity in these areas.

Parking spaces near areas under construction would be impacted.

- ❖ **Glenwood Hot Springs.** Construction activities would occur in the parking area for demolition of the existing bridge foundations and excavation for the new bridge foundations. The existing and new Grand Avenue Bridges and the existing and new pedestrian bridges all have two piers and an abutment in or near the parking area (eleven total foundations). Other construction activities would occur in the parking area to relocate utilities, construct the Grand Avenue Bridge and new pedestrian bridge, reconstruct parking spaces, and stage other construction activities. These activities would impact parking spaces at various times throughout the construction period. A reduction in the available parking spaces could make it more difficult for customers to find parking close to the recreation facility. However, the study team and Glenwood Hot Springs staff have identified several options for temporary parking. A solution will be identified during the right-of-way process.
- ❖ **6th and Laurel Intersection Area.** Parking may be reconfigured in the Village Inn, Kum & Go, and Subway parking lots to improve access with the new roundabout. This may require some temporary reductions in the number of parking spaces. Customers in this area would need to find parking in nearby, alternate locations.
- ❖ **7th Street.** 7th Street would be closed during the approximately 90-day full bridge closure. At other times during the construction period, 7th Street between Colorado Avenue and Cooper Avenue would be converted to one lane with either one-way westbound or alternating direction one-way operation to provide room to construct bridge abutments and piers near 7th Street, provide space for construction equipment and materials, and improve traffic operations at the 7th Street/ Colorado Avenue intersection. This work would require the temporary removal of about 10 to 12 on-street parking spaces on the north side of 7th Street. The removal of parking during construction could impact the businesses and restaurants along 7th Street and Grand Avenue between 7th and 8th Streets, which would require customers to park one to two blocks farther away.

The evaluation of case studies, discussed under *Impacts to Businesses* above, indicates these probable outcomes related to construction-related business impacts:

- ❖ Most businesses closest to the main construction areas would likely suffer a decline in sales, despite all efforts to maintain access and minimize noise and construction nuisance. After construction, sales would recover over time.
- ❖ Destination businesses, such as the Glenwood Hot Springs, would tend to fare better than other types of businesses. Customers would travel to these locations regardless of convenient parking and driving.
- ❖ Marginal businesses would experience the biggest impacts and may close if enough sales are lost in the short term.

Short-Term Impacts from Construction Jobs. Despite its adverse effects, construction would benefit the local economy by creating jobs and certain types of revenue. These benefits can be measured by direct job creation from construction, as well as the indirect jobs and earnings created by the construction. The impacts typically peak during the construction period and decline once the project is fully built.

Construction would benefit the local economy by creating jobs and certain types of revenue.

The study team used multipliers developed by the U.S. Department of Commerce Bureau of Economic Analysis (BEA) to estimate the total potential impact of the Grand Avenue Bridge construction on the Glenwood Springs economy (Bureau of Economic Analysis, 2013). A project's estimated construction budget has multiplier effects throughout the economy as money is spent for materials and labor. For example, construction workers spend money locally on lodging, food, gasoline, and other sundries. And, local companies may provide some goods and services for construction of the project.

Using the BEA multipliers, the estimated economic impacts of the Build Alternative are listed in Table 3-13. The values include both the direct impact of the Build Alternative and the indirect impact related to the spending, jobs, and incomes created by supporting industries in the regional area.

TABLE 3-13. POTENTIAL IMPACT ON GLENWOOD SPRINGS ECONOMY

Type of Impact	Definition	Estimated Impact
Output	Equals the value of construction (\$60 million) plus the impact of the purchase of goods and services generated by the construction (estimated at \$39.7 million)	\$99.7 million
Earnings	Wages and salaries paid to construction workers	\$32.4 million
Employment	Number of jobs generated	782 jobs
Value Added	Total change in the local and regional economy	\$55.6 million
Direct Effect	Change in local household earnings and number of local jobs created	\$91.9 million and 99 jobs

Source: Arland Land Use Economics, 2014.

Quantification of other benefits from the project is very approximate, but general effects would include:

- ❖ Construction workers would eat some meals at local restaurants. The study team estimates that \$975,900 in potential revenue for Glenwood Springs restaurants would be generated during this period.
- ❖ Some of the more moderately priced lodging establishments and apartments would likely employ additional workers who currently live outside the area.
- ❖ Some construction workers could live in extended stay lodging in the area and purchase food and other necessities.
- ❖ Local construction companies would likely benefit from subcontracting opportunities.

3.6.3 Economic Mitigation

Mitigation for Build Alternative impacts includes:

- ❖ Design the Build Alternative to maintain and, where possible, improve access to existing businesses.
- ❖ Comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), for all acquisition and relocation.
- ❖ As part of the right-of-way process, coordinate with the Glenwood Hot Springs to identify a solution to compensate for parking impacts.
- ❖ Using the established CSS process, work with stakeholders to incorporate design features to enhance business and tourism opportunities. Examples include incorporating features into the pedestrian bridge that enhance and strengthen the pedestrian connection between the downtown core and 6th Street, and into the new intersection at 6th and Laurel to create a traffic gateway that creates a positive impression for visitors to Glenwood Springs.
- ❖ Coordinate with the DDA to develop signage that directs visitors to the 6th Street businesses.

To mitigate the economic effects to affected businesses during construction, CDOT will:

- ❖ Maintain access to all businesses at all times.
- ❖ Target the approximately 90-day full bridge closure during the traditionally slower traffic times during the year.
- ❖ Use Accelerated Bridge Construction techniques to minimize bridge closure time.

During construction, CDOT will maintain access to all businesses at all times.

- ❖ Keep pedestrian access across the river open at all times.
- ❖ Continue to coordinate with the Glenwood Hot Springs to mitigate temporary impacts to parking. To lessen the level of impact, conduct public outreach to inform visitors of the construction activities and options for parking in the area.
- ❖ Communicate regularly with businesses about the construction schedule.
- ❖ Provide additional signage to clarify detour and access changes.
- ❖ Conduct public outreach to let the local community and region know that the area is open for business.
- ❖ Participate with local business organizations (e.g., the DDA, the Glenwood Springs Chamber of Commerce, Downtown Market, Colorado Mountain College, and others) to identify other mitigation measures the project could incorporate to mitigate business impacts.
- ❖ Section 3.8 *Noise* and 3.7 *Air Quality* have mitigation measures for related impacts.

Additional measures could include enhanced marketing and promotion during construction that would be led and promoted by local business organizations. CDOT's outreach team will coordinate and work closely with the Glenwood Springs Chamber of Commerce and other location organizations and groups and support this outreach.

3.7 Air Quality

This section describes existing air quality conditions in the study area and impacts that would result from the No Action Alternative and the Build Alternative.

3.7.1 Regulatory Framework

In accordance with the Clean Air Act (CAA), the U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for the following six air pollutants, referred to as "criteria pollutants:"

- ❖ Carbon monoxide (CO)
- ❖ Lead
- ❖ Nitrogen dioxide (NO₂)
- ❖ Ground level ozone (O₃)
- ❖ Microscopic dust particles referred to as "particulate matter" or PM (PM₁₀ and PM_{2.5})
- ❖ Sulfur dioxide (SO₂)

Air quality standards establish the concentration above which a pollutant is known to cause adverse health effects to sensitive groups in the population, such as children and the elderly.

The NAAQS specify the concentration of pollutants in the air that should not be exceeded to protect human health. The 1991 CAA amendments established regulations to ensure

that proposed federal transportation plans, programs, or projects will not cause or contribute to a NAAQS violation in areas with ongoing or past NAAQS violations. These “conformity” regulations are detailed in 40 CFR Part 93. Project-level air quality conformity analysis is not required for federal actions in areas where there is no history of NAAQS violations, such as Garfield County.

The State of Colorado has adopted the NAAQS for the above-listed pollutants. The CDOT *Air Quality Analysis and Documentation Procedures*, as revised in 2010 (CDOT, 2010), detail the processes and considerations taken into account for analyzing air quality impacts of CDOT transportation projects. Table 3-14 summarizes the NAAQS.

Geographic areas are classified as non-attainment, attainment, or maintenance. Areas that exceed a particular NAAQS for a criteria pollutant are considered “non-attainment” areas for that pollutant. Conversely, areas that are below a criteria pollutant standard are considered “attainment.” Maintenance areas are defined as areas that were previously classified as a non-attainment area for a criteria pollutant, but are presently attaining the standard for that pollutant. Maintenance areas are required to develop a maintenance plan that outlines steps to maintain their attainment status over a prescribed maintenance period.

The study area within Garfield County is currently in an attainment area for all criteria pollutants, meaning that it is not believed to experience or contribute to a NAAQS violation.

TABLE 3-14. NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Primary	Secondary
Carbon Monoxide (CO)	1 hour	35 ppm	N/A
	8 hour	9 ppm	N/A
Lead	Rolling 3-Month Average	0.15 µg/m ³	0.15 µg/ m ³
Nitrogen dioxide (NO ₂)	1 hour	100 ppb	N/A
	Annual	53 ppb	53 ppb
Ozone (O ₃)	8 hour	0.075 ppm	0.075 ppm
Particulate Matter (PM ₁₀)	24 hour	150 ug/ m ³	150 ug/ m ³
Particulate Matter (PM _{2.5})	24 hour	35 ug/ m ³	35 ug/ m ³
	Annual	12 ug/ m ³	15 ug/ m ³
Sulfur Dioxide (SO ₂)	1 hour	75 ppb	N/A
	3 hour	N/A	0.5 ppm

Source: EPA, 2013.

ppm=parts per million by volume; ppb=parts per billion; ug/m³=micrograms per cubic meter.

N/A = There is no standard.

In addition to the NAAQS for criteria air pollutants, the EPA also regulates air toxics under Section 202 of the CAA. Most air toxics originate from human-made sources, including on-road mobile sources (automobiles and trucks), non-road mobile sources (airplanes), area sources (dry cleaners), stationary sources (factories or refineries), and non-road equipment (forklifts, backhoes, etc.).

Mobile source air toxics (MSATs) are compounds that are emitted into the air from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted into the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline (EPA, 2000).

Exposure to pollutants (such as vehicle engine emissions and airborne particulates) can adversely affect human health (e.g., respiratory problems), vegetation, and wildlife.

3.7.2 Existing Conditions

Air Quality Monitoring

The Garfield County Board of Health monitors concentrations of air pollutants within the County. Figure 3-22 shows the four monitoring stations within Garfield County located in Parachute, Rifle, Silt, and Battlement Mesa. All four stations monitor pollutants and meteorology. However, only two monitoring stations (Rifle and Parachute) monitor concentrations of the criteria pollutants of ozone and particulate matter. According to the Garfield County 2012 *Monitoring Report for the Second Quarter* (Garfield County, 2012), no exceedances of the NAAQS have occurred in Garfield County. Further, low concentration levels were recorded at a monitoring station in Glenwood Springs during a two-year monitoring program. This monitoring station was closed in 2008.

Air Quality Background

Traffic on I-70 (west of SH 82) and SH 82 is the dominant generator of emissions in the study area. In 2012, I-70 (west of SH 82) traffic volumes totaled approximately 3,672 vehicles per hour (vph), and SH 82 traffic volumes totaled approximately 3,720 vph. Although these traffic volumes are similar, the percentage of trucks along these roadways differs greatly. Trucks made up approximately 14.6 percent of I-70 traffic, while trucks represented approximately 4 percent of traffic on SH 82.

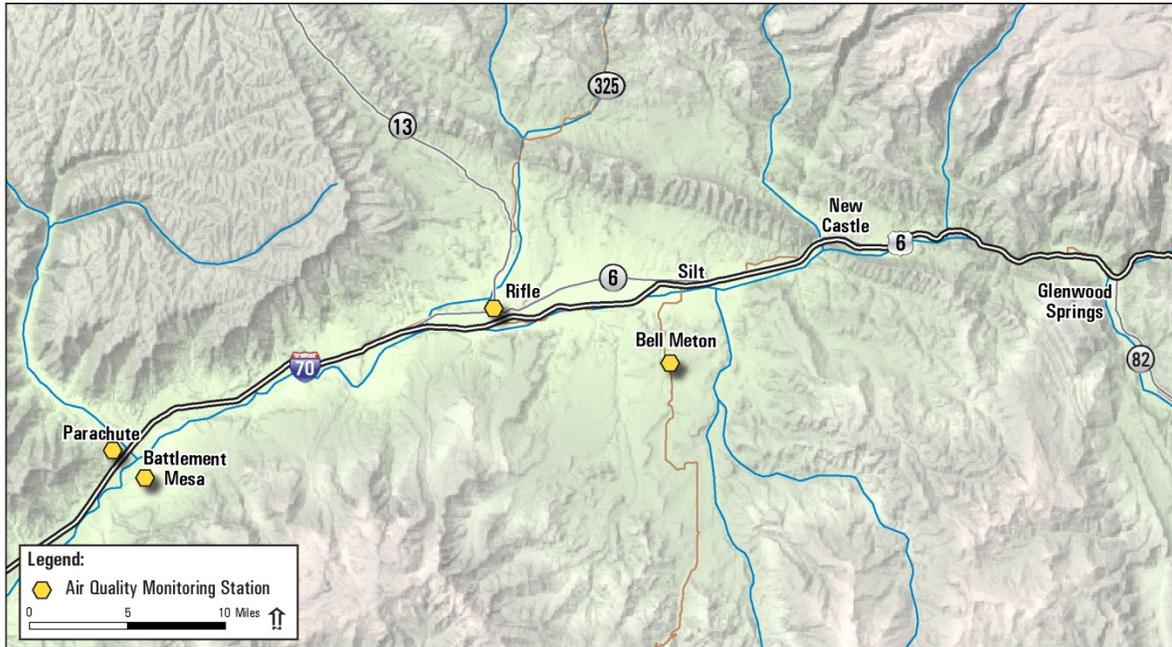
The study area is contained within a mountain valley that often experiences diurnal (daily) temperature inversions. Temperature inversions occur when warm air forms a cap above cool, stable air, which then traps pollutants. This phenomenon isolates local concentrations of emissions within the mountain valleys.

3.7.3 Air Quality Impacts

No Action Alternative

Traffic congestion is likely to worsen with the No Action Alternative, which would increase air quality impacts. However, emissions of hydrocarbons (HC), nitrogen oxides (NO_x), PM₁₀, and CO are expected to decrease in the future as EPA's low emission standards are implemented by 2020.

FIGURE 3-22. MONITORING STATIONS WITHIN GARFIELD COUNTY



Source: Garfield County Quarterly Monitoring Report, 2012.

Build Alternative

Direct Effects. Transportation conformity provisions of the CAA do not apply to this project and, therefore, project-level air quality modeling is not required.

A decrease in congestion under the Build Alternative would reduce concentrations of all air pollutants.

As with the No Action Alternative, implementation of EPA standards is expected to reduce emissions by 2020. Further, the decrease in congestion under the Build Alternative would reduce concentrations of all air pollutants. The existing signalized intersection at 6th and Laurel would be replaced with a roundabout, which would reduce intersection idling and subsequent emissions in the study area. On the north side of the Colorado River, the Build Alternative would pass near sensitive receptors located on the south side of 6th Street, such as commercial and retail shops and second-story residences. Localized emissions of air pollutants are expected to continue in this area.

In short, the Build Alternative is not expected to lead to exceedances of the NAAQS within Garfield County, including the study area.

- ❖ *Mobile Source Air Toxics – Compliance with 40 CFR 1502.22.* Design year traffic is projected to be less than 140,000 AADT. Therefore, the Build Alternative would have low potential MSAT effects. For this reason, a qualitative analysis was conducted

rather than a quantitative analysis to determine the amount of MSAT emissions expected. Appendix C contains the full MSAT analysis.

The amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Action Alternative (20,092 daily VMT) is higher than the Build Alternative (16,091 daily VMT), higher levels of MSAT are not expected from the Build Alternative compared to the No Action Alternative. Emissions would likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future at virtually all locations.

- ❖ *Greenhouse Gases.* Climate change is an important national and global concern. While the earth has gone through many natural climate changes in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) greenhouse gas (GHG) emissions contribute to this rapid change. Carbon dioxide (CO₂) makes up the largest component of these GHG emissions. Other prominent transportation GHG emissions are methane and nitrous oxide.

Under NEPA, detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making (40 CFR 1500.1[b], 1500.2[b], 1500.4[g], and 1501.7). FHWA has concluded, based on the nature of GHG emissions and the exceedingly small potential GHG impacts, that no alternatives-level GHG analysis is needed for this project. Appendix C summarizes the GHG analysis conducted.

Construction Impacts. Construction activities would temporarily generate air pollutants in all areas under construction throughout the construction period.

Construction activities would temporarily generate air pollutants in all areas under construction throughout the construction period.

Vehicle Emissions. Construction vehicles and equipment would generate exhaust emissions in the area. The emissions contributed by construction equipment would be short term and minor. In addition, areas along detour routes could experience an increase in vehicle emissions because of increased traffic during detour operations. However, any temporary impacts would be minimized by implementation of mitigation measures discussed in Section 3.7.4 *Air Quality Mitigation*.

Fugitive dust. Particulate matter (fugitive dust) is the most common air pollutant emitted during construction activities. It is caused by soil-disturbing activities, such as excavation and grading. Fugitive dust may become airborne during material transport, grading, vehicular use and machinery use on and off a construction site, and by high winds. Fugitive dust would also be a concern along the detour routes where an increase in traffic volumes would occur near residential areas. The amount of airborne dust generated and the concentration of particulate matter that the public would be exposed to would depend on soil type, location of construction activities relative to receptors (persons), volume of dirt/material to be moved, wind speed and direction, time of day, and season. Fugitive dust would be a higher concern in construction areas located adjacent to residential or other sensitive areas.



Heavy construction machinery and demolition activities would be a source of air quality and noise impacts.

The Build Alternative is not anticipated to result in long-term impacts to air quality.

3.7.4 Air Quality Mitigation

The Build Alternative is not anticipated to result in long-term impacts; therefore, project-specific mitigation after the project is constructed is not needed.

To help address the global issue of climate change, the U.S. Department of Transportation and EPA are working together to reduce GHG emissions by substantially improving vehicle efficiency and shifting toward lower carbon intensive fuels. The agencies have jointly established new, more stringent fuel economy and first-ever GHG emissions standards for model year 2012-2025 cars, light trucks, heavy-duty trucks, and buses.

At the state level, there are also several programs underway in Colorado to address transportation GHG emissions, which are discussed in Appendix C. In addition, Appendix C contains programwide activities to address MSAT and GHG emissions.

To minimize and mitigate air pollutants during construction, CDOT and its contractor will comply with the fugitive dust permitting and control requirements of the Colorado Air Quality Control Commission (CAQCC) and obtain a general construction Air Pollutant Emission Notice. The requirements are documented in Regulation 1, Emission Control Regulation for Particulate Matter, Smoke, Carbon Monoxide, and Sulfur Oxides

for the State of Colorado, effective August 30, 2007 (CAQCC, 2007), and Regulation 3, Air Pollutant Emission Notice Requirements, effective April 14, 2014 (CAQCC, 2014).

Fugitive dust control measures will include, but are not be limited to, the following:

- ❖ Apply water and chemical stabilizers in active construction areas and on haul roads as necessary to suppress dust.
- ❖ Post speed limit signs and enforce speeds in active construction areas and on haul roads.
- ❖ Water, perform soil compaction, and revegetate disturbed areas, as needed and appropriate for site conditions.
- ❖ Temporarily curtail earthmoving activity during extreme wind or dust conditions.
- ❖ Cover haul trucks, as appropriate, to reduce dust.
- ❖ Limit haul truck speeds in unpaved areas.

To address MSAT, in addition to the programwide activities described in Appendix C, CDOT will:

- ❖ Review the plans for construction truck routing and hauling, in order to reduce the number of trips and periods of avoidable extended idling.

3.8 Noise

The FHWA Noise Abatement Criteria (NAC) has defined noise levels for land activity categories. CDOT has adopted these NAC and defines noise levels that if approached (1 A-weighted decibel [dB(A)] less than the FHWA NAC) or exceeded, require noise abatement consideration. Table 3-15 summarizes the various land use categories with the corresponding noise abatement criteria. FHWA guidelines also state that noise abatement should be considered when the noise levels substantially exceed the existing noise levels (23 CFR 772.11[f]). This criterion is defined by CDOT as increases in the Leq (equivalent sound level) of 10 dB(A) or more above existing noise levels.

Noise is generally defined as unwanted sound.

TABLE 3-15. CDOT NOISE ABATEMENT CRITERIA, HOURLY A-WEIGHTED SOUND LEVEL DECIBELS (DB[A])

Activity Category	Activity Leq(h)*	Evaluation Location	Description of Activities
A	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B ¹	66	Exterior	Residential
C ¹	66	Exterior	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E ¹	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	N/A	N/A	Undeveloped lands that are not permitted for development.

Source: CDOT, *Noise Analysis and Abatement Guidelines*, February 2013.

¹Includes undeveloped lands permitted for this activity category.

* = Hourly A-weighted sound level in dB(A), reflecting a 1-dB(A) approach value below 23 CFR 772 values.

N/A = Not applicable; Leq(h) = Equivalent sound level for a one-hour period.

3.8.1 Existing Conditions

The study area is an urban environment where existing noise levels currently approach, and can sometimes exceed, the NAC thresholds. The primary existing source of noise is traffic.

Noise-sensitive receptors are those locations or areas where there are dwelling units or other fixed, developed sites of frequent human use, such as homes, recreation areas, and hotels.

Noise-Sensitive Receptors

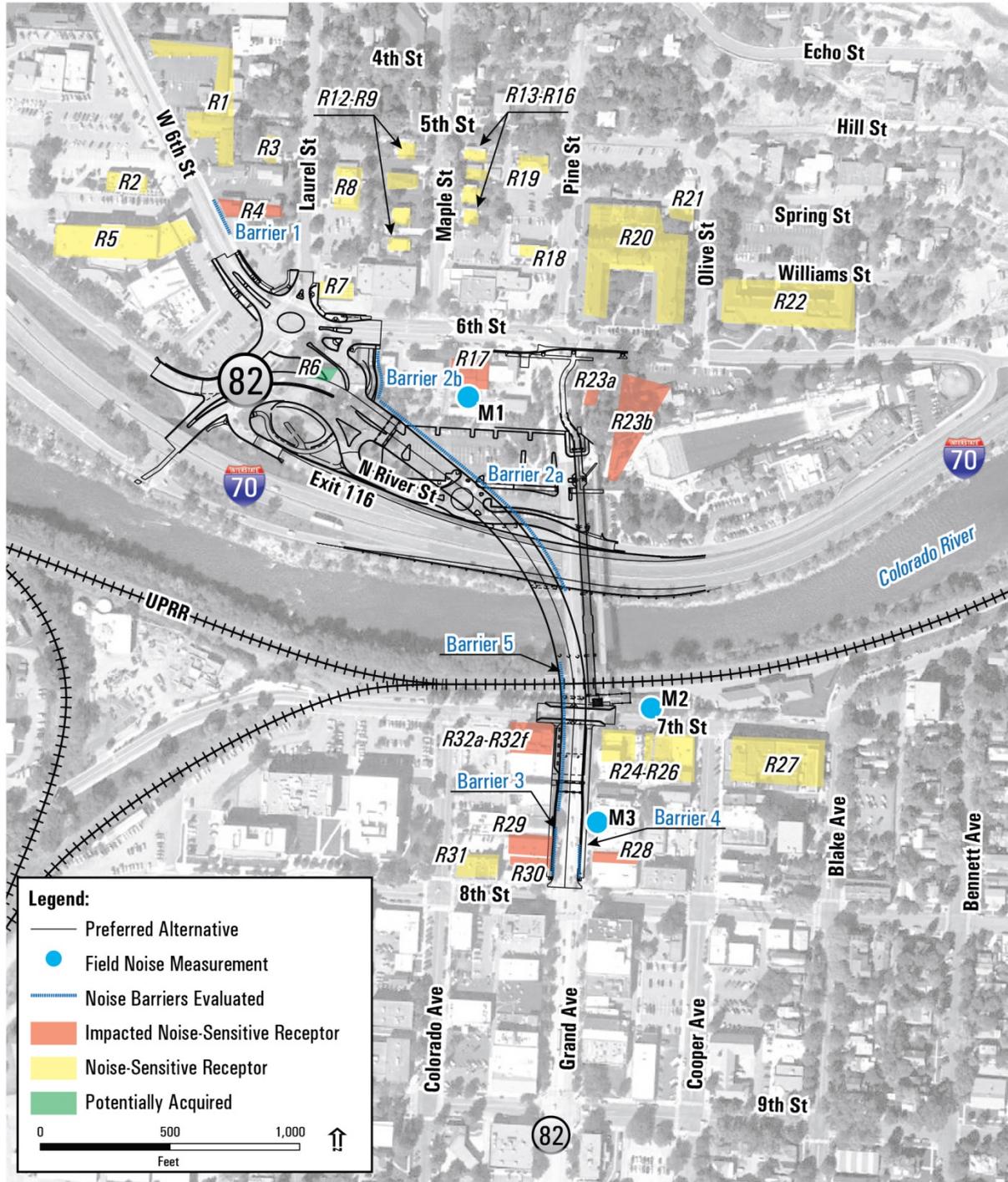
The traffic noise analysis considered all noise-sensitive receptors that could be impacted by the Build Alternative. Numerous receptors exist within the study area, including restaurants with outdoor use areas, residences, and hotels. Several noise-sensitive activities are located on the Glenwood Hot Springs site. However, only the closest outdoor activities were modeled and assessed for the noise analysis. Figure 3-23 shows these noise-sensitive receptors.

Noise Measurements

In March and May 2013, the study team took noise measurements at three locations within the study area to determine ambient noise levels. Figure 3-23 depicts the locations of the field measurements.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-23. NOISE-SENSITIVE RECEPTORS



Source: Jacobs, 2014.

The difference between the field recordings and the modeled-predicted noise levels was 3 dB(A) or less, which validated the model. Three decibels is relevant because the human ear can detect changes in noise levels over 3 dB(A). Detailed information on the noise-sensitive receptors, measurements, and model validation can be found in the *SH 82 Grand Avenue Bridge Noise Technical Report* (Jacobs, 2014).

3.8.2 Noise Impacts

Under existing conditions, twelve noise-sensitive receptors experience traffic noise that exceed the NAC. Table 3-16 summarizes the modeled noise levels for existing conditions, the No Action Alternative, and the Build Alternative. Bold numbers indicate traffic noise levels that approach or exceed the NAC.

The purpose of the models is to show whether traffic noise levels meet defined criteria and whether traffic noise mitigation should be considered.

No Action Alternative

As shown in Table 3-16, fourteen receptors would meet or exceed the NAC under the No Action Alternative. These receptors are located near the 6th Street and Laurel Avenue intersection and near the intersections of Grand Avenue and 8th Street and Grand Avenue and 9th Street.

Although noise impacts would occur under the No Action Alternative, noise abatement was not considered because no improvements are proposed.

Build Alternative

Thirteen noise-sensitive receptors would meet or exceed the NAC as a result of the Build Alternative. These receptors are already impacted under existing (except R4 and R29) and No Action Alternative (except R4) conditions. No sensitive receptors would experience a substantial noise increase over existing conditions (10 dB[A] or more). These seven receptor impacts are a result of traffic increases along Grand Avenue and realignment of the Grand Avenue Bridge as a result of the Build Alternative. Therefore, noise abatement was considered for all impacted receptors, as described in Section 3.8.3 *Noise Mitigation*.

Construction Impacts. Short-term adverse construction noise impacts would be experienced by receptors such as residents, hotel patrons, recreationists, and businesses located along the existing right-of-way, along detour routes, and near the construction and staging areas throughout the construction period. Noise impacts would occur during evening hours if nighttime construction activities are required.

Construction equipment. The primary source of construction noise would be operation of heavy equipment, typically consisting of diesel-powered earth-moving equipment, such as dump trucks and bulldozers, earth-moving machinery, demolition equipment, back-up alarms on certain equipment, compressors, and pile drivers.

TABLE 3-16. MODELED NOISE LEVELS

Receptor #	# of Receptors by Activity	NAC	Existing (dB[A])	No Action Alternative (dB[A])	Build Alternative (dB[A])	Difference Between Future and Existing Noise Level (+ or -) (dB[A])	Build Impact*
R1	1 - H	71	65.0	67.0	67.9	2.9	No
R2	1 - R	71	63.1	65.0	66.0	2.9	No
R3	1 - SFR	66	60.6	62.5	63.3	2.7	No
R4	1 - H	71	66.4	68.4	70.8	4.4	Yes
R5	1 - H	71	65.6	67.5	68.8	3.2	No
R6	1 - Station	71	70.7	72.7	n/a	n/a	No
R7	1 - Station	71	69.7	71.8	69.7	0	No
R8	1 - R	71	62.0	64.0	64.0	2	No
R9	8 - SFR	66	61.1	63.1	62.1	1	No
R17 (2nd story)	1 - SFR	66	67.8	69.7	70.0	2.2	Yes
R18	2 - R	71	64.6	66.7	64.6	0	No
R20 – historic (listed)	1 - H	71	65.0	67.1	63.0	-2	No
R21	1 - SFR	66	58.6	60.5	60.0	1.4	No
R22 – historic (eligible)	1 - H	71	60.2	62.1	61.1	0.9	No
R23a – historic (eligible)	1 - RA	66	68.3	70.4	66.2	-2.1	Yes
R23b – historic (eligible)	1 - RA	66	67.4	69.3	68.9	+1.5	Yes
R24	1 - R	71	65.2	67.1	66.9	1.7	No
R25 (2nd story)	1 - R	71	66.5	68.3	68.1	1.6	No
R26	1 - R	71	66.2	67.3	67.3	1.1	No
R27	1 - H	71	64.2	65.6	65.7	1.5	No
R28	1 - R	71	70.8	72.9	73.5	2.7	Yes
R29 – historic (eligible)	1 - R	71	70.2	72.3	72.8	2.6	Yes
R30	1 - R	71	71.7	73.9	74.2	2.5	Yes
R31	1 - R	71	67.1	68.9	69.0	1.9	No
R32a – R32f	6 – SFR	66	69.2	71.2	71.6	+2.4	Yes

Source: Jacobs, 2013.

Shaded rows indicate receivers that would experience noise levels that approach or exceed the NAC.

*This column only includes noise impacts that would occur as a result of the Build Alternative and that would require assessment of noise abatement.

Bold numbers indicate traffic noise levels that approach or exceed the NAC.

H = Hotel, R = Restaurant, SFR = Single Family Residence, Station = Service Station, RA = Recreational Area, , N/A = Acquired; therefore, not applicable.

Pile driving. Pile driving for bridge piers is unlikely but, if used, could be the loudest construction noise source. This activity could result in both noise and vibration impacts to nearby receptors. In locations next to businesses, economic impacts could result. Bridge piers would be required in the following areas:

According to the FHWA *Construction Noise Handbook* (FHWA, 2006), noise levels from diesel-powered equipment range from 80 to 95 dB(A) at a distance of 50 feet. Impact equipment, such as pile drivers, can generate louder noise levels in the range of 95 to 101 dB(A).

- ❖ **Grand Avenue Bridge downtown.** Up to three sets of piers would be required near or at the outer edges of the bridge.
- ❖ **Railroad/Colorado River/I-70.** The Grand Avenue Bridge might require up to three sets of piers that would be located south of the railroad, on the south bank of the river, and on the north bank of the river.
- ❖ **Glenwood Hot Springs parking lot.** The Grand Avenue Bridge might require up to two piers that would be located north of I-70.
- ❖ **Pedestrian bridge.** The pedestrian bridge would have piers located south of the railroad, on the south bank of the river, on the north bank of the river, north of North River Street, and two in the Glenwood Hot Springs parking lot.

Traffic noise. Given the approximately 90-day duration of the full closure of the Grand Avenue Bridge, there would be increased traffic on the detour routes. A traffic noise model was developed to determine potential temporary impacts from the SH 82 Detour route. Traffic noise is anticipated to range between approximately 59 dBA to 75 dBA near sensitive receptors along the detour routes. The *Noise Technical Report SH 82 Grand Avenue Environmental Assessment* (Jacobs, 2014) provides additional information regarding temporary noise impacts during construction activities and detour routes.

3.8.3 Noise Mitigation

Impacted areas were evaluated for abatement according to CDOT *Noise Analysis and Abatement Guidelines* (CDOT, 2013). Noise Abatement Determination worksheets (CDOT Form 1029) were completed for all impacted noise-sensitive receptors within the study area and are included in the *SH 82 Grand Avenue Bridge Noise Technical Report* (Jacobs, 2014).

Four noise abatement measures were considered for this project:

- ❖ Changing the height and width of the roadway alignment.
- ❖ Creating noise buffers by acquiring undeveloped land between the roadway and the receptors.
- ❖ Traffic management.
- ❖ Building noise barriers.

The *SH 82 Grand Avenue Bridge Noise Technical Report* (Jacobs, 2014) provides further information on the evaluation of these noise abatement measures. Noise barriers were evaluated in greater detail because they usually provide a traffic noise reduction and generally are more feasible to design than other measures.

According to CDOT guidelines, all locations that are projected to experience adverse noise impacts must consider the “feasibility and reasonableness” of mitigation. The analysis for acoustical feasibility of mitigation considers such factors as the effectiveness of a barrier to achieve at least a 5 dB(A) noise reduction in predicted future noise levels. The analysis for engineering feasibility considers construction, engineering, maintenance, and other design issues. The barrier cannot create a safety or unacceptable maintenance problem or engineering fatal flaw, such as reduction of line-of-sight, accessibility deficiencies, icing, or other notable roadway maintenance concerns.

Noise mitigation is considered reasonable if it meets the following criteria:

- ❖ Noise reduction design goal of 7 dB(A).
- ❖ The cost benefit index of \$6,800 or less per receptor per decibel noise reduction.
- ❖ Desires of benefited receptors. A benefited receptor is one that receives 5 dB(A) or more noise reduction resulting from the noise barrier. This includes any benefited receptor, whether impacted or not.

The mitigation analysis identified four areas within the study area where noise barriers may meet these criteria for the impacted receptors. Table 3-17 summarizes the mitigation analysis. The *SH 82 Grand Avenue Bridge Noise Technical Report* (Jacobs, 2014) provides detailed information of the mitigation analysis.

TABLE 3-17. SUMMARY OF NOISE BARRIER ANALYSIS

Noise Barrier	Receptors	Noise Reduction (dBA)	Cost/Receptor/dBA	Barrier Recommended?
Barrier 1	R4	7.1	\$7,301	No
Barrier 2	R17, R23a, and R23b	0.5 – 1.7	\$459,900	No
Barrier 3	R29 and R30	2.2 – 6.1	\$82,800	No
Barrier 4	R28	3.0	\$108,900	No
Barrier 5	R32a – R32f	1.1 – 3.0	\$218,700	No

Source: Jacobs, 2014.

Noise barriers are not recommended at this time. If future substantial changes are made to design elements of the Build Alternative from what has been analyzed for this EA, the noise analysis will need to be reassessed to evaluate the impact of those changes.

However, as discussed in Chapter 2, shielding may be installed on the Grand Avenue Bridge to prevent splash back from the bridge. A preliminary noise analysis was conducted to determine if a noise reduction would be provided by the shielding. A minimum four-foot-tall panel would provide a minimum 3 dBA noise reduction along portions of the bridge. Because the human ear can detect sound changes of 3 dBA or more, four-foot shielding would provide the added benefit of noticeable noise reduction to the pedestrian sidewalk users along portions of the bridge.

CDOT will implement the following measures to mitigate for temporary adverse construction-related noise impacts:

- ❖ Adhere to the City of Glenwood Springs Code Article 100.070, Regulation of Noise. Obtain a construction noise work permit or waiver for construction activities occurring outside of the hours allowed by the Code. The Code allows construction activities to commence between the hours of 7:00 a.m. and 8:00 p.m. Monday to Friday, and 8:00 a.m. to 6:00 p.m. Saturday and Sunday.
- ❖ Offer hotel vouchers to downtown residents most impacted by construction activities during nighttime hours. These are anticipated to be R17 and the second-story residence on 7th Street (not included in this noise analysis since there is no outdoor use). The contractor will conduct preliminary noise monitoring during the noisier nighttime construction periods. These are expected to be in the summer and fall of 2015 and from spring to fall of 2016 when girders for the new bridges would be erected. If noise levels exceed 66 dBA during construction (the threshold that CDOT typically uses for nighttime noise levels), hotel accommodations would be made available for persons residing within eligibility zones.
- ❖ Limit construction activities adjacent to noise-sensitive receptors when they are most sensitive, as practical and feasible.

- ❖ Use noise blankets or other muffling devices on equipment and quiet-use generators at noise-sensitive receptors as needed.
- ❖ Use well-maintained equipment and inspect equipment regularly.
- ❖ Locate stationary equipment and haul roads away from noise-sensitive receptors, as practical and feasible.
- ❖ Pile driving for bridge piers is unlikely but, if used, limit pile driving activities to daytime hours.
- ❖ Minimize pile driving through use of use of drill shafts. Limit pile driving activities, if needed, to workday off-peak hours.
- ❖ Minimize back-up alarm noises on construction vehicles in construction areas where practical and feasible.
- ❖ Turn off idling equipment and vehicles when not in use.
- ❖ Use only equipment that, operating under full load, meets manufacturer specifications. If the equipment falls out of compliance, the contractor will take remedial action to comply with the specifications.
- ❖ For the nighttime I-70 closure detour that would occur several times during safety-critical construction activities, coordinate detour nights and times with local hotels (e.g., Hotel Colorado and Glenwood Hot Springs). This will help hoteliers to move patrons to rooms farther from detour noise.

3.9 Water Resources and Water Quality

This section discusses effects to water resources. The study team acquired water resource information and data for the segments of the Colorado River and the Roaring Fork River within the study area from federal, state, and local agency sources.

3.9.1 Existing Conditions

Surface Water Resources and Quality

The Water Resources and Water Quality study area is located within the Upper Colorado River Watershed. The Upper Colorado River Watershed encompasses approximately 246,000 square miles, which makes it the seventh largest watershed in North America (Colorado River Users Association [CRWUA], 2013a). Elevations of the watershed range from sea level at the Gulf of California to greater than 13,000 feet within the mountains of Colorado. Climates within the watershed also vary. Mean monthly temperatures within the watershed range from lows of 10 degrees Fahrenheit (°F) to highs of 105° F, with extremes of down to -50° F during winter storms, and up to 120° F within the desert regions (CRWUA, 2013a).

The headwaters of the Colorado River are formed within a marshy valley known as Kawuneeche Valley located on the west side of Rocky Mountain National Park. The river is approximately 1,450 miles long. It runs through Colorado, Utah, and Nevada, and delineates the border between Arizona and California (CRWUA, 2013b). The Colorado River finally terminates in the Gulf of California in Mexico.

Approximately 30 million people are dependent on the Colorado River for both domestic and agricultural needs, which makes it very controlled and controversial (CRWUA, 2013a). Water is supplied to the millions of people that live within the cities of the Front Range of Colorado, as well as irrigating the agricultural fields within the Imperial Valley of Southern California. The water quality of the Colorado River impacts all downstream users.

The Roaring Fork River drains into the Colorado River at the western boundary of the study area. The Roaring Fork River originates near Independence Pass at an elevation of approximately 12,000 feet and culminates in Glenwood Springs and the Colorado River at 5,000 feet (Wildernet, 2013). It has many tributaries, including the Crystal River and the Frying Pan River, as it flows approximately 70 miles to its confluence with the Colorado River. The Roaring Fork River is popular for rafting, kayaking, and fishing. It has been designated as a Gold Medal water by the Colorado Parks and Wildlife (CPW) as a stream that is able to produce 60 pounds of trout per acre, and at least twelve 14-inch or larger trout per acre (CFN, 2013).

Much of the study area is developed with road surfaces and parking lots. During precipitation events, transportation and development-related pollutants wash into the Colorado River.

The federal Clean Water Act (CWA) requires each state to classify the intended uses (designated uses) of all surface water bodies and to develop criteria to protect the designated uses of these water bodies. Colorado currently has five designated uses for surface water bodies: agriculture, water supply, recreation, aquatic life, and wetlands. The beneficial use classifications of the Colorado River and the Roaring Fork River are aquatic life cold, water supply, recreation, and agriculture (CDPHE, 2012b).

The CWA requires each state to publish an annual list of water bodies that are not meeting their designated uses because of excess pollutants; these pollutants can be naturally occurring or a result of human activity. The list, known as the Section 303(d) list, is based on violations of water quality standards and is organized by watersheds, which are further divided into stream segments.

The Colorado River (Water Body ID COUCUC03) and the Roaring Fork River (Water Body ID COUCRF03c) are included on the Impaired Waters 303(d) List for the State of

Colorado (CDPHE, 2012a and CDPHE, 2012d). Further upstream, near Basalt, Woody Creek and Aspen, impairments for the Roaring Fork River include selenium, aquatic life, and total recoverable iron (CDPHE, 2012c). The impaired Colorado River segments are located a considerable distance upstream, near Kremmling and Granby. The segment impairments include temperature, manganese for water supply, and aquatic life (CDPHE, 2012c). However, segments for both rivers in the study area are not impaired.

The current bridge does not have more modern technologies to reduce and treat stormwater run-off. Therefore, water drains directly into the Colorado River.

Groundwater Resources and Quality

There are no groundwater wells for municipal water supply present within the study area (Rubin, 2013). Drinking water for the Glenwood Springs area is obtained from Grizzly Creek and No Name Creek, as well as an emergency intake located on the Roaring Fork River just upstream of the 7th Street Bridge. According to maps maintained by the Colorado Division of Water Resources, 17 permitted monitoring wells were identified within the study area. No permitted water wells used for residential, commercial, or industrial purposes were identified within the study area (Colorado Division of Water Resources, 2013).

Historically, the northern portion of the study area has been occupied by automotive fueling stations that had underground storage tanks containing gasoline, diesel fuel, and used oil. Groundwater within the study area is impacted by such petroleum constituents as benzene, ethylbenzene, toluene and xylene, and methyl tert-butyl ether (Pinyon, 2014).

Geothermal Resources

Human use of the geothermal system at Glenwood Springs extends back to when members of the Native American Ute Tribe visited the hot springs that discharge along the Colorado River at the west end of Glenwood Canyon. Soon after the establishment of the Town of Glenwood Springs, the geothermal resources were physically modified and commercially developed, including a well-known destination spa. Currently, the Glenwood Hot Springs, as the primary commercial user of the geothermal resource, is a popular tourist destination.

The study team conducted a geothermal resource assessment to evaluate potential project effects (Wright Water Engineers, Inc., 2013a and 2013b). The assessment included review of published reports and unpublished documents (Zonge, 2013), as well as interviews with knowledgeable individuals and the collection of new hydrologic and geologic data in the field. This information is included as appendices to Wright Water Engineers, Inc. 2013 unpublished reports (Initial Geothermal Resources Assessment [Phase I and II], Grand Avenue Bridge Reconstruction; Preliminary Geophysical Investigation Report

[Phase III], Grand Avenue Bridge Reconstruction) (Wright Water Engineers, Inc., 2013a and 2013b).

The geothermal system at Glenwood Springs extends approximately 1.5 miles along the Colorado River from the west end of Glenwood Canyon. An estimated 15 cubic feet per second of hot, saline, geothermal water is discharged into the river by the Glenwood Springs geothermal system. Yampa Spring, also known as Mammoth Yampa Spring or Big Spring, is the largest hot spring in this geothermal system. Located on the river's north side about 850 feet east of the existing Grand Avenue Bridge, it flows at about 2,250 gallons per minute at a temperature of about 122° F. Yampa Spring is the main source of hot water for the Glenwood Hot Springs.

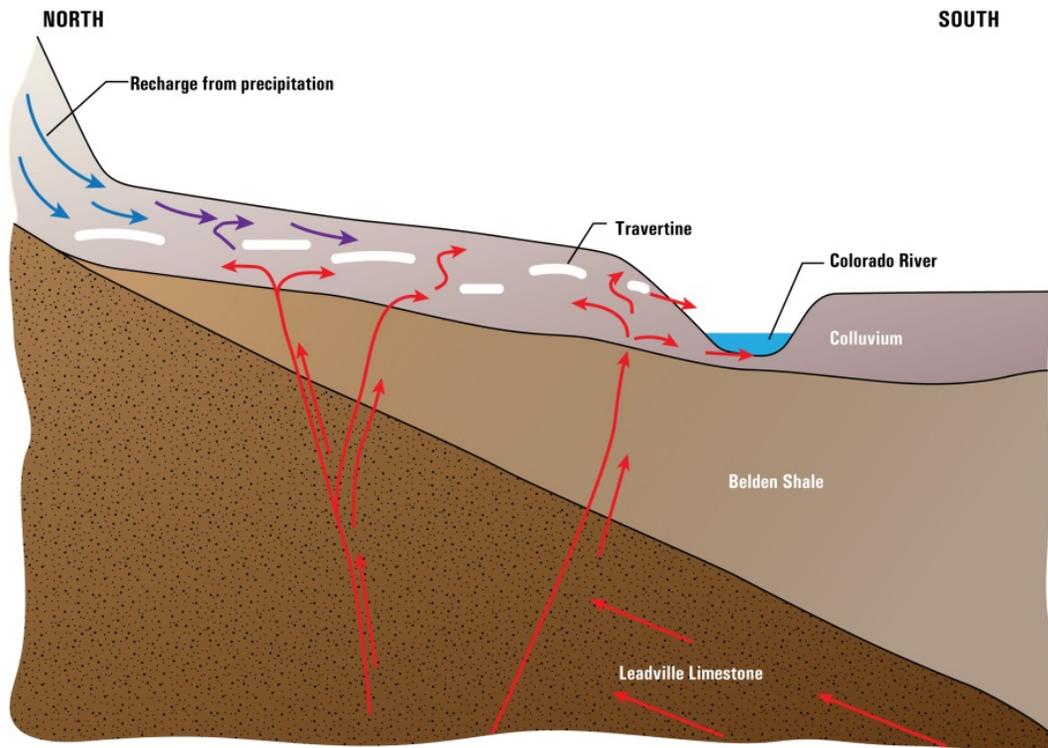
Figure 3-24 illustrates a north-south-oriented geologic cross section of the interpreted subsurface conditions near the study area. On the surface travertine, a type of limestone deposited by mineral springs covers portions of a colluvial layer. Colluvium is a general term for loose, unconsolidated sediments deposited by run-off and erosion. The best information available indicates the Leadville Limestone is the primary bedrock aquifer or conduit for the hot saline waters in the Glenwood Springs geothermal system. The overlying Belden Shale is likely the confining layer over the Leadville Limestone that creates the artesian conditions in the Leadville Limestone. Limited information from a nearby well suggests the lower part of the Belden Shale may be hydrologically connected to the geothermal waters in the Leadville Limestone. Geotechnical investigations conducted for the Grand Avenue Bridge project infiltrated the upper portions of the Belden Shale and did not experience artesian geothermal water.

Most geothermal waters flow out of the Leadville Limestone where it is overlain by the Belden Shale and river deposits, mostly gravel and sand. The hot saline waters flow through open caverns and fractures within the Leadville Limestone, then exit through the Belden Shale and flow upwards into and through the river deposits. Near the study area, the river deposits vary in thickness and may be as much as 90 feet thick in some locations.

Pumping tests conducted several years ago in nearby wells demonstrated that the hot water in the caverns and fractures in the Leadville Limestone are interconnected to some degree. One pumping well test also demonstrated that geothermal water in the Leadville Limestone is hydraulically connected to water within the colluvium, at least locally. Human activities in one part of a geothermal system can, therefore, potentially affect other parts of the system.

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FIGURE 3-24. SUBSURFACE CONDITIONS NEAR STUDY AREA



Source: Colorado Department of Transportation.

3.9.2 Water Resources and Water Quality Impacts

No Action Alternative

No new impacts to water quality would occur under the No Action Alternative. Existing impacts to water quality would continue as pollutants from the existing bridge and road surfaces are washed into the Colorado River during precipitation events.

Build Alternative

The Build Alternative is not expected to result in long-term, direct impacts to surface water, geothermal, and groundwater resources, or to surface or groundwater quality. Because there are no public water supply sources and water supply protection areas within the study area or immediately downstream, drinking water sources would not be impacted. Similarly, impacts to groundwater drinking water resources would not occur due to construction of the Build Alternative because groundwater

The Build Alternative is not expected to result in long-term, direct impacts to surface water, geothermal, and groundwater resources, or to surface or groundwater quality.

is currently not used within the study area, and would not be used for construction of the Build Alternative.

The Build Alternative would result in placement of approximately 3.5 acres of increased roadway pavement and modifications of existing drainage patterns causing additional surface water runoff. However, increases in pollutant runoff or impacts to surface water quality are not expected to be substantial because of the developed nature of the study area and because the proposed project would include treatment for roadway runoff. By implementing mitigation measures discussed in Section 3.9.3 *Water Resources and Water Quality Mitigation*, it is possible that water quality could improve compared to the No Action Alternative. No long-term effects to geothermal resources are expected.

Construction Impacts. Land disturbance during construction would increase the potential for sediment and other pollutants to enter waterways, thereby degrading water quality. The Colorado River would be most affected, although construction of the SH 82 Detour would disturb land just east of the Roaring Fork River, potentially increasing sedimentation into this Gold Medal stream.

The installation of temporary causeways would require work in the Colorado River, which presents increased risk to adversely affect water quality. Also, refueling and operation of construction equipment near the Colorado and Roaring Fork Rivers could result in release of contaminants to these waterways. Figure 2-17 in Section 2.4.3 *Additional Temporary Improvements* shows the proposed causeways and access roads. The only construction staging areas in the study area would be located at the existing Shell station and the Glenwood Hot Springs parking lot. All other staging areas are anticipated to be located off site.

Because of the historical presence of automotive fueling stations, groundwater quality has been affected by petroleum constituents. Construction would include the excavation and proper disposal of soils that may be contaminated with petroleum constituents, thereby improving groundwater quality by removing source contaminants that contribute to existing poor groundwater quality. Also, groundwater would be encountered during installation of several highway bridge piers, which would require dewatering.

The Build Alternative potentially could affect geothermal resources during construction of piers and foundations for the highway bridge, the pedestrian bridge, and other structures if the structures are constructed in the Leadville Limestone (aquifer) or the Belden Shale. Geothermal water within the existing bedrock may be released during drilling activities into the Colorado River. However, drilling and placement of piers and foundations would occur above the Belden Shale confining layer and therefore are not

expected to affect geothermal resources. Because these activities would take place only during construction, any effects would be short term and temporary.

3.9.3 Water Resources and Water Quality Mitigation

CDOT will incorporate design measures into the Build Alternative to mitigate for potential water quality impacts. The design will improve upon the current condition where stormwater runoff drains from the bridge directly into the Colorado River. Best management practices (BMPs) were evaluated to mitigate potential water resource impacts. Specifically, CDOT will:

- ❖ Construct one permanent water quality basin north of the Colorado River to improve water quality and reduce impacts from sediments. The basin will be located between the I-70 westbound off ramp, Grand Avenue, and North River Street. This basin will help provide water quality treatment for runoff from increased roadway pavement and to provide treatment of some existing roadway runoff, thereby improving surface water quality over the No Action Alternative. The water quality basin will treat the volume of stormwater generated from impervious area on the project's north side, as well as stormwater from existing impervious area. Because of concerns regarding the visual impact of the basin, an underground vault system could be used instead. This vault will be designed to provide the same water quality benefit as the basin.

Because of its highly visible location, the basin is being designed to include a series of walls to create an attractive gateway feature through landscaping and other techniques. The grading for the basin would impact most of all of the pervious area between the roads.

The detention basin will require a new outfall to the Colorado River near Two Rivers Park. An additional outfall may be required near the existing highway and pedestrian bridges. Figure 3-25 in Section 3.10 *Wetlands and Waters of the United States* shows these outfall locations.

- ❖ Provide stormwater management infrastructure south of the Colorado River to treat runoff. Because of space limitations, an underground BMP is proposed. This BMP will capture and treat runoff from additional impervious areas (e.g., pavement, sidewalks, and retaining walls) from the Build Alternative and outfall into the Colorado River. The City of Glenwood Springs will assume inspection and maintenance responsibilities for the underground BMP; these responsibilities will be included in an intergovernmental agreement (IGA) between CDOT and the City. Additional stormwater on the south side will be routed via existing inlets and storm sewers to the Colorado River.

The impervious area for the entire project, north and south of the Colorado River, is 7.80 acres. The two BMPs north and south of the river will treat over 8.0 acres of impervious area.

- ❖ Sign inlets to inform public they drain to river.

Mitigation for construction activities mostly relate to erosion and sediment control and include:

- ❖ Provide stormwater management infrastructure prior to construction that would treat runoff from the SH 82 Detour. Similar to above, an underground BMP is proposed, the use of which will be verified during final design. This BMP will capture and treat runoff from additional impervious areas from the detour and outfall into the Roaring Fork River.
- ❖ Implement standard erosion and sediment control BMPs in accordance with CDOT's *Erosion Control and Stormwater Quality Guide* (CDOT, 2002) and established sound engineering practices in final design plans.
- ❖ Develop and implement a site-specific stormwater management plan (SWMP). The BMPs will be designed, installed, and maintained per the SWMP. More detail on the SWMP is included in Section 3.21 *Permits Required*.
- ❖ Perform all work in conformance to Section 107.25 (Water Quality Control) and Section 208 (Erosion Control) of the CDOT *Standard Specifications for Road and Bridge Construction*.
- ❖ Use BMPs from CDOT's *Erosion Control and Stormwater Quality Guide* (CDOT, 2002) for water resources and water quality, as appropriate. BMPs will be maintained for the duration of the project. Specifically:
 - ◆ Phase construction to limit the acreage exposed (cleared) at any given time during project construction.
 - ◆ Revegetate all disturbed areas with native grass and forb species, or appropriate landscaping as required. Apply seed and mulch in phases throughout construction. This will help stabilize the disturbed areas upon completion of the project even during multiple years of potential drought and low precipitation conditions.
 - ◆ Temporarily stabilize disturbed areas, including areas where permanent seeding operations are not feasible because of seasonal constraints (e.g., summer and winter months), and use CDOT-approved methods to prevent erosion.

- ◆ Use erosion control blankets or other suitable methods on steep, newly seeded slopes to control erosion and to promote the establishment of vegetation. Use erosion control blankets with natural fibers and bio-/photo-degradable mesh.
- ◆ Use erosion logs, silt fence, diversion ditches, temporary berms, sediment traps, temporary detention ponds, and other sediment control devices to divert, control, and filter sediment-impacted water in order to protect surface water and inlets to the storm sewer system.
- ◆ Use check dams and other velocity dissipation devices, where appropriate, to slow the velocity of water through roadside ditches and within swales.
- ◆ Limit disturbed areas as much as possible to minimize construction impacts to vegetation.
- ◆ Use permanent structural BMPs, such as grass swales and grass/vegetative buffers, to limit sediment and roadway pollutants resulting from winter sanding, chemical deicing, and normal traffic operations from entering waterways.
- ◆ Use non-structural BMPs, including litter and debris control, and surface roughening on slopes, landscaping, and vegetative practices.
- ◆ Implement temporary and permanent BMPs for erosion control, sediment control, and drainageway protection as required by local and state permitting requirements. Design BMPs to protect waterways from various potential pollutant sources, such as construction materials, fuels and other fluids, sediment, and trash. BMPs will be maintained for the duration of the project.
- ❖ CDOT or its contractor must file a notice of intent with the Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division for groundwater dewatering, if dewatering is required for construction. A discharge permit would also be required if groundwater is discharged to a water body (e.g., the Colorado River). The CDPHE may require that water proposed for discharge be analyzed, and that the discharged water be treated to meet the surface water quality standards applicable to that river segment. The project will comply with all CDPHE dewatering and/or discharge permit requirements. In the event that discharged water cannot be treated to meet the surface water quality standards, discharged water will be stored and transported off site for disposal.
- ❖ Locate construction staging and materials stockpiling farther than 50 feet from the edge of the Colorado River, when possible. In specific circumstances, if this buffer is not achievable, CDOT will consider the placement of materials closer to the edge of water and identify appropriate additional BMPs that would be required.

- ❖ Refuel equipment within designated refueling containment areas, located away from the Colorado River. During refueling operations, the receiving hose will be connected and all valves will be checked to ensure delivery of product to the proper receptacle. The transfer will be constantly monitored to prevent overfilling and spilling, and the delivery hose and lines will be checked for leaks. The transport driver will remain on hand until product delivery has been completed. Following product delivery, all appropriate valves will be shut off, hoses will be disconnected, the transport driver will check for leaks, and the receptacle will be gauged to verify receipt of product. Spill response materials (spill kits) will be available, and personnel will be aware of the storage location of such kits.
- ❖ Place BMPs and containment structures for work conducted within and adjacent to the floodplain and the Colorado River to prevent concrete washout and other potential pollutants from reaching the river.
- ❖ In the event that equipment malfunctions during demolition or construction, any release that may impact waters of the state, no matter how small, must be reported immediately to the CDPHE by telephone. Written notification to the CDPHE must follow within five days. Measures of containment will be followed as included in the spill prevention, countermeasure, and control plan of the SWMP.
- ❖ Remove the two causeways used during bridge construction at the end of construction and return all areas of disturbance to existing conditions.

The following mitigation and preventative measures will minimize the potential for adverse impacts to geothermal resources during construction:

- ❖ Design the foundations above the confining layer of the Belden Shale, which will avoid any penetration of the primary bedrock aquifer, the Leadville Limestone.
- ❖ Use spread footings, where practicable, to minimize the depth of excavation.
- ❖ Drill test holes to determine the subsurface conditions at the locations of foundation structures.
- ❖ Consider foundation grouting to improve groundwater conditions near caisson foundations to minimize the depth of the excavation.

3.10 Wetlands and Waters of the United States

Wetlands are areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support (and that under normal circumstances do support) a prevalence of vegetation adapted for life in saturated soil conditions. EO 11990, Protection of

Federal agencies are required to protect wetlands by avoiding construction in wetlands whenever possible.

Wetlands, directs federal agencies to protect wetlands by avoiding construction in wetlands whenever possible. FHWA requirements for compliance with this EO are outlined in 23 CFR 777.

Section 404 of the CWA regulates wetlands and other waters of the United States. This Act defines jurisdictional waters of the United States to include all surface waters, such as navigable waters and their tributaries, interstate waters and their tributaries, wetlands adjacent to these waters, and all impoundments of these waters. The U.S. Army Corps of Engineers (USACE) regulates and administers the Section 404 Program.

3.10.1 Existing Conditions

Wetlands and other waters of the United States were evaluated in May 2013 in accordance with the *USACE Wetland Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE, 2010).

Wetland determination was based on the presence of facultative wetland vegetation that will only grow in damp environments with hydric soils and wetland hydrology. No wetlands were identified in the study area.

The Colorado and Roaring Fork Rivers fall under the USACE's jurisdiction as waters of the United States. The Colorado River is channelized in the study area, flowing between steep, rock-lined banks. Similarly, the Roaring Fork River has been channelized at the 8th Street Bridge near its confluence with the Colorado River. The Roaring Fork's banks have been rock lined for erosion control. The stretches of both rivers inside the study are native hydrology and vegetation. A discussion of riparian habitat associated with the Colorado and Roaring Fork Rivers is included in Section 3.12 *Vegetation and Noxious Weeds*.



Colorado River under the existing Grand Avenue Bridge and pedestrian bridge.



Steep and rock-lined banks of the Colorado River through the study area.

3.10.2 Wetlands and Waters of the United States Impacts

No Action Alternative Impacts

No wetlands or waters of the United States would be impacted by the No Action Alternative.

Build Alternative Impacts

The Build Alternative would not result in any impacts to wetlands. The Build Alternative would result in the permanent placement of fill within the Colorado River from two stormwater outfalls, shown in Figure 3-25. Outfalls are points at the end of storm sewer systems and permanent water quality basins where stormwater is discharged into receiving water bodies. There would be two outfalls on the Colorado River's north bank; one would be to the west of the SH 82 Bridge, near Two Rivers Park, the other below the existing SH 82 Bridge. Each outfall would impact approximately 85 square feet of waters of the United States, requiring placement of approximately total 10 cubic yards of fill material.

The Build Alternative would not result in any impacts to wetlands.

The Build Alternative would place two piers on the edge of the Colorado River within the river's Ordinary High Water Mark (OHWM). The existing Grand Avenue Bridge pier would be removed. The two new piers within the river would impact approximately 500 square feet. These impacts are summarized in Table 3-18.

FIGURE 3-25. WATERS OF THE UNITED STATES IMPACTS



Source: Jacobs, 2014.

TABLE 3-18. PERMANENT FILL IMPACTS WITHIN THE ORDINARY HIGH WATER MARK

Feature	Impact
Stormwater outfalls	170 square feet
New bridge piers	500 square feet
Total	670 square feet

Source: Jacobs, 2014.

Construction Impacts. There would be no temporary impacts to wetlands under the Build Alternative. Temporary impacts to the Colorado River would result from the installation of temporary construction causeways – temporary, earthen platforms that would serve as work pads. The causeways would facilitate the Accelerated Bridge Construction techniques needed to demolish the existing bridges and erect the new ones. The two causeways would result in approximately 1.33 acres of temporary fill below the Colorado River’s OHWM for the duration of construction, which is estimated to be 18 to 24 months. The temporary construction causeways are shown in Figure 3-25.

3.10.3 Wetlands and Waters of the United States Mitigation

Because the Build Alternative would not impact wetlands, no wetland mitigation will be required. CDOT’s Regional Wetland Specialist will obtain Section 404 permit authorization from the USACE for placement of temporary and permanent fill material in the Colorado River. Based on current estimated impacts, it is anticipated the Build Alternative would meet the requirements for a Nationwide Permit. The study team coordinated with the USACE’s Grand Junction office regarding the proposed project and the Section 404 permit process (see Appendix D). USACE staff indicated the proposed project may qualify for Nationwide Permit 14, for linear transportation projects, Nationwide Permit 3 for maintenance, or Nationwide Permit 33 for temporary construction, access, and dewatering.

Mitigation measures will include protecting riparian areas during construction activities through placement of temporary and/or construction-limit fencing. Also, construction monitors will be on site to ensure compliance with USACE Section 404 permit conditions. In order to minimize temporary impacts to water of the United States, causeways have been designed to cover the smallest practical area, requiring the least volume of fill impacts to waters of the United States. Following construction, causeways will be removed, restoring all disturbed areas according to riparian mitigation requirements specified in the *Guidelines for Senate Bill 40 Wildlife Certification* (CDOT, 2013). Mitigation measures discussed in Section 3.9 *Water Resources and Water Quality* will help minimize temporary impacts to waters of the United States.

3.11 Floodplains

Floodplains are the lands beside a stream or river that are inundated when the capacity of the stream channel is exceeded. EO 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support of development in floodplains whenever there is a practical alternative. FHWA's floodplain regulations are outlined in 23 CFR 650, Subpart A.

Changes in the floodplain, such as adding fill material, constructing buildings or bridges, or constricting the stream channel, can reduce the capacity of a floodplain and cause the water surface elevation to rise.

The base flood (100-year flood) is the regulatory standard used by federal agencies and most states to administer floodplain management programs. A 100-year floodplain represents the area flooded by a 100-year flood event. A 100-year flood is a flood event with a one percent probability of occurring in any given year.

Floodplains provide natural and beneficial values, such as serving as areas for fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural flood moderation, water quality maintenance, and groundwater recharge. Changes in the floodplain, such as adding fill material, constructing buildings or bridges, or constricting the stream channel, can reduce the capacity of a floodplain and cause the water surface elevation to rise.

The following regulatory requirements and criteria designed to preserve floodplains apply:

- ❖ **CDOT.** Bridges must comply with CDOT's *Drainage Design Manual* (CDOT, 2004).
- ❖ **City of Glenwood Springs.** Effects to the floodway regulation will comply with Section 070.090.170(1) of the Municipal Code.
- ❖ **Federal Emergency Management Agency (FEMA).** Effects to the floodplain will comply with the National Flood Insurance Program.

3.11.1 Existing Conditions

The study team conducted hydraulic modeling to assess existing floodplain conditions and effects to floodplains and flood potential from the Build Alternative. Garfield County floodplain data (Garfield County, 2013), which is based on Federal Emergency Management Agency Flood Insurance Rate Maps and the USACE's *Flood Insurance Study, Garfield County (Un-Incorporated Areas)* (USACE, 1976), indicates the study area is bisected by the 100-year floodplain of the Colorado River (Figure 3-26). The existing Grand Avenue Bridge and pedestrian bridge have five piers located within the 100-year floodplain, which is contained in the Colorado River bank. The 100-year floodplain for the Roaring Fork River extends east to the embankment for the railroad tracks.

SH 82 GRAND AVENUE BRIDGE

3.11.2 Floodplains Impacts

No Action Alternative

The No Action Alternative would not result in any new impacts to floodplains.

Build Alternative

Impacts to floodplains would result from replacing the existing Grand Avenue Bridge and pedestrian bridge piers with new piers and the reconstruction of the I-70 on ramp. The proposed Grand Avenue Bridge and pedestrian bridge would have four piers located in the floodplain, replacing the five that currently exist. This would result in the reduction in fill from piers in the floodplain of approximately 10 cubic yards, compared to existing conditions. However, lengthening the I-70 eastbound on ramp would require placing approximately 225 cubic yards of fill in the 100-year floodplain.

FIGURE 3-26. 100-YEAR FLOODPLAIN



Source: Garfield County, 2014.

By modifying the design, hydraulic analysis performed for the Build Alternative now indicates that flood elevations from a 100-year flood would not increase compared to existing conditions. The study team will conduct more detailed hydraulic analysis to confirm a rise in the flood elevation and an increase in flood risk would not occur.

Hydraulic modeling shows the Build Alternative would not increase flood elevations from a 100-year flood compared to existing conditions.

Construction Impacts. Installation of the two causeways upstream and downstream of the new bridges would temporarily impact floodplains. The causeways were designed to strike a balance between providing the highest practical number of working days without overtopping, and the lowest increase in base flood elevation. The construction causeways would temporarily increase flood risk to the Colorado River when construction activities are occurring during the high flow months.

3.11.3 Floodplains Mitigation

CDOT will evaluate the following avoidance and minimization measures during final design to reduce floodplain impacts:

- ❖ Design construction causeways to protect I-70, Glenwood Hot Springs, and similarly positioned infrastructure from a 10-year flood event.
- ❖ During construction, monitor snowpack data, river flow data, daily temperature forecasts, etc., to predict 10-year flood events. In the case of a potential flood event, the contractor will remove portions of the causeways to prevent flooding.
- ❖ Remove riprap previously placed in the river to protect the existing highway bridge pier from erosion. This measure will require coordination with resource agencies.

Also, CDOT will perform detailed hydraulic analysis. If this shows no increase in flood elevations, no further mitigation will be required. CDOT will continue coordinating with the City of Glenwood Springs Floodplain Administrator regarding the City's floodplain ordinance requirements as the design and hydraulic analyses are refined. CDOT will comply with all applicable floodplain design criteria, FHWA's floodplain regulations, and EO 11988.

3.12 Vegetation and Noxious Weeds

The study area is located in the Southern Rockies Ecoregion, further classified into the Sedimentary Mid-Elevation Forests sub-Ecoregion. Coniferous forests characterize this Ecoregion, although mid-elevation ranges have a diversity of trees, including aspen, Douglas fir, and Juniper-Oak woodlands. Precipitation averages 20 to 32 inches annually.

3.12.1 Existing Conditions

Biological data were collected from existing resources, including maps, databases, publications, and government agency information. These data were used to inform the study and assess direct, indirect, and cumulative effects resulting from the Build Alternative. Field surveys collected information concerning plant species, habitats, and potentially affected environmental features.

The study area is located in an urban environment bisected by the Colorado River. Vegetation is limited to landscaped areas and riparian habitat along the banks of the Colorado River. A short stretch of the Roaring Fork River, near its confluence with the Colorado River, flows through the study area. Vegetation along the Roaring Fork's banks is similar to the Colorado River's riparian corridor. Vegetation in the study area includes:

Riparian vegetation consists of plants immediately adjacent to a water body. Riparian vegetation provides food, shelter, and shade to the aquatic ecosystem helping to control erosion and moderate water temperature.

- ❖ **Landscaping.** Trees planted for landscape include locust, crab apple, Siberian elm, Norway maple, and green ash.
- ❖ **Riparian Vegetation.** Plants along the Colorado and Roaring Fork Rivers include non-native species, such as Siberian elm, Norway maple, tamarisk, brome grasses, green ash, and native species, including small numbers of cottonwood, box elder, and pines.



Landscaped area along North River Street.



Riparian vegetation on the banks of the Colorado River.

Noxious Weeds

The study team conducted an inventory of vegetation and noxious weeds in May and November of 2013 and found 14 species designated as noxious by Garfield County and/or the Colorado Department of Agriculture. These species, listed in Table 3-19, are located in landscaped and riparian areas. The Colorado Noxious Weed Act of 2003 (35-5.5-101 through 199, Colorado Revised Statute [C.R.S.]) recognizes that, "...certain undesirable plants constitute a present threat to continued economic and environmental value of the lands to the state, and if present in any area of the state must be managed." This legislation gives jurisdiction to local governments to manage noxious weeds on public and private lands. According to this act, for a plant to be considered a noxious weed, it must meet one of the following criteria:

- ❖ Aggressively invades or is detrimental to economic crops or native plant communities.
- ❖ Is poisonous to livestock.

Noxious weeds are invasive, non-native plants introduced accidentally or that spread from agriculture or landscaping. Their presence results in lands with decreased economic and environmental value.

- ❖ Carries detrimental insects, diseases, or parasites.
- ❖ Has direct or indirect effects detrimental to the environmentally sound management of natural or agricultural ecosystems.

TABLE 3-19. NOXIOUS WEEDS IN THE STUDY AREA

Common Name	Scientific Name	Garfield County List	Colorado Department of Agriculture List
Salt cedar	<i>Tamarix parviflora, Tamarix ramosissima</i>	X	X
Field bindweed	<i>Convolvulus arvensis</i>		X
Bulbous bluegrass	<i>Poa bulbosa</i>		X
Cheatgrass	<i>Bromus tectorum</i>		X
Pepperweed	<i>Lepidium latifolium</i>		X
Chinese clematis	<i>Clematis orientalis</i>		X
Russian olive	<i>Elaeagnus angustifolia</i>	X	X
Mullein	<i>Verbascum thapsus</i>		X
Wild caraway	<i>Carum carvi</i>		X
Hoary cress	<i>Cardaria draba</i>	X	X
Perennial sowthistle	<i>Sonchus arvensis</i>		X
Redstem filaree	<i>Erodium cicutarium</i>		X
Leafy spurge	<i>Euphorbia esula</i>	X	X
Absinth wormwood	<i>Artemisia absinthum</i>		X

Sources: Garfield County, 2013; Colorado Department of Agriculture, 2013.

3.12.2 Vegetation and Noxious Weeds Impacts

No Action Alternative

The No Action Alternative would not impact vegetated areas in the study area. Noxious weed populations have spread under current management practices and would likely continue to expand.

Build Alternative

The Build Alternative is not expected to directly impact vegetation or noxious weeds other than during construction.

The Build Alternative is not expected to directly impact vegetation or noxious weeds other than during construction.

Construction Impacts. The Build Alternative would temporarily impact approximately 1.8 acres of riparian vegetation, primarily because of the construction of the temporary causeways on both banks of the Colorado River. Landscaped areas along local streets and parking lots would be impacted by construction, requiring removal of some plants.

In areas of vegetation removal, construction may promote noxious weed growth. Construction-related vehicles could inadvertently capture noxious weed materials or seeds, thus introducing them to new areas. Surface disturbance and soil movement would increase the likelihood of accidental noxious weed introduction because non-

native plants often thrive and establish populations in disturbed areas. This is of particular concern in riparian areas where fast-growing, water-loving weeds are present.

3.12.3 Vegetation and Noxious Weeds Mitigation

To the extent practicable, CDOT will avoid disturbance to existing trees, shrubs, and vegetation. Areas cleared of vegetation will be revegetated and returned to their preconstruction coverage. In addition, CDOT will:

- ❖ Replace riparian trees and shrubs removed during construction as stipulated in CDOT's *Guidelines for Senate Bill 40 Wildlife Certification* (CDOT, 2013). The guidelines state that trees removed during construction, whether native or non-native, shall be replaced with a goal of 1:1 replacement based on a stem count of all trees with diameter at breast height of two inches or greater. Shrubs removed during construction, whether native or non-native, will be replaced based on their preconstruction areal coverage. In all cases, all such trees and shrubs will be replaced with native species. A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.
- ❖ Revegetate landscaped areas disturbed during construction. Landscaping will be determined during the final design process in consultation with stakeholders.
- ❖ Revegetate disturbed areas with native species.
- ❖ Conduct a noxious weed survey prior to construction. Develop and implement an Integrated Weed Management Plan that will contain BMPs to prevent and/or control the establishment of noxious weeds, including, but not limited to, appropriate herbicide application, equipment cleaning, use of weed-free materials, and prompt revegetation of disturbed areas. CDOT will identify and remove tamarisk trees (a noxious weed also known as Saltcedar), in and adjacent to areas of construction, per the BMPs that will be developed for construction plans and specifications.

3.13 Wildlife and Aquatic Species

Study team biologists conducted wildlife habitat assessments in May and November of 2013. The assessment evaluated both terrestrial and aquatic wildlife and habitat features within the study area. Biologists gave particular attention to special-status species including those protected by state or federal conservation laws. Economically important species, including Mule Deer (*Odocoileus hemionus*) and Elk (*Cervus canadensis*), were also assessment priorities.

3.13.1 Existing Conditions

The study area's urban setting provides limited habitat for terrestrial wildlife. Narrow riparian corridors immediately adjacent to the Colorado River are steep, rocky banks restricted

The study area's urban setting provides limited habitat for terrestrial wildlife.

by roads, railroads, and urban development. The lack of native trees and other vegetation limits wildlife use with plant-specific habitat requirements. The little habitat provided by the study area is fragmented from the surrounding mountains by I-70 and Glenwood Springs.

Species with potential to occur in the study area are common with widespread regional distributions. Sightings of large mammals are rare in the study area, although habitat for Mule Deer, Elk, Bighorn Sheep (*Ovis canadensis*), and Black Bear (*Ursus americanus*) can be found in the mountains surrounding the study area. Small, common mammals potentially occurring in the study area include Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), Red Fox (*Vulpes vulpes*), and Striped Skunk (*Mephitis mephitis*). Bat species that may be present within and near the study area include the Big Brown Bat (*Eptesicus fuscus*), Little Brown Myotis (*Myotis lucifugus*), Long-Legged Myotis (*Myotis volans*), and Silver-Haired Bat (*Lasionycteris noctivagans*).

The Migratory Bird Treaty Act (MBTA) of 1918 protects raptors, migratory birds, and their active nest sites. Most birds are protected by the MBTA except common non-native species, such as the European or House Sparrow (*Passer domesticus*), European Starling (*Sturnus vulgaris*), or Pigeon (*Columba livia*). A number of bird species may be found in the study area, including Red-Tailed Hawk (*Buteo jamaicensis*), Sharp-Shinned Hawk (*Accipiter striatus*), Canada Goose (*Branta canadensis*), Mallard (*Anas platyrhynchos*), Great Blue Heron (*Ardea herodias*), Common Raven (*Corvus corax*), Black-Billed Magpie (*Pica hudsonia*), Northern Flicker (*Colaptes auratus*), Yellow Warbler (*Dendroica petechia*), American Robin (*Turdus migratorius*), Barn Swallow (*Hirundo rustica*), and Cliff Swallow (*Petrochelidon pyrrhonota*).

Field surveys conducted in May 2013 and August 2014 found no evidence of nests for MBTA species in trees within the study area. However, surveys indicated the presence of several Barn Swallow (*Hirundo rustica*) and Cliff Swallow (*Petrochelidon pyrrhonota*) nests attached to the highway bridge, which are expected to be used on a yearly basis. Common Pigeons (Rock Dove) (*Columba livia*) are the dominant bird species using the bridge to nest and perch.

In addition to the MBTA, the Bald and Golden Eagle Protection Act affords federal protection to the Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*). The act prohibits commercial use of these eagles.

Fish potentially found in the study area's portion of the Colorado River include multiple species of Trout, Mountain Whitefish (*Prosopium williamsoni*), Common Carp (*Cyprinus carpio*), Flannelmouth Sucker (*Catostomus latipinnis*), Bluehead Sucker (*Catostomus discobolus*), Mottled Sculpin (*Cottus bairdii*), and Speckled Dace (*Rhinichthys osculus*) (CPW, 2013).

3.13.2 Wildlife and Aquatic Species Impacts

No Action Alternative

The No Action Alternative would not result in any direct impacts to wildlife and aquatic species. The No Action Alternative would not include water quality BMPs; therefore, untreated roadway runoff would continue to be discharged to the Colorado River with associated potential adverse effects to aquatic species habitat.

Build Alternative

No impacts to large mammals are anticipated. The permanent removal of riparian vegetation adjacent to the Colorado River could lead to the direct mortality of small mammals and affect some bird species by eliminating future nesting sites and habitat for small mammals; however, these impacts are expected to be minor.

Species sensitive to human presence and disturbance, such as noise and the visual impact of construction, would be affected primarily during project construction.

Long-term effects to wildlife movement and migration are not anticipated. The Build Alternative would not restrict wildlife movement more than current infrastructure.

The Build Alternative would be designed to incorporate permanent water quality treatment to improve water quality and aquatic species habitat.

Construction Impacts. Up to 1,600 linear feet of the north bank and 600 linear feet of the south bank of the Colorado River may be temporarily disturbed to build construction access roads and causeways. Disturbance on the north side of the Colorado River would occur between the river and I-70, and on the south side between the river and either 7th Street or the train platform.

The placement and removal of the causeways and access roads would disturb habitat on the river banks, cause additional sediment to enter the river, and cause turbidity. Resulting impacts to wildlife and aquatic species could include the following:

- ❖ Temporary loss of habitat due to the clearing of vegetation in and around the Colorado River to build the access roads and causeways. Longer term, the removal of invasive species from the study area's riparian corridor and addition of native vegetation would improve the area as a wildlife corridor.
- ❖ Disturbed areas would be susceptible to spread of noxious weeds.

The permanent removal of riparian vegetation adjacent to the Colorado River could lead to the direct mortality of small mammals and affect some bird species; these impacts are expected to be minor.

- ❖ Removal of migratory bird nests.
- ❖ Increased noise and human presence during construction could cause temporary displacement of wildlife.
- ❖ Construction activities could introduce the spread of invasive aquatic nuisance species, such as the Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail, which could potentially reduce the food supply of other aquatic species.
- ❖ Aquatic species in the river would temporarily experience habitat loss and increased water turbidity.
- ❖ Increased sediment in the Colorado River during the construction and removal of causeways and the demolition and removal of the existing bridge pier located in the river would impact aquatic species and could lead to direct mortality. Sediment can affect trout redds (nests) and benthic invertebrate habitat immediately in and downstream of the study area, temporarily reducing reproductive success and food supply.

3.13.3 Wildlife and Aquatic Species Mitigation

CDOT will continue to coordinate with CPW and implement the following mitigation measures to minimize or avoid impacts to wildlife:

- ❖ To ensure compliance with the MBTA, CDOT Specification 240 (CDOT, 2011) will be followed by the contractor. Specification 240 outlines requirements regarding nests on structures, seasonal vegetation-clearance restrictions, and measures to buffer bird nests within a construction area.
- ❖ Provide temporary fencing in riparian areas to protect wildlife from construction activities.
- ❖ Replace riparian trees and shrubs removed as stipulated in CDOT's *Guidelines for Senate Bill 40 Wildlife Certification* (CDOT, 2013), which states that riparian trees removed during construction, whether native or non-native, shall be replaced with a goal of 1:1 replacement based on a preconstruction stem count of all trees with a diameter at breast height of two inches or greater. Riparian shrubs removed during construction, whether native or non-native, will be replaced with native species based on their preconstruction areal coverage. In all cases, CDOT will replace all such trees and shrubs with native species. A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.

- ❖ Avoid disturbance of native trees, shrubs, and vegetation to the extent possible. When disturbance is unavoidable, replace native and non-native species with native species.
- ❖ Use bear-resistant trash receptacles near construction areas.

CDOT will continue to coordinate with CPW and implement the following mitigation measures to minimize impacts to aquatic species:

- ❖ In no instance allow construction activities or equipment to work in flowing water or disturb sediment during recognized trout spawning seasons unless in coordination with CPW, as follows:
 - ◆ Rainbow Trout: March 1-May 31.
 - ◆ Brown Trout: October 1-November 30.
- ❖ Provide permanent water quality measures discussed in Section 3.9.3 *Water Resources and Water Quality Mitigation*.
- ❖ Prevent the spread of invasive aquatic nuisance species, including Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail by following CDOT's *Guidelines for Senate Bill 40 Wildlife Certification* (CDOT, 2013).
- ❖ Minimize sediment entrainment within the river flow and the diversion channels using protected control structures. Such protection will consist of, but not necessarily be limited to, geotextiles fabrics, riprap, and conduits.
- ❖ Use CDOT-approved BMPs to offset the extent and duration of any temporary impacts to the Colorado River.

3.14 Special-Status Species

Special status refers to species listed by the U.S. Fish and Wildlife Service (USFWS) as threatened, endangered, or a candidate for protection by the Endangered Species Act of 1973 (ESA). It also refers to species listed by CPW as threatened, endangered, proposed, or of special concern at the state level (under the authority of the Colorado Revised Statutes and Colorado Wildlife Commission regulations); or as species considered rare or vulnerable by the Colorado Natural Heritage Program (CNHP).

Federally threatened and endangered species are protected under the ESA, as amended (16 U.S.C. 1531 et seq.). Projects potentially affecting federally listed species or their habitat require consultation with the USFWS, a requirement mandated by the ESA.

3.14.1 Existing Conditions

A list of federally threatened and endangered species was obtained from USFWS through the Information, Planning, and Conservation system that identified federally listed

species potentially occurring in the study area. A statewide list of threatened, endangered and species of special concern was obtained from the CPW website. The CNHP provided site-specific list of species considered rare or vulnerable that are known to occur within two miles of the study area.

Desktop and field surveys were completed in May 2013 to confirm the potential presence of sensitive species in the study area. Table 3-20 lists only those species with suitable habitat present in the study area or species with the potential to occur in the study area. In a letter dated December 9, 2013, the USFWS concurred that no federally protected species were likely to occur in the study area because of a lack of suitable habitat. Appendix D contains a USFWS list of potentially occurring, federally protected species, and a CNHP list of state-protected and other special-status species known to occur or potentially occurring in the study area. Appendix D also has USFWS, CPW, and CNHP correspondence, including CPW's best management practices for protecting special-status species and other wildlife.

A population of Ute-Ladies' Tresses orchid was documented near the confluence of the Roaring Fork and Colorado Rivers. However, two habitat surveys for this species yielded no occurrences of Ute-Ladies' Tresses habitat within the study area. On August 13, 2014, a CDOT biologist conducted a survey during the blooming period for the orchid to determine presence or absence of this species. This survey confirmed the study area's disturbed hydrology, largely non-native riparian vegetation, and lack of wetlands precludes the presence of the orchid. No Ute-Ladies' Tresses orchids were found.

3.14.2 Special-Status Species Impacts

No Action Alternative Impacts

The No Action Alternative would not result in any direct impacts to special-status species. The No Action Alternative would not include water quality BMPs; therefore, roadway runoff would continue to be discharged untreated to the Colorado River.

Build Alternative Impacts

Table 3-21 discusses potential impacts known to occur in or near the study area that could indirectly affect special-status species.

TABLE 3-20. SPECIAL-STATUS SPECIES POTENTIALLY FOUND IN THE STUDY AREA

Species	Status	Comments on Potential Occurrence
Mammals		
River Otter <i>Lontra canadensis</i>	ST	There are no known populations of river otter in the study area. Per CPW, known river otter populations occur upstream and downstream from the study area; therefore, otters may travel through the study area en route to different foraging areas.
Townsend's Big-eared Bat <i>Corynorhinus townsendii pallescens</i>	SC, G3/S4	According to the CNHP, this species of bat was recorded in 2001 within two miles of the study area (CNHP, 2002). Townsend' big-eared bat is strongly correlated with caves for roosting but hesitantly use cave analogs (mines or cavernous structures). This bat is seldom found at these roosting sites (USFS 2006). The undersides of vehicles and pedestrian bridges could serve as a cave analog, though this bat is intolerant to human disturbance (USFS 2006). The lack of traditional roosting habitat combined with consistent human presence render the study area poor habitat for Townsend's big-eared bat.
Birds		
American Peregrine Falcon <i>Falco peregrinus anatum</i>	SC	This species is usually found where rivers, marshes, or other wet habitats are associated with cliff sides. While this habitat is not present within the study area, it does occur east of the study area. Therefore, the study area may provide limited foraging habitat for the species, but the overall likelihood for occurrence is relatively low.
Bald Eagle <i>Haliaeetus leucocephalus</i>	SC	The study area is located within Bald Eagle winter range and winter forage range. Bald Eagle winter roost sites are known to occur along the Colorado River, and the closest known roost site is located along the Roaring Fork River approximately 2.5 miles southwest of the study area (CPW, 2012). Wintering eagles have the potential to occur within the study area while foraging for prey from mid-November through mid-March.
Fish		
Colorado River Cutthroat Trout <i>Oncorhynchus clarki pleuriticus</i>	SC	Occurs in the Colorado River System.
Roundtail Chub <i>Gila robusta</i>	SC, G3/S2	Occurs in the Colorado River System. 2002 surveys indicate that the town of Silt, Colorado, approximately 19 river miles downstream from the study area, may be the upstream extent of the Roundtail Chub's range in the Colorado River (CSU, 2002).
Plants		
Ute-Ladies' Tresses <i>Spiranthes diluvialis</i>	T, G2/S2	Occurs in moist meadows with perennial stream terraces, floodplains, and oxbows between 4,300 and 6,850 feet in elevation. This species requires wetland hydrology (USFWS, 2014). A recorded Ute-Ladies' Tresses population is known to occur near the confluence of the Roaring Fork and Colorado Rivers, west of the study area.

Sources: USFWS, CPW, and CNHP.

USFWS Rankings: T = Threatened

CPW Rankings: SC = State Wildlife of Special Concern ; ST = State Threatened

CNHP Rankings: "S" = State, "G" = Global

- 2 = Imperiled - Imperiled because of rarity or because of some factor(s) making it very vulnerable to extirpation or extinction.
- 3 = Vulnerable - Vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation or extinction.
- 4 = Apparently Secure - Uncommon but not rare, and usually widespread. Possible cause of long-term concern.

TABLE 3-21. SPECIAL-STATUS SPECIES IMPACT SUMMARY

Species	Potential Impacts
Mammals	
River Otter	<p>Though evidence suggests it is unlikely that river otters utilize the study area, it is possible that they travel through it to access more suitable Colorado River habitat. Short-term impacts, such as noise, lights, and causeways related to construction, could deter river otter from the study area.</p> <p>By impacting lower-level organisms, such as benthic macroinvertebrates (including crayfish) and benthic vertebrates (like amphibians), sediment delivery created by in-water construction could temporarily impact river otter through disruption of its food sources. Suspended solids and turbidity generated over the duration of construction could decrease benthic productivity, therefore affecting the river otter.</p> <p>Habitat restoration required by Colorado Senate Bill 40 (SB 40), a statute requiring state agencies to coordinate with CPW whenever riparian areas are impacted, would improve the otter's habitat availability in the long term.</p>
Townsend's Big-eared Bat	<p>Despite poor habitat, there is limited potential for this species to occur. Construction-related disturbances such as light and noise could disorient or deter this bat from the study area.</p> <p>Over the long term, habitat restoration required by SB 40, such as improvements to the riparian corridor adjacent to Grand Avenue Bridge, would increase habitat availability for Townsend's big-eared bat.</p> <p>Because of the limited potential for available roosting and foraging habitat within the study area, no impacts to this species are anticipated.</p>
Birds	
American Peregrine Falcon	<p>No records of peregrine falcon nests exist in or near the study area. However, given the raptor's large range, the study area could provide foraging ground. During construction, noise, light, and increased presence of people in the riparian corridor could deter peregrine falcon from the study area. Because of the bird's high level of mobility, such deterrence would be of negligible impact.</p> <p>Over the long term, riparian restoration required by SB 40 would improve the quality of foraging ground for this species and other birds of prey.</p>
Bald Eagle	<p>Wintering bald eagles congregate at established sites for purposes of feeding and sheltering in close proximity to sufficient food sources. Human activities near or within communal roost sites may prevent eagles from feeding or taking shelter, especially if other undisturbed, suitable sites are not available. Disruptive activities in the eagle's flight path between important roosting and foraging areas may interfere with feeding, and activities that permanently alter these habitats may eliminate essential elements for feeding and sheltering eagles within an area (USFWS, 2007).</p> <p>Implementation of the Build Alternative could affect bald eagles that use the study area. No nesting sites are known to occur in the vicinity of the study area; therefore, impacts to the species are not anticipated during the breeding season (CPW, 2012).</p> <p>Because of the bald eagle's wide range and mobility, construction impacts to this species would be negligible.</p> <p>Habitat restoration required by SB 40 would improve the quality of the Colorado River's riparian corridor adjacent to the Grand Avenue Bridge. Removal of smaller, exotic trees and replacement with substantial native trees would improve nesting and perching habitat for the bald eagle.</p>

TABLE 3-21. SPECIAL-STATUS SPECIES IMPACT SUMMARY

Species	Potential Impacts
Fish	
Colorado River Cutthroat Trout	<p>Colorado River cutthroat trout may experience temporary habitat loss during in-stream construction.</p> <p>Construction-generated sediment delivery in the Colorado River could decrease benthic productivity. This trout's primary food source, benthic macroinvertebrates (such as mayflies, caddisflies, and stoneflies) could experience a temporary population decline due to sediment deposition on the river floor. A decrease in food availability over the duration of bridge construction could affect this species of trout, as well as others.</p> <p>Riparian habitat restoration required of this project by SB40 would improve conditions for this trout species and others. In the long term, the replacement of small, exotic trees with large, native trees would provide more shade and lower summertime water temperatures. Colder water carries the higher oxygen concentrations required by Salmonid fishes (including trout).</p>
Roundtail Chub	<p>The Colorado River flowing through the study area is 19 miles upstream from the nearest known Roundtail Chub population.</p> <p>The omnivorous Roundtail Chub feeds on algae and benthic, aquatic insects, including mayflies (CSU, 2002). Downstream of the study area, within the known Roundtail Chub range, these food sources may be affected by construction-generated sedimentation. As noted above, suspended solids and sediment deposition on the river bottom could lead to decreased ecosystem productivity. This could lead to a decline in food availability for this Chub species.</p> <p>Riparian habitat restoration required of this project by SB 40 would improve conditions for Roundtail Chub. The removal of exotic riparian vegetation with native plants would increase the population size and diversity of insects, a primary food source for the Chub.</p>
Plants	
Ute-Ladies' Tresses	<p>Two surveys of the study area found no habitat for this rare orchid. A survey conducted during the 2014 blooming period determined the species was not present. The lack of wetlands and a historically altered hydrologic regime likely precludes this species from occurring in the study area. Project construction is not expected to impact Ute-Ladies' Tresses orchid.</p>

Construction activities could introduce the spread of invasive aquatic nuisance species, such as the Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail, which could potentially reduce the food supply of the cutthroat trout and roundtail chub.

3.14.3 Special-Status Species Mitigation

CDOT will continue to coordinate with CPW and implement the following BMPs and mitigation measures to minimize impacts to special-status species during construction and to improve habitat availability and quality following construction:

- ❖ Follow CDOT Specification 240 (CDOT, 2011) to ensure compliance with the MBTA.
- ❖ Provide temporary fencing in riparian areas to protect wildlife from construction activities.
- ❖ A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.

- ❖ Replace all riparian trees and shrubs removed during construction, as required by *Senate Bill 40 Wildlife Certification* (CDOT, 2013). Non-native trees and shrubs removed during construction will be replaced with native species.
- ❖ Prevent the spread of invasive aquatic nuisance species, including Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail following CDOT's *Guidelines for Senate Bill 40 Wildlife Certification* (CDOT, 2013).
- ❖ Provide permanent water quality measures discussed in Section 3.9.3 *Water Resources and Water Quality Mitigation*.
- ❖ No in-water work will be allowed between March 1 and May 31 to protect spawning Colorado River Cutthroat Trout.
- ❖ Minimize sediment entrainment within the river flow and the diversion channels through use of protected control structures. Such protection will consist of, but not necessarily be limited to, geotextiles fabrics, riprap, and conduits.
- ❖ In no instance allow construction activities or equipment to work in flowing water during recognized spawning seasons or any other time unless in coordination with CPW.

3.15 Historic Preservation

Historic properties are protected under Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended 2004) and other statutes, as well as Section 4(f) as amended and codified in the U.S. Department of Transportation Act of 1966, 49 U.S. Code (USC) 303 (c) (see Chapter 4.0 *Section 4[f]*

For purposes of this EA, historic properties include historic architecture, historic districts, and traditional cultural properties.

Evaluation). Section 106 of the NHPA requires federal agencies to take into account the effects that their undertakings have on historic properties, which are those properties that are included in, or eligible for, the National Register of Historic Places (NRHP). This review process ensures that federal agencies identify any potential conflicts between their undertakings and historic preservation and resolve any conflicts in the public interest.

Based on the highly disturbed urban environment of the study area and the proposed configuration and location of the new bridges under the Build Alternative, no archaeological resources are likely to occur within the study area. Therefore, archaeological resources are not analyzed in detail in this EA. Section 3.20 *Other Resources* discusses these resources.

3.15.1 Existing Conditions

As part of the NHPA Section 106 process, CDOT began consultation with the State Historic Preservation Office (SHPO) and local agencies and organizations regarding historic resources within the study area through invitations to participate in the project

scoping in November 2011. CDOT also provided eligibility and effect determinations for review and comment in August 2013 (correspondence is in Appendix D). The historic consulting parties for this study include:

- ❖ City of Glenwood Springs Historic Preservation Commission
- ❖ Frontier Historical Society
- ❖ Garfield County Board of County Commissioners
- ❖ Colorado Preservation Inc. (CPI)

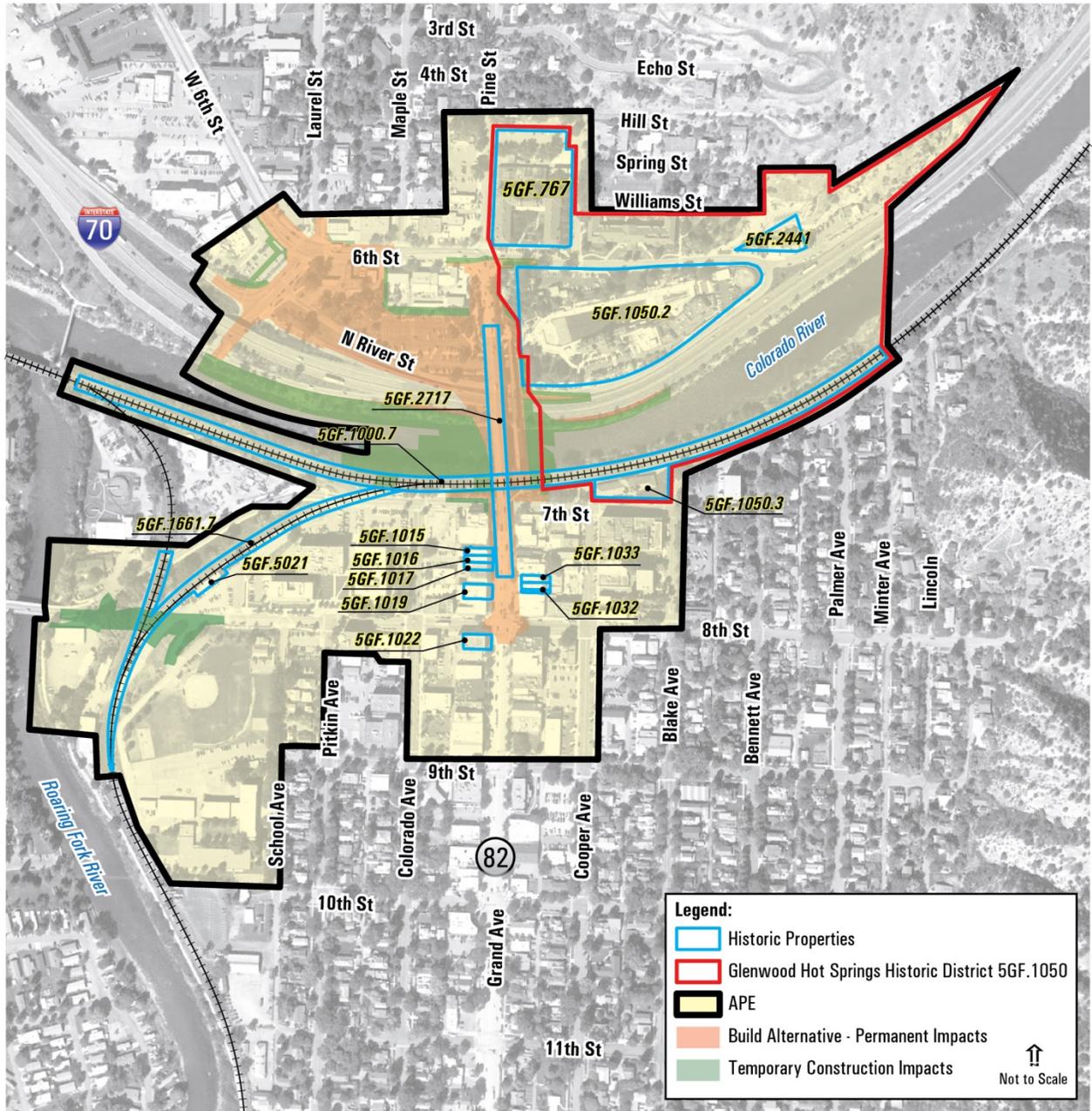
The study team consulted with the SHPO to identify the Area of Potential Effect (APE) for historic resource investigations. The *Summary of Coordination* section below has more information. The APE includes parcels adjacent to the proposed alternative so that potential indirect effects could be evaluated. The APE is shown on Figure 3-27.

The typical age at which a property can be deemed eligible for the NRHP is 50 years old. An age of 45 years old is commonly used to account for the time required to develop and construct a project. Therefore, field survey and historic research were conducted between December 2011 and August 2012 to identify significant historic properties more than 45 years old and any historic districts within the APE that may be eligible for listing on the NRHP. Not all properties within the APE were surveyed; properties that were not anticipated to experience direct effects because of their distance from proposed improvements, and properties that were less than 45 years old, were not surveyed.

Research included a file search on the Colorado Office of Archaeology and Historic Preservation (OAHP) Compass database; research at the City of Glenwood Springs, Garfield County Assessor's Office, Frontier Historical Society Museum, and Western History Collection of the Denver Public Library; review of newspaper articles, historic books and maps, and other published reports; and interviews with property owners and those with knowledge about the area's history.

A total of 39 properties were documented within the APE. Of those, 16 are listed on or eligible to the NRHP. They are summarized in Table 3-22 and shown on Figure 3-27. The March 28, 2014, CDOT letter to the SHPO in Appendix D and the *Historic Resources Survey Report, SH 82/Grand Avenue Bridge Replacement, City of Glenwood Springs, Colorado* (Hermsen Consultants, 2014) report contain detailed descriptions of these properties.

FIGURE 3-27. AREA OF POTENTIAL EFFECT AND NRHP-ELIGIBLE PROPERTIES



Source: Jacobs, 2014.

TABLE 3-22. HISTORIC PROPERTIES ELIGIBLE FOR THE NRHP IN THE APE

ID Number	Address/ Location	Name/ Description	Documentation Status	Eligibility Status*
5GF.767	526 Pine St.	Hotel Colorado	Previously Recorded	NRHP listed. Eligible under Criteria A and C for association with hot springs resort and early Glenwood Springs development for architecture modeled after 16th century Italian Villa de Medici.
5GF.2441	601 6th St.	Glenwood Springs Hydroelectric Plant	Previously Recorded	NRHP listed. Eligible under Criterion A and C for its architecture and significance as one of earliest remaining hydroelectric plants in Colorado and its role in growth of Glenwood Springs.
5GF.1022	801 Grand Ave.	Citizen's National Bank	Previously Recorded	NRHP listed. Eligible under Criterion A and C for its architecture and role in development of commerce in Glenwood Springs in early 20th century.
5GF.1050.2	401 N. River St.	Glenwood Hot Springs Bathhouse/ Natatorium	Previously Recorded	Officially NRHP eligible under Criterion A and C for its architecture and important role that the hot springs resort played in settlement of Glenwood Springs.
5GF.2717	SH 82 Bridge over Colorado River	Glenwood Springs Viaduct/SH 82/Grand Avenue Bridge	Previously Recorded	Officially NRHP eligible under Criterion A and C for its architecture and role in providing mobility and away to transport supplies and products.
5GF.1050	Area surrounding hot springs	Glenwood Hot Springs Historic District	Previously recorded; newly recorded with revised district boundaries	Recommended NRHP eligible under Criterion A and C because it encompasses historic properties directly associated with growth and development of Glenwood Springs.
5GF.1000.7	South edge of Colorado River	Denver & Rio Grande Railroad Tracks	Newly recorded	Recommended NRHP eligible.
5GF.1050.3	413 7th St.	Denver & Rio Grande Station	Previously recorded	Recommended NRHP under Criterion A and C for its architecture and the key role that the railroad played in Glenwood Springs settlement and bringing visitors to the Hot Springs.
5GF.1015	715 Grand Ave.	Silver Club Building	Previously recorded	Recommended NRHP eligible under Criterion A and C as a prominent saloon in early 1900s and its architecture.
5GF.1016	717 Grand Ave.	Palace Hotel	Previously recorded	Recommended NRHP eligible under Criterion A and C for its modest role in commercial history of Glenwood Springs and its architecture.
5GF.1017	719 Grand Ave.	Parkison Building	Previously recorded; new survey prepared because original survey more than 30 years old	Recommended NRHP eligible under Criterion A and C for its architecture and as a building built near turn of the century that furthers understanding of broad patterns of early Glenwood Springs development.

TABLE 3-22. HISTORIC PROPERTIES ELIGIBLE FOR THE NRHP IN THE APE

ID Number	Address/ Location	Name/ Description	Documentation Status	Eligibility Status*
5GF.1033	722-724 Grand Ave.	Springs Restaurant/Doc Holliday Tavern	Previously recorded; new survey prepared because original survey more than 30 years old	Recommended NRHP eligible under Criterion A and C for its architecture and as location of Western Union Telegraph Company and early commercial building that would further understanding of early development patterns in Glenwood Springs.
5GF.1019	725-727 Grand Ave.	Dougan Block	Previously recorded; new survey prepared because original survey more than 30 years old	Recommended NRHP eligible under Criterion A and C for its architecture and association with early development in Glenwood Springs.
5GF.1032	726 Grand Ave.	Ore Sample Room	Previously recorded; new survey prepared because original survey more than 30 years old	Recommended NRHP eligible under Criterion A for association with Hotel Glenwood, mining, and early Glenwood Springs development.
5GF.5021	8th St. and Defiance St.	Freight Depot – Denver & Rio Grande Railroad, Aspen Branch	Newly Recorded	This resource is a contributing feature of the Denver & Rio Grande Railroad – Aspen Branch (Site #5GF.1661.7).
5GF.1661.7	West of parking lot at northwest corner of 8th St. and Defiance Ave.	Denver & Rio Grande Railroad – Aspen Branch	Newly recorded segment	Recommended NRHP eligible under Criterion A for key role in settlement and commercial growth of Glenwood Springs, settlement of Roaring Fork Valley and 19th century development of Aspen's mining industry.

*Four main criteria used to determine if a property is eligible for inclusion on the NRHP are:

Criterion A: Associated with events that have made a significant contribution to the broad pattern of our history.

Criterion B: Associated with the lives of persons significant in our past.

Criterion C: Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or that possess high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: Has yielded, or may be likely to yield, information important in history or prehistory.

3.15.2 Historic Preservation Impacts

No Action Alternative

The No Action Alternative would have no direct or indirect impacts that would affect the NRHP eligibility of the historic properties identified within the APE.

Build Alternative

The Build Alternative would result in impacts to historic properties listed on or eligible for listing on the NRHP in varying degrees, depending on their proximity to the project. Table 3-23 summarizes direct, indirect, and construction effects to each historic resource, as determined through the Section 106 process. More information about the effects determinations is available in correspondence in Appendix D.

TABLE 3-23. DETERMINATION OF EFFECT TO HISTORIC PROPERTIES

Property Name	Site Number	Build Alternative Impacts	Effect Determination
Hotel Colorado	5GF.767	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue and pedestrian bridges. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities and nighttime detour along 6th Street.	No adverse effect.
Glenwood Springs Hydroelectric Plant	5GF.2441	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue Bridge and pedestrian bridge. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities and nighttime detour along 6th Street.	No adverse effect.
Citizen's National Bank	5GF.1022	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue Bridge and pedestrian bridge. <u>Construction Effects:</u> Increased dust, noise from construction activities.	No adverse effect.
Glenwood Hot Springs Bathhouse/Natatorium	5GF.1050.2	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue and pedestrian bridges. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities and nighttime detour along 6th Street, and a temporary construction easement.	No adverse effect.
Glenwood Springs Viaduct/SH 82/Grand Avenue Bridge	5GF.2717	<u>Direct Effect:</u> Replace bridge.	Adverse effect.
Glenwood Hot Springs Historic District	5GF.1050	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue Bridge and pedestrian bridge. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities and nighttime detour along 6th Street, and temporary construction easements.	No adverse effect.
Denver & Rio Grande Railroad Tracks	5GF.1000.7	<u>Direct Effect:</u> Widen bridge over railroad. <u>Indirect Effect:</u> Visual change from new Grand Avenue Bridge and pedestrian bridge. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities and temporary construction easements.	No adverse effect.
Denver & Rio Grande Station	5GF.1050.3	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual changes from new Grand Avenue Bridge and pedestrian bridge. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities.	No adverse effect.
Silver Club Building	5GF.1015	<u>Direct Effect:</u> None. <u>Indirect Effect:</u> Visual and audible changes from new bridge being higher and closer than existing bridge. <u>Construction Effects:</u> Increased dust, noise, vibration from construction activities.	Adverse effect.
Palace Hotel	5GF.1016	Same as Silver Club Building.	Adverse effect.
Parkison Building	5GF.1017	Same as Silver Club Building.	Adverse effect.

TABLE 3-23. DETERMINATION OF EFFECT TO HISTORIC PROPERTIES

Property Name	Site Number	Build Alternative Impacts	Effect Determination
Springs Restaurant/Doc Holiday Tavern	5GF.1033	Same as Silver Club Building.	Adverse effect.
Dougan Block	5GF.1019	Same as Silver Club Building.	Adverse effect.
Ore Sample Room	5GF.1032	Same as Silver Club Building.	Adverse effect.
Denver & Rio Grande Railroad - Aspen Branch	5GF.1661.7	<u>Direct Effect</u> : None. <u>Indirect Effect</u> : None. <u>Construction Effects</u> : Temporary removal of railroad tracks and railbed for 8th Street extension construction detour; restore connection after construction. Install utilities. Temporary and permanent easements would be needed.	No adverse effect.
Freight Depot - Denver & Rio Grande Railroad, Aspen Branch	5GF.5021	<u>Direct Effect</u> : None. <u>Indirect Effect</u> : None. <u>Construction Effects</u> : Dust and noise from construction activities associated with SH 82 Detour.	No adverse effect. Note: Because the depot is associated with the Denver & Rio Grande Railroad - Aspen Branch (5GF.1661.7), the depot would experience the same effects as the railroad.

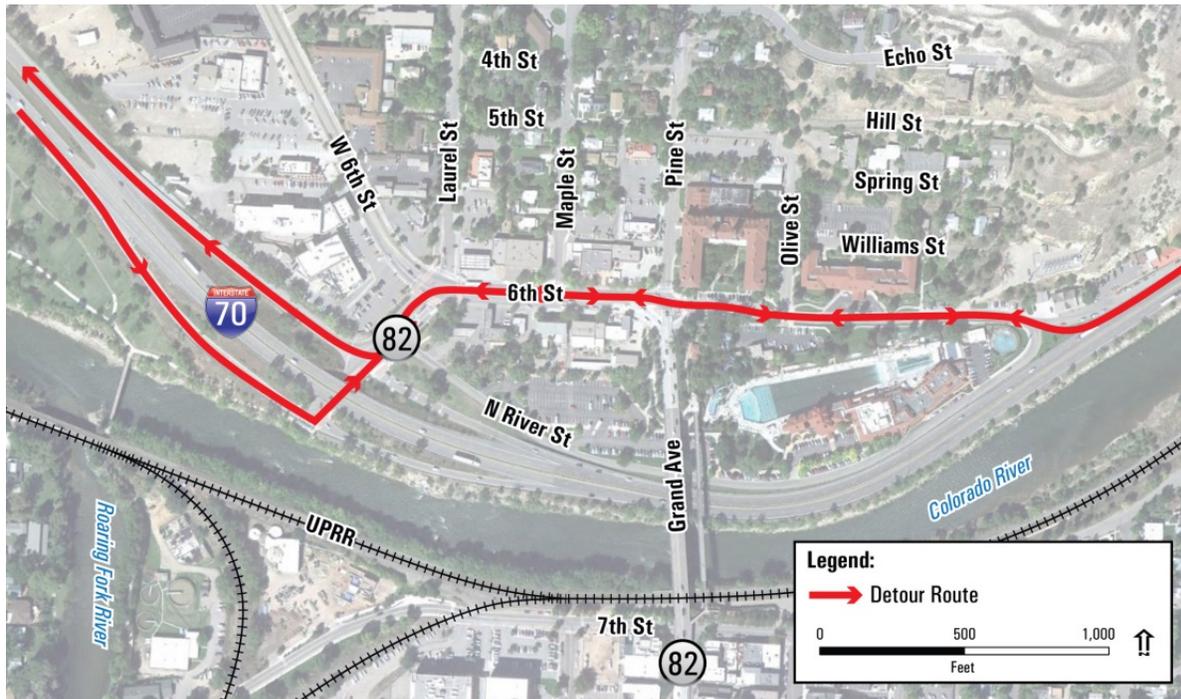
To accommodate traffic movements during full closure of the Grand Avenue Bridge to during construction, CDOT would implement the SH 82 Detour along 8th Street. The detour would require a shallow cut through the Denver & Rio Grande Railroad – Aspen Branch to construct a connection from existing 8th Street to Midland Avenue. When the new Grand Avenue Bridge is reopened and the detour is no longer needed, CDOT would restore the Denver & Rio Grande Railroad – Aspen Branch connection to preconstruction conditions. During nighttime closures, eastbound and westbound I-70 traffic would be rerouted onto 6th Street at a temporary break in the I-70 barrier near the Yampah Vapor Caves. Detours are shown on Figure 3-28 and Figure 3-29.

Summary of Coordination

CDOT consulted with the SHPO to establish the APE in February 2012. In August 2, 2013, CDOT requested concurrence from the SHPO on the eligibility and effect determinations described in Table 3-23 (except for those properties associated with the SH 82 Detour, which include the Denver & Rio Grande Railroad – Aspen Branch [Site #5GF.1661.7] and Freight Depot – Denver & Rio Grande Railroad – Aspen Branch [Site #5GF.5021]). In their August 14, 2013 letter, the SHPO concurred with the determinations.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-28. I-70 DETOUR



In March 2014, CDOT and the SHPO staff met to discuss changes to the APE and to outline effect determinations related to the SH 82 Detour construction area on 8th Street. Subsequently, CDOT provided formal eligibility and effect determinations for historic properties within the SH 82 Detour construction area on 8th Street in correspondence dated March 28, 2014 and August 27, 2014. The SHPO concurred in letters dated April 24, 2014 and September 5, 2014.

CDOT also informed the four historic consulting parties identified for this project (see list in Section 3.15.1) of the APE and eligibility and effect determinations in August 2013, April 2014, and August 2014, and provided them an opportunity to comment. Only the Glenwood Springs Historic Preservation Commission and Colorado Preservation, Inc. provided comments. The Glenwood Springs Historic Preservation Commission requested additional information in correspondence dated August 15, 2013. CDOT provided the requested information in April 2014. In a September 5, 2014 email, Colorado Preservation Inc. indicated that they are comfortable with the determinations made and had no additional comments. Relevant correspondence can be found in Appendix D.

FIGURE 3-29. SH 82 DETOUR ROUTE



Because the Build Alternative was determined to result in an *adverse effect* to certain historic properties, FHWA will invite the Advisory Council on Historic Preservation (ACHP) to participate in Section 106 consultation for the project.

3.15.3 Historic Preservation Minimization and Mitigation

Minimization

CDOT avoided and minimized impacts to historic properties in several ways. The proposed new Grand Avenue Bridge alignment is located farther west than the existing bridge alignment, so visual impacts to the Glenwood Hot Springs Historic District (Site #5GF.1050), Glenwood Hot Springs Bathhouse/Natatorium (Site #5GF.1050.2), and Hotel Colorado (Site #5GF.767) would be reduced. Similarly, the study team shifted the new pedestrian bridge alignment slightly west on the north side of the Colorado River to minimize direct impacts to these properties. Additional measures undertaken by the study team in the development of the Build Alternative to minimize impacts to historic properties along the 700 block of Grand Avenue include:

- ❖ Reduced highway bridge lane widths in this area from the standard 12-foot width to 11 feet.
- ❖ Designed a thinner (shorter) bridge structure in this area to minimize the visual effect on the historic properties located on the 700 block of Grand Avenue.
- ❖ Eliminated from consideration a pedestrian ramp attached to the east side of the highway bridge in this area. This would allow for a narrower overall bridge cross-section near the historic properties along the 700 block of Grand Avenue, creating more distance between those properties and the new bridge.

CDOT has implemented the following measures to minimize effects to the Denver & Rio Grande Railroad - Aspen Branch (Site #5GF.1661.7) at the detour location:

- ❖ Use a steeper (2:1) cut slope to minimize grading limits.
- ❖ Use a minimal roadway section width of 24 feet, with an overall width of 29 feet with curb and gutter.
- ❖ Design the road to match the existing 8th Street bridge and 8th Street grade to reduce the amount of excavation required for the road and minimize the length of railroad track to be removed.

During final design, the study team will continue to seek ways to further minimize impacts to historic properties.

Memorandum of Agreement

The Build Alternative would result in an *adverse effect* to historic properties, which will require FHWA, CDOT, and SHPO to enter into a Memorandum of Agreement (MOA) that stipulates the mitigation measures to be undertaken to resolve the adverse effects, such as those summarized below. The signed MOA will be included in the decision document for the project.

- ❖ **Glenwood Springs Viaduct/SH 82/Grand Avenue Bridge (Site #5GF.2717).** Level II archival documentation.
- ❖ **Historic Properties Along 700 Block of Grand Avenue** (includes Silver Club Building [Site #5GF.1015], Palace Hotel [Site #5GF.1016], Parkison Building [Site #5GF.1017], Springs Restaurant/Doc Holliday Tavern Site [#5GF.1033], Dougan Block [Site #5GF.1019], Ore Sample Room [Site #5GF.1032]). Using the established CSS process, CDOT will work with Section 106 consulting parties and SHPO to identify opportunities for aesthetic treatments in the design of the bridge, roadway, and sidewalk elements to reflect the materials and architectural style of the historic period of significance for these properties.

CDOT is coordinating with the Glenwood Springs Historic Preservation Commission regarding mitigation measures. CDOT met with Commission staff on June 5, 2014 and attended a Commission meeting on October 13, 2014 to discuss mitigation and their participation as a concurring party to the MOA.

Temporary Construction Impact Mitigation

During construction, temporary noise mitigation will be deployed during nighttime detour operations along 6th Street to reduce noise impacts to nearby historic resources. This will include, but not be limited to, CDOT coordinating detour nights and times with local hotels (e.g., Hotel Colorado and Glenwood Hot Springs). This will help hoteliers to move patrons to rooms farther from detour noise.

3.16 Hazardous Materials

Regulated materials may exist within the study area at facilities that generate, store, and dispose of these substances; or at the location of past releases of these substances. Examples of regulated materials include asbestos, lead-based paint, heavy metals, dry-cleaning solvents, and petroleum hydrocarbons (e.g., gasoline and diesel fuels), which could be harmful to human health and the environment. In accordance with FHWA and CDOT requirements, this section evaluates the potential for regulated materials to affect project construction.

Regulated materials are substances or materials, including hazardous substances and materials, which have been determined by the EPA to be capable of posing an unreasonable risk to health, safety, and property.

A Modified Phase I Environmental Site Assessment (MESA) was conducted to evaluate the potential for encountering soil and/or groundwater contamination within the study area (Pinyon, 2014). The MESA was conducted in accordance with the CDOT *Hazardous Materials Document Guide* (CDOT, 2011). The MESA generally follows the American Society for Testing and Materials (ASTM) E1527-05 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process” (Phase I Standard),

with the following exceptions: (1) interviews were not conducted, and (2) building interiors were not accessed. Based on search distances identified in the Phase I Standard, a records search was conducted to identify regulated material facilities within the study area. Detailed information regarding the review of environmental agency records, historical records, physical setting information, and site reconnaissance were included in the MESA.

3.16.1 Existing Conditions

The study area has been commercially developed since the late 1800s. Table 3-24 identifies the regulated materials facilities located at or near the study area based on the environmental records search of federal, state, and local environmental sources.

TABLE 3-24. RESULTS OF ENVIRONMENTAL RECORDS SEARCH

Environmental Records Database	Number of Facilities
National Priority List (NPL) (e.g., Superfund)	0
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) List	0
CERCLIS No Further Remedial Action Planned (NFRAP) List	0
Resource Conservation Recovery Act (RCRA) Corrective Action Sites (CORRACTS)	1
RCRA non-CORRACTS Treatment Storage and Disposal Facilities (TSDF) List	0
RCRA Generators	6
State and Tribal Landfill and/or Solid Waste Disposal Sites	0
Leaking Underground Storage Tanks (LUST) Sites	7
Underground Storage Tank (UST) Sites	10
Colorado Voluntary Cleanup Program (VCP) List	0

Source: Environmental Data Resources Report (EDR, 2013).

Several filling stations and automotive maintenance facilities that use and store petroleum hydrocarbons have been located within the study area since the mid-1950s. The recognized environmental conditions (REC) identified in the MESA are listed in Table 3-25. Figure 3-30 shows the location of the facilities of concern.

Potential regulatory implications depend on the source, nature, and degree of contamination. Authorities may require corrective action for contamination originating from previous or current on-site activities (e.g., petroleum hydrocarbon releases or other contaminants, undocumented underground storage tanks).

TABLE 3-25. RECOGNIZED ENVIRONMENTAL CONDITIONS IN THE STUDY AREA

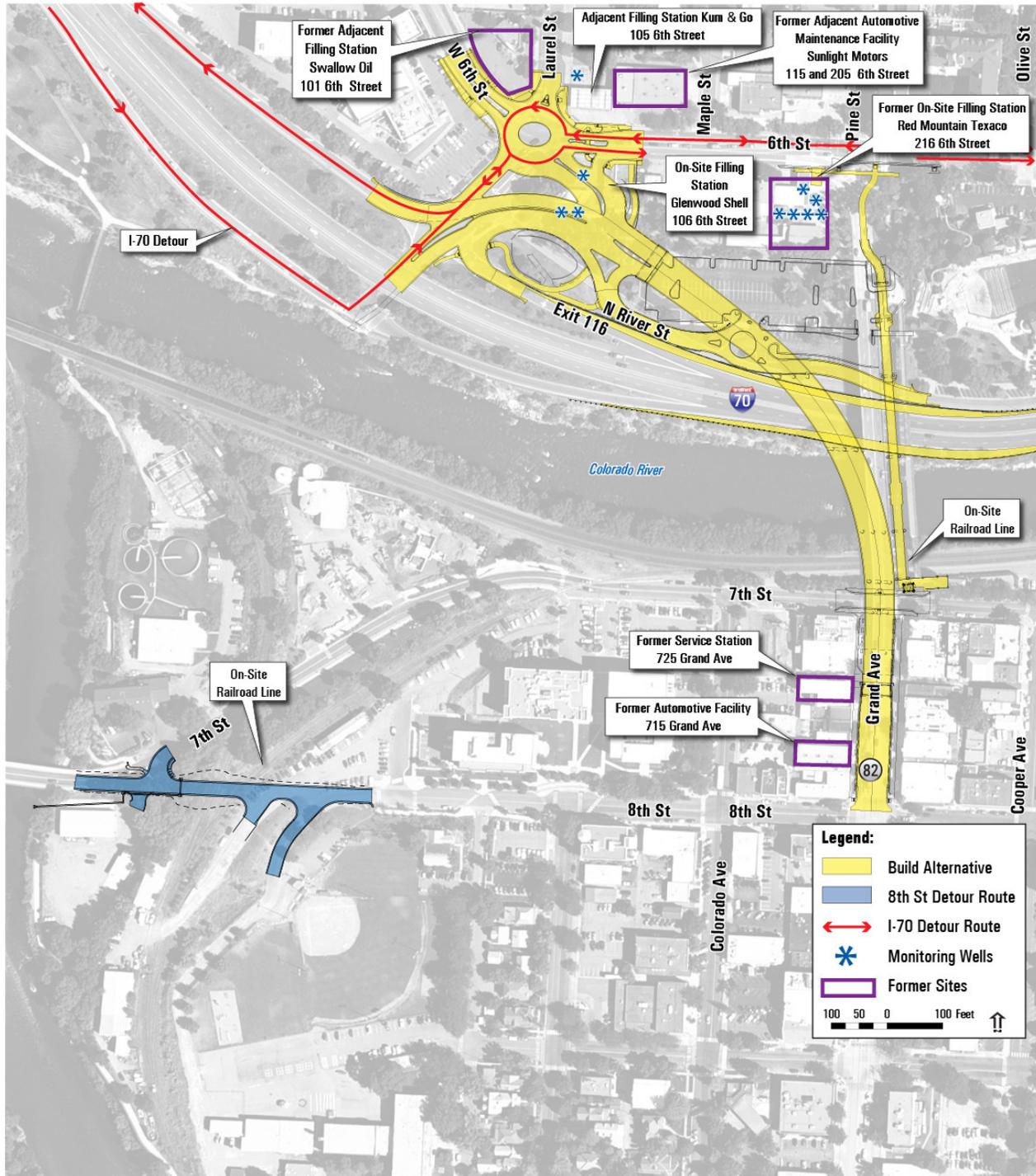
REC	Description
On-Site Filling Station Glenwood Shell 106 6th Street	A filling station and maintenance facility has been located at the northwest portion of the study area since at least 1966. There is the potential for contamination to be present at the facility.
Former On-Site Filling Station Red Mountain Texaco 216 6th Street	A filling station was located at the northeast corner of the study area from at least 1956 to 2006. Remediation activities are currently being implemented at the facility, including groundwater monitoring.
Potential Former On-Site Filling Station 6th and Pine Street	A filling station was reportedly located at 6th Street and Pine Street (specific street address not provided) from at least 1966 to 1986. Since USTs were not regulated during that time, limited agency information is available for review regarding this facility.
Former Adjacent Automotive Maintenance Facility Sunlight Motors 115 and 205 6th Street	An automotive maintenance facility was reported located at 115 and 205 6th Street. Historical records indicate a service station and automotive facility were located at this location from at least 1956 to at least 1986. No additional information regarding contamination or remediation activities was identified.
Former Adjacent Filling Station Swallow Oil 101 6th Street	A filling station was located at 101 6th Street from at least 1956 to 1986. The USTs were no longer in use as of 1986. No additional information was provided regarding the potential closure/removal of the USTs, or potential releases, as the facility operated prior to UST regulations.
Adjacent Filling Station Kum & Go 105 6th Street	A filling station is located at 105 6th Street. The facility has been present since at least 1968. Based on the location of the facility and the duration of the facility at this location (45 years), there is the potential for contamination to be present at the facility.
On-Site Railroad Line	A railroad line has extended through the study area since at least 1886. No releases have been reported; however, railroad cargo can include regulated materials and petroleum hydrocarbons; therefore there is potential for contamination to be present in the study area. In addition, railroad ties located along the rail line typically contain creosote, a hazardous material.

Source: SH 82 Grand Avenue Bridge Project MESA, Pinyon, 2014.

In addition to the RECs noted above, there is potential that other regulated materials could be located in the study area. These could include lead-containing paint and asbestos-containing materials located on or within building structures and bridges located within the study area. Lead sampling of the Grand Avenue Bridge was conducted in 1999, which confirmed the presence of lead-containing paint on all painted bridge components except the guard rails around the gas lines on either side of the bridge (Walsh Environmental Scientists and Engineers, Inc., April 1999). According to a CDOT representative, neither of the existing bridges has been sampled for asbestos-containing materials, and the pedestrian bridge has not been sampled for lead-based paint.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-30. FACILITIES OF CONCERN WITHIN THE STUDY AREA



Source: Pinyon, 2014.

3.16.2 Hazardous Materials Impacts

No Action Alternative

Under the No Action Alternative, existing or future hazardous materials releases could continue to occur since regulated material releases have been identified within the study area. Cleanup of these conditions would continue under regulatory programs. Spills resulting from traffic accidents and crashes could also affect the study area under the No Action Alternative.

Build Alternative

Construction activities would involve workers excavating potentially contaminated media that currently exists within the study area. Ground disturbance activities during construction could impact regulated materials, potentially causing the transport of pollutants into the Colorado River and/or the Roaring Fork River. Demolition of the existing Grand Avenue Bridge, which would include activities such as sanding, cutting, and welding, would expose workers to lead-based paint on painted bridge components. Lead-based paint could also be present on the pedestrian bridge and in building structures. Other regulated materials, including asbestos-containing materials (ACM), could also be present in building structures or bridges.

The filling stations located with the study area reportedly have active and inactive groundwater remediation systems, including groundwater-monitoring wells. Disturbance of these systems by construction activities could result in release of regulated materials, or could delay or impede remedial efforts at those facilities.

Construction at regulated materials sites may also affect the construction budget and schedule, particularly if previously unidentified contamination is found. The acquisition of contaminated properties would require additional investigation to evaluate subsurface conditions before construction, and construction activities could require the off-site disposal of contaminated soil and debris in permitted facilities.

3.16.3 Hazardous Materials Mitigation

- ❖ CDOT will attempt to resolve regulatory responsibilities for known regulated materials contaminants at properties targeted for right-of-way acquisition or easements prior to acquisition. Properties targeted for acquisition are identified in Section 3.5 *Relocation/Right-of-Way*.
- ❖ CDOT's contractor also will prepare a Materials Management Plan to address potential regulated materials that may be encountered during construction activities and minimize the spread of any remaining regulated materials located in the subsurface within the construction area. The plan will have emphasis on these areas:

- ◆ The potential exists for hazardous materials (including residual contamination associated with the on-site filling stations and the Aspen Branch wye tracks used by the UPRR) to be encountered in areas where proposed construction and excavation areas approach the groundwater table and within the temporary construction detour route. Recent investigations reveal that groundwater levels are about 10 to 20 feet below ground on the south side and approximately 30 feet below the ground on the north side.
- ◆ Potential fill or demolition debris from roadway construction may be present on the site. Ensure that workers follow CDOT Specification 250 - Environmental, Health and Safety Management and the CDOT Asbestos - Contaminated Soil Management Standard Operating Procedure during excavation activities at the site.

These additional mitigation measures will be implemented during construction to avoid and minimize potential impacts for hazardous materials:

- ❖ Complete ASTM-compliant Phase I Environmental Site Assessment for properties considered for right-of-way acquisition.
- ❖ Complete subsurface soil and groundwater investigation to identify potential contaminants in the construction area. The subsurface investigation should target areas where contamination would likely be encountered during construction, or parcels where right-of-way is acquired.

A subsurface investigation at the northwest portion of the study area could be eliminated because subsurface groundwater investigations are currently being conducted in this area related to active petroleum releases.

- ❖ In the event that suspected ACM is encountered, including with buried utilities, workers must follow CDOT Specification 250.07 - Asbestos-Containing Material Management and CDOT Asbestos-Contaminated Soil Management Standard Operating Procedure. Additionally, depending on the type of ACM, this material must also be abated in accordance with either Section 5.5 of the Solid Waste Regulations, or Regulation No. 8 of the Air Quality Control Commission Regulations.
- ❖ Complete appropriate surveys for asbestos and lead-containing paint prior to demolition. If ACM is encountered, implement abatement activities in accordance with all applicable state and federal regulations and guidelines. Surveys for asbestos will not be required if an architect certifies the structures were constructed with asbestos-free building materials.
- ❖ Follow CDOT guidelines regarding lead-containing paint. The contractor will avoid sanding, cutting, burning, or otherwise causing the release of lead from paint on these structures when possible. If this is not possible, the lead must be abated properly.

- ❖ Specify proper handling procedures of contaminated media identified during subsurface investigations in accordance with applicable state and federal requirements.
- ❖ Develop a Health and Safety Plan to protect workers during construction activities.
- ❖ Stop work in the event that unknown contaminated media is encountered during construction until the contamination has been properly evaluated and measures are taken to protect worker health and safety, as well as public health and the environment.
- ❖ Follow the CDOT Specification 250 – Environmental, Health, and Safety Management during excavation activities within the study area.
- ❖ Implement standard construction measures for fugitive dust control, as well as stormwater erosion and sediment control.
- ❖ Conduct dewatering and/or dewatering activities in accordance with CDPHE permits during construction activities if groundwater is encountered.
- ❖ Properly store and treat contaminated water prior to discharge in accordance with dewatering and/or discharge permits. In the event that discharged water cannot be treated to meet the surface water quality standards, discharged water will be stored and transported off site for disposal.
- ❖ Identify and properly close, remove, and/or replace monitoring wells and remediation systems within the construction area to avoid impacts and minimize the spread of regulated materials.
- ❖ Properly abandon or potentially replace monitoring wells and/or existing remediation system components impacted during construction if the system is still being utilized.
- ❖ Initiate coordination with lead regulatory agencies before impacts to regulated facilities occur.

3.17 Parks and Recreation

This section describes existing and planned public and private parks and recreation resources identified in the study area, including parks, recreational facilities (such as swimming pools and golf courses), and open space areas that offer opportunities for recreation. Bicycle and pedestrian facilities are discussed in Section 3.18 *Pedestrian and Bicycle Facilities*.

3.17.1 Existing Conditions

The study team identified existing and planned parks, recreational facilities, and open space areas within the study area through coordination with local jurisdictions, analysis of geographic information system (GIS) data, and review of two area plans:

- ❖ *Glenwood Springs Comprehensive Plan*, adopted March 2011 (City of Glenwood Springs, 2011).
- ❖ *Glenwood Springs, Colorado Parks and Recreation Comprehensive Master Plan*, November 2006 (City of Glenwood Springs, 2006).

Existing parks and recreation resources in the study area include Centennial Park, Glenwood Hot Springs, Vogelaar Park, Veltus Park (also known as Kiwanis Park), Two Rivers Park, and the Colorado and Roaring Fork Rivers. The Colorado River and Roaring Fork River converge in Glenwood Springs in the study area. Both are used extensively by local residents, visitors, and commercial outfitters for rafting, kayaking, floating, and fishing. Rafting season begins in April/May and ends in September/October.



Glenwood Hot Springs.

The Roaring Fork River offers Gold Medal fishing¹ from Fryingspan River to its confluence with the Colorado River in Glenwood Springs. The Colorado and Roaring Fork Rivers are open to fishing day and night, year-round (Colorado Parks and Wildlife, 2013a and 2013b). There are no recreational river access points within the study area because of the close proximity of the railroad and interstate to the Colorado River. River access points are immediately west of the study area at Two Rivers Park on the north side of the river. Existing parks and recreation resources within the study area are shown on Figure 3-31 and on Table 3-26.

TABLE 3-26. EXISTING PARKS AND RECREATION RESOURCES IN THE STUDY AREA

Resource Name	Location	Size	Ownership Type	Amenities / Recreation Activities
Centennial Park	Northeast corner of 9th Street and Grand Avenue	0.016 acre (696.5 square feet)	Public	Rona's Garden, picnic tables, local farmer's market June to September
Glenwood Hot Springs and Lodge	415 East 6th Street, just north of I-70 and east of Grand Avenue	Not applicable	Private	Hot springs pool, water slide, miniature golf, and hotel
Colorado River	Flows west through Glenwood Springs	Not applicable	Public	Rafting, kayaking, floating, and fishing
Roaring Fork River	Flows north through Glenwood Springs	Not applicable	Public	Rafting, kayaking, floating, and fishing

¹ Gold Medal Waters are defined by the Colorado Wildlife Commission as any river or lake that is producing a standing stock of at least 60 pounds per acre, and at least 12 trout that are 14 inches or longer per acre on a sustained basis. River segments designated as Gold Medal Trout Waters must be a minimum of two miles in length.

TABLE 3-26. EXISTING PARKS AND RECREATION RESOURCES IN THE STUDY AREA

Resource Name	Location	Size	Ownership Type	Amenities / Recreation Activities
Vogelaar Park	815 School Street; southwest corner of 8th Street and School Street	4 acres	Public	Playground and softball field
Veltus Park (also known as Kiwanis Park)	901 Midland Avenue; southeast corner of 8th Street and Midland Avenue	8 acres	Public	Picnic tables and shelters, volleyball courts, barbeque pits, playground, basketball court, tennis courts, horseshoe pits, and fishing ramp
Two Rivers Park	740 Devereux Road; north side of Colorado River between Devereux Road and I-70	22 acres	Public	Glenwood Skate Park, restrooms, lighted fields, picnic areas, two park shelters with barbeques, playground, horseshoe pits, and large outdoor amphitheater

A future park is planned at the City's existing wastewater treatment plant site located near the confluence of the Colorado and Roaring Fork Rivers, to be constructed after the plant is decommissioned (City of Glenwood Springs, 2003) (see Figure 3-31).

Section 6(f)

The Land and Water Conservation Fund Act (LWCF) of 1965 established a program that provides grants to help pay for the acquisition and development costs of outdoor recreation sites and facilities. Section 6(f) of the act assures that once an area has been funded with LWCF assistance, it is continually maintained in public outdoor recreation use. Section 6(f) requires evaluation of any project that would convert properties that were acquired or developed with LWCF grant assistance to another use.

The recreational amenities on Vogelaar Park constructed with LWCF monies are shown on Figure 3-32. No other properties in the study area were purchased or developed with these funds.

3.17.2 Parks and Recreation Impacts

No Action Alternative Impacts

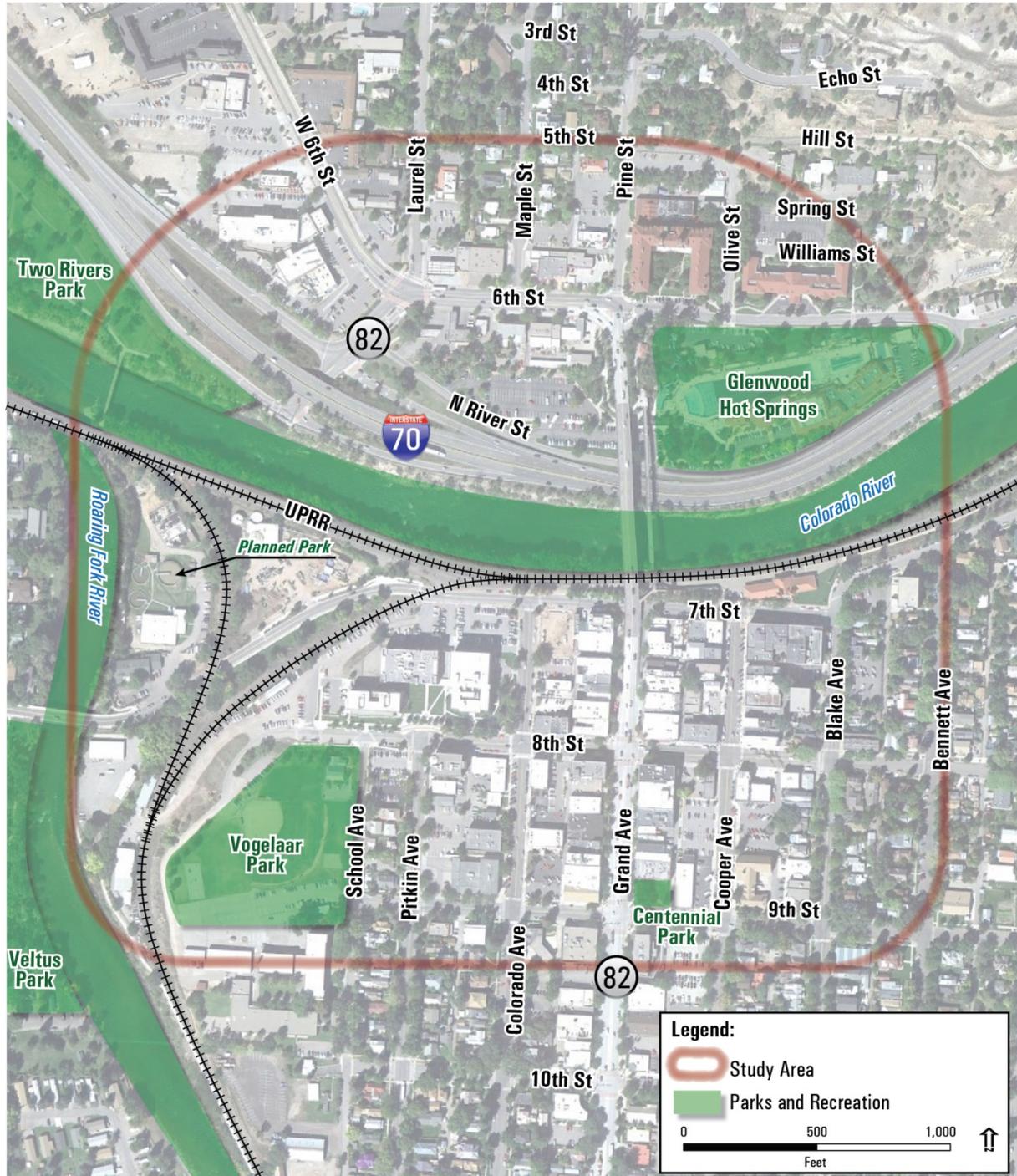
The No Action Alternative would have no direct, indirect, or construction impacts to parks and recreation areas within the study area.

Build Alternative Impacts

Parks and recreation facilities within 500 feet of the Build Alternative were assessed for direct, indirect, and construction impacts from the Build Alternative.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-31. PARKS AND RECREATION FACILITIES IN THE STUDY AREA



Source: Garfield County Geographic Information System.

FIGURE 3-32. VOGELAAR PARK 6(F) BOUNDARY



Direct effects would result from the visual changes associated with replacing the existing highway bridge with a new bridge that is approximately 22 feet wider and curves to the west, which would reduce Glenwood Hot Springs visitors' views of the highway bridge. Also, the pedestrian bridge would be replaced with a new bridge similar in height to the existing bridge, except the bridge deck would be 16 feet wide (the existing bridge deck width is between 10 and 14 feet), and its touchdown point on the north side of the river would be slightly west of the existing, farther away from Glenwood Hot Springs. This new pedestrian bridge would continue to partially obscure views of the new highway bridge. Section 3.1 *Visual Resources* contains details on visual impacts.

Similarly, direct effects to river recreationists associated with the new highway and pedestrian bridges would include the visual changes described for Glenwood Hot Springs visitors. Additional visual changes for river users include views of wider bridge structures while floating under the bridges. Also, the new curved highway bridge would be more prominent to river users compared to the existing narrower straight bridge because the curved bridge would be above a larger portion of the river. For river recreationists east of the two bridges, the pedestrian bridge would continue to partially block views of the new highway bridge. While the existing highway bridge has a pier in center of the river, the new highway and pedestrian bridges would have one pier each on the river's edge. Removing this physical intrusion for kayakers and rafters would create a safer boating experience (because bridge piers can cause hydraulics that can trap boaters) and visually open up the area under the bridges, improving the river recreationist experience.

The Build Alternative would eliminate some existing surface parking spaces from the Glenwood Hot Springs parking lot located immediately west of the existing highway bridge. The west entrance to the large Glenwood Hot Springs parking lot would be removed. Access to this parking lot would be provided only from North River Street via a small roundabout.

Indirect impacts resulting from the Build Alternative would include:

- ❖ Removal of vehicular traffic from the existing Grand Avenue Bridge, reducing indirect traffic impacts to users of Glenwood Hot Springs by directing traffic farther west and away from the facility. Although traffic would be moved farther from the facility, noise is expected to increase due to a predicted increase in traffic overall. The noise analysis indicated that the Build Alternative would result in a slight noise increase at the Glenwood Hot Springs of 1.5 dB(A) in 2035 over existing conditions. This increase would likely be imperceptible to the human ear. Refer to Section 3.8.2 *Noise Impacts* for more information.
- ❖ As discussed in Section 3.18 *Pedestrian and Bicycle Facilities*, the Build Alternative would improve pedestrian and bicycle access and movement to and from Two Rivers Park.

The Build Alternative would not affect construction of the park planned at the City's existing wastewater treatment plant.

Construction Impacts. Temporary impacts to parks and recreation facilities would include:

- ❖ *Glenwood Hot Springs.* Construction activities on the property immediately west of the pool and lodge would include demolition of the existing bridge foundations and excavation for the new bridge foundations. Other construction activities would occur in the parking area to relocate utilities, construct the Grand Avenue Bridge and new pedestrian bridge, reconstruct parking spaces, and stage other construction activities. Temporary effects resulting from these activities would include a reduced number of parking spaces and increased dust, noise, and vibration from construction equipment operation. Also, the SH 82 Detour for the approximately 90-day bridge closure would temporarily change access routes to the Glenwood Hot Springs. During the temporary I-70 Detour on 6th Street, visitors at the Glenwood Hot Springs would experience views of increased traffic and headlight glare.
- ❖ *Colorado River Users.* River recreationists would experience the same visual and audible effects during construction activities as those described for the Glenwood Hot Springs. Construction would require placement of temporary causeways on both banks of the Colorado River and possibly cofferdams (to hold back water during pier

removal). There would be periods of river closure for critical construction activities, such as bridge demolition and girder placement. Construction activities that disturb the channel during construction and demolition of cofferdams may create muddy and unclear water conditions for anglers. This would diminish the river recreationists' experience.

- ❖ *Impacts along SH 82 Construction Detour Route.* Parks and recreation areas located along the temporary SH 82 Detour route on 8th Street include Vogelaar Park and Veltus Park. CDOT sent an email on September 17, 2014 to CPW, the official with jurisdiction over Vogelaar park, regarding park impacts and Section 6(f) conversion concerns. In an October 8, 2014 email, CPW agreed that none of the proposed construction activities would occur within the Vogelaar Park parcel or Section 6(f) boundary; therefore, no direct impacts to the park would occur and no Section 6(f) conversion would be required. Referenced correspondence is in Appendix D *Agency Coordination*. The driveway leading to Vogelaar Park would be temporarily regraded to match the modified grade of 8th Street (see Figure 3-32). The regrading activities would temporarily affect that access point to Vogelaar Park; however, other access points from the south of the park can reasonably accommodate park users during that time.

3.17.3 Parks and Recreation Mitigation

To mitigate visual impacts to Glenwood Hot Springs visitors and Colorado River recreationists, CDOT will incorporate aesthetic treatments in the design of bridge elements to reflect the materials and architectural style of the surrounding historic structures. The process for identifying and incorporating aesthetic treatments is discussed under Section 3.1.4 *Visual Mitigation*.

As part of the right-of-way process, CDOT will continue coordinating with the Glenwood Hot Springs to identify a solution to compensate for permanent parking impacts.

CDOT will coordinate with the City School Board about the regrading of the Vogelaar Park access road before and after implementation of the SH 82 Detour to avoid conflicts with large events that may be planned in the park or ballfield. When the new Grand Avenue Bridge is reopened, the SH 82 Detour will be removed and the driveway leading to Vogelaar Park will be regraded to match the restored 8th Street grade.

For construction-related impacts to Colorado River recreationists, CDOT will coordinate with rafting companies and outfitters to develop a Construction River Use Plan. This River Use Plan will include at a minimum:

- ❖ Methods to give advance notice of channel-disturbing activities so anglers can avoid turbid sections of the Colorado River.
- ❖ Management of river users through the construction site, including measures to keep river users from encountering culvert openings (if any) and to minimize turbulent water or backwater conditions. This will address times of critical construction activities, such as bridge demolition and girder placement.
- ❖ Management of recreational boat take-out during river closures, including locations and notification.

3.18 Pedestrian and Bicycle Facilities

This section describes existing and planned pedestrian and bicycle facilities in the study area and changes that would occur as a result of the Build Alternative.

3.18.1 Existing Conditions

Pedestrian and bicyclist use of the study area is heavy. The pedestrian bridge and streets in the study area provide pedestrians and bicyclists convenient access to lodging, businesses, and restaurants north and south of the river. There are approximately 800 hotel rooms on the north side of the river within walking distance of the downtown area south of the river. The Hotel Denver is on the south side of the river along 7th Street. Additional hotel rooms in Glenwood Springs are within walking distance from the downtown. Tourists staying in the lodging along West 6th Street walk along 6th Street to Glenwood Hot Springs and across the pedestrian bridge to the restaurants and businesses on the south side. The downtown core south of the river experiences heavy pedestrian traffic and generally is pedestrian friendly.

The study team identified existing and planned pedestrian and bicycle facilities in the study area through coordination with local jurisdictions and the review of four area plans. These plans all support and promote more pedestrian-intensive uses and increased connectivity for bicyclists through the study area.

- ❖ *Glenwood Springs Bicycle/Pedestrian Transit Access Study*, February 2008.
- ❖ *Glenwood Springs Comprehensive Plan*, adopted March 2011.
- ❖ *City of Glenwood Springs Long Range Transportation Plan 2003-2030*, adopted July 2003.
- ❖ *Glenwood Springs, Colorado Parks and Recreation Comprehensive Master Plan*, November 2006.

Pedestrian Amenities

The pedestrian facilities in the study area include sidewalks, recreation trails, and a pedestrian bridge across the Colorado River. There are sidewalks along all local streets in the study area, except North River Street. These sidewalks vary in width, configuration,

and condition; and some do not comply with Americans with Disabilities Act (ADA) requirements.

All of the study area's four signalized and two stop sign intersections have pedestrian amenities. SH 82/Grand Avenue intersections with 6th, 8th, and North River Streets, as well as the I-70 on and off ramps, have colored concrete or brick-paved crosswalks and ADA-accessible ramps. The existing Grand Avenue Bridge has four travel lanes with no shoulder or pedestrian and bicyclist amenities.



Colored concrete crosswalk and ADA-accessible ramp at 6th Street and W. 6th Street.



Brick-paved crosswalk and ADA-accessible ramp on the north side of 6th Street across Pine Street.

Existing Pedestrian Bridge

The pedestrian bridge provides a transportation connection for pedestrians and bicyclists across I-70, the Colorado River, and the railroad tracks. The bridge, constructed in 1985 and rehabilitated in 2009, is adjacent to the Grand Avenue Bridge on its east side. It is approximately 10 feet wide with a 5 percent slope and concrete surface. The 5 percent slope meets minimum design standards; however, because of the travel distance across the bridge, this degree of slope is not considered desirable.

At the pedestrian bridge's southern touchdown point between the railroad and 7th Street, a ramp and stairs provide connections to downtown Glenwood Springs. The slope of the ramp does not meet ADA standards. At the north touchdown point located north of I-70, sidewalks along 6th Street and Grand Avenue lead to the pedestrian bridge, and stairs provide a direct connection from the pedestrian bridge to the Glenwood Hot Springs and parking lot. There is a sign stating that no roller skates, skate boards, and related devices are allowed on the bridge.

Recreation Trails and Bicycle Routes

Paved and soft-surface recreation trails are located in or near the study area. These trails, combined with on-road bicycle routes, provide pedestrian and bicyclist accessibility through the study area. Existing recreation trails and bicycle routes are shown on Figure 3-33.

Planned Pedestrian and Bicycle Facilities

The *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011) identifies objectives, goals, policies, and strategies to achieve a vision for a balanced multimodal transportation system. Key objectives include:

- ❖ Maximizing vehicular traffic movement on Grand Avenue while maintaining the pedestrian movements.
- ❖ Increasing the connectivity of local streets, trails and walkways, and providing alternatives to automobile circulation.

The *Glenwood Springs Bike and Pedestrian Transit Access Study* (City of Glenwood Springs, 2008) addresses pedestrian connections associated with transit stops. The plan recommends routine maintenance of sidewalks and bicycle facilities, ADA-compliant intersections, and painted crosswalks.

Additional area plans identify specific improvements for the pedestrian and bicyclist network in Glenwood Springs, as shown on Figure 3-33. These include:

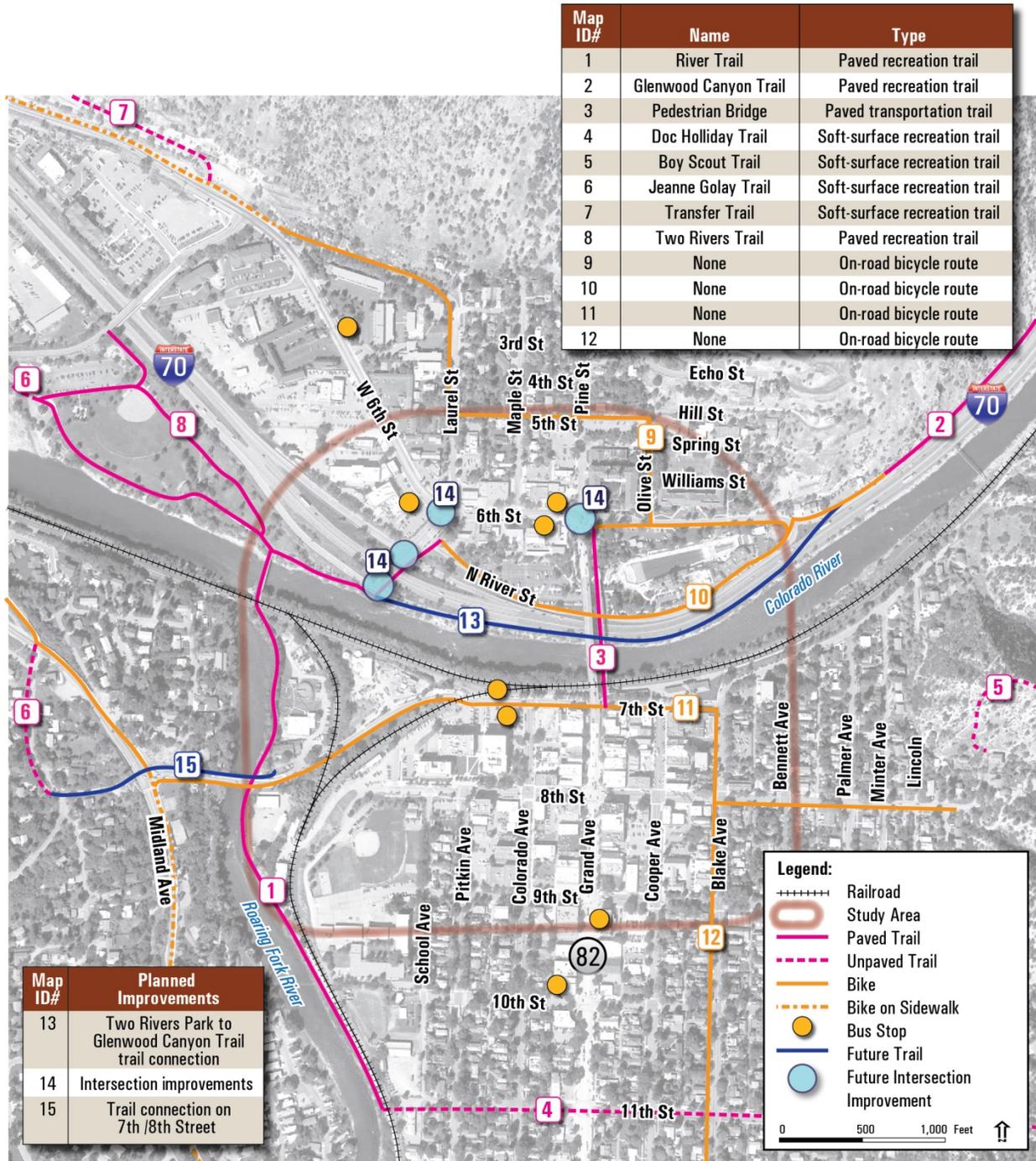
- ❖ Trail connection south of I-70 and north of the Colorado River, from Two Rivers Park to Glenwood Canyon Trail (#13 on figure).
- ❖ Intersection improvements at I-70, W. 6th Street, and SH 82 (traffic calming and streetscaping) (#14 on figure).
- ❖ Trail connection on 7th /8th Street across the Roaring Fork River connecting to the Jeanne Golay Trail and the Glenwood Springs Community Center (#15 on figure).

3.18.2 Pedestrian and Bicycle Facilities Impacts

No Action Alternative

No pedestrian or bicycle facility improvements are programmed within the study area prior to the construction of the Grand Avenue Bridge. The planned improvements identified on Figure 3-33 are not identified to be constructed in the foreseeable future. The No Action Alternative would not impact existing facilities. As study area traffic increases under the No Action Alternative, pedestrian and bicyclist crossings of SH 82 would become increasingly difficult.

FIGURE 3-33. EXISTING AND PLANNED PEDESTRIAN AND BICYCLE FACILITIES



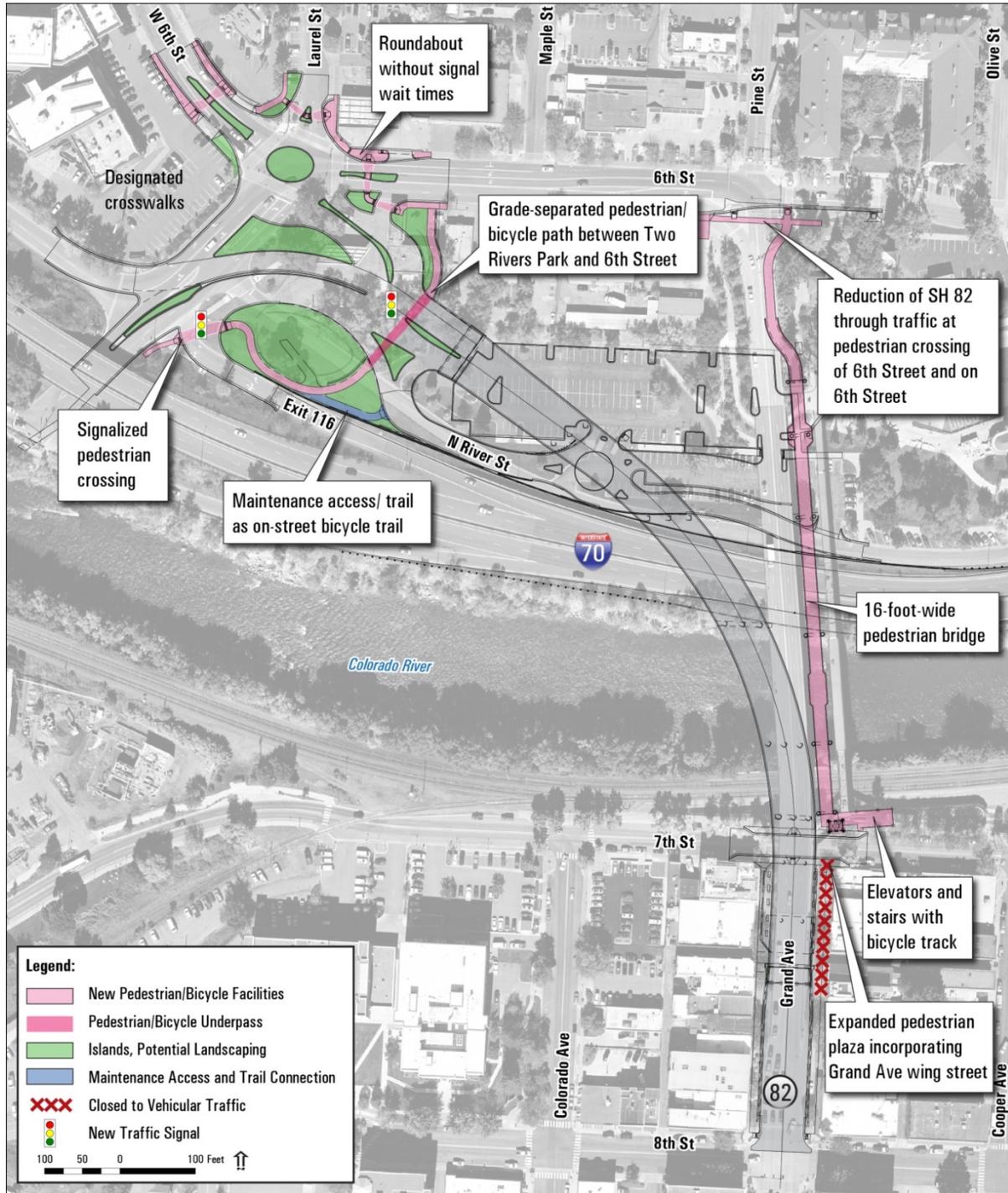
Source: Jacobs, 2014.

Build Alternative

By reconstructing existing facilities to new standards and providing new trail connections, the Build Alternative would improve pedestrian and bicycle facilities in the study area, as shown in Figure 3-34 and as follows:

- ❖ The increased width and reduced slope of the new pedestrian bridge would improve the capacity and accessibility for the connection from the downtown area to the Glenwood Hot Springs and the hotel areas on W. 6th Street.
- ❖ The stair and elevators connecting the new pedestrian bridge to 7th Street would be ADA compliant and improve access to the bridge for pedestrians and bicyclists.
- ❖ There would be a more pedestrian friendly environment at the pedestrian bridge northern touchdown point at 6th Street and along 6th Street because of lower traffic volumes.
- ❖ A new pedestrian/bicycle path connecting the existing Two Rivers Park Trail and 6th Street would eliminate the need for pedestrians and bicyclists to mix with vehicular traffic, improve the connection between Two Rivers Park and 6th Street, and strengthen the recreational link between Two Rivers Park and the Glenwood Canyon Trail. This connection would include an underpass of SH 82.
- ❖ Increased clearance under 7th Street and closing the Grand Avenue wing street (the narrow northbound lane of Grand Avenue that runs along the east side of the bridge to 7th Street) to vehicular traffic would provide an opportunity for an expanded pedestrian area under the Grand Avenue Bridge between 7th and 8th Streets.
- ❖ Crosswalks and streetscaping at W. 6th Street, 6th and Laurel intersection, and the I-70 ramps for pedestrians and bicyclists would create a more attractive, more accessible, and safer area for pedestrians to cross the roadways. For example, the added signalized crossing with a crosswalk at the I-70 off ramp and SH 82 would provide a safer crossing than the current stop sign with crosswalk.
- ❖ Replacing the signalized intersection at 6th and Laurel with a roundabout would eliminate the wait time for the signal walk phase.
- ❖ Adding sharrow markings on North River Street alerts drivers that this road is a shared facility and encourages safe passing of bicyclist by motorist. A sharrow is a street marking that indicates that the bicyclist may use the full travel lane. The bicyclist and vehicle are expected to share the lane.
- ❖ Considerably shorter 15- to 25-foot-long pedestrian crossings at 6th Street and W. 6th Street intersections would replace the existing 60-foot crossing at the intersection.

FIGURE 3-34. BUILD ALTERNATIVE PEDESTRIAN AND BICYCLE FACILITIES



Source: Jacobs, 2014.

Despite these benefits, the Build Alternative could impact pedestrian and bicyclist behaviors at perceived unsafe locations. Potential impacts would include:

- ❖ Pedestrians would have to cross 6th Street, W. 6th Street, SH 82, and Laurel Street where there are no signals and vehicular traffic has free right-turn movements. This could contribute to uncertainty at these locations.
- ❖ Bicyclists and pedestrians would be unfamiliar with new trail connections.
- ❖ The new underpass/tunnel connecting Two Rivers Park and 6th Street would be approximately 14 to 16 feet wide and 150 feet long. Long underpasses are sometimes perceived to be undesirable and unsafe.



Example of a bike channel on the side of stairs.

Construction Impacts. The following impacts are anticipated to occur during construction activities:

- ❖ Pedestrians and bicyclists would experience temporary noise, visual, and air quality impacts during construction activities in the downtown area.
- ❖ Construction near existing pedestrian and bicycle facilities could pose safety risks to users.
- ❖ The Build Alternative would require temporary closure and detour of sidewalks and bike trails during construction, as described below.
 - ◆ *Pedestrian Bridge.* Temporary interruption of pedestrian and bicyclist connectivity would occur during replacement of the pedestrian bridge.
 - ◆ *6th and Laurel Streets Roundabout.* Temporary closure and sidewalk detours would occur during construction of the roundabout and reconfiguration of Grand Avenue.
 - ◆ *Changes to Trail Access.* Two on-road bicycle routes could be subject to temporary construction impacts – one along North River Street and one along 7th Street.

- ◆ *Change to Two Rivers Trail Access.* The portion of the trail east of the park and within I-70 right of way would need to be closed temporarily to install a storm water outfall.
- ◆ *SH 82 Detour.* The temporary reconfiguration of the 7th Street/8th Street intersection for the SH 82 Detour would interrupt pedestrian and bicycle connectivity. The sidewalk on the south side of 8th Street at Midland Avenue would be temporarily closed. No impacts would occur to the River Trail.

3.18.3 Pedestrian and Bicycle Facilities Mitigation

CDOT will incorporate the following measures into the final project design to avoid and minimize impacts to pedestrians and bicyclists:

- ❖ Use prominent signage to direct bicyclists and pedestrians around the 6th and Laurel roundabout.
- ❖ Install new signage to direct users to new recreational trail connections, as funding allows.
- ❖ Install lighting in the new 150-foot underpass and wider approaches to improve safety and security for users.

Mitigation for construction-related impacts will include:

- ❖ Provide construction fencing to protect pedestrians and bicyclists from construction areas.
- ❖ *Pedestrian Bridge.* Maintain connectivity across the railroad, Colorado River, and I-70, during construction. Early in the project, a five-foot sidewalk with barrier will be built on or adjacent to the existing Grand Avenue Bridge. The existing pedestrian bridge will be removed and the new bridge built adjacent to the existing Grand Avenue Bridge. Temporary access will be provided on the northern and southern touchdown points of the pedestrian bridge to maintain ADA access from the new pedestrian bridge to the adjacent sidewalks until permanent connections are completed.
- ❖ *6th and Laurel Streets Roundabout.* Provide detours to maintain pedestrian connectivity at all times to the businesses. Pedestrian routes will be kept open to the extent practical, but temporary detours will be necessary during parts of the construction.
- ❖ *Changes to Trail Access.* Keep the North River Street and 7th Street on-road bicycle routes open to the extent feasible, although temporary detours will be necessary during parts of the construction. Detour routes for North River Street could include existing bike routes/trails both north and west of the construction area. Detour routes for 7th Street could include 8th Street or 9th Street downtown.

- ❖ *Change to Two Rivers Trail Access.* The trail access will be kept open to the extent practical, but temporary detours will be necessary during construction. Detour routes could include a temporary sidewalk or a detour across the Colorado River south to the Roaring Fork Trail to 7th Street, and then back across the pedestrian bridge.
- ❖ *SH 82 Detour.* Provide an accessible ramp and sidewalk connecting the on-road bicycle route on 7th Street to the ramp leading to the River Trail. ADA-accessible ramps and a three-foot sidewalk on the south side of 7th Street will connect the 8th Street intersection to the existing sidewalk under the railroad bridge. Pedestrians will be directed to use the sidewalk on the north side of 8th Street. When the Grand Avenue bridge is reopened, use of sidewalks on the south side of 8th Street will be restored, and all existing pedestrian ramps along 8th Street will be restored to their original location.
- ❖ Use signage to direct pedestrians and bicyclists to temporary sidewalk detours and connections.

3.19 Energy

Regulations and guidance that promote energy conservation and limits on energy and natural resource consumption include the following:

- ❖ Energy Policy and Conservation Act of 1979.
- ❖ Energy Independence and Security Act of 2007.
- ❖ Energy Policy Act of 2005.
- ❖ EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance.
- ❖ Moving Ahead for Progress in the 21st Century Act (MAP-21), the 2012 surface transportation bill, which builds upon the initiatives established by the 2005 Safe, Accountable, Flexible and Efficient Transportation Act: A Legacy for Users (SAFETEA-LU), the 1998 Transportation Equity Act for the 21st Century, and the Intermodal Surface Transportation Efficiency Act of 1991.

In 2012, Colorado developed a *The Colorado EnergySmart Transportation Initiative* (CDOT et al., 2012), which outlines a framework for considering energy efficiency and greenhouse gas emissions in transportation decision-making. These regulations and guidance clearly indicate that energy conservation is an important factor in the design and analysis of transportation projects.

The study team took a general approach to the energy analysis. Energy usage was assessed based on traffic operations, local and freeway congestion, VMT, and construction.

3.19.1 Existing Conditions

Energy sources for transportation are most commonly petroleum-based fossil fuels for automobiles, trucks, trains, and buses. In general, a project's energy use is directly related to traffic operational efficiency. More efficient traffic operations typically result in broad-scale energy savings.

In addition, energy consumption directly contributes to GHG emissions. Carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) are the primary GHG emissions resulting from fuel consumption. According to the City of Glenwood Springs *Energy and Climate Action Plan* (City of Glenwood Springs, 2009), CO₂ emissions were estimated to be 3,204 tons in 1990 and increased to 7,337 tons in 2006.

Under existing conditions, congestion in the study area contributes to increased fuel consumption because excessive idling and stop-and-go traffic conditions substantially reduce fuel economy compared to free-flow conditions.

3.19.2 Energy Impacts

No Action Alternative

Under the No Action Alternative, the Build Alternative would not be constructed, which would not result in any construction operation energy consumption in or around the study area. However, under the No Action Alternative, congestion would continue to increase on the highway and local arterial roadways.

Build Alternative

The Build Alternative would result in more efficient vehicle operations by lessening congestion and related traffic delay. Improved traffic operations provided by the Build

Alternative are expected to reduce vehicle energy use, either in the form of petroleum fuels or alternative energy sources. As described in Section 3.2 *Transportation*, the Build Alternative would reduce 2035 VMT by approximately 4,000 VMT per day relative to the No Action Alternative (from 20,000 to 16,000), despite serving the same numbers of motorists. This 20 percent reduction is because the highest volume of traffic through the study area travels from I-70 onto SH 82. The Build Alternative provides a more direct, efficient route for this transition than the No Action Alternative. In addition, the Build Alternative would accommodate multimodal transportation, including buses, pedestrians, and bicyclists; and would incorporate sustainable elements into the design. For these reasons, the Build Alternative would have a positive effect on energy use compared to the No Action Alternative.

The Build Alternative would have a positive effect on local energy consumption.

The Build Alternative would be designed to minimize energy required for maintenance activities. For example, the proposed roundabout at 6th and Laurel would be more sustainable than the existing signalized intersection because roundabouts require less maintenance and reduce electrical power demand. In addition, the Build Alternative would include installation of energy-efficient lighting along bridges and roadways in accordance with CDOT specifications and local lighting ordinances to provide a safe travel environment. Therefore, energy consumption for operation and maintenance of the Build Alternative is anticipated to be reduced compared to the No Action Alternative.

Construction Impacts. Energy consumption and GHG emissions would be higher than existing conditions during the construction period. Construction energy would be required to process raw materials and operate equipment to construct the Build Alternative. Energy would be consumed for on-site construction activity, such as bridge demolition and construction and road widening. Energy would be consumed for off-site manufacture of pavement and bridge components. Transportation energy would be required to haul and deliver materials to and from the construction site, and for construction workers to access the site. Energy consumption associated with construction-related activities for the Build Alternative would be short term and localized. Any minimal adverse effect caused by construction energy consumption would be offset by these energy conservation measures undertaken during construction. Therefore, with implementation of these conservation measures, the Build Alternative is not expected to result in adverse construction-related energy effects.

3.19.3 Energy Mitigation

- ❖ Incorporate lighting fixtures that minimize energy use in the design of the Build Alternative, in compliance with CDOT specifications and local light ordinances.
- ❖ CDOT will require contractors to implement an energy plan that would consider several construction energy conservation measures. These could include the following:
 - ◆ Limit construction equipment idling.
 - ◆ Locate construction staging areas close to work sites to minimize travel time.
 - ◆ Use cleaner and more fuel-efficient construction equipment and vehicles.
 - ◆ Consolidate material delivery whenever possible to ensure efficient vehicle use.
 - ◆ Promote employee carpooling.

3.20 Other Resources

The resources in this section were not analyzed in detail in this EA because one of the following conditions was met:

- ❖ They are not present in the study area.
- ❖ They would not be affected by the Build Alternative.
- ❖ They would experience negligible impacts after application of standard precautions during construction.

3.20.1 Farmlands

There are no farmlands in the study area, which is within the urbanized area of Glenwood Springs.

3.20.2 Archaeological Resources

Based on the highly disturbed urban environment of the study area and the proposed configuration and location of the new bridges under the Build Alternative, no archaeological resources are likely to occur within the proposed project limits, and CDOT determined that an archaeological survey was not warranted. If any unanticipated archaeological resources are encountered during construction, ground-disturbing activities in the area of the find will immediately cease, and the CDOT Staff Archaeologist will be notified immediately to assess their significance and make further mitigation recommendations.

3.20.3 Paleontological Resources

On October 11, 2013, CDOT conducted an on-the-ground reconnaissance for paleontological resources within the Build Alternative project limits (CDOT, 2013). The survey found that the depositional units within the proposed project limits have no paleontological potential because of their young geologic age, and there are no known previously recorded fossil locations within the proposed project limits. On March 6, 2014, CDOT conducted an on-the-ground reconnaissance for paleontological resources for the area within the footprint of the SH 82 detour along 8th Street (CDOT, 2014). The survey found that the depositional units within that area have some potential to produce fossils or subfossil remains. No fossil or subfossil remains were observed during the pedestrian survey, and there are no known previously documented fossil resources from the immediate proposed project area. Both surveys recommended paleontological clearance with no additional mitigation stipulations for the project.

If any subsurface bones or other potential fossils are found by the construction contractor during construction, work in the immediate area will cease immediately, and the CDOT Staff Paleontologist will be contacted to evaluate the significance of the find. Once salvage or other mitigation measures (including sampling) is complete, the CDOT Staff Paleontologist will notify the construction supervisor that paleontological clearance has been granted.

3.20.4 Native American Consultation

Section 106 of the NHPA (as amended) and the ACHP regulations (36 CFR 800.2[c][2][ii]) mandate that federal agencies coordinate with interested Native American tribes in the planning process for federal undertakings. Consultation with Native American tribes recognizes the government-to-government relationship between the U.S. government and sovereign tribal groups.

FHWA contacted the following federally recognized tribes with an established interest in Garfield County and invited them to participate as consulting parties.

- ❖ Southern Ute Indian Tribe
- ❖ Uintah & Ouray Tribal Business Committee
- ❖ Ute Mountain Ute Tribe

No replies to the invitation letters, included in Appendix D, were received. Therefore, no tribal governments are consulting on the project under the auspices of the NHPA. As a result of these actions, FHWA has fulfilled its legal obligations for tribal consultation under federal law.

3.21 Permits Required

The following permits and coordination activities may be required to support the construction of the Build Alternative. This list may change as design progresses.

- ❖ **Colorado Discharge Permit System (CDPS).** EPA issues stormwater regulations under the National Pollution Discharge System (NPDES). For Colorado, EPA's authority to issue NPDES permits has been delegated to the CDPHE, a state regulatory agency. CDPHE implements and enforces the NPDES programs through the CDPS program.

A CDPS General Permit for Stormwater Discharges Associated with Construction Activity, commonly called a Stormwater Construction Permit, is required for all CDOT projects that impact one acre of land, or are part of a larger project. Prior to commencement of construction, a Stormwater Construction Permit will be obtained. Under the permit stipulations, CDOT will prepare a site-specific SWMP that ensures that the water quality of receiving waters is protected during construction. The SWMP will outline in detail the specific BMPs in the project plan for implementation in the field. Included in the SWMP are such aspects as BMP locations, monitoring requirements, seed mix, concrete wash-out provisions, and other relevant information that is provided to the contractor.

- ❖ **Section 402 Permit.** A Section 402 Permit is required for the following activities:
 - ◆ Construction dewatering operations associated with such activities as utility excavation, bridge pier installation, foundation or trench digging, or other subsurface activities.
 - ◆ If discharge is expected to occur from a point source discharge from mechanical wastewater treatment plants, vehicle washing, or industrial discharges.
- ❖ **Section 404 Permit.** A Section 404 Permit issued by USACE is required because the construction will require filling below the OHWM of the Colorado River. Based on the design developed to date, the project could qualify for a Nationwide Section 404 permit.
- ❖ **Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR).** Modifications of the 100-year floodplain require coordination with FEMA via the submission of a CLOMR and LOMR. Hydraulic analysis conducted to date indicates a CLOMR and LOMR are not needed, although this may change with more detailed analysis.
- ❖ **SB 40 Certification.** An SB 40 Certification is required by CPW for disturbance to the Colorado River banks to avoid adverse effects to waterways and adjacent riparian vegetation.
- ❖ **Air Pollutant Emission Notice.** This permit from CDPHE will include measures to control fugitive dust.
- ❖ **Construction Access Permit.** A Construction Access Permit is required for temporary access needs outside the project limits.
- ❖ **State Access Permit.** A State Access Permit is required for all new or modified access to SH 82. Any existing accesses adversely affected by the Build Alternative will be notified of the proposed changes.
- ❖ **Other Local Permits.** Other permits are required by the City of Glenwood Springs, as needed, such as building, utility, or survey permits needed to support project construction requirements.

3.22 Cumulative Impacts

The Code of Federal Regulations defines a cumulative impact as:

“The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (Title 40 of the Code of Federal Regulations Part 1508.7).

This section analyzes the cumulative impacts of the Build Alternative when added to other past, present, and reasonably foreseeable future actions.

3.22.1 Identification of Resources for Cumulative Impact Analysis

A cumulative impact analysis is resource-specific and is generally performed for environmental resources directly impacted by a federal action and/or identified through scoping as being key resources of concern. The Council on Environmental Quality (CEQ) guidance limits the cumulative impact analysis to “important issues of national, regional, or local significance” (CEQ, 1997). Therefore, not all resources assessed for impacts in this EA were analyzed for cumulative effects—only land use, water resources, visual, and historic resources. These resources would be affected by the proposed project and are of ongoing concern for local, state, and federal agencies, as well as the general public. The proposed project would not have a significant contribution to cumulative global climate change or GHG emissions, as discussed in Section 3.7 *Air Quality* and Appendix C.

3.22.2 Geographic Area of Analysis

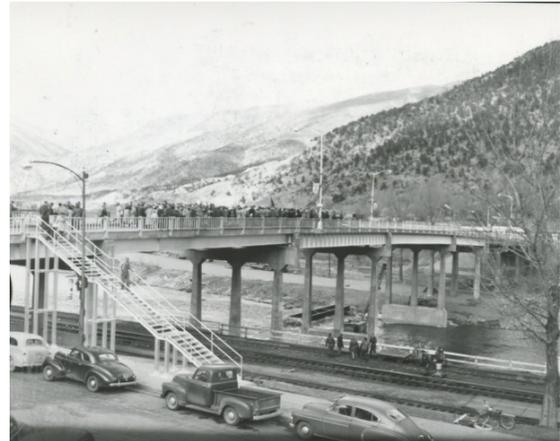
The geographic resource boundary used for the cumulative impacts analysis is based on the resources of concern and the potential impacts to these resources. The cumulative impact study area for each resource is described below:

- ❖ For land use, the cumulative study area includes lands within the municipal boundaries of the City of Glenwood Springs. This was chosen as the cumulative impact study area because topographic constraints limit developable land outside of the City boundaries and, therefore, this area captures the primary area where past, present, and reasonably foreseeable future land use change is anticipated.
- ❖ For water resources, the cumulative study area includes the Lower Roaring Fork Sub-Watershed.
- ❖ For visual, the cumulative study area is the same as the Landscape Units defined in Section 3.1 *Visual Resources*, since these are the areas with views of Grand Avenue Bridge.
- ❖ For historic resources, the cumulative study area is the same as the APE defined in Section 3.15 *Historic Preservation*, which includes the Glenwood Hot Springs Historic District and areas with affected buildings or structures.

3.22.3 Time Frame for Analysis

The time frame for the analysis of cumulative impacts should allow the analysis to recognize long-term trends while remaining focused. Time frames are typically based upon the availability of data or a meaningful event that has influenced existing conditions.

Early development in Glenwood Springs occurred from the late 1800s through 1953; however, major population growth and development began after World War II (1950s). Therefore, the timeframe for this cumulative impacts analysis begins in 1953, when the Grand Avenue Bridge was dedicated, and continues to 2035, coinciding with the long-range transportation planning period for this EA.



Grand Avenue Bridge dedication in 1953.
(Photo courtesy of Frontier Historical Society Museum.)

3.22.4 Historical Context and Existing Conditions

Since its inception, Glenwood Springs has catered to tourists and travelers. Early visitors to Glenwood Springs were attracted to the area for its mining potential and mineral hot springs. With a location at the confluence of two rivers and the opportunity to develop a resort around the hot springs, Glenwood Springs was a busy community by the late 1800s with a transportation network that was beginning to grow.

In 1890, with a railroad already running through Glenwood Canyon, construction of a one-lane road began. The automobile helped Glenwood Springs flourish, bringing more tourists, which promoted development through the Roaring Fork Valley and in communities along the Colorado River. The road through Glenwood Canyon was continually improved over the next decades. After years of planning, construction of the four-lane interstate highway through Glenwood Canyon started in 1980 and was completed in 1993.

Both the City of Glenwood Springs and Garfield County have grown every decade since 1950, as shown in Table 3-27. Population growth is expected to continue. Per the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011), the 2035 population of Glenwood Springs is expected to be approximately 15,000, a 56 percent increase from 2010. In that same time period, the Garfield County population is expected to reach approximately 101,000, a 79 percent increase (DOLA, 2012).

TABLE 3-27. POPULATION GROWTH

	1950	1960	1970	1980	1990	2000	2010
Glenwood Springs	2,412	3,637	4,106	4,637	6,561	7,736	9,614
Garfield County	11,625	12,017	14,821	22,514	29,974	43,791	56,389

Source: U.S. Census Bureau.

Land Use

Prior to the 1950s, Glenwood Springs was a compact and relatively isolated town in the flat areas near the confluence of the Roaring Fork and Colorado Rivers. After World War II, Glenwood Springs began to grow to the south and west. Residential construction boomed, with neighborhoods swelling beyond the boundaries of the original town site. Car dealerships opened, shopping centers were built, and motor lodges that offered more economical lodging options were built along SH 82 and US 6. Sunlight Ski Hill (formerly Holiday Hill) expanded, offering another recreational draw for tourists. The pattern of development from the 1950s through the present time is shown in Figure 3-35.

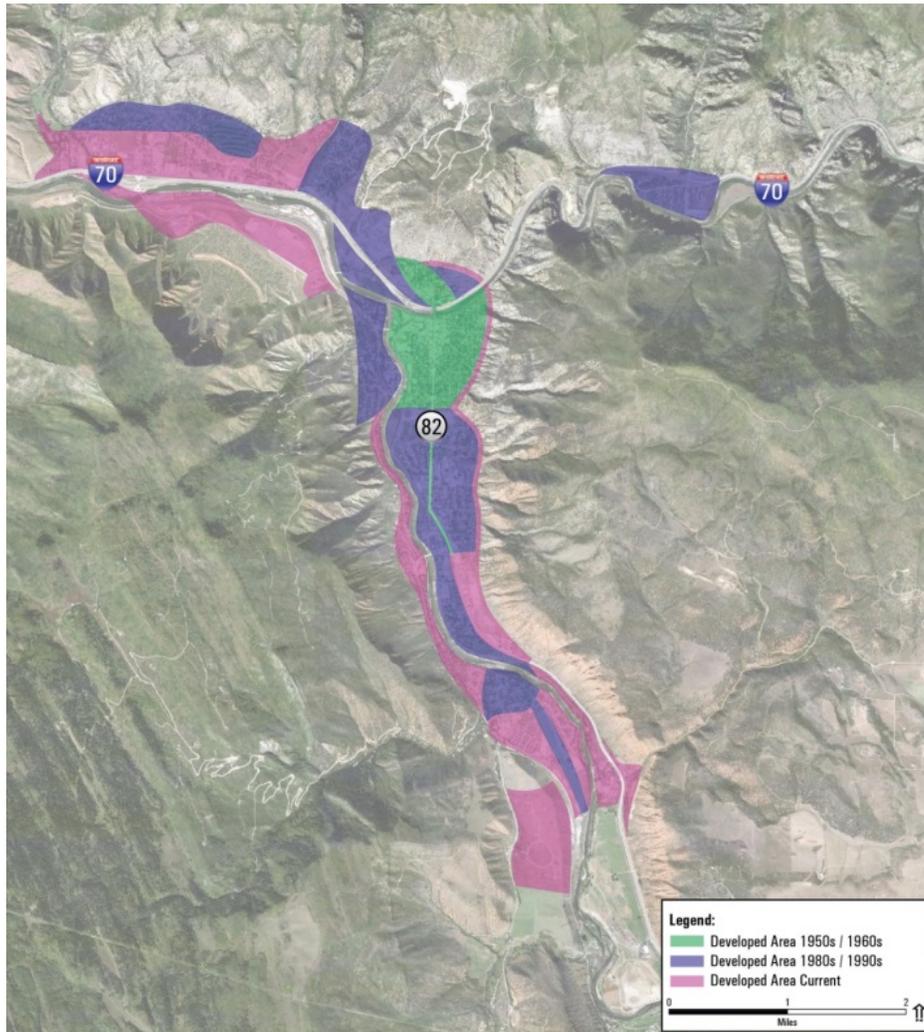


Glenwood Springs in 1955.

(Photo courtesy of U.S. Geological Service.)

Over time, Glenwood Springs has become a regional employment center as commercial and tourist industries have matured. Undeveloped and buildable land within Glenwood Springs is limited by topography, resulting in high real estate costs and growth in communities west of Glenwood Springs, such as Rifle and New Castle. This trend is anticipated to continue. Higher-density redevelopment of underused lands is also anticipated as developable lands become less available. Recognizing this trend, the City of Glenwood Springs adopted a long-term redevelopment strategy for the confluence area in 2003 in its document, *A Redevelopment Strategy for the Confluence Area – City of Glenwood Springs* (City of Glenwood Springs, 2003). Also, RFTA recently completed a regional Bus Rapid Transit system between Glenwood Springs and Aspen with a station in South Glenwood Springs, which will facilitate commuting in the Roaring Fork Valley.

FIGURE 3-35. GLENWOOD SPRINGS DEVELOPMENT PATTERN 1950 TO PRESENT



Source: Jacobs, 2014.

Water Resources

The Lower Roaring Fork Sub-watershed is a subset of the larger Upper Colorado River Basin. The Lower Roaring Fork Sub-watershed extends from the Crystal River to the Colorado River. Elevation ranges from 5,717 to more than 10,000 feet, covering Foothill Shrublands to Subalpine Forest land. It includes the wide river bottomland and terraces in the lower part of the Roaring Fork Watershed. A large portion of the land adjacent to the river has existing or planned residential development, most of which is located in Glenwood Springs. Historically, the valley bottomlands were irrigated for livestock pasture and hay crops (Ruedi Water & Power Authority, 2008).

Currently, both the Colorado and Roaring Fork Rivers are in fair health in the study area. There are no 303(d) water quality impairments in the study area. However, diversions within the larger Colorado River Watershed have affected stream flow, and development has negatively affected the quality of riparian habitat in many locations along both rivers (Ruedi Water & Power Authority, 2008). Given the study area's population growth and land use development, the most immediate water resource issues are the effects of development on the availability and quality of water, and on riparian and instream habitat.



Taylor State Road on right side of Colorado River in Glenwood Canyon, June 1909. (Photo courtesy of Denver Public Library, Western History Collection, Reference GB-8131.)

Visual

The context and existing conditions for each of the four landscape units are described in in Section 3.1 *Visual Resources*. The study area's overall existing visual quality was assessed as Moderately High and is characterized by views of the developed downtown area with distinct historic architecture adjacent to the Colorado River with background views of surrounding hillsides.

Historic Resources

A complete historic context was developed as part of the *Historic Resources Survey Report, SH 82/Grand Avenue Bridge Replacement, City of Glenwood Springs, Colorado* (Hermsen Consultants, 2014), and is summarized here.

The late 1880s saw the first period of growth in terms of population, services, opportunities, and buildings in Glenwood Springs. Glenwood Springs developed saloons, laundry services, gambling halls, brothels, banks, doctors, and pharmacies to provide for the needs of miners working in the upper reaches of the Roaring Fork Valley.



Grand Ave. – Looking south circa 1910. Photo Courtesy of Frontier Historical Society Museum– Photo E44

The first commercial use of the Glenwood Springs hot springs began in 1881. The hot springs pool (Natatorium) was completed in 1888, and the bathhouse was completed by 1890. The Hotel Colorado was completed in 1891. The hot springs resort attracted wealthy clientele from Europe and America and helped develop and sustain the local economy.

The Denver & Rio Grande railroad tracks reached Glenwood Springs in 1887, providing the first direct connection to Denver and other cities further east. In 1903, the Denver & Rio Grande Railroad built the depot on the south side of the Grand River just north of the intersection of 7th Street and Blake Avenue. This was followed by road construction through Glenwood Canyon (discussed above). The original Grand Avenue Bridge was constructed in 1891 and then replaced by the Colorado Highway Department with a new bridge in 1953.

The post-World War II period brought more growth and development to Glenwood Springs. The original town site began to expand with the construction of more residential areas. New commercial development followed modernistic architectural styles. Hotel Colorado was modernized and returned to its use as a hotel following its time as a Navy hospital during World War II.

Recreation around Glenwood Springs expanded with the development of the Holiday Hill ski area, which later became Sunlight Ski area. The hot springs pool continued as a draw for tourists, attracting a more varied clientele than only wealthy patrons. Motor lodges developed to fill the demand for more economical lodging when visiting the hot springs and the Glenwood Springs area.



Busy day at the Glenwood Hot Springs Pool – 1893-1919. (Photo Courtesy of Denver Public Library, Western History Collection, Reference MCC-841.)

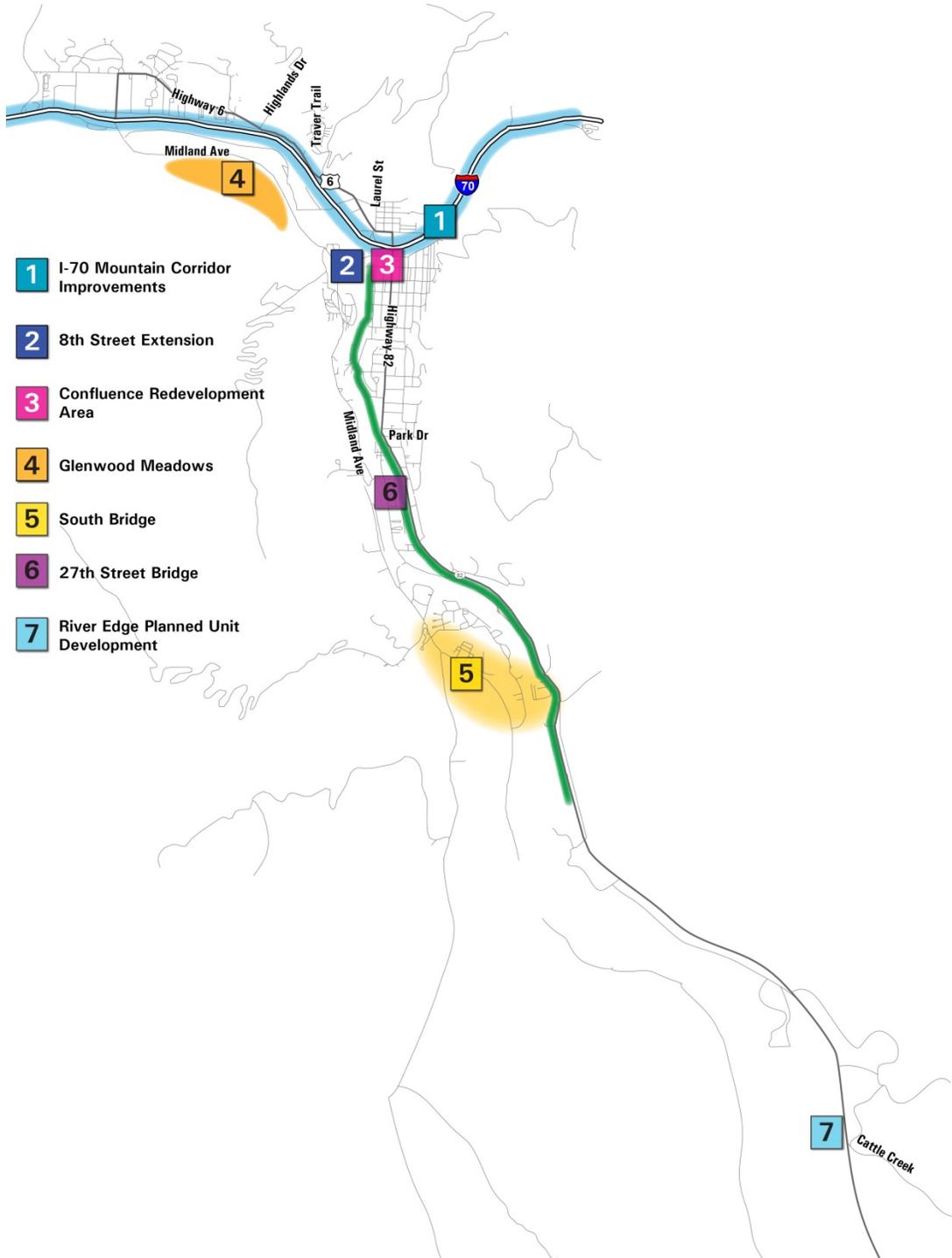
3.22.5 Reasonably Foreseeable Future Projects

The information on reasonably foreseeable future projects was obtained from discussions with the City of Glenwood Springs and Garfield County staff, and local and state agencies. The projects are shown on Figure 3-36.

- ❖ **I-70 Improvements.** Projects on I-70 in the study area that CDOT currently has funded are repaving and the installation of a fiberoptic line off the westbound shoulder of I-70.

SH 82 GRAND AVENUE BRIDGE

FIGURE 3-36. REASONABLY FORESEEABLE FUTURE PROJECTS



Source: Jacobs, 2014.

- ❖ **8th Street Extension.** The City of Glenwood Springs plans to extend 8th Street in the downtown area, as identified in the *Glenwood Springs Comprehensive Plan* (City of Glenwood Springs, 2011). The connection would provide a more direct route between Midland and Grand Avenues. The City is evaluating alternatives for this extension, has identified funding for the project, and is actively pursuing additional funds needed.
- ❖ **Confluence Redevelopment Area.** In 2003, the City of Glenwood Springs completed a plan for redevelopment of the “underdeveloped sub-area directly west of downtown, at the confluence of the Roaring Fork and Colorado rivers” (*A Redevelopment Strategy for the Confluence Area – City of Glenwood Springs*) (City of Glenwood Springs, 2003). Recommendations in the plan included relocation of the wastewater treatment plant (which was completed in 2012), additional parking (completed in 2013), the extension of 8th Street, possible realignment of SH 82 to reduce traffic volumes on Grand Avenue, potential development of a cultural theater facility, residential infill and mixed-use redevelopment of larger sites, and development of the confluence area where the water treatment plant was previously located. DDA, a tax-funded district established in 2001, has funding for improvements to the core of downtown. DDA is providing predevelopment advocacy, leadership, and partnership for the implementation of the plan for the confluence area and the redevelopment of the land north of 7th Street where the Colorado and Roaring Fork Rivers connect (DDA, 2014).
- ❖ **Glenwood Meadows.** Opened in 2005, this retail development includes major chain retailers and restaurants. Approximately 53 acres of land south of the shopping center has been approved for 475 housing units, 300 of which could be rental apartments. As of early 2014, construction of 60 rental apartments is nearing completion.
- ❖ **South Bridge.** This proposed new bridge in south Glenwood Springs would provide emergency and local access across the Roaring Fork River. The project would include improvements on Airport Road, intersection improvements, and a new connection to SH 82.
- ❖ **27th Street Bridge.** The 27th Street Bridge spans the Roaring Fork River and connects SH 82 to Midland Avenue providing access to the Four Mile Corridor. This bridge requires resurfacing or reconstruction. If the South Bridge project is built, the 27th Street Bridge will not need added capacity to handle the increased traffic in south Glenwood Springs and up the Four Mile Corridor, and a resurfacing most likely will be appropriate.
- ❖ **River Edge Planned Unit Development.** In 2011, Garfield County approved a 366-unit south of Glenwood Springs on 160 acres of the Saunders Ranch. The development includes single-family and attached housing, parks, trails, and a community center. Prior to construction, the developer, Garfield County, and CDOT

must work together to make improvements to the Cattle Creek intersection with SH 82.

Other projects that are not reasonably foreseeable but might occur include:

- ❖ **Whitewater Park.** In 2008, the first whitewater park was built on the Colorado River near the Midland Bridge. The park features a recreational wave for kayaking and surfing. The feature is very popular, and in December 2013 the City submitted a conditional water rights application for three more whitewater features in the river. One of the locations under consideration is near the confluence of the Colorado and Roaring Fork Rivers. The project is in the permitting phase, which is expected to take approximately three years, and construction could be completed in one year (Gardner-Smith, 2014).
- ❖ **Thompson Divide Oil and Gas Leasing Area.** Applications for oil and gas leases have become increasingly common within the Thompson Divide, land that stretches from Sunlight ski area to McClure Pass west of Highway 133. In April 2014, the Bureau of Land Management (BLM) extended 25 existing leases for 2 years in the Thompson Divide area. However, the temporary agreement stipulates that the additional oil and natural gas developments cannot be undertaken until an Environmental Impact Statement is completed to review 64 oil and gas leases on the Western Slope (Stricherz, 2014). Conservation groups are fighting to prevent further leasing of federal land for gas exploration, as well as to prevent drilling on existing leases in this area. These competing interests will be resolved through the Federal Land Management Act permitting and NEPA environmental review processes. If these projects move forward, heavy truck traffic on Four Mile Road in Glenwood Springs may increase as construction vehicles access oil and gas sites in Pitkin County. One proposed project is estimated to result in 1,034 truck round trips during construction.

Because the study area has limited undeveloped and buildable land, future growth will be accommodated through in-fill development or denser redevelopment, or will occur beyond City limits likely to the south or west. Traffic analysis indicates that most of the traffic accessing the Roaring Fork Valley in the future will continue to use Exit 116 and the Grand Avenue Bridge.

3.22.6 Cumulative Impacts on Land Use

The study area is located in an urbanized environment, which was already developed when the existing Grand Avenue Bridge was dedicated in 1953.



The study area is in an urbanized environment, and growth is constrained by topography.

Growth in Glenwood Springs is constrained by topography and has since then grown south and west. The Roaring Fork Valley has become a regional employment center as commercial and tourist industries have matured. The high cost of housing has led to growth in the communities west of Glenwood Springs, such as Rifle and New Castle. Population forecasts for Garfield County indicate that this trend will continue. Forecasts also indicate the population of Glenwood Springs will increase 56 percent by 2035. The City plans to accommodate this population through in-fill development and higher-density redevelopment.

The identified future projects that have the potential to impact land use are possible residential and energy development improvements along the Four Mile Road Corridor resulting from improvements to the 27th Street Bridge or construction of South Bridge, and increased residential and commercial growth toward the south and west as the Glenwood Meadows and River Edge developments are built out.

Because the Build Alternative is in a fully developed area, it would not directly alter land use beyond the minor impacts discussed in Section 3.3 *Land Use*.

The Build Alternative has the potential to make redevelopment opportunities along 6th and 7th Streets more attractive to developers because of the enhanced mobility and pedestrian amenities. However, potential redevelopment occurring in these areas would be consistent with and further the goals of the City's adopted plans. The Build Alternative would not induce substantial land use changes, nor would it change the rate or intensity of planned growth.

Growth and development can result in a range of different resources impacts. However, impacts to natural resources as a result of growth would be minimal since most of the future development in Glenwood Springs would be in-fill or redevelopment of land that is already disturbed. Also, the Build Alternative would have a very minor contribution to impacts since it would not affect the rate or intensity of planned growth. Based on the analysis, no mitigation measures are required for land use.

3.22.7 Cumulative Impacts on Water Quality

The study area is adjacent to the Colorado River and immediately upstream of its confluence with the Roaring Fork. Cumulative impacts from future projects, whether residential or commercial, include greater use and discharge for municipal purposes and stormwater runoff because of increased impervious surfaces. Greater amounts of contaminated runoff from developed areas may be carried to either of these rivers. Additionally, increased development puts additional pressure on the water supply and can reduce the in-stream flows necessary to protect the environment. The Colorado Basin Roundtable, part of the Colorado River Water Conservation Board, is responsible for preparing a water supply assessment for the Colorado Basin that holistically considers

consumptive needs to support energy development, agriculture, and population growth, as well as non-consumptive water needs to support adequate in-stream flows to protect river habitat and recreation opportunities. This planning process is designed to manage the long-term health of the Colorado River Basin.

Project-specific, short-term impacts to water quality would be minimized through the use of water quality BMPs. Construction of the Build Alternative would result in an increase in impervious surfaces when compared to existing conditions. The Build Alternative would include permanent water quality features, whereas the existing bridge does not. Compared to the existing condition, the Build Alternative would provide a water quality benefit and not contribute to cumulative water quality impacts within the Lower Roaring Fork Sub-watershed.



Compared to the existing condition, the Build Alternative would provide a water quality benefit and not contribute to cumulative water quality impacts to the Colorado River.

Other cumulative threats to the Lower Roaring Fork Sub-watershed would include reduced flow and water quality impairment as a result of energy development, withdrawals, and habitat modification. These issues are anticipated to persist over time, but the Build Alternative would not make these issues worse.

The mitigation efforts identified in Section 3.9 *Water Resources and Water Quality* will benefit water quality in the Colorado River. No further mitigation will be needed for cumulative impacts to water quality.

3.22.8 Cumulative Impacts on Visual Quality

Visual features in the study area are characterized by historic buildings in downtown Glenwood Springs adjacent to the Colorado River and surrounded by vegetated hillsides. As discussed in Section 3.1 *Visual Resources*, the Build Alternative would result in a moderate visual change, and the study area's overall visual quality would remain Moderately High after implementation. These impacts, combined with visual impacts from past, present, and reasonably foreseeable future projects, would not result in cumulative visual impacts in any of the four landscape units defined as part of the visual impact analysis described in Section 3.1 *Visual Resources* and the *Visual Impact Assessment Technical Report* (Jacobs, 2014).

Within the City Center Landscape Unit, some visual changes could occur as a result of the adopted plan (*A Redevelopment Strategy for the Confluence Area – City of Glenwood*

Springs, 2003) for the confluence area that includes new development downtown. However, according to the plan, “New development should respect the attractive small-town scale and historic context of the central business district; the pedestrian atmosphere of the downtown should be preserved and enhanced; and physical and visual connections to the Roaring Fork and Colorado Rivers should be created.” These driving policies are intended to protect visual quality within the City Center Landscape Unit. Recent library and parking structure projects on Cooper Avenue added to the attractiveness and vitality of the area by including architecture consistent with the historic setting, improved sidewalks, lighting, seating, and landscaping. These projects demonstrate the DDA’s commitment to blending new development into the existing visual setting. Over time, cumulative development is expected to improve visual quality in the City Center Landscape Unit.

None of the reasonably foreseeable future projects would be visible from Glenwood Hot Springs and Neighborhood Landscape Unit. This area has moderately high visual quality and is not expected to experience major cumulative visual changes in the future. The landscape unit is urbanized and has experienced minimal visual change over the last several decades.

The only reasonably foreseeable future projects visible from the I-70 Corridor Landscape Unit and the Grand Avenue Auto and Pedestrian Bridges Landscape Unit would be associated with the I-70 Mountain Corridor Improvements and possibly some of the downtown redevelopment discussed above in the background; however, these changes are minimal and localized and would not affect the visual quality in the landscape units either individually or cumulatively.

3.22.9 Cumulative Impacts on Historic Resources

The Section 106 analysis for the Grand Avenue Bridge project considered impacts not just in terms of direct and indirect impacts on individual structures, but within the context of the broader historic districts, including the Glenwood Hot Springs Historic District and the 700 block of Grand Avenue. Past and present actions described under Section 3.22.4 *Historical Context and Existing Conditions* have led to the urbanization of the study area. Because undeveloped and buildable land within Glenwood Springs is limited by topography, minimal development is anticipated that would change the historic context of the area. The only reasonably foreseeable projects that could indirectly affect historic resources in the study area are the City’s 8th Street Extension project and development associated with the City’s adopted plan – *A Redevelopment Strategy for the Confluence Area – City of Glenwood Springs* (City of Glenwood Springs, 2003). One of the primary objectives of the redevelopment plan is to respect the attractive small-town scale and historic context of the central business district. The impacts of the Build Alternative combined with impacts from past, present, and reasonably foreseeable future projects,



SH 82

GRAND AVENUE BRIDGE

would not result in additional cumulative impacts on the historic Glenwood Hot Springs District or the 700 Block of Grand Avenue.

3.23 Summary of Impacts and Mitigation Measures

Table 3-28 provides a summary of impacts and mitigation measures for the Build Alternative as discussed in Chapter 3.0.

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
1.	Visual	Visual changes from new bridges	Using the established CSS process, CDOT has and will continue to work with stakeholders to identify opportunities for aesthetic treatments in the design of the bridge, roadway, and sidewalk elements to reflect the materials and architectural style of Glenwood Springs' small town character and historic structures, as well as the visual and aesthetic goals and objectives provided in the I-70 Mountain Corridor Aesthetic Guidance.	Landscape Architect, Project Engineer	Final design and construction
2.	Visual	Visual changes from new bridges	Use open rail type side barriers on the pedestrian bridge to preserve views from the bridge.	Landscape Architect, Project Engineer	Final design and construction
3.	Visual	Visual changes from vegetation removal to construct project	Preserve existing vegetation where practicable, and revegetate riverbanks with native species as soon as practicable upon construction completion.	Landscape Architect, Project Engineer	Final design and construction
4.	Visual	Visual changes from new bridges	Use materials and/or aesthetic treatments on bridges to blend with the historic and mountain context of the study area. This would include, but not be limited to, consideration of the following design elements: <ul style="list-style-type: none"> • Use earth-tone paints and stains and select paint finishes with low reflectivity. • Use natural appearing forms to complement landscape. • Take advantage of natural screening. 	Landscape Architect, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
5.	Visual	Visual changes from new lighting	<p>Develop a lighting plan that balances sometimes conflicting needs, such as:</p> <ul style="list-style-type: none"> Compliance with CDOT, Garfield County, and City of Glenwood Springs design standards. Incorporating lighting fixtures that minimize nighttime glare and sky glow. Where new light fixtures are added, use lamps and/or light shields that direct glare away from the street, buildings, or the sky to minimize glare and sky glow, in accordance with local ordinances. These measures will not preclude any aesthetic ambient lighting features that may be included in the project design. Incorporating bridge and highway lighting as part of aesthetic treatments. 	Landscape Architect, Project Engineer	Final design and construction
6.	Visual	Visual changes at new roundabout intersection	Incorporate landscaping, monuments, entryways, and/or other aesthetic features into the design of the 6th and Laurel roundabout intersection areas to soften views of transportation facilities and create an urban visual environment.	Landscape Architect, Project Engineer	Final design and construction
7.	Visual	Temporary visual changes during construction	Minimize light glare during nighttime construction activities by taking measures to direct the light inward toward the construction site and minimize glare for motorists, pedestrians, and hot springs visitors in the vicinity of the construction site.	Project Engineer	Final design and construction
8.	Transit	Removal of bus stop at 6th and Maple or provision of new stop in the vicinity	During final design, CDOT will continue to coordinate with RFTA to determine the best options.	Project Engineer	Final design and construction
9.	Transit	Removal of Grand Avenue Wing Street impacts RFTA bus service routing	RFTA has indicated that the connection can be rerouted to either Cooper Avenue to the east or Colorado Avenue to the west. CDOT will continue to coordinate with RFTA during final design and construction.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
10.	Transit	Impacts to bus routes serving study area during construction.	CDOT will coordinate with RFTA during design and construction to provide adequate detour routes for impacted bus routes and bus stops.	Project Engineer	Final design and construction
11.	Transportation	Temporary transportation impacts during construction	CDOT has designed detour routes in coordination with City of Glenwood Springs and stakeholders to reduce travel demand and provide other means of accommodating transportation needs during construction.	Project Engineer	Final design and construction
12.	Transportation	Temporary access and connectivity impacts during construction	CDOT will maintain access and local connectivity throughout construction activities as much as possible.	Project Engineer	Final design and construction
13.	Transportation	Temporary railroad closure during construction detour	CDOT will coordinate with the UPRR and RFTA on details of the Aspen Branch railroad temporary closure and will restore the railbed and track after the new Grand Avenue Bridge is reopened.	Project Engineer	Final design and construction
14.	Transportation	Temporary access impacts during construction	Access will be maintained to businesses and properties along both sides of Grand Avenue.	Project Engineer	Final design and construction
15.	Transportation	Temporary roadway impacts during construction	7th Street will be fully closed during the approximately 90-day full bridge closure. To maintain access on 7th Street during other times of the construction period, 7th Street will be converted to either one-way westbound or alternating direction one-way operations that will be controlled by flagging or other traffic control measures.	Project Engineer	Final design and construction
16.	Transportation	Temporary safety and mobility impacts during construction	Midland Avenue. Install traffic signals at either end of the detour route to meter traffic volumes, providing gaps for local traffic turning to/from Midland Avenue. In residential areas along Midland Avenue, particularly the denser residential areas between 8th and 27th Streets, CDOT will monitor traffic during the full bridge closure and respond with appropriate measures to mitigate	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
17.	Transportation	Temporary traffic impacts during construction	<p>traffic impacts. These measures could include temporarily reducing the number of accesses onto Midland Avenue from neighborhoods with more than one access, and/or using flaggers or intersection controls during peak travel periods.</p> <p>As part of the SH 82 Detour, 8th Street will be temporarily extended to connect to the 8th Street Bridge over the Roaring Fork River during the approximately 90-day full bridge closure.</p>	Project Engineer	Final design and construction
18.	Transportation	Temporary traffic impacts during construction	<p>During the approximately 90-day full bridge closure, a "square about" would be implemented as part of the SH 82 Detour that would consist of a temporary one-way loop on 8th Street, Colorado Avenue, 9th Street, and Grand Avenue. A temporary signal will be installed at the 8th Street and Colorado Avenue intersection to facilitate pedestrian crossings and address higher traffic volumes. A temporary physical barrier will be placed at the 9th Street and Colorado Avenue intersection to force detour traffic to turn east toward Grand Avenue and keep detour traffic from continuing south on Colorado Avenue.</p>	Project Engineer	Final design and construction
19.	Transportation	Temporary road closures during construction	<p>At the 6th and Laurel intersection, when closures are required, the date and time will be widely communicated through the construction phase public information program and signage so motorists can plan. If needed, alternate route information also will be provided.</p>	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
20.	Transportation	Temporary traffic impacts during construction.	<p><i>Travel Demand Management Measures.</i> Implement a full public information campaign to educate travelers on travel demand management measures that will maximize the use of the detour route. CDOT will work with local and regional organizations and employers to promote the campaign.</p> <p>The public information campaign will inform the organizations, employers, and the general public about the upcoming closure and how to plan trips accordingly. The information campaign will include:</p> <ul style="list-style-type: none"> • Timeframe for full closure. • Best and worst times to travel. • Best routes to travel. • Alternative modes of travel available. 	Public Involvement, Project Engineer	Final design and construction
21.	Transportation	Temporary mobility impacts during construction.	<p><i>Specific travel demand measures could include:</i> <i>Bicyclists/Pedestrians</i></p> <ul style="list-style-type: none"> • Maintain a pedestrian connection over the river during construction. • Provide additional information about bicycle and pedestrian routes to commuters and the general public. • Provide bike facilities and services – these could include bike depots, bike lockers, and bike rental/sharing services. • Provide free – or low fare – pedicab (bicycle taxi) service across the new pedestrian bridge, connecting to roads on either end. <p><i>Regional and Local Motorists</i></p> <ul style="list-style-type: none"> • Inform commuters, recreationists, and tourists, so they could adjust their travel/work schedules during the closure period. 	Public Involvement, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
22.	Transportation	Temporary mobility impacts during construction.	<ul style="list-style-type: none"> Offer incentives for commuters to shift their travel times to off-peak periods, carpool, or use alternative modes, including public transportation, walking, and biking. Provide information targeted to commercial vehicles and companies, such as delivery trucks, on the detour route and less congested travel times. <p><i>Transit Users</i> Work with RTA and the City to:</p> <ul style="list-style-type: none"> Modify transit routes and increase frequency of operation along those routes to provide a reliable transit alternative during construction. Communicate transit service/schedule information to commuters, tourists, and the general public. Extend the VelociRTA BRT service or other regional service along the detour route temporarily and/or into downtown, where the stop will be within walking distance of the north side of the river. Provide transit subsidies to commuters and recreationists. Work with local businesses and tourism organizations to distribute passes and/or coupons. Provide a regularly scheduled, free – or very low fare – shuttle along the detour route. 	Public Involvement, Project Engineer	Final design and construction
23.	Social and Environmental Justice (EJ)	Temporary traffic impacts during construction	Provide advance notice to emergency service providers, community facilities, local schools, and local businesses of upcoming construction activities that are likely to result in traffic disruption, rerouting, and changes in access.	Public involvement, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
24.	Social and EJ	Temporary detours during construction	Develop and implement a public information plan for the construction phase. This plan will include information on construction activities and the established detours and associated signage.	Public involvement Manager, Project Engineer	Final design and construction
25.	Social and EJ	Temporary noise impacts during construction	Offer hotel vouchers to downtown residents most impacted by construction activities during nighttime hours.	Public involvement Manager, Project Engineer	Final design and construction
26.	Relocation/Right-of-Way	Property Acquisition and Relocation (commercial and private)	All acquisition and relocation shall comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.	Right-of-Way Agent	Final design/ROW
27.	Relocation/Right-of-Way	Property Acquisition (commercial and private)	CDOT will provide all impacted property owners notification of its intent to acquire an interest in their property, including a written offer letter of just compensation specifically describing those property interests being sought. CDOT will provide all displaced persons advisory services and notification of relocation eligibility, as applicable. A Right-of-Way Specialist will be assigned to each property owner to assist them with this process.	Right-of-Way Agent	Final design/ROW
28.	Economic	Impacts to business access	Design the Build Alternative to maintain and, where possible, improve access to existing businesses.	Project Engineer	Final design and construction
29.	Economic	Impacts to businesses acquired for right-of-way	Comply fully with federal and state requirements, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), for all acquisition and relocation.	Right-of-Way Agent	Final design/ROW
30.	Economic	Impacts to parking	As part of the right-of-way process, coordinate with the Glenwood Hot Springs to identify a solution to compensate for parking impacts.	Project Engineer	Final design and construction
31.	Economic	Impacts to business access	Using the established CSS process, work with stakeholders to incorporate design features to enhance business and tourism opportunities.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
32.	Economic	Impacts to business access	Coordinate with the DDA to develop signage that directs visitors to the 6th Street businesses.	Project Engineer	Final design and construction
33.	Economic	Impacts to business access during construction	Maintain access to all businesses at all times.	Project Engineer	Final design and construction
34.	Economic	Impacts to businesses during construction	Target the approximately 90-day full bridge closure during the traditionally slower traffic times during the year.	Project Engineer	Final design and construction
35.	Economic	Impacts to businesses during construction	Use Accelerated Bridge Construction techniques to minimize bridge closure time.	Project Engineer	Final design and construction
36.	Economic	Impacts to businesses access during construction	Keep pedestrian access across the river open at all times.	Project Engineer	Final design and construction
37.	Economic	Parking impacts during construction	Continue to coordinate with the Glenwood Hot Springs and other businesses to mitigate temporary impacts to parking. To lessen the level of impact, conduct public outreach to inform visitors of the construction activities and options for parking in the area.	Project Engineer	Final design and construction
38.	Economic	Impacts to businesses during construction	Communicate regularly with businesses about the construction schedule.	Public Involvement, Project Engineer	Final design and construction
39.	Economic	Impacts to businesses during construction detours	Provide additional signage to clarify detour and access changes.	Project Engineer	Final design and construction
40.	Economic	Impacts to businesses during construction detours	Conduct public outreach to let the local community and region know that the area is open for business.	Public Involvement, Project Engineer	Final design and construction
41.	Economic	Impacts to businesses during construction	Participate with local business organizations (e.g., the DDA, the Glenwood Springs Chamber of Commerce, Downtown Market, Colorado Mountain College, and others) to identify other mitigation measures the project could be incorporated to mitigate business impacts.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
42.	Economic	Impacts to businesses during construction	CDOT's outreach team will coordinate and work closely with the Glenwood Springs Chamber of Commerce and other location organizations and groups and support additional outreach.	Public Involvement, Project Engineer	Final design and construction
43.	Economic	Noise and air quality impacts	See mitigation measures under Air Quality and Noise.	Project Engineer	Final design and construction
44.	Air Quality	Air pollutants released during construction	CDOT and its contractor will comply with the fugitive dust permitting and control requirements of the Colorado Air Quality Control Commission (CAQCC), and obtain a general construction Air Pollutant Emission Notice. These requirements are documented in Regulation 1, Emission Control Regulation for Particulate Matter, Smoke, Carbon Monoxide, and Sulfur Oxides for the State of Colorado, effective August 30, 2007 (CAQCC, 2007), and Regulation 3, Air Pollutant Emission Notice Requirements, effective April 14, 2014 (CAQCC, 2014).	Project Engineer	Final design and construction
45.	Air Quality	Fugitive dust during construction	Apply water and chemical stabilizers in active construction areas and on haul roads.	Project Engineer	Final design and construction
46.	Air Quality	Fugitive dust during construction	Post speed limit signs and enforce speeds in active construction areas and on haul roads.	Project Engineer	Final design and construction
47.	Air Quality	Fugitive dust during construction	Water, perform soil compaction, and revegetate disturbed areas, as needed and appropriate for site conditions.	Project Engineer	Final design and construction
48.	Air Quality	Fugitive dust during construction	Temporarily curtail earthmoving activity during extreme wind or dust conditions.	Project Engineer	Final design and construction
49.	Air Quality	Fugitive dust during construction	Cover haul trucks, as appropriate, to reduce dust.	Project Engineer	Final design and construction
50.	Air Quality	Fugitive dust during construction	Limit haul truck speeds in unpaved areas.	Project Engineer	Final design and construction
51.	Air Quality	Vehicle emissions during construction	CDOT will review the plans for construction truck routing and hauling, in order to reduce the number of trips and periods of avoidable extended idling.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
52.	Noise	Noise impacts	If future substantial changes are made to design elements of the Build Alternative from what has been analyzed for this EA, the noise analysis will need to be reassessed to evaluate the impact of those changes.	Environmental Manager	Final design and construction
53.	Noise	Temporary impacts from construction activities	Adhere to the City of Glenwood Springs Code Article 100.070, Regulation of Noise. Obtain a construction noise work permit or waiver for construction activities occurring outside of the hours allowed by the Code. The Code allows construction activities to commence between the hours of 7:00 a.m. and 8:00 p.m. Monday to Friday, and 8:00 a.m. to 6:00 p.m. Saturday and Sunday.	Project Engineer	Final design and construction
54.	Noise	Temporary impacts from construction activities	Offer hotel vouchers to downtown residents most impacted by construction activities during nighttime hours. These are anticipated to be R17 and the second-story residence on 7th Street (not included in this noise analysis since there is no outdoor use).	Project Engineer	Final design and construction
55.	Noise	Temporary impacts from construction activities	The contractor will conduct preliminary noise monitoring during the noisier nighttime construction periods. These are expected to be in the summer and fall of 2015 and from spring to fall of 2016 when girders for the new bridges would be erected. If noise levels exceed 66 dBA during construction (the threshold that CDOT typically uses for nighttime noise levels), hotel accommodations would be made available for persons residing within eligibility zones.	Project Engineer	Final design and construction
56.	Noise	Temporary impacts from construction activities	Limit construction activities adjacent to noise-sensitive receptors when they are most sensitive, as practical and feasible.	Project Engineer	Final design and construction
57.	Noise	Temporary impacts from construction activities	Use noise blankets or other muffling devices on equipment and quiet-use generators at noise-sensitive receptors as needed.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
58.	Noise	Temporary impacts from construction activities	Use well-maintained equipment and inspect equipment regularly.	Project Engineer	Final design and construction
59.	Noise	Temporary impacts from construction activities	Locate stationary equipment and haul roads away from noise-sensitive receptors, as practical and feasible.	Project Engineer	Final design and construction
60.	Noise	Temporary impacts from construction activities	If pile driving for bridge piers is used, limit activities to daytime hours.	Project Engineer	Final design and construction
61.	Noise	Temporary impacts from construction activities	Minimize pile driving through use of use of drill shafts. Limit pile driving activities, if needed, to workday off-peak hours.	Project Engineer	Final design and construction
62.	Noise	Temporary impacts from construction activities	Minimize back-up alarm noises on construction vehicles in construction areas where practical and feasible.	Project Engineer	Final design and construction
63.	Noise	Temporary impacts from construction activities	Turn off idling equipment and vehicles when not in use.	Project Engineer	Final design and construction
64.	Noise	Temporary impacts from construction activities	The contractor will only use equipment that, operating under full load, meets manufacturer specifications. If the equipment falls out of compliance, the contractor will take remedial action to comply with the specifications.	Project Engineer	Final design and construction
65.	Noise	Temporary impacts from construction activities	For the nighttime I-70 closure detour that would occur several times during safety critical construction activities, coordinate detour nights and times with local hotels (e.g., Hotel Colorado and Glenwood Hot Springs). This will help hoteliers to move patrons to rooms farther from detour noise.	Public Involvement, Project Engineer	Final design and construction
66.	Water Resources and Water Quality	Impacts to water quality	Incorporate design measures into the Build Alternative to mitigate for potential water quality impacts. The design will improve upon the current condition where stormwater runoff drains from the bridge directly into the Colorado River.	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
67.	Water Resources and Water Quality	Impacts to water quality	<p>Construct one permanent water quality basin north of the Colorado River to improve water quality and reduce impacts from sediments. The basin will be located between the I-70 westbound off ramp, Grand Avenue, and North River Street. This basin will help provide water quality treatment for runoff from increased roadway pavement and to provide treatment of some existing roadway runoff, thereby improving surface water quality over the No Action Alternative.</p> <p>The water quality basin will treat the volume of stormwater generated from impervious area on the project's north side, as well as stormwater from the existing impervious area. Because of concerns regarding the visual impact of the basin, an underground vault system could be used instead. This vault will be designed to provide the same water quality benefit as the basin.</p> <p>Because of its highly visible location, the basin is being designed to include a series of walls to create an attractive gateway feature through landscaping and other techniques. The grading for the pond would impact most of all of the pervious area between the roads.</p> <p>The detention basin will require a new outfall to the Colorado River near Two Rivers Park. An additional outfall may be required near the existing highway and pedestrian bridges.</p>	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
68.	Water Resources and Water Quality	Impacts to water quality	Provide stormwater management infrastructure south of the Colorado River to treat runoff. Because of space limitations, an underground BMP is proposed. This BMP will capture and treat runoff from additional impervious areas (e.g., pavement, sidewalks, and retaining walls) from the Build Alternative and outfall into the Colorado River. The City of Glenwood Springs will assume inspection and maintenance responsibilities for the underground BMP, which will be included in the IGA between CDOT and the City. Additional stormwater on the south side will be routed via existing inlets and storm sewers to the Colorado River.	Water Pollution Control Manager, Project Engineer	Final design and construction
69.	Water Resources and Water Quality	Impacts from stormwater runoff	Sign inlets to inform public they drain to river.	Water Pollution Control Manager, Project Engineer	Final design and construction
70.	Water Resources and Water Quality	Temporary storm water impacts during construction	Provide stormwater management infrastructure prior to construction that would treat runoff from the SH 82 detour. An underground BMP is proposed, the use of which will be verified during final design. This BMP will capture and treat runoff from additional impervious areas from the detour and outfall into the Roaring Fork River.	Water Pollution Control Manager, Project Engineer	Final design and construction
71.	Water Resources and Water Quality	Temporary erosion and sediment impacts during construction	Implement standard erosion and sediment control BMPs in accordance with CDOT's <i>Erosion Control and Stormwater Quality Guide</i> (CDOT, 2002) and established sound engineering practices in final design plans.	Water Pollution Control Manager, Project Engineer	Final design and construction
72.	Water Resources and Water Quality	Temporary erosion and sediment impacts during construction	Develop and implement a site-specific stormwater management plan (SWMP). The BMPs will be designed, installed, and maintained per the SWMP.	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
73.	Water Resources and Water Quality	Temporary erosion and sediment impacts during construction	Perform all work in conformance to Section 107.25 (Water Quality Control) and Section 208 (Erosion Control) of the CDOT Standard Specifications for Road and Bridge Construction.	Water Pollution Control Manager, Project Engineer	Final design and construction
74.	Water Resources and Water Quality	Temporary erosion and sediment impacts during construction	<p>Use BMPs from CDOT's <i>Erosion Control and Stormwater Quality Guide</i> (CDOT, 2002) for water resources and water quality, as appropriate. BMPs must be maintained for the duration of the project. Specifically:</p> <ul style="list-style-type: none"> Phase construction to limit the acreage exposed (cleared) at any given time during project construction. Revegetate all disturbed areas with native grass and forb species, or appropriate landscaping as required. Apply seed and mulch in phases throughout construction. This will help stabilize the disturbed areas upon completion of the project even during multiple years of potential drought and low precipitation conditions. Temporarily stabilize disturbed areas, including areas where permanent seeding operations are not feasible due to seasonal constraints (e.g., summer and winter months), and use CDOT-approved methods to prevent erosion. Use erosion control blankets or other suitable methods on steep, newly seeded slopes to control erosion and to promote the establishment of vegetation. Use erosion control blankets with natural fibers and biodegradable mesh. Use erosion logs, silt fence, diversion ditches, temporary berms, sediment traps, temporary detention ponds, and other sediment control devices to divert, control, and filter sediment- 	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
			<ul style="list-style-type: none"> impacted water in order to protect surface water and inlets to the storm sewer system. Use check dams and other velocity dissipation devices, where appropriate, to slow the velocity of water through roadside ditches and within swales. Limit disturbed areas as much as possible to minimize construction impacts to vegetation. Use permanent structural BMPs, such as grass swales and grass/vegetative buffers, to limit sediment and roadway pollutants resulting from winter sanding, chemical deicing, and normal traffic operations from entering waterways. Use non-structural BMPs, including litter and debris control, and surface roughening on slopes, landscaping, and vegetative practices. Implement temporary and permanent BMPs for erosion control, sediment control, and drainage way protection as required by local and state permitting requirements. Design BMPs to protect waterways from various potential pollutant sources, such as construction materials, fuels and other fluids, sediment, and trash. BMPs will be maintained for the duration of the project. 		
75.	Water Resources and Water Quality	Impacts from dewatering during construction	CDOT or its contractor will file a notice of intent with the CDPHE Water Quality Control Division for groundwater dewatering, if dewatering is required for construction. A discharge permit would also be required if groundwater is discharged to a water body (e.g., the Colorado River). The CDPHE may require that water proposed for discharge be analyzed, and that the discharged water be	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
			treated to meet the surface water quality standards applicable to that river segment. The project will comply with all CDPHE dewatering and/or discharge permit requirements. In the event that discharged water cannot be treated to meet the surface water quality standards, discharged water will be stored and transported off site for disposal.		
76.	Water Resources and Water Quality	Impacts to water quality during construction	Locate construction staging and materials stockpiling farther than 50 feet from the edge of the Colorado River, when possible. In specific circumstances, if this buffer is not achievable, CDOT will consider the placement of materials closer to the edge of water and identify appropriate additional BMPs that would be required.	Water Pollution Control Manager, Project Engineer	Final design and construction
77.	Water Resources and Water Quality	Impacts to water quality during construction	Refuel equipment within designated refueling containment areas, located away from the Colorado River. During refueling operations, the receiving hose will be connected and all valves will be checked to ensure delivery of product to the proper receptacle. The transfer will be constantly monitored to prevent overflowing and spilling, and the delivery hose and lines will be checked for leaks. The transport driver will remain on hand until product delivery has been completed. Following product delivery, all appropriate valves will be shut off, hoses will be disconnected, the transport driver will check for leaks, and the receptacle will be gauged to verify receipt of product. Spill response materials (spill kits) will be available, and personnel will be aware of the storage location of such kits.	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
78.	Water Resources and Water Quality	Impacts to water quality during construction	Place BMPs and containment structures for work conducted within and adjacent to the floodplain and the Colorado River to prevent concrete washout and other potential pollutants from reaching the river.	Water Pollution Control Manager, Project Engineer	Final design and construction
79.	Water Resources and Water Quality	Impacts to water quality during construction	In the event that equipment malfunctions during demolition or construction, any release that may impact waters of the state, no matter how small, must be reported immediately to the CDPHE by telephone. Written notification to the CDPHE must follow within five days. Measures of containment will be followed as included in the spill prevention, countermeasure, and control plan of the SWMP.	Water Pollution Control Manager, Project Engineer	Final design and construction
80.	Water Resources and Water Quality	Impacts to water quality during construction	Remove the two causeways used during bridge construction at the end of construction and return all areas of disturbance to existing conditions.	Water Pollution Control Manager, Project Engineer	Final design and construction
81.	Water Resources and Water Quality	Impacts to geothermal resources during construction	Design foundations to stay above the confining layer of the Belden Shale, which will avoid any penetration of the primary bedrock aquifer, the Leadville Limestone.	Water Pollution Control Manager, Project Engineer	Final design and construction
82.	Water Resources and Water Quality	Impacts to geothermal resources during construction	Use spread footings where practicable to minimize the depth of excavation.	Water Pollution Control Manager, Project Engineer	Final design and construction
83.	Water Resources and Water Quality	Impacts to geothermal resources during construction	Drill test holes to determine the subsurface conditions at the locations of foundation structures.	Water Pollution Control Manager, Project Engineer	Final design and construction
84.	Water Resources and Water Quality	Impacts to geothermal resources during construction	Consider foundation grouting to improve groundwater conditions near caisson foundations to minimize the depth of the excavation.	Water Pollution Control Manager, Project Engineer	Final design and construction
85.	Waters of the United States	Temporary waters of the United States impacts	CDOT's Regional Wetland Specialist will obtain Section 404 permit authorization from the USACE for placement of temporary and permanent fill material in the Colorado River.	Environmental Manager	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
86.	Waters of the United States	Temporary riparian impacts	Protect riparian areas during construction activities through placement of temporary and/or construction-limit fencing.	Landscape Architect, Project Engineer	Final design and construction
87.	Waters of the United States	Temporary waters of the United States impacts	Closely monitor all work within and near the Colorado River to ensure compliance with the USACE Section 404 Permit.	Environmental Manager Project Engineer	Final design and construction
88.	Waters of the United States	Temporary waters of the United States impacts	Following construction, causeways will be removed, restoring all disturbed areas according to riparian mitigation requirements specified in the <i>Guidelines for Senate Bill 40 Wildlife Certification</i> (CDOT, 2013).	Environmental Manager Project Engineer	Final design and construction
89.	Floodplains	Potential increase in flood elevations from a 100-year flood	<p>CDOT will evaluate the following avoidance and minimization measures during final design to reduce floodplain impacts:</p> <ul style="list-style-type: none"> ▪ Design construction causeways to protect I-70, Glenwood Hot Springs, and similarly positioned infrastructure from a 10-year flood event. ▪ During construction, monitor snowpack data, river flow data, daily temperature forecasts, etc., to predict 10-year flood events. In the case of a potential flood event, the contractor will remove portions of the causeways to prevent flooding. ▪ Remove riprap previously placed in the river to protect the existing highway bridge pier from erosion. This measure will require coordination with resource agencies. <p>CDOT will perform a detailed hydraulic analyses. If this shows no increase in flood elevations, no further mitigation will be required.</p>	Project Engineer	Final design and construction
90.	Floodplains	Potential increase in flood elevations from a 100-year flood	CDOT will continue coordinating with the City of Glenwood Springs' Floodplain Administrator regarding the City's floodplain ordinance requirements as the design and hydraulic analyses are refined.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
91.	Floodplains	Potential increase in flood elevations	CDOT will comply with all applicable floodplain design criteria, FHWA's floodplain regulations, and Executive Order 11988.	Project Engineer	Final design and construction
92.	Vegetation	Temporary impacts to vegetation during construction	To the extent practicable, CDOT will avoid disturbance to existing trees, shrubs, and vegetation.	Landscape Architect, Project Engineer	Final design and construction
93.	Vegetation	Temporary impacts to vegetation during construction	Areas cleared of vegetation would be revegetated and returned to their preconstruction coverage.	Landscape Architect, Project Engineer	Final design and construction
94.	Vegetation	Temporary impacts to riparian vegetation during construction	Replace riparian trees and shrubs removed during construction as stipulated in CDOT's Guidelines for Senate Bill 40 Wildlife Certification (CDOT, 2013), which states that trees removed during construction, whether native or non-native, shall be replaced with a goal of 1:1 replacement based on a stem count of all trees with diameter at breast height of two inches or greater.	Environmental Manager, Landscape Architect	Final design and construction
95.	Vegetation	Temporary impacts to riparian vegetation during construction	Shrubs removed during construction, whether native or non-native, will be replaced based on their preconstruction areal coverage. In all cases, all such trees and shrubs will be replaced with native species.	Landscape Architect, Project Engineer	Final design and construction
96.	Vegetation	Temporary impacts to riparian vegetation during construction	A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.	Environmental Manager, Landscape Architect	Final design
97.	Vegetation	Impacts to landscaped areas during construction	Revegetate landscaped areas disturbed during construction. Landscaping will be determined during the final design process in consultation with stakeholders.	Environmental Manager, Landscape Architect	Final design and construction
98.	Noxious Weeds	Weed growth where vegetation removed during construction	Revegetate disturbed areas with native species.	Environmental Manager, Landscape Architect	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
99.	Noxious Weeds	Weed growth where vegetation removed during construction	Conduct a noxious weed survey prior to construction.	Environmental Manager, Landscape Architect	Pre-construction
100.	Noxious Weeds	Weed growth where vegetation removed during construction	Develop and implement an Integrated Weed Management Plan that will contain BMPs to prevent and/or control the establishment of noxious weeds, including, but not limited to, appropriate herbicide application, equipment cleaning, use of weed-free materials, and prompt revegetation of disturbed areas.	Environmental Manager, Landscape Architect	Final design and construction
101.	Noxious Weeds	Weed growth where vegetation removed during construction	CDOT will identify and remove tamarisk trees (a noxious weed also known as Saltcedar), in and adjacent to areas of construction, per the BMPs that will be developed for construction plans and specifications.	Environmental Manager, Landscape Architect	Final design and construction
102.	Wildlife – Non Aquatic	Direct mortality of and removal of habitat for small mammals from permanent riparian vegetation removal	CDOT will continue to coordinate with CPW to implement mitigation measures to minimize impacts to wildlife.	Environmental Manager, Landscape Architect	Final design and construction
103.	Wildlife – Non Aquatic	Removal of future nesting sites for some bird species from permanent riparian vegetation removal	To ensure compliance with the MBTA, CDOT Specification 240 will be followed by the contractor. Specification 240 outlines requirements regarding nests on structures, seasonal vegetation-clearance restrictions, and measures to buffer bird nests within a construction area.	Environmental Manager	Final design
104.	Wildlife – Non Aquatic	Direct mortality of and removal of habitat for small mammals from permanent riparian vegetation removal	Provide temporary fencing in riparian areas to protect wildlife from construction activities.	Environmental Manager, Landscape Architect	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
105.	Wildlife – Non Aquatic	Temporary loss of habitat due to the clearing of vegetation in and around the Colorado River	Replace riparian trees and shrubs removed as stipulated in CDOT's <i>Guidelines for Senafe Bill 40 Wildlife Certification</i> (CDOT, 2013), which states that riparian trees removed during construction, whether native or non-native, shall be replaced with a goal of 1:1 replacement based on a preconstruction stem count of all trees with a diameter at breast height of two inches or greater.	Environmental Manager, Landscape Architect	Final design and construction
106.	Wildlife – Non Aquatic	Temporary loss of habitat due to the clearing of vegetation in and around the Colorado River	Riparian shrubs removed during construction, whether native or non-native, will be replaced with native species based on their preconstruction areal coverage. In all cases, CDOT will replace all such trees and shrubs with native species.	Environmental Manager, Landscape Architect	Final design and construction
107.	Wildlife – Non Aquatic	Temporary loss of habitat due to the clearing of vegetation in and around the Colorado River	A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.	Environmental Manager, Landscape Architect	Final design
108.	Wildlife – Non Aquatic	Temporary loss of habitat due to the clearing of vegetation in and around the Colorado River	Avoid disturbance of native trees, shrubs, and vegetation to the extent possible. When disturbance is unavoidable, replace native and non-native species with native species.	Environmental Manager, Landscape Architect	Final design and construction
109.	Wildlife – Non Aquatic	Impacts to wildlife during construction	Use bear-resistant trash receptacles near construction areas.	Environmental Manager, Project Engineer	Final design and construction
110.	Wildlife - Aquatic	Habitat loss and increased water turbidity	CDOT will continue to coordinate with CPW and implement the following mitigation measures to minimize impacts to aquatic species.	Water Pollution Control Manager, Project Engineer	Final design and construction
111.	Wildlife - Aquatic	Habitat loss and increased water turbidity	Use CDOT-approved BMPs to offset the extent and duration of any temporary impacts to the Colorado River.	Water Pollution Control Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
112.	Wildlife - Aquatic	Habitat loss and increased water turbidity	In no instance allow construction activities or equipment to work in flowing water or disturb sediment during recognized trout spawning seasons unless in coordination with CPW, as follows: <ul style="list-style-type: none"> • Rainbow Trout: March 1-May 31 • Brown Trout: October 1-November 30 	Environmental Manager	Final design and construction
113.	Wildlife - Non Aquatic	Introduction of invasive aquatic species	Prevent the spread of invasive aquatic nuisance species, including Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail by following CDOT's <i>Guidelines for Senate Bill 40 Wildlife Certification</i> (CDOT 2013).	Environmental Manager, Landscape Architect	Final design
114.	Wildlife - Aquatic	Habitat loss and increased water turbidity	Provide permanent water quality measures discussed in Section 3.9.3 <i>Water Resources and Water Quality Mitigation</i> .	Environmental Manager	Final design and construction
115.	Wildlife - Aquatic	Sediment increase in Colorado River during construction.	Minimize sediment entrainment within the river flow and the diversion channels using protected control structures. Such protection will consist of, but not necessarily be limited to, geotextiles fabrics, riprap, and conduits.	Water Pollution Control Manager, Project Engineer	Final design and construction
116.	Special Status Species-Non Aquatic	Vegetation removal due to construction activities	CDOT will continue to coordinate with CPW and implement the following BMPs and mitigation measures to minimize impacts to special-status species during construction and to improve habitat availability and quality following construction.	Environmental Manager	Final design and construction
117.	Special Status Species-Non Aquatic	Potential bird impacts	Follow CDOT specification 240 (CDOT, 2011) to ensure compliance with the MBTA.	Environmental Manager	Final design and construction
118.	Special Status Species-Non Aquatic	Potential wildlife impacts	Provide temporary fencing in riparian areas to protect wildlife from construction activities.	Environmental Manager	Final design and construction
119.	Special Status Species-Non Aquatic	Habitat removal due to construction activities	A vegetation survey will be completed during final design to determine the number of riparian trees and the areal coverage of shrubs impacted.	Environmental Manager, Landscape Architect	Final design

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
120.	Special Status Species-Non Aquatic	Habitat removal due to construction activities	Replace all riparian trees and shrubs removed during construction, as required by <i>Senate Bill 40 Wildlife Certification</i> (CDOT, 2013).	Environmental Manager, Landscape Architect	Final design and construction
121.	Special Status Species-Non Aquatic	Habitat removal due to construction activities	Non-native trees and shrubs removed during construction will be replaced with native species.	Environmental Manager, Landscape Architect	Final design and construction
122.	Special Status Species- Aquatic	Introduction of invasive aquatic species	Prevent the spread of invasive aquatic nuisance species, including Eurasian watermilfoil, zebra mussel, and New Zealand mudsnail following CDOT's <i>Guidelines for Senate Bill 40 Wildlife Certification</i> (CDOT, 2013).	Environmental Manager, Landscape Architect	Final design and construction
123.	Special Status Species- Aquatic	Water quality impacts to river otter and fish during construction	Provide permanent water quality measures discussed in Section 3.9.3 Water Resources and Water Quality Mitigation.	Environmental Manager, Landscape Architect	Final design and construction
124.	Special Status Species-Aquatic	Sedimentation and streambed disturbance	No in-water work will be allowed between March 1 and May 31 to protect spawning Colorado River Cutthroat Trout.	Water Pollution Control Manager, Project Engineer	Final design and construction
125.	Special Status Species-Aquatic	Temporary habitat loss and sediment impacts during construction	Minimize sediment entrainment within the river flow and the diversion channels through use of protected control structures. Such protection will consist of, but not necessarily be limited to, geotextiles fabrics, riprap, and conduits.	Water Pollution Control Manager, Project Engineer	Final design and construction
126.	Special Status Species- Aquatic	Vegetation removal due to construction activities	In no instance allow construction activities or equipment to work in flowing water during recognized spawning seasons or any other time unless in coordination with CPW.	Environmental Manager, Landscape Architect	Final design and construction
127.	Historic	Direct impacts to historic properties	Prepare Level II archival documentation to mitigate the adverse effect to Glenwood Springs Viaduct/SH 82/Grand Avenue Bridge (5GF.2717), per Memorandum of Agreement to be prepared..	Staff Historian	Pre-construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
128.	Historic	Proximity impacts to historic properties	Using the established CSS process, CDOT will work with Section 106 consulting parties and SHPO to identify opportunities for aesthetic treatments in the design of the bridge, roadway, and sidewalk elements to reflect the materials and architectural style of the historic period of significance for these properties: Silver Club Building (5GF.1015); Palace Hotel (5GF.1016); Parkison Building (5GF.1017); Springs Restaurant/Doc Holiday Tavern (5GF.1033); Dougan Block (5GF.4730); and Ore Sampling Room (5GF.1032).	Staff Historian, Landscape Architect	Final design and construction
129.	Historic	Temporary impacts to the Denver & Rio Grande Railroad – Aspen Branch (Site #5GF.1661.7) for construction detour	When the new Grand Avenue Bridge is reopened and the detour is no longer needed, CDOT will restore the Denver & Rio Grande Railroad – Aspen Branch connection to preconstruction conditions.	Staff Historian, Project Engineer	Final design and construction
130.	Historic	Noise impacts to historic properties during nighttime construction detour	Temporary noise mitigation will be deployed during nighttime detour operations along 6th Street to reduce noise impacts to nearby historic resources. This would include, but not be limited to, CDOT coordinating detour nights and times with local hotels (e.g., Hotel Colorado and Glenwood Hot Springs). This will help hoteliers to move patrons to rooms farther from detour noise.	Public Involvement, Project Engineer	Final design and construction
131.	Hazardous Materials	Possible exposure to potentially hazardous materials	CDOT will attempt to resolve regulatory responsibilities for known regulated materials contaminants at properties targeted for right-of-way acquisition or easements prior to acquisition. Properties targeted for acquisition are identified in Section 3.5 Relocation/Right-of-Way.	Environmental Manager, Project Engineer	Final design

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
132.	Hazardous Materials	Possible exposure to potentially hazardous materials	<p>CDOT's contractor will prepare a Materials Management Plan to address potential regulated materials that may be encountered during construction activities and minimize the spread of any remaining regulated materials located in the subsurface within the construction area. The plan will have emphasis on these areas:</p> <ul style="list-style-type: none"> The potential exists for hazardous materials (including residual contamination associated with the on-site filling stations as well as the Union Pacific Railroad line) to be encountered in areas where proposed construction and excavation areas approach the groundwater table and within the temporary construction detour route. Recent investigations reveal that groundwater levels are about 10 to 20 feet below ground on the south side and approximately 30 feet below the ground on the north side. Potential fill or demolition debris from roadway construction may be present on the Site. Ensure that workers follow CDOT Specification 250 – Environmental, Health and Safety Management and the CDOT Asbestos-Contaminated Soil Management Standard Operating Procedure during excavation activities at this site. 	Environmental Manager	Final design and construction
133.	Hazardous Materials	Possible exposure to potentially hazardous materials	<p>Complete ASTM-compliant Phase I Environmental Site Assessment for properties considered for right-of-way acquisition.</p>	Environmental Manager	Final Design

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
134.	Hazardous Materials	Possible exposure to potentially hazardous materials	Complete subsurface soil and groundwater investigation to identify potential contaminants in construction area. The subsurface investigation should target areas where contamination would likely be encountered during construction, or parcels where right-of-way is acquired. A subsurface investigation at the northwest portion of the study area could be eliminated since subsurface groundwater investigations are currently being conducted in this area related to active petroleum releases.	Environmental Manager	Final design
135.	Hazardous Materials	Possible exposure to potentially hazardous materials	In the event that suspected asbestos containing material (ACM) is encountered, including with buried utilities, workers must follow CDOT Specification 250.07 – Asbestos-Containing Material Management and CDOT Asbestos-Contaminated Soil Management Standard Operating Procedure. Additionally, depending on the type of ACM, this material must also be abated in accordance with either Section 5.5 of the Solid Waste Regulations, or Regulation No. 8 of the Air Quality Control Commission Regulations.	Environmental Manager, Project Engineer	Construction
136.	Hazardous Materials	Possible exposure to potentially hazardous materials	Complete appropriate surveys for asbestos and lead-containing paint prior to demolition. If ACM is encountered, implement abatement activities in accordance with all applicable state and federal regulations and guidelines. Surveys for asbestos will not be required if an architect certifies the structures were constructed with asbestos-free building materials.	Environmental Manager	Final design
137.	Hazardous Materials	Possible exposure to potentially hazardous materials	Follow CDOT guidelines regarding lead-containing paint. The contractor will avoid sanding, cutting, burning, or otherwise causing the release of lead from paint on these structures when possible. If this is not possible, the lead must be abated properly.	Environmental Manager, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
138.	Hazardous Materials	Possible exposure to potentially hazardous materials	Specify proper handling procedures of contaminated media identified during subsurface investigations in accordance with applicable state and federal requirements.	Environmental Manager, Project Engineer	Final design and construction
139.	Hazardous Materials	Possible exposure to potentially hazardous materials	Develop a Health and Safety Plan to protect workers during construction activities.	Environmental Manager, Project Engineer	Final design and construction
140.	Hazardous Materials	Possible exposure to potentially hazardous materials	Stop work in the event that unknown contaminated media is encountered during construction until the contamination has been properly evaluated and measures are taken to protect worker health and safety, as well as public health and the environment.	Project Engineer, Environmental Manager	Construction
141.	Hazardous Materials	Possible exposure to potentially hazardous materials	Follow the CDOT Specification 250 – Environmental, Health, and Safety Management during excavation activities within the construction area.	Project Engineer, Environmental Manager	Construction
142.	Hazardous Materials	Possible exposure to potentially hazardous materials	Implement standard construction measures for fugitive dust control, as well as stormwater erosion and sediment control.	Environmental Manager, Project Engineer	Final design and Construction
143.	Hazardous Materials	Possible exposure to potentially hazardous materials	Conduct dewatering and/or dewatering activities in accordance with Colorado Department of Public Health and Environment (CDPHE) permits during construction activities if groundwater is encountered.	Environmental Manager, Project Engineer	Final design and Construction
144.	Hazardous Materials	Possible exposure to potentially hazardous materials	Properly store and treat contaminated water prior to discharge in accordance with dewatering and/or discharge permits. In the event that discharged water cannot be treated to meet the surface water quality standards, discharged water will be stored and transported off site for disposal.	Environmental Manager, Project Engineer	Final design and Construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
145.	Hazardous Materials	Possible exposure to potentially hazardous materials	Identify and properly close, remove and/or replace monitoring wells and remediation systems within the construction area to avoid impacts and minimize the spread of regulated materials. Properly abandon or potentially replace monitoring wells and/or existing remediation system components impacted during construction if the system is still being utilized. Initiate coordination with lead regulatory agencies before impacts to regulated facilities occur.	Environmental Manager, Project Engineer	Final design and Construction
146.	Hazardous Materials	Possible exposure to potentially hazardous materials	Initiate coordination with lead regulatory agencies before impacts to regulated facilities occur.	Environmental Manager, Project Engineer	Final design and Construction
147.	Parks and Recreation	Visual impacts to Glenwood Hot Springs visitors and Colorado River recreationists	CDOT will incorporate aesthetic treatments in the design of bridge elements to reflect the materials and architectural style of the surrounding historic structures.	Staff Historian, Landscape Architect	Final design and construction
148.	Parks and Recreation	Parking impacts to Glenwood Hot Springs	CDOT will continue coordinating with the Glenwood Hot Springs to identify a solution to compensate for permanent parking impacts.	ROW Manager, Project Engineer	Final design and construction
149.	Parks and Recreation	Temporary impacts at park access	CDOT will coordinate with the City School Board about the regrading of the Vogelaar Park access road before and after implementation of the SH 82 Detour to avoid conflicts with large events that may be planned in the park or ballfield. When the new Grand Avenue Bridge is reopened, the SH 82 Detour will be removed and the driveway leading to Vogelaar Park will be regraded to match the restored 8th Street grade.	Project Engineer	Final design and construction
150.	Parks and Recreation	Temporary impacts at park access	CDOT will coordinate with rafting companies and outfitters to develop a Construction River Use Plan. This River Use Plan will include at a minimum: <ul style="list-style-type: none"> • Methods to give advance notice of channel-disturbing activities so anglers can avoid turbid sections of the Colorado River. • Management of river users through the 	Project Engineer	Final design and construction
151.	Parks and Recreation	Temporary impacts to river recreationists during construction	CDOT will coordinate with rafting companies and outfitters to develop a Construction River Use Plan. This River Use Plan will include at a minimum: <ul style="list-style-type: none"> • Methods to give advance notice of channel-disturbing activities so anglers can avoid turbid sections of the Colorado River. • Management of river users through the 	Public Involvement, Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
			<p>construction site, including measures to keep river users from encountering culvert openings (if any) and to minimize turbulent water or backwater conditions. This will address times of critical construction activities, such as bridge demolition, and girder placement.</p> <ul style="list-style-type: none"> Management of recreational boat take-out during river closures, including locations and notification. 		
152.	Pedestrian and Bicycle Facilities	Changes in street crossings	Use prominent signage to direct bicyclists and pedestrians around the roundabout.	Project Engineer	Final design and construction
153.	Pedestrian and Bicycle Facilities	Changes in circulation patterns	Install new signage to direct users to new recreational trail connections, as funding allows.	Project Engineer	Final design and construction
154.	Pedestrian and Bicycle Facilities	Safety for underpass/tunnel connection users	Install lighting in the new 150-foot underpass and wider openings/approaches to improve safety and security for users.	Project Engineer	Final design and construction
155.	Pedestrian and Bicycle Facilities	Safety for sidewalk and pathway users during construction	Provide construction fencing to protect pedestrians and bicyclists from construction areas.	Project Engineer	Final design and construction
156.	Pedestrian and Bicycle Facilities	Interruption of connectivity during pedestrian bridge replacement	Maintain connectivity during construction. Early in the project, a five-foot sidewalk with barrier will be built on or adjacent to the existing Grand Avenue Bridge. The existing pedestrian bridge will be removed and the new bridge built adjacent to the existing Grand Avenue Bridge. Temporary access will be provided on the northern and southern touchdown points of the pedestrian bridge to maintain ADA access from the new pedestrian bridge to the adjacent sidewalks until permanent connections are completed.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
157.	Pedestrian and Bicycle Facilities	Closures and detours at 6th and Laurel Streets roundabout	Provide detours to maintain pedestrian connectivity at all times to the businesses. Pedestrian routes will be kept open to the extent practical, but temporary detours will be necessary during parts of the construction.	Project Engineer	Final design and construction
158.	Pedestrian and Bicycle Facilities	Changes to trail access	Keep the North River Street and 7th Street on-road bicycle routes open to the extent feasible, although temporary detours will be necessary during parts of the construction. Detour routes for North River Street could include existing bike routes/trails both north and west of the construction area. Detour routes for 7th Street could include 8th Street or 9th Street downtown.	Project Engineer	Final design and construction
159.	Pedestrian and Bicycle Facilities	Changes to trail access	Access to the Two Rivers Trail will be kept open to the extent practical, but temporary detours will be necessary during construction. Detour routes could include a temporary sidewalk or a detour across the Colorado River south to the Roaring Fork Trail to 7th Street, and then back across the pedestrian bridge.	Project Engineer	Final design and construction
160.	Pedestrian and Bicycle Facilities	Access changes and closures for SH 82 Detour	Provide an accessible ramp and sidewalk connecting the on-road bicycle route on 7th Street to the ramp leading to the River Trail. ADA-accessible ramps and a three-foot sidewalk on the south side of 7th Street will connect the 8th Street intersection to the existing sidewalk under the railroad bridge. Pedestrians will be directed to use the sidewalk on the north side of 8th Street. When the Grand Avenue bridge is reopened, use of sidewalks on the south side of 8th Street will be restored, and all existing pedestrian ramps along 8th Street will be restored to their original location.	Project Engineer	Final design and construction
161.	Pedestrian and Bicycle Facilities	Temporary sidewalk closures and detours during construction	Use signage to direct pedestrians and bicyclists to temporary sidewalk connections.	Project Engineer	Final design and construction

TABLE 3-28. SUMMARY OF IMPACTS AND MITIGATION MEASURES

Mitigation Commitment #	Mitigation Category	Impact	Mitigation Commitment	Responsible Branch	Timing
162.	Energy	Energy consumption from new lighting fixtures	Incorporate lighting fixtures that minimize energy use in the design of the Build Alternative, in compliance with CDOT specifications and local light ordinances. CDOT will require contractors to implement an energy plan that would consider several construction energy conservation measures. These could be the following: <ul style="list-style-type: none"> • Limit construction equipment idling. • Locate construction staging areas close to work sites to minimize travel time. • Use cleaner and more fuel-efficient construction equipment and vehicles. • Consolidate material delivery whenever possible to ensure efficient vehicle use. • Promote employee carpooling. 	Project Engineer	Final design and construction
163.	Energy	Energy consumption during construction activities	CDOT will require contractors to implement an energy plan that would consider several construction energy conservation measures. These could be the following: <ul style="list-style-type: none"> • Limit construction equipment idling. • Locate construction staging areas close to work sites to minimize travel time. • Use cleaner and more fuel-efficient construction equipment and vehicles. • Consolidate material delivery whenever possible to ensure efficient vehicle use. • Promote employee carpooling. 	Project Engineer	Final design and construction
164.	Archaeological Resources	Unanticipated archaeological discoveries during construction	If any unanticipated archaeological resources are encountered during construction, ground-disturbing activities in the area of the find will immediately cease, and the CDOT Staff Archaeologist will be notified immediately to assess their significance and make further mitigation recommendations.	Project Engineer, Staff Archaeologist	Final design and construction
165.	Paleontological Resources	Unanticipated paleontological discoveries during construction	If any subsurface bones or other potential fossils are found by the construction contractor during construction, work in the immediate area will cease immediately, and the CDOT staff paleontologist will be contacted to evaluate the significance of the find. Once salvage or other mitigation measures (including sampling) is complete, the CDOT staff paleontologist will notify the construction supervisor that paleontological clearance has been granted.	Project Engineer, Staff Paleontologist	Final design and construction