5.0 ENVIRONMENTAL CONSEQUENCES

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5.1 INTRODUCTION

Evaluation of impacts discussed in this chapter for the alternatives to the I-25 Corridor and US 85 Corridor was based on guidelines issued by the Federal Highway Administration (FHWA) (Technical Advisory T6640.8A, 1987). The following impact categories were considered during preparation of this Final Environmental Impact Statement (FEIS):

- Permits and Approvals
- Socioeconomics
- Relocation
- Right-of-Way
- Recreational Resources
- Land Use and Zoning
- Air Quality
- Water Quality
- Vegetation
- Wetlands
- Geology
- Wildlife
- Wild and Scenic Rivers
- Floodplains
- Threatened, Endangered, and Other Special-Status Species
- Historical Resources
- Section 4(f) Properties
- Archaeological Resources
- Paleontological Resources
- Prime and Unique Farmland
- Noise
- Visual Character
- Hazardous Waste Sites
- Energy
- Temporary Construction
- Secondary Impacts
- Cumulative Impacts

In this chapter, the No-Action Alternative is evaluated first, followed by an analysis of the Preferred Alternative and the Other Alternative. The environmental impacts discussed in this chapter are a result of the No-Action Alternative, Preferred Alternative, and the Other Alternative; they do not include the impacts from the Early-Action projects.

A tabular summary of quantifiable and qualitative impacts identified on Table 5.30 and Table 5.31 follows the impact analysis at the end of this chapter.

5.2 NO-ACTION ALTERNATIVE IMPACTS

The No-Action Alternative for the I-25 Corridor and US 85 Corridor includes the completion of all Early-Action projects and the Douglas Lane Interchange. Early-Action projects and the Douglas Lane Interchange have been environmentally cleared in previous studies or are in the process of being cleared (Douglas Lane Interchange is in

the process of completing the Colorado Procedural Directive 1601 Interchange Approval Process and amending the Denver Regional Council of Government [DRCOG] Regional Transportation Plan [RTP]). Their impacts have been or will be mitigated prior to the construction of the improvements discussed in this document and are not included in this Environmental Impact Statement (EIS).

Adoption of a No-Action Alternative for the I-25 Corridor and US 85 Corridor has no impact on many of the environmental resources discussed in this chapter. No direct land use impacts occur and no open space is taken for right-of-way (ROW). No relocations are required. No sedimentation or potential spills related to construction affect the corridor. No wetlands are disturbed and no additional impacts on vegetation and wildlife result. Floodplain hydraulics are not altered, and no recreation or historic resources are affected. No construction impacts occur.

The No-Action Alternative, however, results in several other impacts. Without additional corridor improvements, further deterioration of existing levels of service (LOS) on the I-25 Corridor and US 85 Corridor occurs with the increase in traffic volumes. Congestion and delays currently experienced during peak-traffic periods become much worse and extend through more hours of the day. Some increase in the number of minor (fender bender) traffic crashes is expected with the projected increased traffic volumes. The additional traffic volume increases the noise levels at homes and businesses and deteriorates air quality throughout both corridors. The local economy also experiences impacts, and energy consumption increases. The No-Action Alternative is not responsive to community planning efforts. This alternative does not accommodate the rapid growth and development of Douglas County.

5.3 FEIS ALTERNATIVE IMPACTS (PREFERRED ALTERNATIVE / OTHER ALTERNATIVE)

5.3.1 Permits And Approvals

The following permits and approvals may be required for the I-25 Corridor and US 85 Corridor improvements:

- Federal Emergency Management Agency (FEMA)
- Clean Water Act Section 404 permit for dredge and fill in Waters of the U.S.
- Clean Water Act Section 402 permit for point source discharge
- Water Quality Control Division Section 401 certification
- National Pollutant Discharge Elimination System (NPDES) Stormwater Permit
- Programmatic or individual certification for Senate Bill 40
- Migratory Bird Treaty Act permit
- Temporary construction permit to realign railroad
- Other permits such as Access, Utility, Survey, etc.

5.3.2 Socioeconomic Impacts

5.3.2.1 Neighborhood Impacts

An alternative is considered to have a substantial social or induced population impact if numerous residents or businesses are relocated involuntarily; if it causes the population of the surrounding region to exceed historic growth rates; if it substantially alters the location and distribution of population; or if it affects the local housing market and vacancy rates. These criteria are the basis by which social and economic consequences of a proposed project can be judged as having impacts of importance.

The proposed improvements are located either within existing Colorado Department of Transportation (CDOT) ROW or on land adjacent to existing ROW. The surrounding lands are currently developed adjacent to the highways. Because this project represents an expansion of existing operations and usage, minimal direct and indirect disruption occurs to the communities. Shifts in population or degradation of the socioeconomic attributes of Douglas County that have not already been accounted for in the original roadway development and previously considered by populations in the vicinity of the highways are not expected to occur.

Widening and other improvements to US 85 have the highest potential for socioeconomic impacts due to indirect or quality-of-life disruption. Increased noise, traffic, and evening lighting could adversely affect the lifestyle currently enjoyed by nearby residents. While these effects are not expected to exceed any thresholds of importance, they could become annoying and disruptive to limited numbers of residents of Sedalia and Louviers, and to others close to the existing highway who are already affected by highway activity. In some cases, ROW acquisitions may decrease the value of residences without actually taking them.

Contiguity to these highways could also have a positive effect on the value of some homes in nearby residential areas. Improving/managing access to these roads may improve residents' connection to commercial areas and employment locations and result in increased home values. Commercial areas could also benefit from improved highway access in terms of improved mobility, improved visibility, accessibility to a regional roadway, and improved safety.

Highway widening is not expected to cause adverse impacts to specific neighborhoods. There are no neighborhoods that exist on both sides of the highway, and the highway widening will not divide neighborhoods or create neighborhood disruption. Access to specific residences may change, most notably on US 85, but in no case will access to a residential area be eliminated. Highway widening will create beneficial impacts for the connection of communities along I-25 by reducing congestion times.

Modifications to the interchanges along the northern part of I-25 may change the primary access for residents in the Surrey Ridge and Oak Hills neighborhoods. Public meetings with these residents have been held to assess the residents' concerns. Although access may be modified by the closing of Schweiger and/or Surrey Interchanges, access to their neighborhoods will still be provided through a new frontage road or through a connection off of the Castle Pines Interchange, only a short distance to the north of the existing Surrey Interchange.

In the long-term, secondary impacts may occur that could also be disruptive to current and future nearby residents. Temporary construction impacts may occur through disrupting traffic flow. Residential and commercial development in the vicinity of the corridor may occur based on the availability of improved access. Impacts from any new development can be controlled by local site plan review and development regulations.

For additional information, please see Section 5.3.3.14, *Noise Impacts*, Section 5.3.3.15, *Visual Character*, Section 2.5.1.4, *I-25 Corridor Changes in Travel Patterns, Access, and Safety for the Preferred Alternative*, Section 2.5.2.4, *US 85 Corridor Changes in Travel Patterns, Access, and Safety for the Preferred Alternative*, Section 2.6.1.4, *I-25 Corridor Changes in Travel Patterns, Access, and Safety for the Other Alternative*, and Section 2.6.2.4, *US 85 Corridor Changes in Travel Patterns, Access, and Safety for the Other Alternative*.

5.3.2.2 Environmental Justice Impacts

Environmental Justice impacts are those with a disproportionate impact on the minority or low-income community resulting from any substantial adverse impact on nearby residents and businesses, including but not limited to social, economic, health-related environmental effects, and other environmental impacts (Executive Order 12898). A disproportional impact might result, if an impact is appreciably more severe or greater in magnitude than the impact that is suffered by the non-minority or non-low-income population.

The percentage of minority populations in the project corridors is similar to that of other locations in the county and is essentially dispersed into large census block groups. Low-income populations are likewise small in number and relatively well dispersed throughout the county.

No disproportionately high or adverse economic or environmental effects on minority or low-income populations are expected to occur as a result of developing the elements of the proposed project. This project does not result in adverse impacts in any specific neighborhood where residents are minority or low income. The impacts from this project are consistent with the spirit of the Executive Order on Environmental Justice.

For additional information on socioeconomics, see the ***Socioeconomic Technical Memorandum South I-25 Corridor and US 85 Corridor,*** May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.2.3 Relocation Impacts

Relocations described in this document are those in which a structure is actually being taken due to road construction so as to require relocating residents and businesses in the affected area. The CDOT will comply with the ***Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970***, as amended (1989). The purpose of this act is to provide for uniform and equitable treatment of all persons displaced from their homes, businesses, or farms. All relocatees are given a minimum of 90 days in which to find replacement housing or business locations. Relocatees may receive monetary payments, which can include payments of moving expenses, business in lieu of payments, rent supplements, down payments, and increased interest payments.

No person shall be displaced by a federal aid project unless and until adequate replacement housing has been offered to all affected persons regardless of race, color, religion, sex, or national origin.

In accordance with Title VI, in addition to full compliance with the ***Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970***, as amended (1989), CDOT will provide assistance to any eligible owner or tenant in relocating their business or residence at the time of displacement. Benefits under the Act, to which each eligible owner or tenant may be entitled (including early [or hardship] acquisition), will be determined on an individual basis and explained to them in detail, in addition to information regarding their

financial options.

Preferred Alternative and Other Alternative

This section considers potential relocation impacts within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative because the impacts are the same for both alternatives.

I-25 Corridor Relocations (Preferred Alternative and Other Alternative)

No relocation impacts are anticipated within the I-25 Corridor as a result of the Preferred Alternative and Other Alternative.

US 85 Corridor Relocations (Preferred Alternative and Other Alternative)

Nine relocations are required based on the conceptual design of the Preferred Alternative and Other Alternative as shown on Figure 5.1 and Table 5.1. Six sites are businesses and three are residences. Currently, there appears to be commercial properties of comparable value and character in the vicinity of the study area.

It is customary to include family characteristics in relocation studies of this type; however, when there are few displacees, information on race, ethnicity and income levels is not included to protect the privacy of those affected. Their locations are easily identified by alternative, and no data will be published about the specific characteristics of individuals potentially affected.

Table 5.1
Potential Relocations
(Number of Relocations)

	Preferred Alternative	Other Alternative
I-25 Corridor	0	0
US 85 Corridor	9	9
Total	9	9

5.3.2.4 Right-of-Way Acquisition

ROW acquisitions are necessary for both the Preferred Alternative and Other Alternative. As the highway is widened, additional ROW is required. In some cases, ROW acquisitions may decrease the value of residences without actually taking them. Some commercial property values may increase due to the proximity to a regional roadway. CDOT has been coordinating with Douglas County, the City of Lone Tree, the Town of Castle Rock, and developers to provide setbacks for the transportation corridor. Table 5.2 summarizes the ROW impacts for the Preferred Alternative and the Other Alternative.

Preferred Alternative

I-25 Corridor Right-of-Way Acquisition (Preferred Alternative)

The estimated amount of ROW needed for the I-25 Corridor elements of the Preferred Alternative is 10.1 hectares (25.0 acres).

Figure 5.1
Potential Relocations

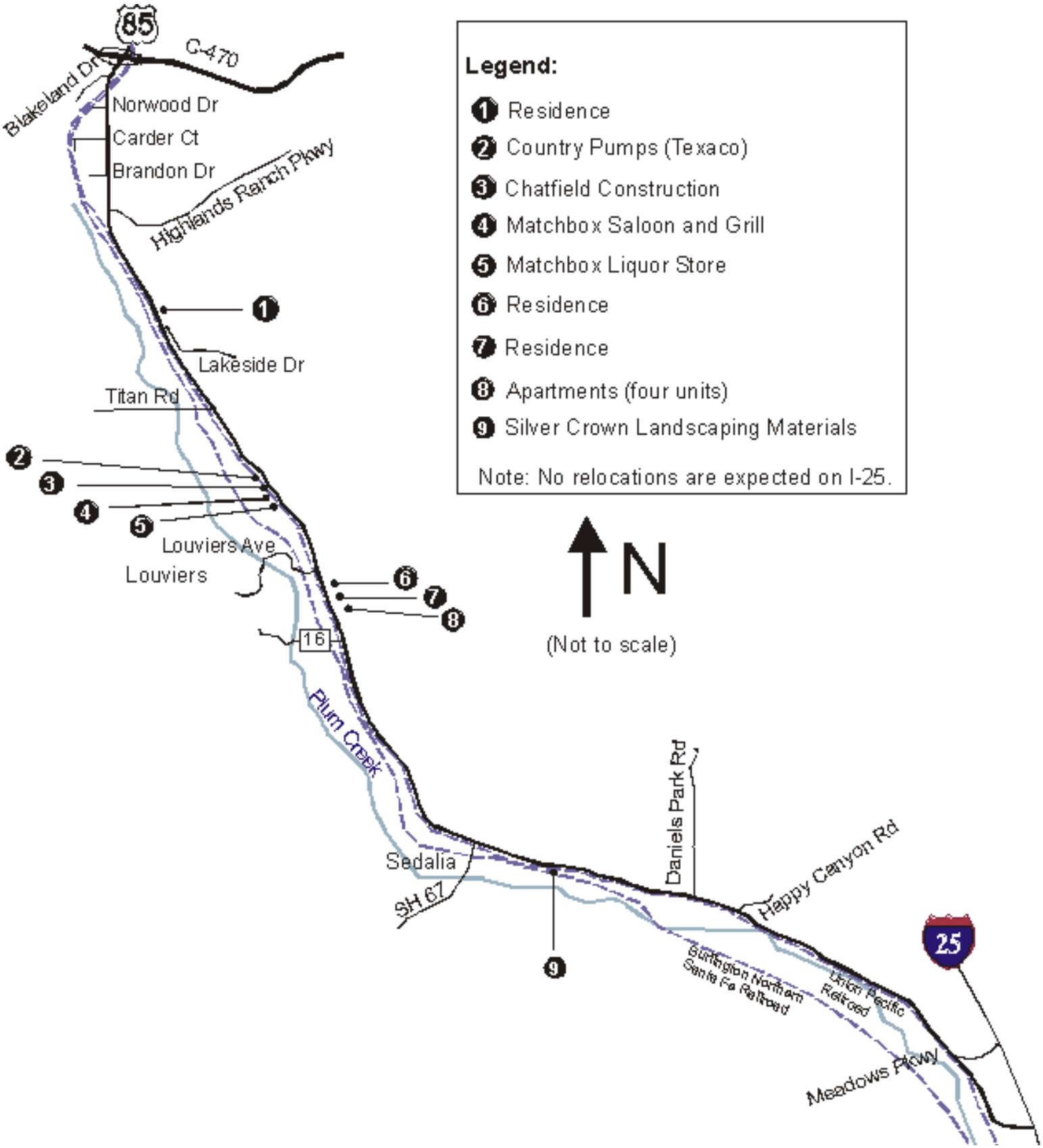


Table 5.2
Potential Right-of-Way Acquisition
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor	10.1 (25.0)	28.9 (71.4)
US 85 Corridor	49.4 (122)	51.4 (127)
Total	59.7 (147.6)	80.3 (198.4)

US 85 Corridor Right-of-Way Acquisition (Preferred Alternative)

The estimated amount of ROW needed for the US 85 Corridor elements of the Preferred Alternative is 49.4 hectares (122 acres).

Other Alternative

I-25 Corridor Right-of-Way Acquisition (Other Alternative)

The estimated amount of ROW needed for the I-25 Corridor elements of the Other Alternative is 28.9 hectares (71.4 acres). The ROW increases for this alternative because the frontage road is being constructed on a new alignment.

US 85 Corridor Right-of-Way Acquisition (Other Alternative)

Estimated amount of ROW needed for the US 85 Corridor elements of the Other Alternative is 51.4 hectares (127 acres). The ROW increases for this alternative because of the additional laneage between Highlands Ranch Parkway and Titan Road.

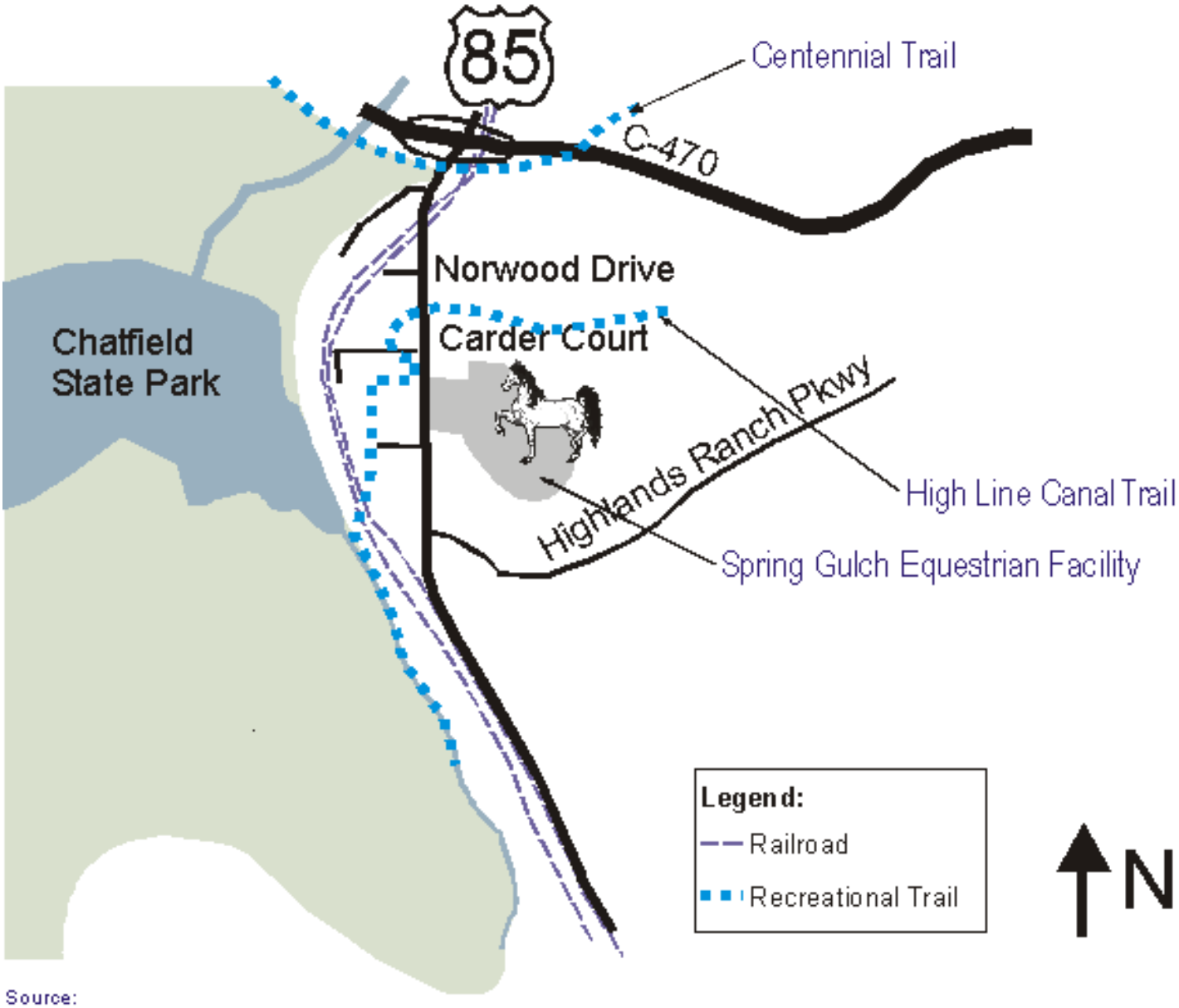
5.3.2.5 Recreational Impacts

Potential impacts to recreational resources may occur as a result of highway improvements. This section evaluates potential impacts to recreational resources along the I-25 Corridor and the US 85 Corridor for the Preferred Alternative and the Other Alternative. The likelihood of impacts is evaluated based on the proximity of both temporary and permanent impact areas to recreational resources. The total area of primary impact to each property is calculated by overlaying proposed project area maps on parcel maps provided by Douglas County and recent ROW mapping. Calculation of secondary impact is based on corridor noise projections (Section 5.3.3.14: *Noise Impacts*), consideration of visual character impacts (Section 5.3.3.15:*Visual Character Impacts*), and potential changes in accessibility to each resource. Letters of concurrence relating to recreational impacts are included in the Appendix of this document.

Preferred Alternative and Other Alternative

This section considers potential impacts to recreational resources within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. Table 5.3, at the end of this section, summarizes impacts to recreational resources. Figure 5.2 shows the location of impacted resources.

Figure 5.2
Recreation Impacts*



Source:
Douglas County Assessor's Maps
and Pierson Graphics Corp. 1998

*All impacts to recreational resources occur within the US 85 Corridor.

I-25 Corridor Recreational Impacts (Preferred Alternative and Other Alternative)

No primary impacts to recreational resources are anticipated as a result of the Preferred Alternative or the Other

Alternative, along the I-25 Corridor. No secondary impacts resulting from noise, visual, or impaired accessibility are anticipated as a result of the Preferred Alternative or the Other Alternative, along the I-25 Corridor.

US 85 Corridor Recreational Impacts (Preferred Alternative and Other Alternative)

Three recreational resources along US 85 are impacted as a result of the Preferred Alternative and the Other Alternative. These resources include: Centennial Trail, High Line Canal Trail, and the Spring Gulch Equestrian Facility. No substantial secondary impacts (noise or visual) are anticipated as a result of the Preferred Alternative or the Other Alternative.

Centennial Trail

The Preferred Alternative and Other Alternative each impact approximately 2 meters (6.5 feet) of the Centennial Trail where it intersects with US 85. This portion of the trail is within CDOT's existing ROW. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative.

High Line Canal Trail

The Preferred Alternative and Other Alternative each impact 124 meters (410 feet) of the existing High Line Canal Trail where it intersects with US 85. However, under both alternatives, this segment of the trail will be rerouted directly north of its current location to cross US 85 below grade. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative. The High Line Canal Trail is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information on Section 4(f) impact, see Chapter 6.0, *Section 4(f) Evaluation*.

Spring Gulch Equestrian Facility

The Preferred Alternative and Other Alternative each impact approximately 0.2 hectare (0.6 acre) of the Spring Gulch Equestrian Facility along US 85. The land impacted as a result of this alternative is not used for equestrian recreation. No secondary impact resulting from noise, visual, or impaired accessibility are anticipated as a result of either alternative. Spring Gulch Equestrian Facility is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information on this Section 4(f) impact, see Chapter 6.0, *Section 4(f) Evaluation*.

Table 5.3
Potential Recreation Impacts

Resource	Preferred Alternative	Other Alternative
Centennial Trail US 85 Corridor	2 meters* (6.5 feet)	2 meters* (6.5 feet)
High Line Canal Trail US 85 Corridor	124 meters (410 feet)	124 meters (410 feet)
Spring Gulch Equestrian Facility US 85 Corridor	0.2 hectare (0.6 acre)	0.2 hectare (0.6 acre)

** within CDOT ROW*

For additional information on recreation, see the ***Recreation Technical Report,*** May 2000, amended November 2000***,*** in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.2.6 Land Use and Zoning Impacts

This section discusses the effects of the proposed action on land uses and zoning as well as the effects of the project on DRCOG's ***Metro Vision 2020 Plan*** and the RTP (the fiscally constrained elements). More specifically, how the proposed action may or may not affect the extent of urban development, open space, free-standing communities, balanced multi-modal transportation systems, urban centers, and environmental quality.

Preferred Alternative and Other Alternative

This section considers potential impacts to land use and zoning within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. The FEIS Preferred Alternative and Other Alternative do not encourage substantial land use and zoning changes within the project corridor. Figure 5.3a and Figure 5.3b show land use and zoning along the I-25 Corridor. Figure 5.3c and Figure 5.3d show land use and zoning along the US 85 Corridor according to Douglas County and Town of Castle Rock plans.

The South I-25 Corridor and US 85 Corridor FEIS project proposes improvements to existing roadway facilities. This project does not create or induce growth, but is responding to current and projected demand. Creation of new jobs has been limited, this community is a bedroom community and employment is largely situated outside Douglas County. Three major links to employment for residents in Douglas County are US 85, I-25, and State Highway (SH) 83.

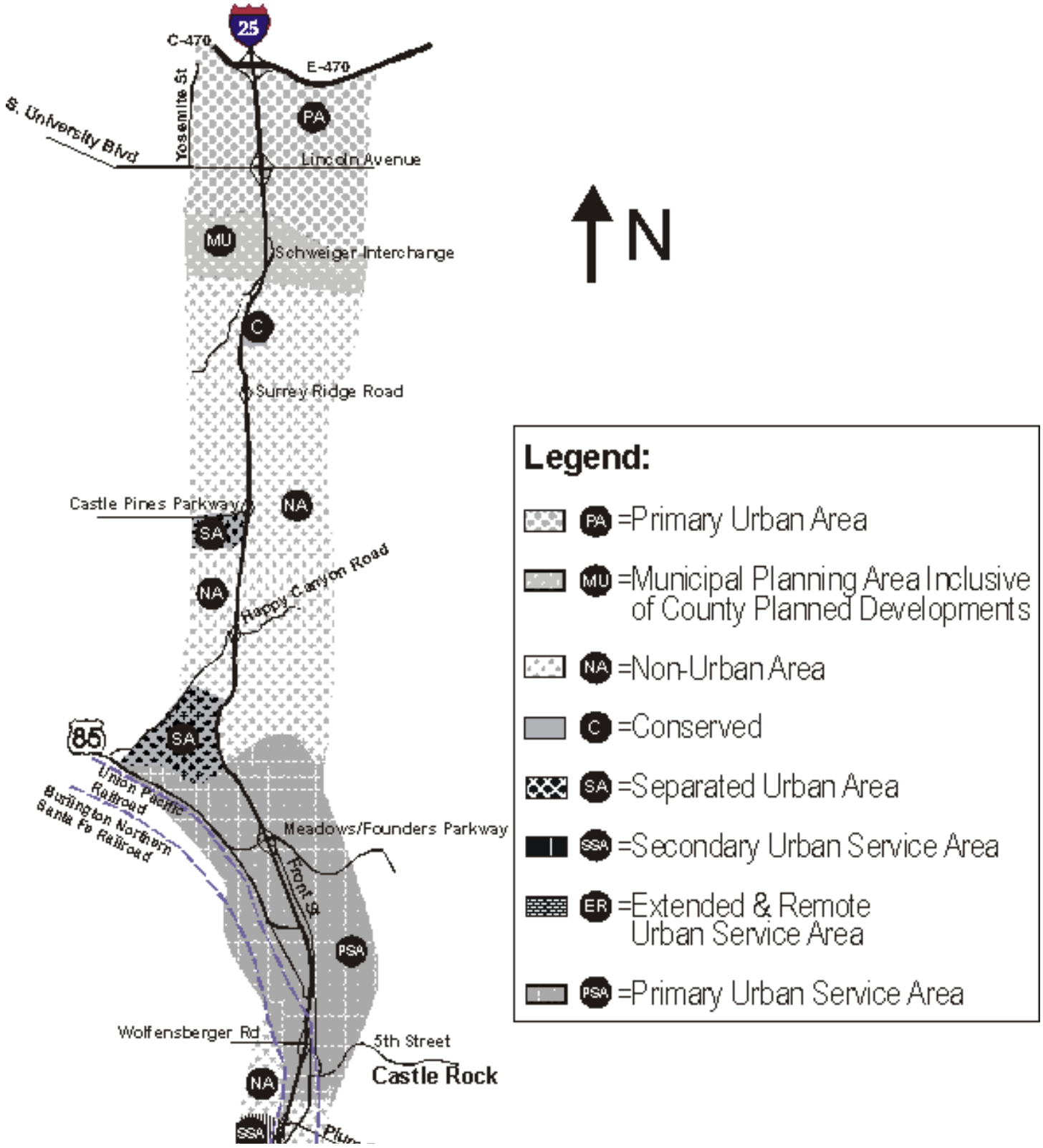
Douglas County growth trends have been consistent, indicating it will continue to be a growing area, independent of improvements to I-25 and US 85. Infrastructure needs will increase due to anticipated residential development and other actions. As a result, this project's impact on non-transportation infrastructure needs and tax changes for county and state residents are unforeseeable and impossible to assess beyond its purpose to provide improved transportation for current and proposed Douglas County land use.

Impacts on the Metro Vision 2020 Plan

The South I-25 Corridor and US 85 Corridor FEIS alternatives and the Long-Term Vision for South I-25 Corridor and US 85 Corridor Through 2020 and Beyond are in accordance with the Metro Vision 2020 Plan. The Metro Vision elements are discussed as follows:

- *Extent of urban development*. The Metro Vision 2020 Plan aims to contain urban development within 1,126 square kilometers (700 square miles) by the year 2020, accommodating expected population growth. This would add 265 square kilometers (165 square miles) to the existing urbanized area. If the current land use trend continues, the Denver region is expected to grow to 1,170 square kilometers (1,100 square miles) by the year 2020. Keeping urban growth to 1,126 square kilometers (700 square miles) will

Figure 5.3a
I-25 Corridor Land Use



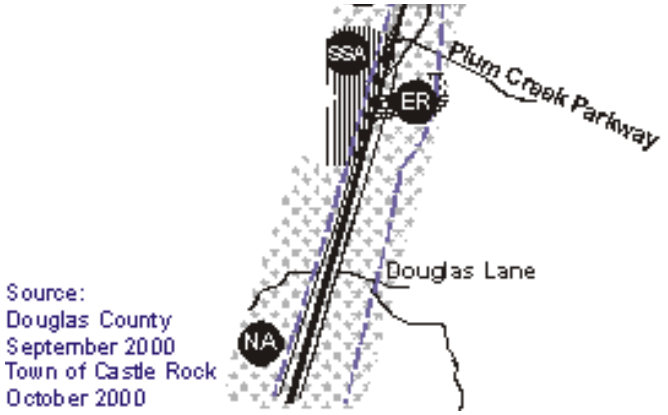
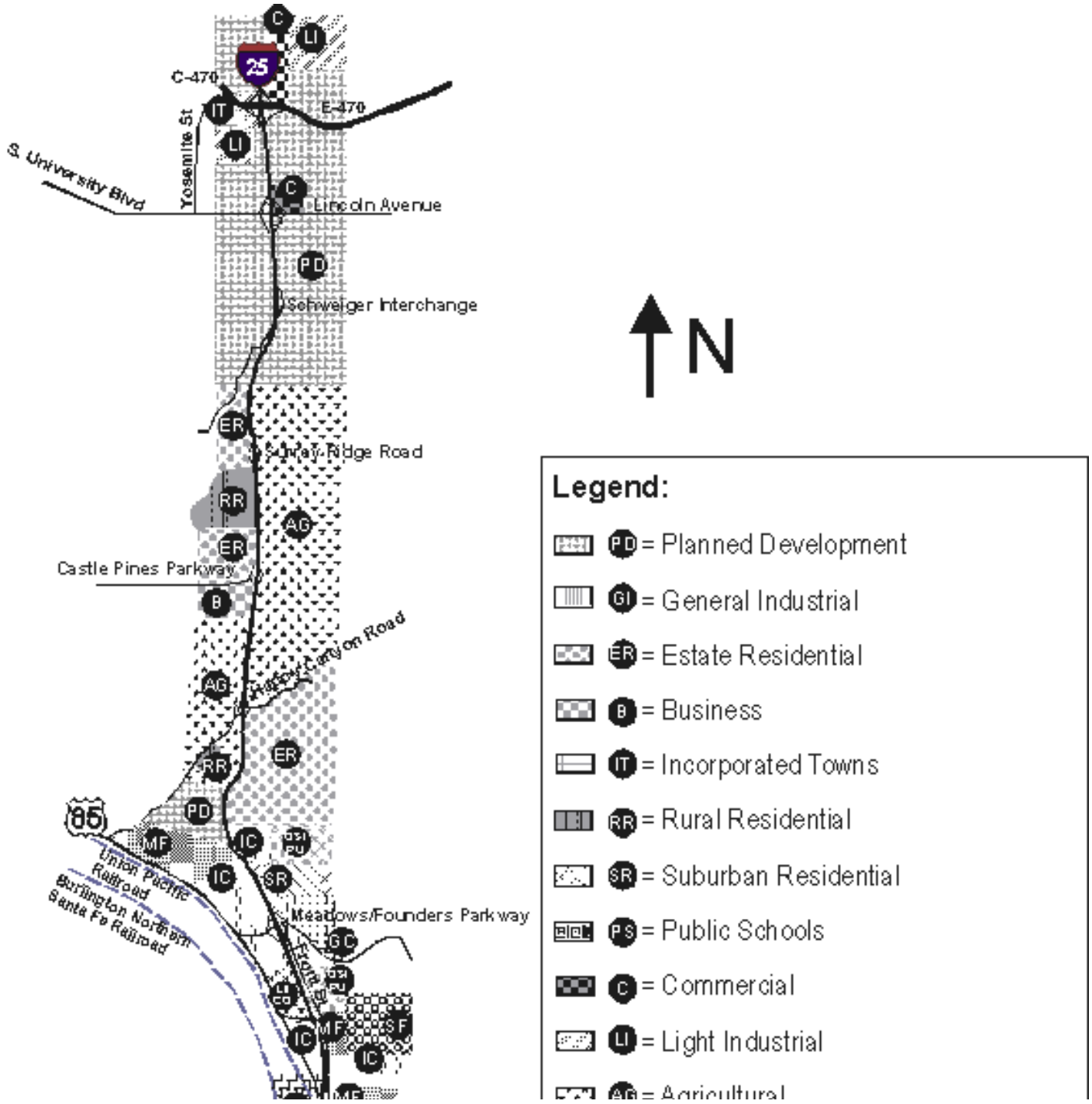


Figure 5.3b
I-25 Corridor Zoning



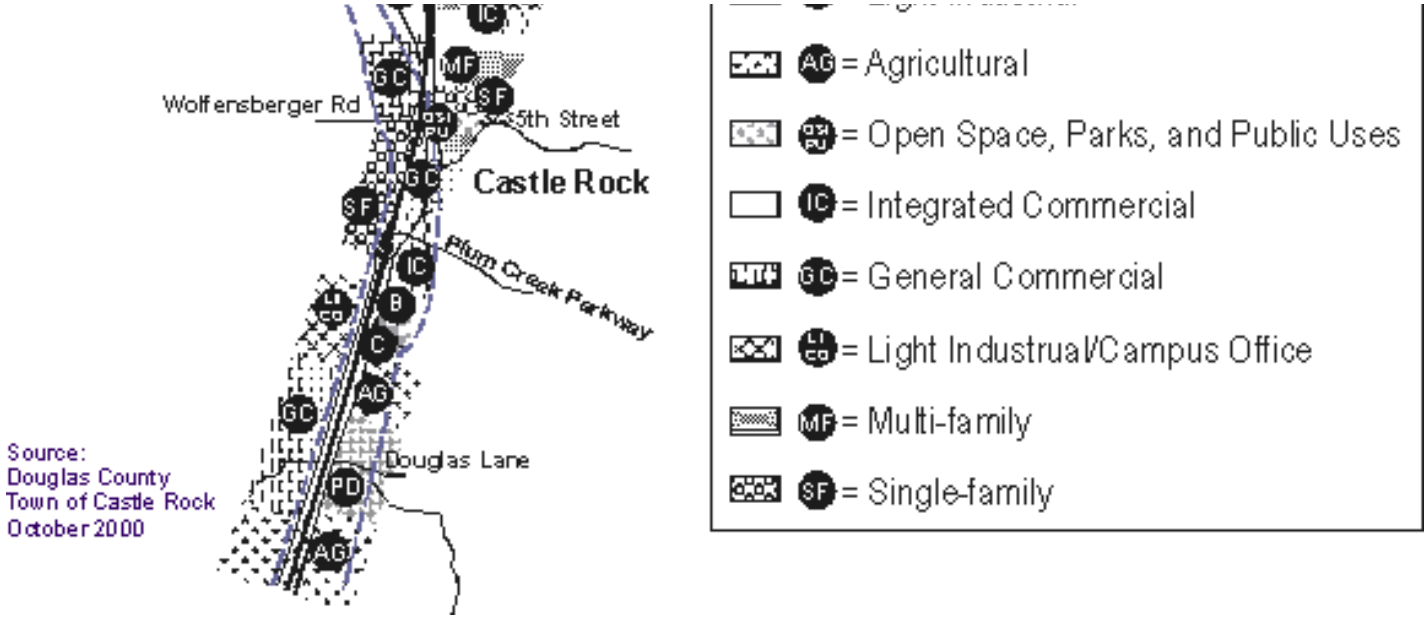
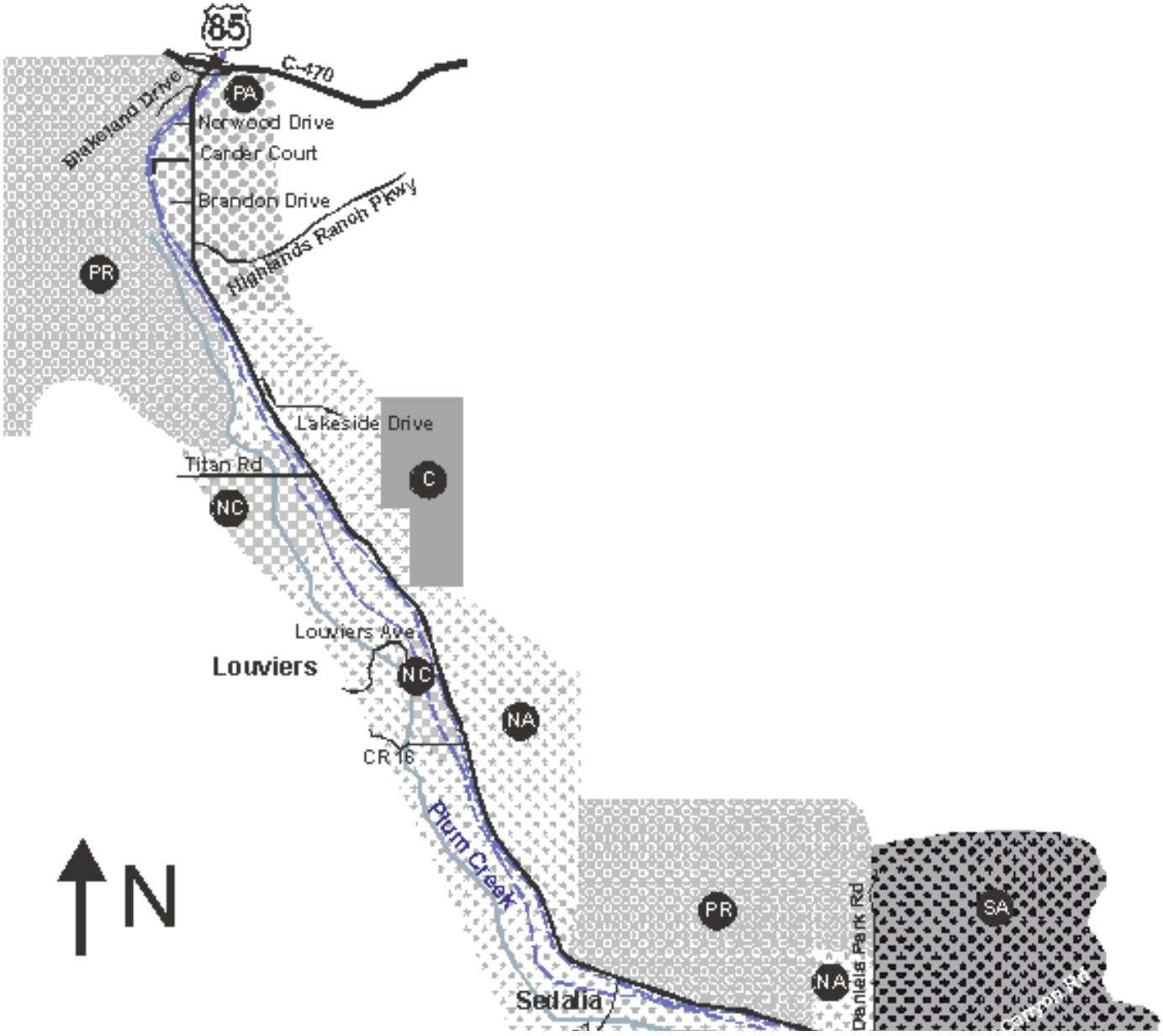


Figure 5.3c
US 85 Corridor Land Use



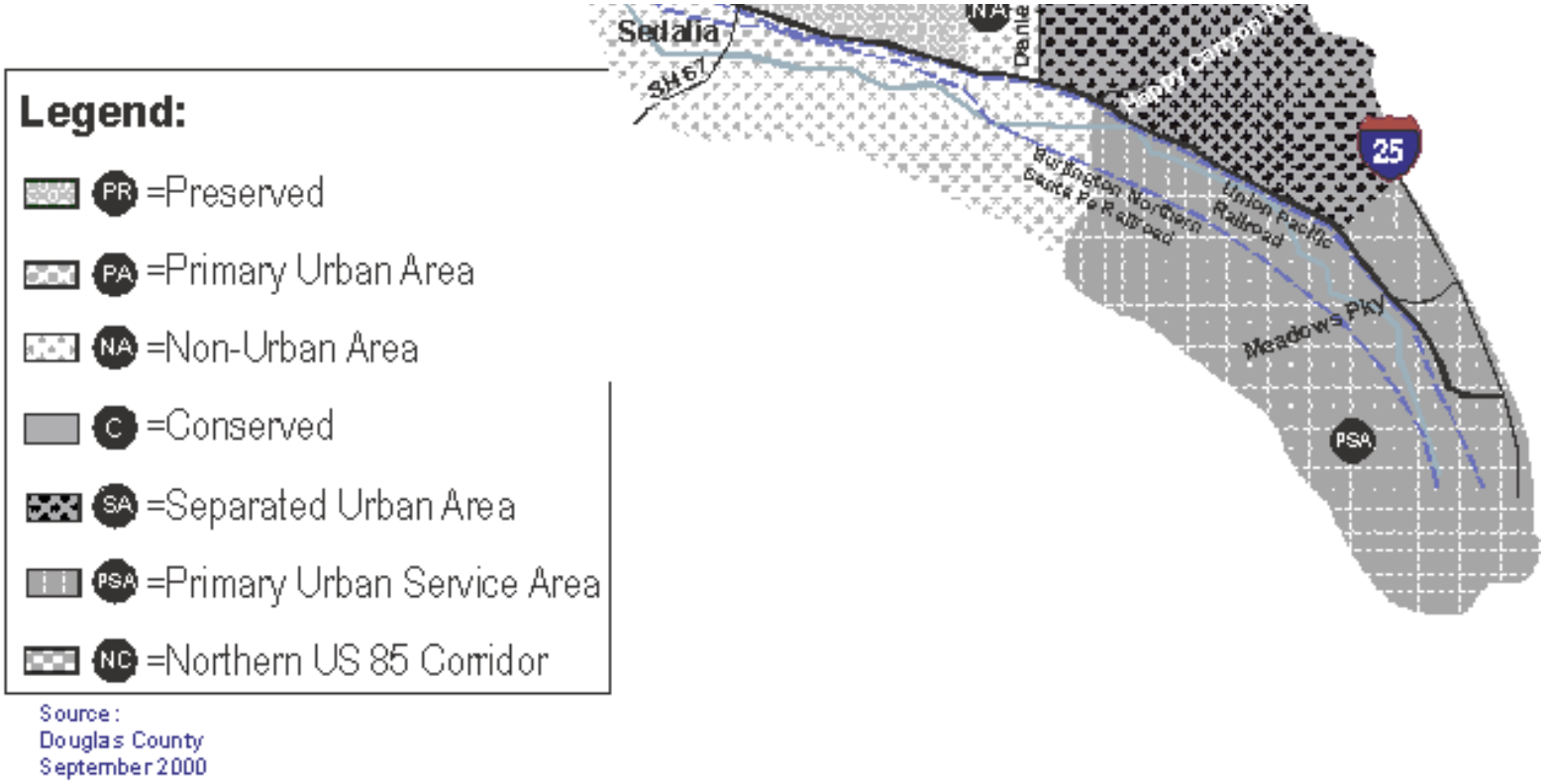
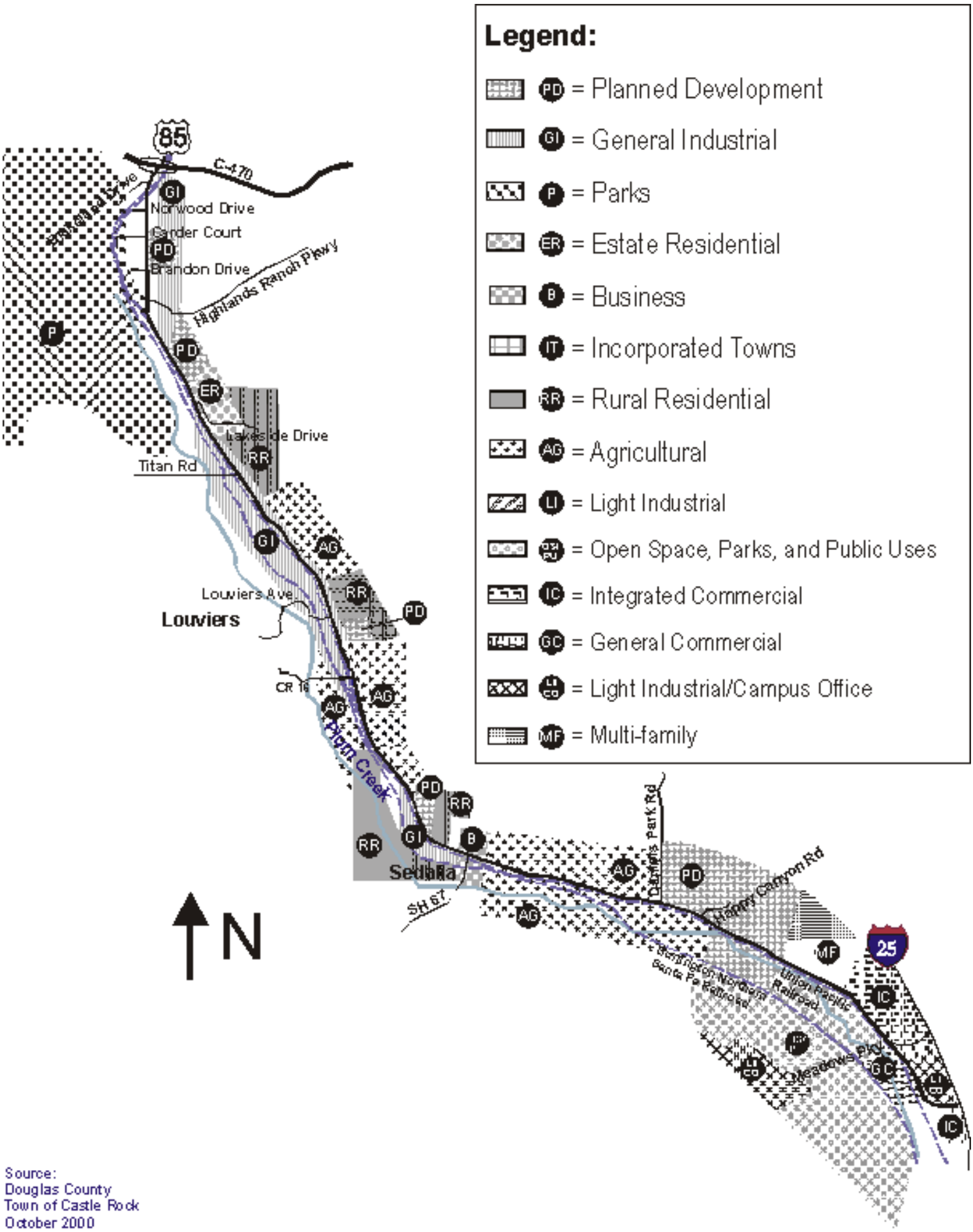


Figure 5.3d
US 85 Corridor Zoning



Source:
Douglas County
Town of Castle Rock
October 2000

encourage contiguous and orderly land development, help prevent unnecessary infrastructure extension, reduce vehicle travel, maintain air quality and help preserve open space. The regional Urban Growth Boundary creates predictability in planning for local and regional facilities and services, such as water, sewer, and roads, so that costs are reduced and can be managed efficiently. The South I-25 Corridor and US 85 Corridor FEIS Preferred Alternative and Other Alternative are responding to existing and planned travel conditions and is compatible with the Metro Vision's approach to urban development.

Currently, there is no demand for additional capacity to the south of the project. Therefore, it is not anticipated that the improvements would create additional growth. However, it is recognized that new developments will occur in the near future in Douglas County. From a cumulative perspective, the housing and commercial developments planned for Highlands Ranch, the Rampart Range area, Meridian, the Canyons, and the Douglas Lane area add a substantial number of persons to Douglas County. The extent of these developments is still not well defined but has been accounted for in DRCOG's plan used for transportation studies. However, the relative contribution of the highway project and its associated capacity are negligible in respect to the anticipated amount of growth effects from new development. It is not anticipated that the Preferred Alternative and the Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. For additional information, please refer to ***Section 5.3.2.8 Socioeconomic Cumulative Impacts*** of the FEIS.

In addition, as part of the FEIS, an access management plan has been developed for US 85. The access management plan evaluates existing and new access points along a highway. The purpose of the plan is to improve traffic flow and safety, reduce traffic conflicts, and provide appropriate access to adjacent land uses. Moreover, the access management plan will assist in managing growth.

- *Open space*. The Metro Vision encourages preservation of open space. Open space is being avoided where possible within each alternative. Douglas County has more than 15,000 hectares (37,000 acres) of open space within the county, which is managed by Douglas County Division of Open Space and Natural Resources. Douglas County Parks currently manages 120 hectares (293 acres) of developed parkland, and more than 970 hectares (2,400 acres) of unimproved open space.

  Douglas County is actively planning to preserve quality of life through planning and zoning. The preservation of open space is a critical component in maintaining quality of life and quality of environment. The county has been aggressive in purchasing open space and conservation easements, particularly along the I-25 Corridor and the US 85 Corridor. The county has a goal of protecting areas of visual significance and of wildlife habitat to preserve the quality of life for the residents and to protect the image and identity of Douglas County. Several studies have been conducted on this issue, including the ***High Plateau Conservation Area Study*** and the ***Douglas County Open Space Plan***. These plans will aid in managing of growth and development. Large areas recently purchased or acquired in the program include the Cherokee Ranch along US 85 and the Greenland Ranch near Larkspur. Additionally, 3,320 hectares (8,200 acres) south of the developed portion of Highlands Ranch was planned by Mission Viejo for open space and recreation at the inception of the Highlands Ranch Development. The county supports planning for Open Space Conservation Area (OSCA) to ensure its preservation.

  Moreover, the bicycle/pedestrian facilities also potentially tie into the open space areas to develop a network of trails. Governmental agencies, private citizens, and local organizations have attempted to preserve and improve existing trails, as well as plan for future trails in the area. The ***Douglas County***

Parks, Trails and Open Space Master Plan, 1998 provides a design for future interconnected trails throughout the project area. In addition, other agencies and organizations including Chatfield Basin Conservation Network, Colorado State Parks, US Army Corp of Engineers (USACE), Highlands Ranch Metropolitan District, Denver Water Board, and South Suburban Park and Recreation District have set similar goals to improve existing trails and increase the number of interconnecting trails within the area.

In addition to preserving open space and encouraging trail connectivity, wildlife is considered. Nearby protected open space areas not managed by Douglas County include Chatfield State Park, Plum Creek Riparian Corridor, Roxborough State Park, Pike National Forest, Woodhouse State Wildlife Area, Cherokee Ranch Foundation, and Highlands Ranch Open Space Conservation Area. These areas serve as refuges for wildlife and become increasingly important as surrounding lands are converted from agriculture and natural landscape to developed areas. Additionally, much of the project area between Daniels Park Road and Titan Road along US 85 is relatively undeveloped. A wildlife tracking study was completed along both corridors. Two enhanced wildlife crossings are included in the Preferred Alternative and Other Alternative to ensure wildlife connecting to the different open spaces.

- *Free-standing communities*. Free-standing communities are communities that are visually and physically separated from the core of the metro area, and strive to meet their residents' employment and service needs. The communities have the ability to balance jobs and housing. This balance reduces traffic, leading to less congestion and improved air quality. The communities retain town centers for focused mixed-use development and create internal and external transportation systems. The Town of Castle Rock is one of four communities designated as a free-standing community in the Metro Vision 2020 Plan. For Castle Rock to remain the free-standing community envisioned by the Denver Regional Council of Governments and the Town of Castle Rock, a non-urban buffer needs to surround the community. The South I-25 Corridor and US 85 Corridor FEIS alternatives are compatible with the Metro Vision's approach to free-standing communities. The FEIS Preferred Alternative works with the Douglas County Master Plan and the Town of Castle Rock transportation network to provide the good internal transportation system a free-standing community needs to support a reasonable job/housing balance. The non-urban buffer should not be impacted, as it is not anticipated that the Preferred Alternative and Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. The ability to travel quickly through the southern portion of Douglas County already exists. Once a southbound motorist passes the Castle Rock area, the LOS is very high, and traffic flows smoothly. Currently, there is no demand for additional capacity to the south of the project. Consequently, the project does not drive development further to the south or encourage drivers to go further to the south than they already do.

  The 5th Street Overpass Early-Action project and the US 85/I-25 Early-Action project will assist in the development of east/west connectors in the internal transportation system. The 5th Street Overpass project reduces demand at the Wolfensberger Interchange and improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. The US 85/I-25 Interchange project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway and I-25 Interchange. An overpass is constructed at the existing interchange location, connecting the east side of Castle Rock to the west side.

- *Balanced/multi-modal transportation system*. The Metro Vision shows inter-city rail along US 85 as part of the Rapid Transit Network. The Long-Term Vision for South I-25 Corridor and US 85 Corridor Through 2020 and Beyond calls for corridor preservation of the current freight rail system in an effort to

implement future commuter rail. Although the Long-Term Vision is not being fully evaluated in this FEIS, the alternatives do not preclude the construction of the elements identified in the Long-Term Vision. A transit demonstration project is being researched by others to test US 85 commuter rail popularity.

Fixed-guideway is shown along I-25 in the Long Term Vision for South I-25 and US 85 Through 2020 and Beyond. Fixed-guideway is not being evaluated as an alternative in this FEIS, but improvements are being developed as to not preclude transit. Planning for fixed-guideway along I-25 is in accordance with the Metro Vision Rapid Transit Network.

A car pool lot in the northeast corner of the Castle Pines Parkway Interchange is included as part of the Preferred Alternative and Other Alternative. Initially the car pool lot will have approximately 500 spaces and will be used by commuters. It is anticipated that the lot will serve as a future transit station. This lot is consistent with the Metro Vision Rapid Transit Network.

A more friendly bicycle environment is created in conjunction with the Preferred Alternative and the Other Alternative along the US 85 Corridor. Improvement alternatives include a grade-separated crossing for pedestrians and bicycles at the High Line Canal Trail and an improved crossing for the Centennial Trail. For additional information on bicycle/pedestrian facilities, please refer to ***Section 7.2.5 Recreational Resources*** of the FEIS.

- *Urban centers*. The Denver region's urban centers are envisioned as communities (urban villages) that are compact, have a mixture of uses, and are focused on pedestrian activity. They are intended to be locations that provide a range of retail, business, civic, cultural, service and diverse residential opportunities within the growing metropolitan area. Urban centers can help improve traffic congestion and air quality by keeping activities and services near where people live. They can serve as transit origins and destinations and are friendly to all travel modes. Local communities have discussed urban center plans for several locations in the South I-25 Corridor and US 85 Corridor FEIS study area, including Highlands Ranch, Rampart Range, and the Castle Rock Town Center. The South I-25 Corridor and US 85 Corridor FEIS is compatible with the Metro Vision's approach to urban centers. Although fixed-guideway is not being evaluated as an alternative in the FEIS, the future fixed-guideway will not be precluded. The Long-Term Vision calls for preservation of the current freight rail system in an effort to implement commuter rail in the future. The implementation of commuter rail will enable the construction of additional transit stations, thereby assisting in the development of urban centers.

- *Environmental quality*. The Metro Vision recognizes that the decisions made locally about how we grow and develop in the region will affect environmental factors, especially air and water quality. All the core elements of the Metro Vision work together to provide a balanced growth and development strategy that will lessen the negative environmental impacts on the region. CDOT will comply with appropriate federal, state, and local regulations to ensure that project-related impacts do not result in additional water quality degradation over current conditions. CDOT will obtain a Construction Stormwater Discharge Permit(s) for the Selected Alternative presented in the ROD. The Construction Stormwater Discharge Permit requires preparation of a Stormwater Management Plan (SWMP), site inspections every 14 days, and specific erosion control and pollution prevention measures. The SWMP is project-specific and will be prepared during the design phase. The SWMP will specify and describe BMPs needed to mitigate any potential adverse impacts to surface water quality resulting from construction activities in the I-25 Corridor and US 85 Corridor. The proposed improvements in the South I-25 Corridor and US 85 Corridor FEIS are

compatible with the core elements of the Metro Vision. For additional information on air quality and water quality, see Section 5.3.3.1 *Air Quality Impacts* and Section 5.3.3.2 *Water Quality and Quantity* of the FEIS.

Impacts on the Regional Transportation Plan

Improvements included in the Selected Alternative identified in the Record of Decision (ROD) must be in the RTP. If an improvement is not currently in the RTP but is recommended, then the RTP will need to be amended and the ROD will need to be revised.

The following elements evaluated in the South I-25 Corridor and US 85 Corridor FEIS are not currently included in the RTP:

- Six lanes between Highlands Ranch Parkway and Titan Road along the US 85 Corridor (Other Alternative)
- Rampart Range Interchange (Other Alternative)
- Removal of Schweiger Interchange ramps (Other Alternative)
- Full diamond interchange at Surrey Ridge (Other Alternative)

Impacts on the Castle Rock Town Wide Transportation Plan

The ***1994 Castle Rock Town Wide Transportation Plan*** recommends the following:

- Upgrade the I-25 Meadows/Founders Parkway Interchange to a partial cloverleaf design – One of the Early-Action projects
- Convert the US 85/I-25 Interchange to a local service crossing of I-25 only – One of the Early-Action projects
- Retain Liggett Drive as a crossing of I-25 – FEIS alternatives do not preclude this option
- Upgrade the I-25 Wolfensberger/Wilcox Interchange and supplement this crossing of I-25 with a new 5th Street Overpass – One of the Early-Action projects
- Upgrade the Plum Creek Parkway Interchange in the long-term future – FEIS alternatives do not preclude this option

Alternatives evaluated in this FEIS meet the goals and objectives of the Town of Castle Rock.

Impacts on the Douglas County Transportation Plan

The ***Douglas County 2015 Transportation Plan*** outlines transportation improvements that will be needed in

Douglas County in 5-year increments for the next 15 years. Some improvements related to the study area include:

- Construct 5th Street overpass across I-25 – One of the Early-Action projects
- Widen Meadows/Founders Parkway Interchange at I-25 from two to four lanes – One of the Early-Action projects
- Widen Titan Road between Moore Road and US 85 from two to four lanes – FEIS alternatives do not preclude this option

  Construct four-lane facility and bridge overpass at the existing US 85/I-25 Interchange>
- Signalize ramps at Plum Creek Parkway and I-25 Interchange– FEIS alternatives do not preclude this option
- Improve intersection at Wolfensberger and County Road 105 – FEIS alternatives do not preclude this option
- Construct a four-lane facility extension of Peoria Street between E-470 and Potomac – FEIS alternatives do not preclude this option
- Widen US 85 between Highlands Ranch Parkway and Meadows Parkway from two to four lanes – Part of the Preferred Alternative and Other Alternative
- Widen I-25 from Meadows Parkway to Wolfensberger Road from four to six lanes – FEIS alternatives do not preclude this option
- Widen US 85 from County Line Road to Highlands Ranch Parkway from four to six lanes – FEIS alternatives do not preclude this option
- Widen Meadows Parkway between I-25 and US 85 from four to six lanes – One of the Early-Action projects

Alternatives evaluated in this FEIS meet the goals and objectives of Douglas County.

5.3.2.7 Socioeconomic Secondary Impacts

The Preferred Alternative and Other Alternative add capacity to I-25 and US 85. A benefit of the additional capacity is improved north/south mobility throughout Douglas County. The result of improved mobility and travel times on an existing roadway does not necessarily lead to additional development. Douglas County is a desirable area as a residential community with or without roadway improvements. The per capita income of Douglas County is one of the highest of all counties in the state and the historic and future growth trends are among the largest in the nation. Changes to the economy or to the cost of housing are more likely to have impacts to the county’s growth, than implementation of the proposed highway improvements.

5.3.2.8 Socioeconomic Cumulative Impacts

The proposed improvements to the I-25 Corridor and US 85 Corridor, in combination with other highway projects, do not contribute to economic growth in a quantifiable way. Impacts to socioeconomic conditions are from residential development and increased growth and other foreseeable events. Given the fact that it has been almost fifty years since I-25 was constructed and US 85 has been improved, it would appear that improved transportation has had a historically negligible affect.

Improvements to the transportation system and the I-25 Corridor and US 85 Corridor are crucial for expected growth as well as for maintaining acceptable roadway operations and safety in Douglas County. The alternatives evaluated in this FEIS meet the goals and objectives of Douglas County.

It is not anticipated that the improvements would create additional growth to the south or into El Paso County. The ability to travel quickly through the southern portion of Douglas County already exists. Once a southbound motorist passes the Castle Rock area, the LOS is very high, and traffic flows smoothly. Currently, there is no demand for additional capacity to the south of the project. Consequently, the project does not drive development further to the south or encourage drivers to go further to the south than they already do.

The Preferred Alternative does not include new interchanges. If new interchanges are developed, such as Rampart Range (included in the Other Alternative), additional service-oriented business is likely to follow. However, it is noteworthy that existing interchanges that currently serve residential areas only, such as the interchanges at Surrey Ridge Road and Happy Canyon Road, do not have commercial services associated with them.

Additionally, as stated in the ***Douglas County Master Plan***, growth within Douglas County is directed toward areas within their urban growth boundaries. Douglas County has identified primary urban areas, municipal service areas, and separated urban areas. The county intends to support infrastructure improvements to these areas before other undeveloped areas. The county also encourages separation of these development areas and the preservation of open space. It is not anticipated that the project causes growth within or outside of the county's urban growth boundaries.

An analysis of cumulative impacts must take into consideration impacts from past, current, and reasonably foreseeable actions and their effects when added to the proposed project. In this situation, it is not only the cumulative impacts resulting from other transportation projects, but also from other developments that might use the transportation system in the foreseeable future. It is recognized that new developments will occur in the near future in Douglas County. From a cumulative perspective, the housing and commercial developments planned for Highlands Ranch, the Rampart Range Area, Meridian, the Canyons, and the Douglas Lane area add a substantial number of persons to Douglas County. The extent of these developments is still not well defined but has been accounted for in DRCOG's plan used for transportation studies. However, the relative contribution of the highway project and its associated capacity are negligible in respect to the anticipated amount of growth effects from new development.

It is not anticipated that the Preferred Alternative and Other Alternative will create growth or induce development. It is generally understood that growth will occur in Douglas County regardless of transportation enhancements. The county anticipates a population increase of roughly 180 percent by the year 2020. Resulting environmental damage such as loss of open space and wildlife habitat will be caused primarily by proposed developments such as those mentioned above and not by the improvements to the I-25 Corridor and US 85

Corridor. The Preferred Alternative and Other Alternative includes mitigation measures for environmental damages to resources, such as wetlands caused by the addition of lanes or changes to bridge structures, as required by law, but it does not compensate or mitigate for the damages caused by future housing and commercial developments. Environmental degradation caused by these developments will be addressed through municipal, county, and state permits and clearances.

In cases where the project causes potential minor impacts, there are no substantial cumulative effects. This is due to the fact that impacts of other projects are also minor, temporary, can be fully mitigated, or the effects are controlled by planning and development regulations in the potentially effected areas.

5.3.3 Physical Impacts

5.3.3.1 Air Quality Impacts

Corridor-Level Emission Impacts

The air quality status of the Central Front Range Air Quality Region is currently designated as non-attainment for carbon monoxide (CO) and fine particulate (PM_{10}). The current emission budgets for the horizon years (2010 and 2020) are 800 tons per day for CO and 60 tons per day for PM_{10}.

Corridor-level impacts were determined based on the daily vehicle miles traveled (VMT). The VMT of each of the three FEIS alternatives for 2010 and 2020 were used to determine levels of emissions from the proposed project. The emission factors utilized were generated by the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD).

Carbon Monoxide (CO) "Hot-Spot" Screening Analysis for Selected Intersections

The "hot-spot" screening analysis was performed on selected intersections along the I-25 Corridor and US 85 Corridor. The closest signalized intersection on either side of each interchange on I-25, and each signalized intersection on US 85 were analyzed for LOS using current and projected traffic count information. If an intersection can demonstrate a LOS C or better, then this intersection by EPA definition cannot lead to a violation of the National Ambient Air Quality Standards (NAAQS), and no additional analysis is required. An intersection that demonstrates a LOS D or worse is subject to "hot-spot" modeling.

The LOS results were generated from traffic analysis modeling of the I-25 Corridor and US 85 Corridor specifically used in assessing the impacts of each alternative.

PM_{10} "Hot-Spot" Analysis

The requirements for performing a PM_{10} quantitative "hot-spot" analysis will not take effect until the Environmental Protection Agency (EPA) releases modeling guidance on this subject and announces in the Federal Register that these requirements are in effect. EPA has not released its modeling guidance to date; therefore, these requirements are not in effect for this project. As a result a PM_{10} "hot-spot" analysis will not be conducted for this project.

The PM_{10} air quality dispersion modeling that was conducted for the RTP and transportation improvement program (TIP) shows that there would be no exceedances of the PM_{10} standard in the project area.

Carbon Monoxide (CO) "Hot-Spot" Modeling Analysis for Selected Intersections

Those intersections that demonstrated a LOS of D or worse were modeled using the CAL3QHC model to determine the estimated CO concentrations at the "hot-spot" intersections. The background CO concentrations included in the projected ambient levels are 4.5 parts per million (ppm) for the 1-hour concentration, and 3.1 ppm for the 8-hour concentration. The CO NAAQS for the 1-hour level is 35 ppm, and for the 8-hour level is 9 ppm.

No-Action Alternative

I-25 Corridor Air Quality Impacts (No-Action Alternative)

Average daily VMT for the I-25 Corridor is estimated at 1,350,000 (2010) and 1,613,400 (2020) for the No-Action Alternative. The air pollution emissions associated with the I-25 Corridor are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the No-Action Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln a.m. peak for 2020
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2010
- Northbound Lincoln a.m. peak for 2020
- Northbound Lincoln p.m. peak for 2010
- Northbound Lincoln p.m. peak for 2020
- Northbound Castle Pines a.m. peak for 2020
- Northbound Happy Canyon p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2020

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (No-Action Alternative)

The daily VMT for the US 85 Corridor is estimated at 259,300 (2010) and 313,300 (2020) for the No-Action Alternative. The air pollution emissions associated with the US 85 Corridor are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the No-Action Alternative (CO hot-spot analysis is not required):

- Town Center a.m. peak for 2020
- Town Center p.m. peak for 2020
- Blakeland a.m. peak for 2010
- Blakeland a.m. peak for 2020
- Blakeland p.m. peak for 2010
- Blakeland p.m. peak for 2020
- Highlands Ranch a.m. peak for 2010
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Louviers a.m. peak for 2010
- Louviers a.m. peak for 2020
- Louviers p.m. peak for 2010
- Louviers p.m. peak for 2020
- Sedalia a.m. peak for 2010
- Sedalia a.m. peak for 2020
- Sedalia p.m. peak for 2010
- Sedalia p.m. peak for 2020
- Meadows Parkway a.m. peak for 2020

- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown at the end of this section on Table 5.7.

Preferred Alternative

I-25 Corridor Air Quality Impacts (Preferred Alternative)

The average VMT for the I-25 Corridor is estimated at 1,462,700 (2010) and 1,748,000 (2020) for the Preferred Alternative. The air pollution emissions associated with the Preferred Alternative are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Preferred Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln p.m. peak for 2010
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2020
- Northbound Meadows/Founders p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2010
- Southbound Wolfensberger p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 37 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (Preferred Alternative)

The daily VMT for the US 85 Corridor is estimated at 263,100 (2010) and 314,400 (2020) for the Preferred Alternative. The air pollution emissions associated with the Preferred Alternative are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Preferred Alternative (CO hot-spot analysis is not required):

- Town Center p.m. peak for 2010
- Town Center p.m. peak for 2020
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Meadows Parkway a.m. peak for 2010
- Meadows Parkway a.m. peak for 2020
- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 68 percent as compared to the No-Action Alternative

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown at the end of this section on Table 5.7.

Other Alternative

I-25 Corridor Air Quality Impacts (Other Alternative)

The average daily VMT for the I-25 Corridor is estimated at 1,472,200 (2010) and 1,759,400 (2020) for the Other Alternative. The air pollution emissions associated with the Other Alternative are represented on Table 5.4 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Other Alternative (CO hot-spot analysis is not required):

- Southbound Lincoln p.m. peak for 2010
- Southbound Lincoln p.m. peak for 2020
- Northbound Lincoln a.m. peak for 2020

- Northbound Lincoln p.m. peak for 2020
- Northbound Meadows/Founders p.m. peak for 2020
- Southbound Wolfensberger p.m. peak for 2010
- Southbound Wolfensberger p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 45 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the I-25 Corridor is shown at the end of this section on Table 5.6.

US 85 Corridor Air Quality Impacts (Other Alternative)

The VMT for the US 85 Corridor is estimated at 264,700 (2010) and 316,300 (2020) for the Other Alternative. The air pollution emissions associated with the Other Alternative are represented on Table 5.5 at the end of this section.

The following signalized intersections demonstrate a LOS D or worse for the Other Alternative (CO hot-spot analysis is not required):

- Town Center p.m. peak for 2010
- Town Center p.m. peak for 2020
- Highlands Ranch a.m. peak for 2020
- Highlands Ranch p.m. peak for 2010
- Highlands Ranch p.m. peak for 2020
- Meadows Parkway a.m. peak for 2010
- Meadows Parkway a.m. peak for 2020
- Meadows Parkway p.m. peak for 2010
- Meadows Parkway p.m. peak for 2020

The number of intersections that demonstrated LOS D or worse decreased by 64 percent as compared to the No-Action Alternative.

The "hot-spot" modeling determined that these intersections were in compliance with the CO NAAQS. A summary of the "hot-spot" modeling analysis along the US 85 Corridor is shown in at the end of this section Table 5.7.

Table 5.4
I-25 Corridor Projected Air Quality Emission Levels

	Hydrocarbons (HC)		Carbon Monoxide (CO)		Oxides of Nitrogen (NO_x)		Fine Particulate Matter (PM_{10})	
Year	2010	2020	2010	2020	2010	2020	2010	2020
No-Action Alternative	1.34	1.03	11.68	9.15	2.47	2.61	1.04	1.24
Preferred Alternative	1.46	1.12	12.7	9.91	2.67	2.83	1.13	1.35
Other Alternative	1.47	1.12	12.7	9.97	2.69	2.85	1.14	1.36

Note: Vehicles in 2020 will run cleaner and emit less pollutants; therefore, in some cases, 2020 pollutants are predicted to be slightly less then year 2010 pollutants.

Table 5.5
US 85 Corridor Projected Air Quality Emission Levels

	Hydrocarbons (HC)		Carbon Monoxide (CO)		Oxides of Nitrogen (NO_x)		Fine Particulate Matter (PM_{10})	
Year	2010	2020	2010	2020	2010	2020	2010	2020
No-Action Alternative	0.20	0.24	2.80	2.57	0.52	0.56	0.20	0.24
Preferred Alternative	0.20	0.24	2.85	2.58	0.53	0.56	0.20	0.24
Other Alternative	0.20	0.24	2.86	2.60	0.53	0.56	0.20	0.24

Note: Vehicles in 2020 will run cleaner and emit less pollutants; therefore, in some cases, 2020 pollutants are predicted to be slightly less then 2010 pollutants.

Table 5.6
I-25 Corridor "Hot-Spot" Modeling Analysis Results

Location	Peak	Year	No-Action Alternative		Preferred Alternative		Other Alternative	
			CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)
SB Lincoln	p.m.	2010	*	*	7.1	5.0	7.1	4.9
NB Lincoln	a.m.	2010	7.0	4.8	N/A	N/A	N/A	N/A
NB Lincoln	p.m.	2010	7.9	5.5	N/A	N/A	N/A	N/A
NB Castle Pines	p.m.	2010	*	*	N/A	N/A	N/A	N/A
SB Wolfensberger	p.m.	2010	N/A	N/A	6.0	4.2	6.0	4.2
SB Lincoln	a.m.	2020	6.4	4.4	N/A	N/A	N/A	N/A
SB Lincoln	p.m.	2020	7.0	4.9	7.0	4.9	6.6	4.6
NB Lincoln	a.m.	2020	7.0	4.8	6.6	4.6	6.4	4.4
NB Lincoln	p.m.	2020	8.0	5.5	7.4	5.1	*	*
NB Castle Pines	a.m.	2020	5.3	3.7	N/A	N/A	N/A	N/A
NB Happy Canyon	p.m.	2020	5.1	3.5	N/A	N/A	N/A	N/A
NB Meadows/Founders	p.m.	2020	N/A	N/A	6.6	4.6	6.1	4.2
SB Wolfensberger	p.m.	2020	5.7	3.9	6.2	4.3	6.1	4.2

Note: CO 1-hour levels include a background of 4.5 ppm and 8-hour levels include a background of 3.1 ppm.
N/A: Not Applicable
**Researching information at this location*

Table 5.7
US 85 Corridor "Hot-Spot" Modeling Analysis Results

Location	Peak	Year	No-Action Alternative		Preferred Alternative		Other Alternative	
			CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)	CO 1-hour (35 ppm)	CO 8-hour (9 ppm)
Town Center	p.m.	2010	N/A	N/A	8.1	5.6	7.4	5.1
Blakeland	a.m.	2010	6.6	4.6	N/A	N/A	N/A	N/A
Blakeland	p.m.	2010	6.8	4.7	N/A	N/A	N/A	N/A
Highlands Ranch	a.m.	2010	6.7	4.6	N/A	N/A	N/A	N/A
Highlands Ranch	p.m.	2010	7.4	5.1	7.5	5.2	7.6	5.3
Louviers	a.m.	2010	5.8	4.0	N/A	N/A	N/A	N/A
Louviers	p.m.	2010	5.8	4.0	N/A	N/A	N/A	N/A
Sedalia	a.m.	2010	8.0	5.6	N/A	N/A	N/A	N/A
Sedalia	p.m.	2010	7.2	5.0	N/A	N/A	N/A	N/A
Meadows	a.m.	2010	N/A	N/A	7.1	4.6	7.0	4.5
Meadows	p.m.	2010	8.0	5.6	8.4	5.8	8.1	5.6
Town Center	a.m.	2020	7.1	4.9	N/A	N/A	N/A	N/A
Town Center	p.m.	2020	7.3	5.1	8.1	5.6	7.3	5.1
Blakeland	a.m.	2020	6.6	4.6	N/A	N/A	N/A	N/A
Blakeland	p.m.	2020	6.9	4.8	N/A	N/A	N/A	N/A
Highlands Ranch	a.m.	2020	7.6	5.3	7.6	5.3	7.0	4.9
Highlands Ranch	p.m.	2020	7.3	5.1	7.1	4.9	7.3	5.1
Louviers	a.m.	2020	5.8	4.0	N/A	N/A	N/A	N/A
Louviers	p.m.	2020	5.5	3.8	N/A	N/A	N/A	N/A
Sedalia	a.m.	2020	7.7	5.3	N/A	N/A	N/A	N/A
Sedalia	p.m.	2020	7.0	4.9	N/A	N/A	N/A	N/A
Meadows	a.m.	2020	6.8	4.7	7.4	5.1	7.4	5.1
Meadows	p.m.	2020	8.0	5.6	8.5	5.9	8.4	5.8

Note: CO 1-hour levels include a background of 4.5 ppm and 8-hour levels include a background of 3.1 ppm.
N/A: Not Applicable

Other Pollutants of Concern

Toxic Air Constituents

In addition to the NAAQS set forth by EPA for the six criteria pollutants, EPA has also established a list of 33 urban hazardous air pollutants. This list of pollutants includes air toxics emitted from stationary (factories), non-road (lawnmowers, airplanes, etc.) and road (cars, trucks, and buses) sources.

In order to better understand the harmful effects road sources have on human health, the EPA has also developed a list of 22 mobile source air toxics (MSAT). Toxics such as benzene, formaldehyde, diesel exhaust, lead and 1,3 butadiene are included on the list of 22 MSATs. People are exposed to the MSATs in six basic ways: airborne emissions from burning of fuel, airborne emissions from partially burning the fuel, emissions from evaporating fuel primarily at filling stations, chemical reactions that transform MSATs once they are released to the air into other MSATs, and airborne exposure to warn engine parts, tires or brakes and direct exposure to toxics through drinking water sources from leaking underground fuel storage tanks.

Studies are currently being conducted by the EPA to better understand the rates at which these MSATs are emitted. They are also developing an air toxics model called the Assessment System for Population Exposure Nationwide (ASPEN). The ASPEN will help predict areas where toxics may be concentrated based on emission estimates of toxic air pollutants and meteorological data from the National Weather Service.

Greenhouse Gas

Carbon dioxide (CO_2) is a "greenhouse gas" that is a global concern. The Colorado APCD has developed a list of CO_2 reduction strategies and will be considering CO_2 reduction options that will affect point, area, and mobile sources on a region-wide basis. The transportation sector in Colorado represents approximately 28 percent of the CO_2 emissions. The Preferred Alternative results in a 7.24 percent increase in CO_2 emissions in 2010 and a 7.04 percent increase in CO_2 emissions in 2020 over the No-Action Alternative for the proposed project.

Air Quality Secondary Impacts

Secondary air quality impacts that may result from changes in the pattern of land use, population density, or growth rate include:

- Increased emissions from natural gas space and hot-water heating systems installed in new residential, commercial, recreational and industrial facilities
- Increased emissions from new commercial and industrial facilities that provide increased employment in the region
- Increased emissions from electric generating systems in the air quality region needed to serve the projected growth
- Increased emissions from new home heating fireplaces and out door barbecue appliances
- Increased emissions from additional lawn mower usage

However, these secondary or indirect impacts are accounted for in the development and implementation of the State Implementation Plan (SIP), which combines these impacts with the transportation related impacts to ensure compliance with the NAAQS.

Air Quality Cumulative Impacts

A transportation plan or RTP is the official intermodal metropolitan transportation plan that is developed through the metropolitan planning process for the metropolitan planning area. A TIP is a staged, multi-year, intermodal program of transportation projects covering the metropolitan planning area, which is consistent with the metropolitan transportation plan. The RTP and TIP account for the vast majority of transportation projects well into the future. When planning for and approving these transportation projects, air quality is taken into consideration and modeled to show that the projects will not have an adverse affect on air quality. In turn, the RTP and TIP are then tested for conformity with the SIP, which not only includes the transportation-related emissions, but also includes all other sources of emissions related to the future growth of a region.

Hence, for any transportation project that has already been approved, the cumulative impacts of air quality have already been assessed and determined to be acceptable. The Preferred Alternative is part of DRCOG's conforming RTP and 2001-2006 TIP, and the cumulative impacts of air quality in combination with other transportation projects are within pre-determined acceptable levels.

For additional information on air quality, see the ***Air Quality Analysis South I-25 Corridor and US 85 Corridor,*** November 2000.

5.3.3.2 Water Quality and Quantity

Impacts to surface water quality and quantity are of primary concern within and adjacent to the area of potential effect (APE). However, potential impacts to surface water quality and water resources may result from proposed construction activities in and adjacent to perennial and intermittent streams such as Happy Canyon Creek, East Plum Creek, and Marcy Gulch. Temporary and permanent impacts that may result from either build alternative include:

- Temporary increases in sediment loading to surface waters during and immediately after construction from the movement of heavy machinery in and around the channel and banks.
- Construction-related discharges of concrete wash or saw water. Concrete wash water is highly alkaline, contains fine particles of suspended solids that are difficult to settle out, and can be detrimental or fatal to aquatic organisms.
- Temporary increases in petroleum distillates in surface waters due to the movement of heavy machinery in the stream channels or spills of gasoline, diesel fuel, and engine oils.
- Permanent impacts to water temperature and riparian buffer vegetation due to bridge widening at East Plum Creek.
- Increases in phosphorus levels due to increased run-off.

Water quality impacts potentially resulting from construction will be prevented or minimized. Any industrial wastewater generated during construction activities will be treated to water quality standards before being discharged to the land surface for dust suppression. The potential for fuel and other spills to reach state waters will be minimized through implementation of the spill prevention and emergency response plan created for this project. Discharges from construction dewatering activities are not expected to be substantial in the I-25 Corridor and US 85 Corridor.

Impacts to groundwater are not expected from any of the alternatives because local aquifers occur at depths significantly below ground surface. The South I-25 Corridor and US 85 Corridor EIS is not expected to need a construction dewatering permit because the Dawson Aquifer occurs more than 30 meters (98 feet) below I-25 and the Plum Creek Alluvial Aquifer occurs between 6 and 24 meters (20 to 80 feet) below US 85.

The expected growth in Douglas County will likely lead to the designation of the Town of Castle Rock area as a Municipal Separate Storm Sewer System Phase II permit area. It is important to mention this possibility to ensure adequate steps are taken during the design phase to comply with the permit (acquire ROW, design of adequate stormwater control structures, provide for inspections and maintenance).

Preferred Alternative

I-25 Corridor Water Quality Impacts (Preferred Alternative)

The Preferred Alternative is not expected to result in substantial impacts to water quality (including groundwater). Construction of bridge footings within, and construction activities adjacent to, East Plum Creek and Happy Canyon Creek, will likely result in sediment discharges and increased suspended solids and turbidity downstream from the construction site. These impacts are expected to be small and temporary in nature and are not expected to increase annual total suspended solids (TSS) loads over time. Mandatory adherence to national, state, and local water quality, stormwater, and drainage regulations ensure that project related impacts do not result in additional water quality degradation over current conditions. Shading is a permanent impact related to bridge widening that can affect stream temperatures and streamside vegetation. Impacts related to an increase in shading will be negligible due to the relatively small projected increase in bridge widths at Happy Canyon and East Plum Creeks.

US 85 Corridor Water Quality Impacts (Preferred Alternative)

The Preferred Alternative is not expected to result in substantial impacts to water quality (including groundwater) for the reasons discussed in the Preferred Alternative I-25 Corridor section. However, the Preferred Alternative has the potential to positively benefit water quality and re-establish hydrologic connections along the US 85 Corridor through cross-culvert resizing, reconstruction, or clearing of obstructions. Over the years many of the cross-culverts have become clogged with debris causing potential erosion of surface and side slopes. Cross-culverts can be cleared, resized, or reconstructed, as required, to re-establish hydrologic connections and minimize sediment delivery to the Plum Creek, East Plum Creek, and Other Waters of the US. These measures also reduce the risk of flooding that can occur when surface water ponds behind clogged culverts.

Other Alternative

I-25 Corridor Water Quality Impacts (Other Alternative)

Impacts from the Other Alternative are projected to be slightly larger than those discussed for the Preferred Alternative. This is due to a new crossing of Happy Canyon Creek by the proposed frontage road. Though intermittent, work in the stream channel could temporarily increase downstream sediment loads and TSS.

US 85 Corridor Water Quality Impacts (Other Alternative)

Impacts from the Other Alternative are not expected to be substantially different from those discussed in the Preferred Alternative.

Table 5.8 summarizes the impervious surface area associated with each of the proposed alternatives. The use of impervious surface area as a water quality metric may underestimate the area of land disturbed, and associated water quality impacts from erosion and sedimentation, during the construction phase, because this measurement does not include temporary staging areas, possible traffic detours, and other construction related disturbances. These additional disturbances, however, are expected to be similar for the two construction alternatives. Moreover, these temporary disturbances will be operated and reclaimed according to the Stormwater Management Plans (SWMPs) created for the FEIS alternatives. SWMPs contain provisions to control stormwater runoff and minimize potential impacts to water quality. Totals presented on Table 5.8 do not include Early-Action projects that are included as part of the No-Action Alternative.

Table 5.8
Potential Water Quality Impacts
Square Meters (Square Feet) of Impervious Surface Area

	No-Action Alternative*	Preferred Alternative*	Other Alternative*
I-25 Corridor	592,383 (6,377,269)	1,048,801 (11,285,096)	1,191,194 (12,817,247)
US 85 Corridor	257,701 (2,772,862)	711,452 (7,655,223)	732,544 (7,882,178)
Total	830,384 (9,150,131)	1,760,253 (18,940,319)	1,923,737 (20,699,411)

**Total does not include impermeable surface area created by the Early-Action projects*

Water Quality Secondary Impacts

Secondary impacts are projected to be negligible for both corridors and both alternatives due to adherence to mandatory county, state, and federal regulations. Best management practices (BMPs) should preclude any increases in sediment loading, stormwater runoff, and pollutant loading downstream of the construction sites during construction and operation of the new highway surfaces. However, potential secondary impacts to water quantity and quality include:

- *Water Quantity*. Changes in stormwater runoff volume due to increased impervious surface area, changes in drainage pattern, or reductions in floodplain capacity.

- *Water Quality*. Elevated inputs of pollutants to surface waters from increased traffic flow and increased

maintenance activities. Types of pollutants potentially include sand, de-icers (e.g., salt, liquid magnesium chloride), hydrocarbons, and metals including lead, zinc, iron, chromium, cadmium, nickel, and copper.

- Either water quantity or water quality impacts may result in loss or degradation of riparian and aquatic habitat, loss of aesthetics; degradation of recreation areas (e.g., Chatfield Reservoir); loss of recreation opportunity; increased water treatment costs; and declines in human health.

I-25 Corridor Water Quantity Secondary Impacts

The Preferred Alternative along the I-25 Corridor results in 77 percent more impervious surface area than the No-Action Alternative. The frontage road and interchange improvements included in the Other Alternative increases impervious surface area by an additional 14 percent over the Preferred Alternative, or 101 percent more than the No-Action Alternative along the I-25 Corridor. Both build alternatives generate additional stormwater runoff compared to the No-Action Alternative; however, increased run-off volume will be accommodated by adequate drainage systems. For example, stormwater mitigation typically involves construction of stormwater retention basins with outlets sized to release historic flow levels, to prevent downstream conveyance of stormwater in excess of historic levels. As a result, neither build alternative is expected to adversely impact water quantity or quality downstream from the project corridor over the short- or long-term.

US 85 Corridor Water Quantity Secondary Impacts

The Preferred Alternative along the US 85 Corridor increases impervious surface area by 176 percent over the No-Action Alternative due to mainline widening, mainline reconstruction, and the detached bicycle/pedestrian facilities. The Other Alternative adds two additional lanes between Highlands Ranch Parkway and Titan Road, increasing impermeable surface area by 3 percent over the Preferred Alternative. Appropriate sizing of the drainage system, including retention basins, designed and implemented for either alternative, should adequately control the additional stormwater run-off generated.

I-25 Corridor Water Quality Secondary Impacts

Types and concentrations of pollutants present in highway runoff are affected by factors such as: traffic characteristics, climatic conditions, maintenance practices, surrounding land use, adjacent vegetation types, and institutional characteristics, e.g., litter laws or car emission regulations. CDOT applies a maximum of 0.23 metric ton (500 pounds) of a sand/salt mixture to each lane-mile, equal to 5,900 m^2 (63,360 ft^2) of paved surface, per winter storm. CDOT is beginning to substitute liquid magnesium chloride, and other de-icing compounds, for the traditional sand/salt mixture.

The additional driving surfaces constructed as part of the Preferred Alternative require additional application of winter traction materials over the No-Action Alternative along the I-25 Corridor. The additional application of traction material is estimated to be no more than 17.8 metric tons (38,700 pounds) per storm event, or 77 percent more than the No-Action Alternative. Under the Other Alternative 5.6 metric tons (12,067 pounds) per storm additional sand material would be applied over the Preferred Alternative. As part of the SWMP, construction of retention structures will benefit water quality by allowing solids and other contaminants to settle out of stormwater runoff.

US 85 Corridor Water Quality Secondary Impacts

The Preferred Alternative sand-application rate increases by 17.7 metric tons (39,000 pounds) per storm, 176 percent more than application rates under the No-Action Alternative along the US 85 Corridor. The Other Alternative sand application rate increases by 0.82 metric ton (1,787 pounds) per storm over the Preferred Alternative.

Water Quality Cumulative Impacts

The cumulative impact of changing land uses, from rural to suburban, and accompanying increases in population has potentially modified the quantity, timing, and quality of surface water runoff. Urban and suburban runoff typically contains higher concentrations of nutrients (e.g., nitrogen and phosphorus), oxygen consuming wastes, pathogens, pesticides, heavy metals, and oil, compared with runoff from rural areas. The Cherry Creek and Chatfield Reservoir Control Regulations were adopted in 1985 and 1989, respectively, to address point and non-point source water quality degradation (e.g., increased phosphorus loading) resulting from upstream development in the Cherry Creek and Chatfield Basins.

At least four major residential developments are planned for the I-25 Corridor: the Canyons Development; the Meridian Development; the Douglas Lane Development; and the Rampart Range Development. These planned developments and the FEIS build alternatives contribute to the cumulative degradation of water quality in the Chatfield Basin and Cherry Creek Basin.

The original construction of US 85 in the 1940's and subsequent land use changes (e.g., agriculture to residential) and population increases along the transportation corridor may have adversely impacted Chatfield Basin water quality. For example, access roads and driveways in large lot subdivisions along US 85 comprise one-half to three-quarters of the impervious surface area surrounding this transportation corridor. Substantial head-cuts are developing where roads and driveways cut across drainages. Head-cuts generally occur when cross-culverts are constructed below grade. The abrupt change from the natural grade, above or below the cross culvert, causes the stream to down-cut in an attempt to regain the natural gradient, causing downstream sedimentation and erosion. The Chatfield Reservoir Control Regulation was adopted in 1989 to address point and non-point source water quality degradation (e.g., increased phosphorus loading) resulting from upstream development in the Chatfield Basin. The FEIS build alternatives and planned residential developments in the area (i.e., Highlands Ranch build-out) add to the cumulative degradation of water quality in the Chatfield Basin.

Land preservation in Douglas County is a beneficial cumulative impact to water quality. For example, from 1995 to 2000, the Douglas County Open Space and Natural Resource program has preserved over 6,680 hectares (16,500 acres). These conservation efforts and others occurring in the vicinity of the project corridors are generally up-gradient from US 85; including the Highlands Ranch Conservation Area, Daniels Park, and the Cherokee Ranch Foundation. Preservation of these areas helps limit stormwater runoff, erosion, and sedimentation reaching the project area to historic levels, and thereby minimizes the cumulative impact to the water resource.

Recognizing the importance of water quality and quantity, it is expected that Douglas County and CDOT/FHWA regulations, guidelines, and BMP's on stormwater management and runoff can minimize the cumulative impacts to water resources in Douglas County. For additional information on surface water drainageways, see the ***Floodplain and Drainage Assessment Technical Report,*** May 2000, amended November 2000**,** in the Technical

Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.3 Vegetation Impacts

Impacts to native vegetation can occur in three ways: as direct, secondary, or as cumulative impacts. The direct loss of native vegetation is either permanent or temporary and is quantified as hectares (acres). Secondary impacts to native vegetation may occur due to noxious weed invasion or as changes in vegetation types some distance from the direct road widening. Other types of secondary impacts such as habitat fragmentation, as well as cumulative impacts to native vegetation are discussed in Section 5.3.3.6, *Wildlife Impacts*.

Preferred Alternative

I-25 Corridor Vegetation Impacts (Preferred Alternative)

The Preferred Alternative permanently impacts 73.6 hectares (182 acres) (Table 5.9) and temporarily impacts 13.4 hectares (33.0 acres) of upland vegetation communities along the I-25 Corridor. This estimate includes 0.8 hectare (2.0 acres) of permanent impact from the proposed railroad realignment, and approximately 1.3 hectares (3.1 acres) from the addition of a car pool lot at the Castle Pines Parkway Interchange. The largest relative impact from the Preferred Alternative is to woodlands, with 15.6 percent (12.9 hectares [31.9 acres]) of woodlands within the APE converted.

Temporarily impacted lands from construction activities have an increased susceptibility to noxious weed invasion. Weeds such as diffuse knapweed, Canada thistle, and musk thistle occur within the APE on both corridors, and are among the ten most widespread weeds in the State of Colorado.

US 85 Corridor Vegetation Impacts (Preferred Alternative)

The Preferred Alternative permanently impacts 68 hectares (169 acres) (Table 5.9) and temporarily impacts 12.9 hectares (32 acres) of upland vegetation communities along the US 85 Corridor

Other Alternative

I-25 Corridor Vegetation Impacts (Other Alternative)

The Other Alternative permanently impacts approximately 3.6 percent (30.5 hectares [75.4 acres]) (Table 5.9) more native vegetation along the I-25 Corridor than the Preferred Alternative. The proposed Rampart Range Interchange and frontage road impact grasslands, shrublands, and riparian habitat. The proposed Surrey Ridge diamond interchange increases permanent impacts to grasslands and shrublands. The loop ramp at Castle Pines Parkway impacts grasslands and shrublands. The widening of the Happy Canyon Interchange Bridge impacts grasslands and woodlands.

US 85 Corridor Vegetation Impacts (Other Alternative)

Permanent, direct impacts to grasslands associated with the Other Alternative are slightly more (4 percent) than the Preferred Alternative along the US 85 Corridor due to the difference in laneage between

Highlands Ranch Parkway and Titan Road (Table 5.9).

For additional information on vegetation, see the ***Vegetation Technical Report***, May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

Table 5.9
Potential Direct Impacts to Vegetation Cover Types
Hectares (Acres)

		Preferred Alternative	Other Alternative
Grasslands	I-25 Corridor	44.2 (109.2)	69.3 (171.1)
	US 85 Corridor	54 (134)	56.5 (139.5)
Woodlands	I-25 Corridor	12.9 (31.9)	13.3 (32.9)
	US 85 Corridor	0.5 (1.2)	0.5 (1.2)
Shrublands	I-25 Corridor	9.8 (24.3)	13.8 (34.2)
	US 85 Corridor	5.4 (13.4)	5.4 (13.4)
Riparian	I-25 Corridor	1.2 (3.0)	2.2 (5.5)
	US 85 Corridor	0.7 (1.8)	0.7 (1.8)
Urban	I-25 Corridor	5.5 (13.6)	5.5 (13.6)
	US 85 Corridor	7.4 (18.4)	7.4 (18.4)
	Total	141.6 (350.8)	174.6 (431.6)

5.3.3.4 Wetland Impacts

Impacts to wetlands and Other Waters of the US resulting from roadway construction can potentially occur either directly as temporary or permanent filling or draining, or as secondary impacts. A direct loss of wetland area is unavoidable for both build alternatives (Table 5.10). Direct impacts will be mitigated on a 1:1 replacement ratio.

Preferred Alternative

I-25 Corridor Wetland Impacts (Preferred Alternative)

The locations of permanent impacts to wetlands and Other Waters of the US from the Preferred Alternative along the I-25 Corridor are shown on Figure 5.4a and summarized on Table 5.10. Temporary impacts from construction result in an additional 0.03-hectare (0.07-acre) impact to wetlands and 0.08 hectare (0.19 acre) of impact to Other Waters of the US. The majority of the impacts caused by the Preferred Alternative occur to wetlands located adjacent to Happy Canyon Creek. These wetlands provide all six wetland functions evaluated including wildlife habitat, dynamic water storage, flood flow attenuation, production export/aquatic food chain support, nutrient and pollutant removal/sediment retention, shoreline stabilization/sediment control. Many of the remaining wetland impacts are to isolated roadside ditch wetlands that were not considered jurisdiction by the United States Army Corps of Engineers (USACE). This type of wetland provides relatively limited functionality, but provides some wildlife habitat as well as acting as biotic filters for non-point source pollution. Impacts to Other Waters of

the US are typically due to culvert replacements and/or extensions.

US 85 Corridor Wetland Impacts (Preferred Alternative)

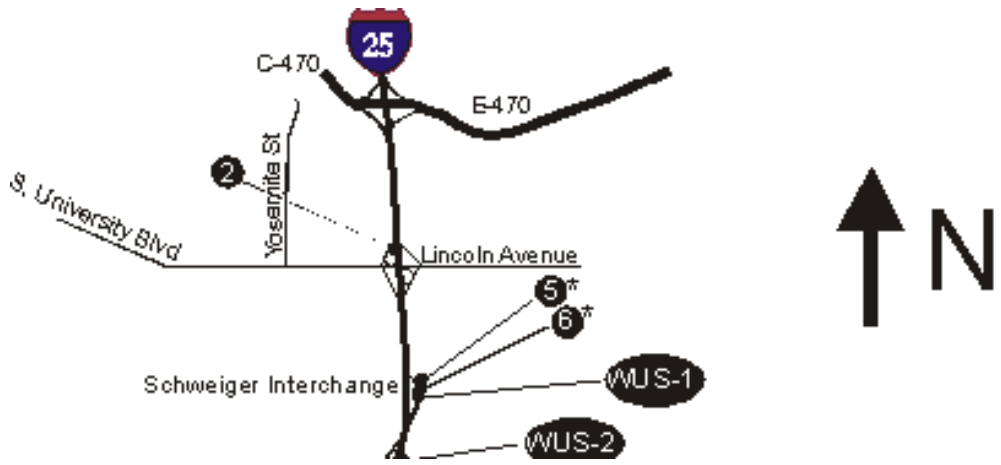
The locations of permanent impacts to wetlands and Other Waters of the US from the Preferred Alternative along the US 85 Corridor are shown on Figure 5.4b and summarized on Table 5.10. Temporary impacts from construction result in an additional 0.02 hectare (0.05 acre) of impact to wetlands and 0.06 hectare (0.16 acre) of impact to Other Waters of the US. The majority of permanent impact is to jurisdictional wetlands in the northern part of the study area.

Although the total area of jurisdictional wetland impact is relatively small, wetland habitat at Marcy Gulch and Spring Gulch do provide functions such as dynamic water storage, flood flow attenuation, production export/aquatic food chain support, nutrient and pollutant removal/sediment retention, shoreline stabilization/sediment control, and wildlife habitat. Impacts to Other Waters of the US are typically due to culvert replacements and/or extensions.

Table 5.10
Potential Direct Impacts to Wetlands and Other Waters of the US
Hectares (Acres)

		Preferred Alternative	Other Alternative
Jurisdictional Wetlands	I-25 Corridor	0.06 (0.15)	0.11 (0.28)
	US 85 Corridor	0.06 (0.15)	0.06 (0.15)
	Total	**0.12 (0.30)**	**0.17 (0.43)**
Non-Jurisdictional wetlands	I-25 Corridor	0.04 (0.1)	0.04 (0.1)
	US 85 Corridor	0.04 (0.09)	0.04 (0.09)
	Total	**0.08 (0.19)**	**0.08 (0.19)**
Other Waters of the US	I-25 Corridor	0.19 (0.48)	0.35 (0.85)
	US 85 Corridor	0.46 (1.14)	0.46 (1.14)
	Total	**0.65 (1.19)**	**0.81 (1.99)**

Figure 5.4a
I-25 Corridor Wetland Impacts



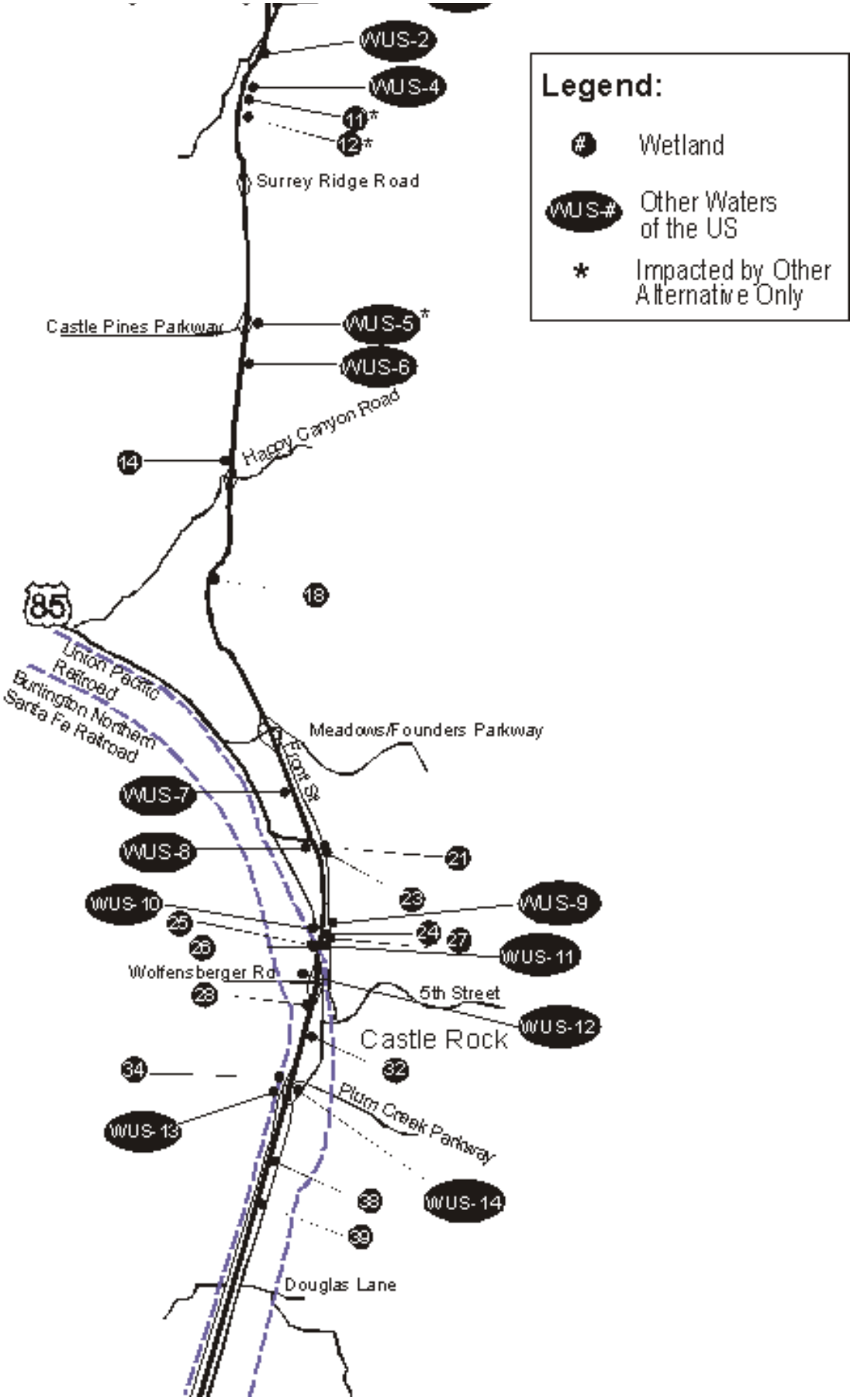
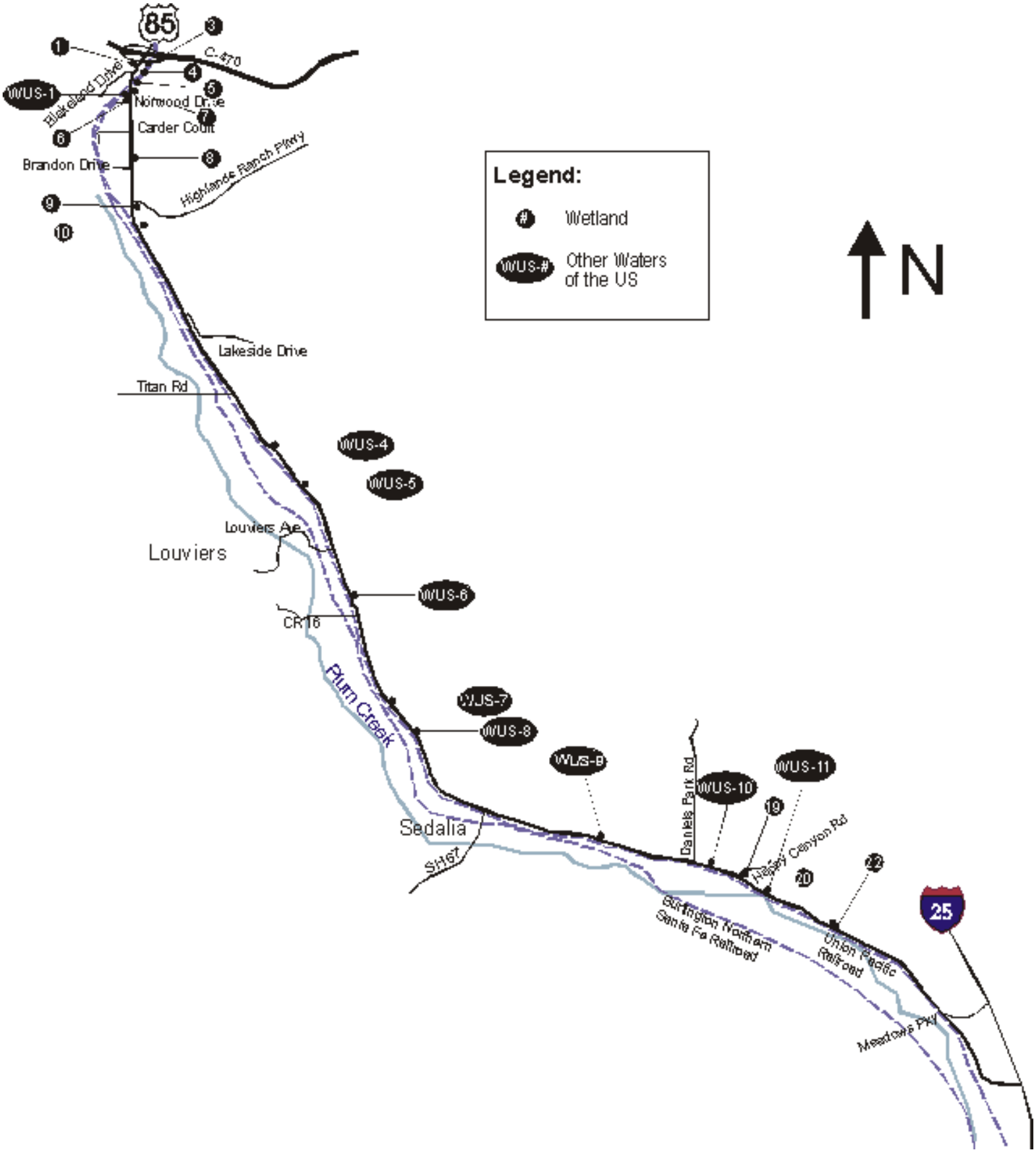


Figure 5.4b
US 85 Corridor Wetland Impacts



Other Alternative

I-25 Corridor Wetland Impacts (Other Alternative)

Direct impacts to wetlands caused by the Other Alternative along the I-25 Corridor are the same as described in the Preferred Alternative. Additional impacts to wetlands (0.05 hectare [0.13 acre]) and Other Waters of the US (0.16 hectare [0.37 acre]) also result due to the loop ramp at the Castle Pines Parkway and the frontage road between Castle Pines Parkway and the proposed Rampart Range Interchange (Table 5.10) included as elements of the Other Alternative.

US 85 Corridor Wetland Impacts (Other Alternative)

Direct impacts to wetlands caused by the Other Alternative along the US 85 Corridor are the same as those described under the Preferred Alternative.

Wetland Secondary Impacts

Potential secondary impacts to wetlands from either build alternative include:

- Alteration of wetland hydrology from changes in drainage patterns or changes in runoff volumes.
- Increased delivery of non-point source pollution including temporary increases in sediment loads from land clearing activities, seasonal pulses of sediment and salt from winter road maintenance, and petroleum distillates, metals, and rubber contained in stormwater from ordinary vehicle wear.
- Degradation of wetland/wildlife habitat due to increased noise levels.

CDOT and Douglas County regulations limit the amount of allowable impact to historic drainage patterns (see Section 5.3.3.2, *Water Quality*). It is, therefore, unlikely that runoff volumes to nearby creeks from either build alternative (i.e., East Plum Creek, Marcy Gulch) change substantially. However, the potential for secondary impacts increases slightly under the Other Alternative due to increases in impervious surface area. The development and implementation of a SWMP minimizes potential impact from non-point source pollution. Secondary impacts to wetlands or Other Waters of the US removed from the APE are therefore expected to be minimal.

Secondary impacts resulting from gravel mining to provide borrow material needs is not an issue. Projected fill requirements are currently exceeded on both corridors by planned excavation.

Although the ambient noise level likely increases in most wetlands adjacent to the highways, it is likely that most wildlife species in these areas habituate to the higher noise levels (see Sections 4.3.14, *Noise* and 5.3.3.14, *Noise Impacts*).

Wetland Cumulative Impacts

Previous, current, and foreseeable actions were considered in this cumulative impact analysis. USACE data indicate that within Douglas County, 11.61 hectares (28.68 acres) of documented wetland impact has occurred from 1992 to 2000. Of this impact, 4.08 hectares (10.08 acres) have been mitigated, representing a net loss of 7.53 hectares (18.6 acres) of wetland area. The majority of this impact has occurred in the northern half of Douglas County near the towns of Parker and Castle Rock, and in the Highlands Ranch area near C-470. It should

be noted that more impacts to wetlands have likely occurred in the past 8 years, but due to less stringent regulations in the past and illegal activities, these impacts may not have been recorded.

Impact to wetlands from the FEIS build alternatives increase the total amount of cumulative impact to this resource. However, CDOT's and FHWA's commitment to no net loss minimizes the cumulative loss of wetlands from transportation projects. For example, CDOT proposes to install a series of check dams along East Plum Creek with wetland restoration as one of the project's primary goals.

I-25 Corridor Wetland Cumulative Impacts

The proposed Douglas Lane Interchange and Rampart Range Interchange do not impact wetland resources. Early-Action projects, such as the Climbing Lanes Phase II, US 85/I-25 Interchange, and the 5th Street Overpass, have a combined wetland fill of 0.05 hectare (0.13 acre) (Table 5.11).

Table 5.11
Wetland Impacts and Mitigation for Cumulative Transportation Projects Considered

Corridor	Transportation Project Name	Area of Impact hectares (acres)	Area of Mitigation hectares (acres)
I-25	Climbing Lanes, Phase II	0.03 (0.08)	0.03 (0.08)
	US 85/I-25 Interchange	0.01 (0.03)	0.01 (0.03)
	5th Street Overpass	0.008 (0.02)	0.008 (0.02)
US 85	Titan Road	0.03 (0.07)	0.03 (0.07)
	Total	**0.08 (0.20)**	**0.08 (0.20)**

Planned residential developments along the I-25 Corridor may impact additional wetland area, contributing to the cumulative loss of wetlands. National Wetland Inventory (NWI) mapping indicates that approximately 6 hectares (15 acres) of wetlands occur in the vicinity of the future Canyons Development, and approximately 1.6 hectares (4 acres) of wetlands occur in the vicinity of the future developments near Douglas Lane. Current Clean Water Act regulations limit impacts to wetlands and typically require compensatory wetland mitigation for impacted wetland areas greater than 0.13 hectare (0.33 acre) in size.

Residential and commercial developments may increase runoff to wetlands, thereby creating secondary impacts. This is of higher concern in areas where development will occur close to East Plum Creek and Marcy Gulch, because stormwater runoff may be directed into these perennial creeks as point sources of runoff. It is expected that this type of secondary impact will be minimized by adherence to Douglas County regulations on stormwater management.

US 85 Corridor Wetland Cumulative Impacts

The Preferred Alternative and the Other Alternative have small, but equal contributions to the cumulative loss of wetlands along the US 85 Corridor. In addition to the US 85/I-25 Interchange discussed previously, the Titan Road Interchange project permanently impacts 0.03 hectare (0.07 acre) of non-jurisdictional wetland area.

Current NWI mapping indicates that the Highlands Ranch build-out includes approximately 19.8 hectares (49 acres) of potential wetland. It is unlikely, however, that this much wetland area will be directly impacted due to the inaccuracies in the NWI mapping and regulations limiting impacts to wetlands.

For additional information on wetlands, see the ***Wetland Finding*** in Volume II of this FEIS, or in the Appendix of the ***Wetland Technical Report,*** May 2000, amended November 2000**,** in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.5 Geology Impacts

Chapter 4.0, *Affected Environment,* describes the geology and soils constraints for development. No impacts as a result of the South I-25 Corridor and US 85 Corridor project are identified; however, it is recommended that the project designers use the data in Section 4.3.5, *Geology*, as a reference for appropriate design and construction measures.

For additional information on geology, see the ***Geology Technical Memorandum South I-25 Corridor and US 85 Corridor,*** October 2000**,** in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.6 Wildlife Impacts

Impacts to wildlife from highway projects include road kill and the loss, degradation, or fragmentation of habitat. These impacts are either temporary (i.e., construction) or permanent (i.e., operational and construction). Construction and operational impacts may include the temporary loss of habitat in construction areas; loss of habitat from paving; degradation of adjacent habitats due to altered runoff and/or increased exposure to salts and other pollutants including noise; fragmentation of habitat by formation of barriers to wildlife movement; increased edge effect; displacement of wildlife due to increased noise and human activity; changes in wildlife movement patterns; and reductions in biological diversity. Increased traffic volume also increases the likelihood of direct mortality from collisions with vehicles. Wildlife impacts are calculated similar to vegetation impacts with the exception of urban cover type. Urban cover type is not considered wildlife habitat and is not included in the wildlife impacts calculation.

Preferred Alternative

I-25 Corridor Wildlife Impacts (Preferred Alternative)

The Preferred Alternative results in a permanent loss of approximately 67.5 hectares (166.8 acres) of habitat along the I-25 Corridor (see section 5.3.3.3, *Vegetation Impacts*, for descriptions of impacted habitat types; urban vegetation types are not included in calculations for impacted wildlife habitat). Some of this habitat is within the existing ROW and is of poor quality due to its proximity to the highway, alteration of ROW plant communities following original construction, and the effect of subsequent highway maintenance (i.e., snow plowing). Other ROW habitat has higher value to wildlife species, such as disturbed sites favored by the black-tailed prairie dogs colonies, or the riparian corridors at Happy Canyon Creek and East Plum Creek.

The Preferred Alternative impacts approximately 0.1 hectare (0.2 acre) of black-tailed prairie dog habitat

along the I-25 Corridor (black-tailed prairie dog impact calculations include losses from road construction and a 3-meter [10-feet] temporary construction zone). Approximately 1.2 hectares (3.0 acres) of riparian habitat are lost with this alternative. Riparian habitat is used by an array of birds, reptiles, amphibians, and mammals. Although the area lost may be relatively small, its per acre value to wildlife is high. In addition, riparian corridors maintained across highways by directing stream channels under bridges or through culverts also provide passage for wildlife attempting to cross I-25. Tracking studies indicate that bridges and culverts are used by carnivores and small-to medium-sized mammals to cross under I-25; however, no deer or elk were detected crossing under I-25.

Existing culverts under I-25 are extended under the Preferred Alternative to accommodate highway widening. The small openness factors of these existing culverts (see Section 4.3.6, *Wildlife*, for information on openness factor) are further reduced without improvements. Ungulates, such as deer and elk, are not expected to use the smaller extended structures. Based on wildlife tracking data from a similar length culvert under US 85, (i.e., Station Number 2), the small openness factor for existing and future extended I-25 culverts is not expected to substantially reduce the number of crossings for species that already use these structures. Rather, the lower number of underpass crossings and reduced diversity of species crossing under I-25, relative to US 85, are more likely related to the lower quality of surrounding habitat, lower density of conservation areas, and greater amount of development adjacent to I-25 culverts compared to US 85 culverts.

Currently, at-grade crossing of I-25 is difficult for wildlife species given the pavement width, traffic volume, and artificial barriers (i.e., Type IV concrete barriers). The Colorado Division of Wildlife (CDOW) considers I-25 to be a substantial barrier to wildlife movement, particularly since there are no large, nearby, protected tracts of land to serve as stand alone habitat areas, and development has encroached substantially on the project area. Successful at-grade wildlife crossings over I-25 in the APE are expected to further decrease with implementation of the Preferred Alternative.

US 85 Corridor Wildlife Impacts (Preferred Alternative)

Construction noise and ROW ground clearing activities for US 85 have impacts similar to those described for the Preferred Alternative along the I-25 Corridor.

The Preferred Alternative results in a permanent loss of approximately 61 hectares (151 acres) of upland habitat along the US 85 Corridor. Portions of several small black-tailed prairie dog colonies are impacted, resulting in the loss of approximately 2.47 hectares (6.1 acres) of black-tailed prairie dog habitat. The Preferred Alternative results in impacts to some mesic shrub vegetation that occurs within dry gulches intersected by US 85 and some streamside riparian vegetation at Marcy Gulch and Spring Gulch. The area of impervious surface increases with the Preferred Alternative (see Section 5.3.3.2, *Water Quality Impacts* for details on increases in impervious surface runoff).

The Preferred Alternative increases the highway's barrier effect to wildlife attempting to cross US 85, especially to ungulates. Currently, bridges and culverts are inadequate to provide safe crossing for deer and elk. Although the Preferred Alternative includes improvements to two wildlife crossings, it is expected to increase the barrier effect of US 85 to deer and elk movement. The Preferred Alternative similarly decreases the permeability of the US 85 Corridor for species less likely to use extended bridges or culverts.

Other Alternative

I-25 Corridor Wildlife Impacts (Other Alternative)

The Other Alternative directly impacts an additional 30.5 hectares (75.4 acres) of habitat along the I-25 Corridor over the Preferred Alternative. This alternative impacts approximately 0.03 hectare (0.074 acre) less black-tailed prairie dog habitat than the Preferred Alternative.

The frontage road on the east side of I-25 from Castle Pines Parkway to proposed Rampart Range Interchange adds to the movement barrier across I-25 and further fragments habitat.

US 85 Corridor Wildlife Impacts (Other Alternative)

The Other Alternative directly impacts an additional 63 hectares (156 acres) of habitat along the US 85 Corridor over the Preferred Alternative. No additional impacts occur to black-tailed prairie dog habitat due to the increase in laneage between Highlands Ranch Parkway and Titan Road as part of the Other Alternative.

Wildlife Secondary Impacts

Secondary impacts to wildlife habitat may occur from increased operational capacity/activity, and habitat loss or degradation. Potential secondary impacts due to both build alternatives include:

- impacts to wildlife that utilize impacted black-tailed prairie dog colonies
- impacts to aquatic and riparian communities due to increased runoff
- isolation of wildlife populations due to habitat fragmentation and decreased permeability of the US 85 Corridor, and
- habitat degradation from increased noise.

Loss of black-tailed prairie dog habitat has the potential to secondarily affect numerous other species such as 4 species of reptiles, 23 species of birds, and 16 species of mammals that may be drawn to black-tailed prairie dog colonies. Species such as desert cottontail use black-tailed prairie dog burrows for cover. Pronghorn may prefer to forage in colonies because black-tailed prairie dogs may improve the quality of some preferred plants. Predators such as coyotes, bobcats, badgers, long-tailed weasels, bull snakes, prairie rattlesnakes, golden eagles, bald eagles, northern harriers, prairie falcons, red-tailed hawks, and ferruginous hawks prey on black-tailed prairie dogs. As a keystone species, impacts to black-tailed prairie dog habitat have the potential to secondarily impact numerous other species.

Secondary impacts to riparian and aquatic habitats may occur in two ways: (1) degrade water quality by increasing non-point source pollutants to surface waters; and (2) further downcutting of East Plum Creek due to the erosive effects of runoff. Downcutting disconnects the stream channel and associated hydrology from the floodplain and can degrade adjacent wetland and riparian habitat. Loss of wetlands and riparian

habitat, which can filter pollutants from runoff, further exacerbates aquatic habitat degradation.

ROW clearing activities and noise generated during construction temporarily displaces wildlife from habitat in the immediate vicinity of the construction zone, with some wildlife species returning to the area once construction is complete. The potential for substantial adverse operational noise impact to wildlife, resulting from the FEIS build alternatives, is minor due to animal habituation to existing highway sound levels.

Wildlife Cumulative Impacts

I-25 Corridor Wildlife Cumulative Impacts

To better understand the FEIS build alternatives' effects on wildlife communities, it is necessary to assess cumulative impacts within the I-25 Corridor. The five Early-Action projects along I-25 impact all five cover types. Grassland habitat has been or will be impacted by the Climbing Lanes Phase I project, the Climbing Lanes Phase II project, and the Meadows/Founders Interchange project. Woodlands are impacted by the Climbing Lanes Phase II project. The Climbing Lanes Phase I project impacted Shrublands. Riparian habitat is impacted by the Wolfensberger Bridge project and 5th Street Bridge project. However, due to the presence of the Preble's Meadow Jumping Mouse (PMJM) in these areas, full mitigation offsets impacts to the riparian communities in those areas. A small amount of riparian habitat along Happy Canyon Creek was impacted by the Climbing Lanes Phase I project as well. The urban cover type has been impacted by the Meadow/Founders Interchange project.

In addition to these other transportation projects, current and future development in the Chatfield Basin area will increase barriers to wildlife movement, fragment habitat, cause habitat loss (including black-tailed prairie dog colonies, riparian and wetland areas), and increase impervious surface runoff. Four major residential development areas are planned for the I-25 Corridor (Table 5.12). Combined with historic impacts, these current and foreseeable activities may further impact wildlife habitat.

The Meridian Development will be surrounded by the Rampart Range Development in the area east of I-25, south of E-470 and north of Lincoln Avenue, with a portion also located east of I-25 and south of Lincoln Avenue. Total development is expected to be 80 hectares (199 acres), with approximately 4.9 hectares (12 acres) preserved as open space. This area is primarily grasslands and is adjacent to black-tailed prairie dog colonies. The Rampart Range Development will total 1,417 hectares (3,514 acres), with 337 hectares (835 acres) maintained as open space. Developments in the vicinity of Douglas Lane, located south of the Town of Castle Rock, will include approximately 2,242 hectares (5,540 acres). All three development areas may further fragment wildlife habitat in the I-25 Corridor.

Table 5.12
Cumulative Vegetation Impacts for Residential Development Projects

	Project Name	Area Impacted hectares (acres)	Cover Type Impacted	Open Space Areas hectares (acres)
I-25	The Meridian Development	80 (199)	Grassland	4.9 (12)
	Rampart Range Development	1,417 (3,514)	Shrubland, grassland	337 (835)
	The Canyons Development	2,248 (5,576)	Shrubland, grassland	202 (500)
	Douglas Lane Developments	2,242 (5,540)	Shrubland, grassland	196 (485)
US 85	Highlands Ranch Development	242 (600)	Riparian, shrubland, grassland	None indicated

The Canyons Development will occur in an area south of Castle Pines Parkway, east of I-25, and north of Happy Canyon. The total direct impact from the development will be 2,248 hectares (5,576 acres), although 202 hectares (500 acres) of open space will abut I-25. Habitat subject to impact is primarily shrubland and grassland, but could include high quality habitats such as black-tailed prairie dog colonies. Wildlife movement across I-25 north of Castle Rock is already heavily inhibited by I-25. The Canyons Development will fragment habitat east of I-25 but will likely not appreciably reduce movement of deer and elk across I-25. However, permeability of the I-25 Corridor will be reduced for smaller animals.

Continued habitat changes along I-25 may eventually cause a shift in species composition from the existing grassland specialists such as ferruginous hawks and burrowing owls, to suburban generalists such as European starlings and raccoons. This type of shift would lead to a loss in regional biodiversity.

US 85 Corridor Wildlife Cumulative Impacts

Planned development along the US 85 Corridor exacerbates pressures on wildlife, and is a cumulative impact. Development in Highlands Ranch will include the area south of C-470, north of Highlands Ranch Parkway, and east of US 85 (see Table 5.12). This development will primarily impact grasslands, shrublands, and may impact some riparian areas, as well as contribute to habitat loss and fragmentation. In addition, the Titan Road and I-25/US 85 Interchange Early-Action projects impact grasslands.

Land preservation in Douglas County is a beneficial cumulative impact resulting from revenues generated by the rapidly growing economy. Douglas County, Chatfield Basin Conservation Network, private entities, local, state, and federal agencies have all invested considerable time and expense preserving land (conservation areas) on both sides of US 85. Their efforts provide habitat for a rich wildlife community directly south of a major metropolitan area, as well as scenic vistas, recreational opportunities, and community buffers all of which improve the quality of life for residents in Douglas County. For example, from 1995 to 2000 the Douglas County Open Space and Natural Resource program has purchased over 6,680 hectares (16,500 acres). These areas, and other significant conservation areas in the vicinity of US 85, include Chatfield State Park, Highlands Ranch Conservation Area, Daniels Park, and Cherokee Ranch Foundation. Preservation of these areas may benefit black-tailed prairie dogs by reducing the total amount of cumulative habitat loss possible to them.

Habitat connectivity is a crucial component to maintaining the habitat quality and biological diversity of this resource. Decreasing the permeability of the US 85 Corridor, coupled with loss and degradation of habitat associated with ongoing development, has the potential to undermine conservation and preservation efforts. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county. For additional information on wildlife, see the ***Wildlife Technical Report,*** May 2000, amended November 2000, and the ***Wildlife Tracking and Habitat Connectivity Study US Highway 85 Corridor***, October 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.7 Wild and Scenic Rivers Impacts

No known wild or scenic rivers are in the APE. Therefore, no wild and scenic river impacts are anticipated as a result of the I-25 Corridor and US 85 Corridor Preferred Alternative and Other Alternative.

5.3.3.8 Floodplain Impacts

Impacts to the 100-year floodplain can occur in two forms: (1) directly through changes to the volumetric capacity of the floodplain (e.g., filling, bridge piers); or (2) indirectly through an increase in the total volume of water arriving at and being conveyed by the floodplain. Indirect impacts are especially important when considering cumulative impacts to floodplains from all the previous, current, and planned projects in an area.

Fill needed to accommodate additional laneage could potentially impact 100-year flood surface elevations downgradient from the project area. However, this type of impact is expected to be minimal because the amount of fill added to 100-year floodplains is not substantial relative to the total volume each 100-year floodplain embodies. Moreover, at each crossing, adequate freeboard between the bottom of a crossing structure (e.g., bridge) and the predicted 100-year flood surface elevation is maintained to ensure a minimal risk of flooding new areas. These types of impacts are evaluated in more detail in the ***Floodplain and Drainage Assessment Technical Report,*** November 2000.

Preferred Alternative

I-25 Corridor Floodplain Impacts (Preferred Alternative)

The primary source for impact to 100-year floodplain surface elevations is mainline widening. The floodplains of Happy Canyon Creek, Tributary A, Tributary D, Hangmans Gulch, and East Plum Creek are expected to be directly impacted by mainline widening. Figure 5.5a shows the locations of these impacted floodplains. The estimated direct impact at these locations is provided on Table 5.13. Drainage designs for 50- and 100-year precipitation events minimize long-term on-site impacts to the natural and beneficial values of these floodplains. Drainage designs were based on the 50- and 100-year precipitation events primarily because these drainages are ungaged and peak flow data is not available. The design approach used is consistent with procedures recommended by the Urban Drainage and Flood Control District (UDFCD) and Douglas County's "Storm Drainage Design and Technical Criteria." The hydrologic model used to estimate 50- and 100-year flood events used numerous watershed-specific input factors to estimate stormwater hydrographs including: the Douglas County two-hour design storm hyetograph, basin geometry, and development characteristics such as basin area, catchment length, distance from the design point to the basin centroid, percent impervious, retention, and infiltration rates. This procedure is described

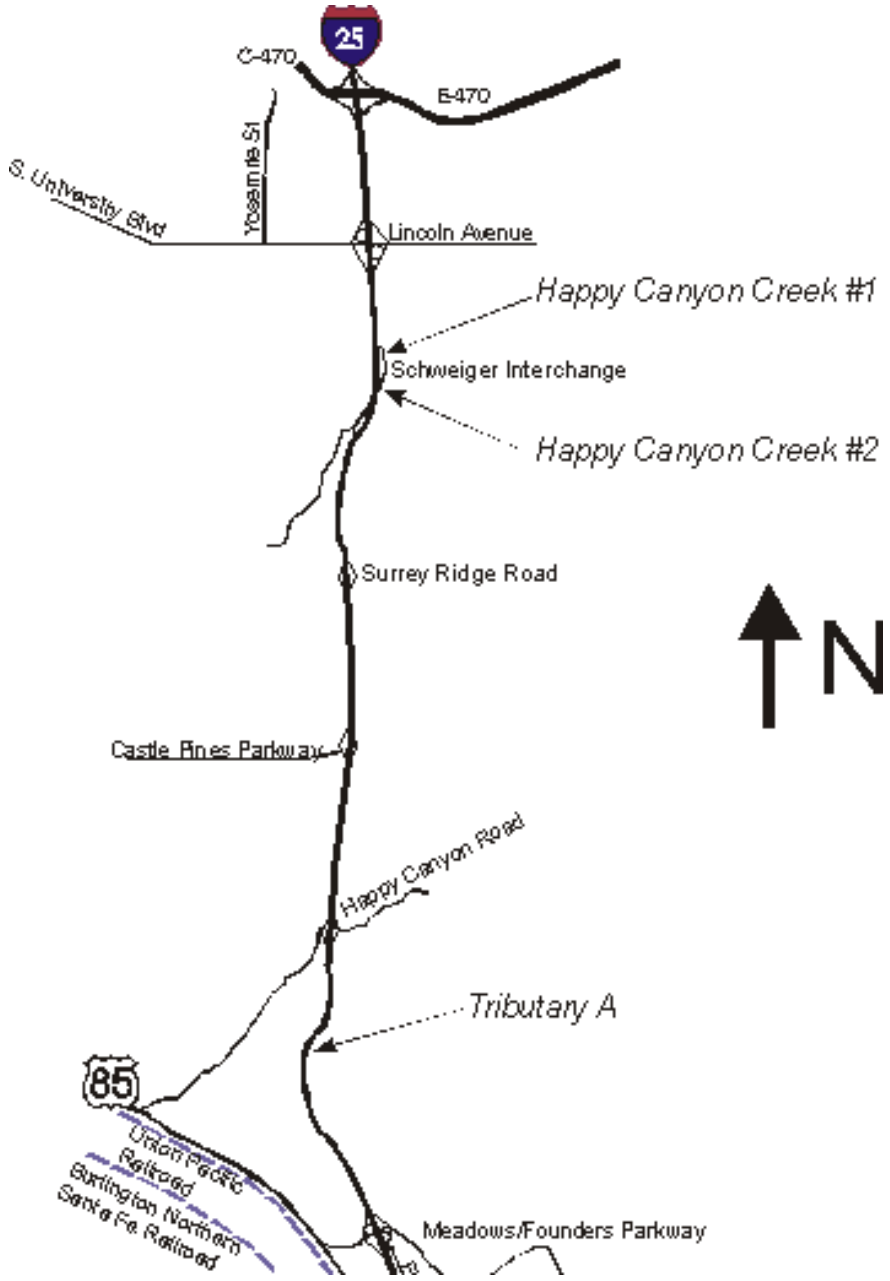
in some detail in the ***Floodplain and Drainage Technical Appendix***.

BMPs that minimize runoff prevent secondary impacts caused by mainline widening. Temporary impacts caused by construction, to the aesthetics, wildlife habitat, and water quality maintenance functions of floodplains are also minimized by BMPs.

US 85 Corridor Floodplain Impacts (Preferred Alternative)

Mainline widening of US 85 causes direct impact to eight of the 100-year floodplains found within the US 85 APE (Table 5.13). Figure 5.5b shows the locations of these impacted floodplains. However, no adverse effects to 100-year flood surface elevations are anticipated because design considerations account for predicted 50- and 100-year flood volumes. Minimization of impact potentially caused by increased runoff volumes requires appropriate use of BMPs.

Figure 5.5a
I-25 Corridor Floodplain Impacts



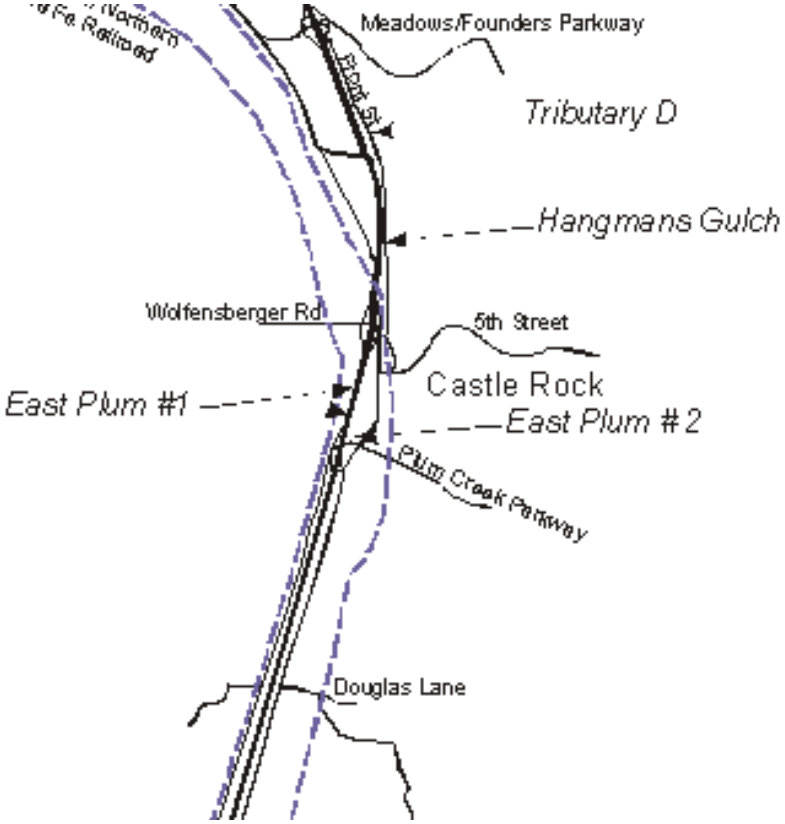


Figure 5.5b
US 85 Corridor Floodplain Impacts

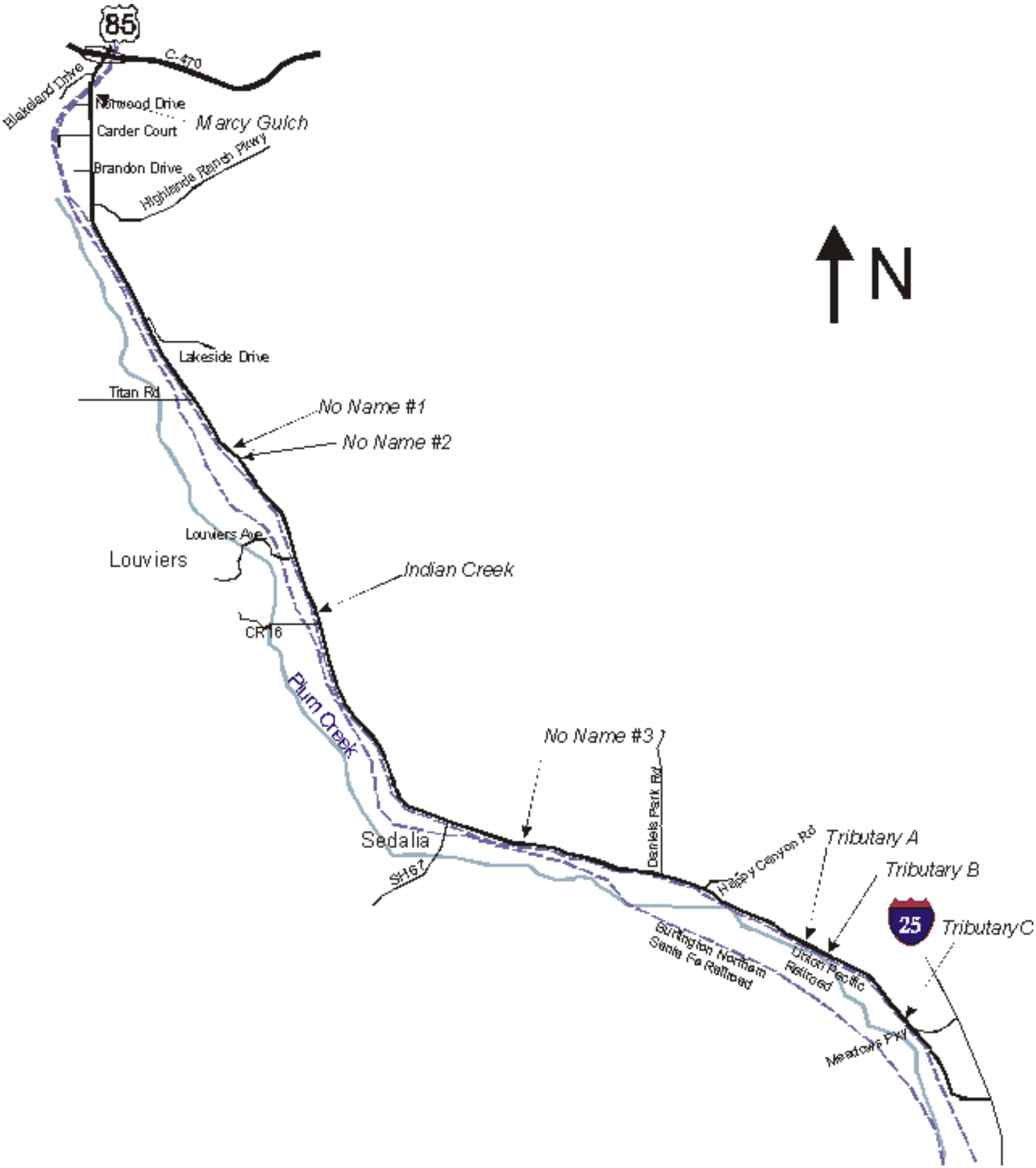


Table 5.13
Potential Direct Impacts to the Beneficial Uses of Floodplains*
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor		
Happy Canyon Creek #1	0.02 (0.05)	0.33 (0.82)
Happy Canyon Creek #2	0.58 (1.43)	1.3 (3.21)
Tributary A	0.02 (0.04)	0.02 (0.04)
Tributary D	0.24 (0.58)	0.24 (0.58)
Hangman's Gulch	0.02 (0.04)	0.02 (0.04)
East Plum Creek #1	0.56 (1.38)	0.56 (1.38)
East Plum Creek #2	0.09 (0.21)	0.09 (0.21)
US 85 Corridor		
Marcy Gulch	0.35 (0.86)	0.35 (0.86)
No Name # 1	0.53 (1.32)	0.53 (1.32)
No Name # 2	0.26 (0.65)	0.26 (0.65)
Indian Creek	0.69 (1.7)	0.69 (1.7)
No Name # 3	0.16 (0.39)	0.16 (0.39)
Tributary A	0.15 (0.37)	0.15 (0.37)
Tributary B	0.22 (0.55)	0.22 (0.55)
Tributary C	0.15 (0.36)	0.15 (0.36)
Total	4.04 (9.93)	5.07 (12.48)

**100-year flood surface elevations will not be impacted, however, other uses such as aesthetics and wildlife habitat will be impacted. Impacts shown here include impacts to Other Waters of the US (not wetlands) found within designated 100-year floodplains.*

Other Alternative

I-25 Corridor Floodplain Impacts (Other Alternative)

In addition to impacts associated with mainline widening (Preferred Alternative), the frontage road and interchange improvements included in the Other Alternative increase runoff volumes. Impacts associated with each of these are estimated on Table 5.13.

The addition of a frontage road from the Castle Pines Parkway Interchange to the proposed Rampart Range Interchange is a potential source of direct impact to the Happy Canyon Creek floodplain. Design configurations will likely span the 100-year floodplain surface elevation allowing for adequate freeboard between the new structure and the 100-year flood elevation. The increase in runoff volume requires BMPs (i.e., retention basins) to prevent alteration of the 100-year floodplain.

US 85 Corridor Floodplain Impacts (Other Alternative)

The additional laneage of the Other Alternative is expected to generate more stormwater runoff, and thus potentially more indirect impact, than the Preferred Alternative.

For more floodplain and drainage details, see the ***Floodplain and Drainage Assessment Technical Report,*** May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.9 Threatened, Endangered, and Other Special-Status Species Impacts

This section analyzes potential impacts to special-status species such as those listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA). Also included are species warranted for federal listing but precluded by other higher priority species (warranted but precluded) and candidates for federal listing. Species identified as threatened, endangered, or of special concern by the State of Colorado are also discussed in this section although they are not protected under ESA. Threatened and endangered species letters of concurrence are included in the Appendix of this document.

The potential for impacts to special-status wildlife and plants are discussed by species. Only those species identified in Section 4.3.9, *Threatened, Endangered, and Other-Special Status Species*, as occurring or possibly occurring in the project APE are discussed in this section. Direct impacts to special-status species occur as impacts to black-tailed prairie dog and PMJM habitat.

Preferred Alternative

The Preferred Alternative does not take any listed, proposed, or candidate species, or their critical habitat, as defined in accordance with the ESA.

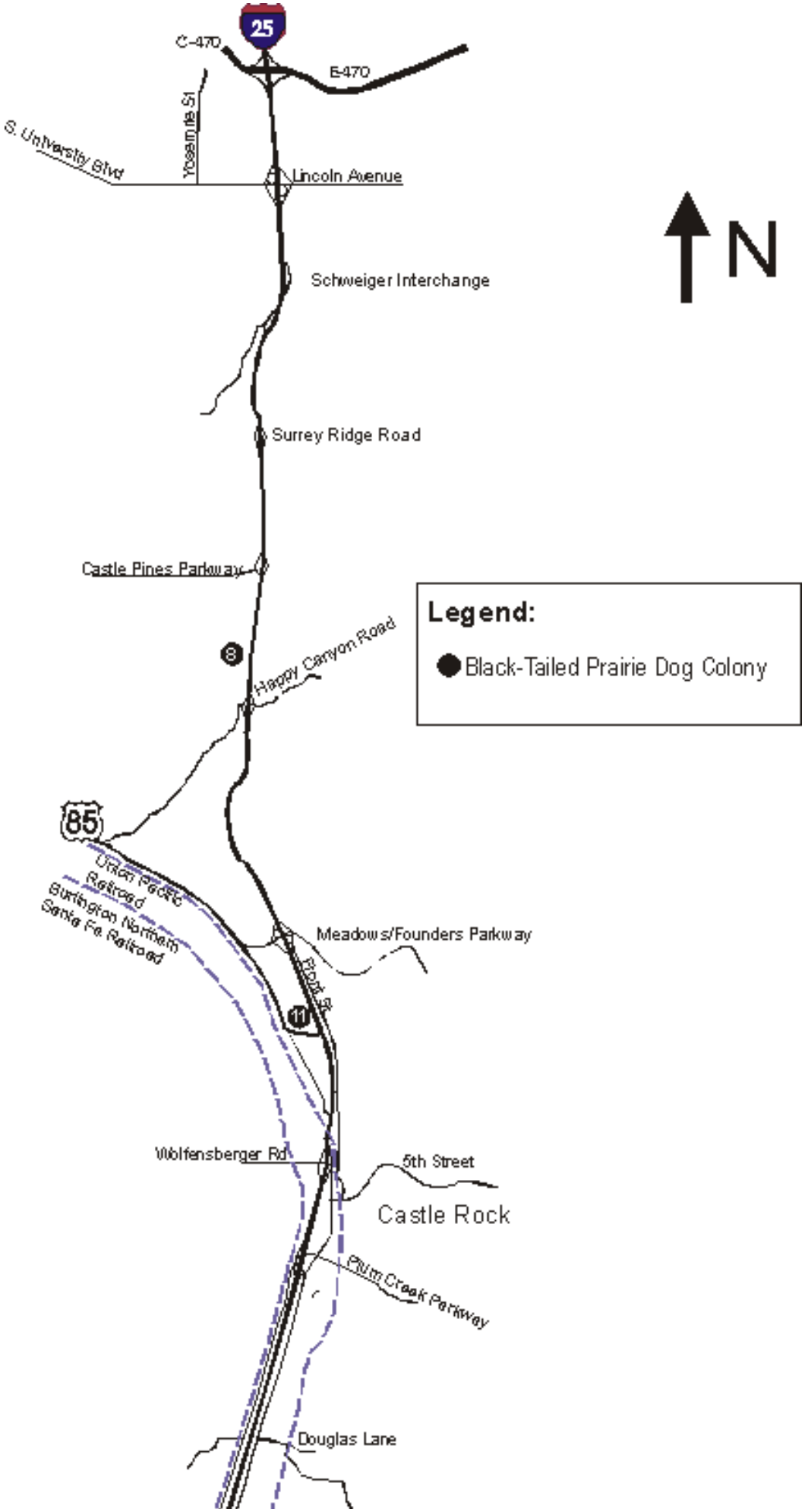
I-25 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Preferred Alternative)

Black-Tailed Prairie Dog (Warranted but Precluded and State Species of Concern). Black-tailed prairie dog habitat of 0.10 hectare (0.24 acre) is directly impacted by the Preferred Alternative (habitat impact calculations include permanent losses from road construction and a 3-meter [10-foot] temporary construction zone) as shown on Table 5.14. Black-tailed prairie dogs at Colony 6, Colony 8, and Colony 11, as shown on Figure 5.6a, are either permanently displaced or lost as a direct result of the Preferred Alternative.

Table 5.14
Potential Permanent, Direct Impacts to Special-Status Wildlife Species
Hectares (Acres)

		Preferred Alternative	Other Alternative
Black-Tailed Prairie Dog	I-25 Corridor	0.10 (0.24)	0.07 (0.18)
	US 85 Corridor	2.47 (6.1)	2.47 (6.1)
	Total	**2.57 (6.34)**	**2.54 (6.28)**
Preble's Meadow Jumping Mouse	I-25 Corridor	1.76 (4.36)	1.76 (4.36)
	US 85 Corridor	0	0
	Total	**1.76 (4.36)**	**1.76 (4.36)**

Figure 5.6a
I-25 Corridor Black-Tailed Prairie Dog
Habitat Impacts


25
C-470
E-470
Yosemite St
S. University Blvd
Lincoln Avenue
N
Schweiger Interchange
Surrey Ridge Road
Castle Pines Parkway
Legend:
Black-Tailed Prairie Dog Colony
8
Happy Canyon Road
85
Union Pacific Railroad
Burlington Northern Santa Fe Railroad
Meadows/Founders Parkway
Front St
11
Wolfensberger Rd
5th Street
Castle Rock
Plum Creek Parkway
Douglas Lane

Preble's Meadow Jumping Mouse (Threatened). Both temporary and permanent impacts from the Preferred Alternative are expected to affect jumping mouse populations and their habitat along the I-25 Corridor; however, no "taking" of this species is anticipated. The permanent impact area is approximately 1.76 hectares (4.36 acres), and the temporary impact area is expected to be approximately 0.51 hectare (1.29 acres). Permanent direct impacts are primarily caused by roadway widening, new slope toes, and bridge widening in the vicinity of East Plum Creek. Temporary impacts are due to the construction of a haul road and construction buffer zones. The majority of these impacts are expected to be to active season habitat, but some impacts occur to hibernation areas as well. The PMJM impacted habitat is shown on Figure 5.6b and Figure 5.6c. More complete descriptions of impacts to PMJM habitat are found in the ***Preble's Meadow Jumping Mouse Biological Assessment for the South I-25 Corridor and US 85 Corridor Environmental Impact Statement,*** October 2000**.**

Bald Eagle (Federal Threatened and State Threatened). Although loss of black-tailed prairie dog habitat (and black-tailed prairie dogs) is a secondary impact to bald eagles, any future loss along the Front Range should be considered a direct impact. This is due to the importance of black-tailed prairie dog colonies suitable for foraging eagles, and the persistent and accelerating loss of prairie dog habitat to development within bald eagle winter range. No nesting or critical habitat for the bald eagle is impacted by the Preferred Alternative.

Swift Fox (Federal Candidate and State Species of Concern). The APE does not contain typical swift fox habitat. No swift fox impacts are anticipated as a result of the Preferred Alternative.

Plains Sharp-Tailed Grouse (State Endangered). Plains sharp-tailed grouse occur at three sites within the scope of the project area. However, no known lek sites are directly impacted by proposed construction. No direct sharp-tailed grouse impacts are anticipated as a result of the Preferred Alternative.

Burrowing Owl (State Threatened). A single burrowing owl was recently reported outside the northern end of the study area near Park Meadows Mall west of I-25 and north of C-470. No occurrences of burrowing owls are documented within the APE, and thus no direct impacts to this species are anticipated as a result of the Preferred Alternative. CDOT will survey for burrowing owl presence in the project area one year prior to construction and additional surveys will be conducted prior to any earth moving activity.

American Peregrine Falcon (State Species of Concern). The project corridor does not contain peregrine nesting or critical habitat. The nearest active nesting pairs occur approximately 24.14 kilometers (15 miles) southwest of the town of Castle Rock and approximately 25.75 kilometers (16 miles) west of Sedalia. No peregrine falcon impacts are anticipated as a result of the Preferred Alternative.

Ferruginous Hawk (State Species of Concern). Due to the almost exclusive dependence of the ferruginous hawk on black-tailed prairie dogs, loss of black-tailed prairie dog habitat represents a direct impact to ferruginous hawks. Loss of black-tailed prairie dogs within the APE will particularly affect ferruginous hawks during the winter months, when food resources can be scarce.

Northern Leopard Frog (State Species of Concern). The northern leopard frog was observed in the I-25

Corridor APE by CDOW staff in 1999. Subsequent surveys, conducted by CDOT staff, have turned up negative for the presence of northern leopard frogs. In addition, northern leopard frogs were not encountered during construction of Climbing Lanes Phase I project. No impacts are anticipated as a result of the Preferred Alternative.

Northern Redbelly Dace (State Endangered), **Common Shiner** (State Threatened), **Brassy Minnow** (State Threatened), **Iowa Darter** (State Species of Concern). Plum Creek is potential habitat for the northern redbelly dace. The common shiner has been documented in West Plum Creek. East Plum Creek and Plum Creek are potential habitat for the common shiner. The brassy minnow may occur within the project area. The Iowa darter has been documented as occurring in Plum Creek. No direct impacts to these fish species are anticipated as a result of the Preferred Alternative.

US 85 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Preferred Alternative)

Impacts to the bald eagle, swift fox, plains sharp-tailed grouse, burrowing owl, American peregrine falcon, ferruginous hawk, northern redbelly dace, common shiner, brassy minnow, and Iowa darter are the same as those described for the I-25 Preferred Alternative.

Black-Tailed Prairie Dog (Warranted but Precluded and State Species of Concern). Approximately 2.47 hectares (6.1 acres) of black-tailed prairie dog habitat along the US 85 Corridor are impacted by the Preferred Alternative. Black-tailed prairie dogs at Colonies 1, 3, 5, 6, 7, 8, 9, 10, 11, and 12 as shown on Figure 5.6d, are either permanently displaced or lost as a direct result of the Preferred Alternative. The majority of this impact (1.6 hectares [3.9 acres]) occurs at Colony 8 and Colony 12.

Preble's Meadow Jumping Mouse (Threatened). Surveys for the jumping mouse were conducted within the US 85 APE, but no jumping mice were found. PMJM habitat is not impacted by the Preferred Alternative along the US 85 Corridor.

Other Alternative

The Other Alternative has similar impacts to special-status species as those described for the Preferred Alternative.

I-25 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Other Alternative)

The Other Alternative directly impacts 0.07 hectare (0.18 acre) of black-tailed prairie dog habitat within the US 85 Corridor, 0.03 hectare (0.074 acre) less than the Preferred Alternative. The additional impact under the Preferred Alternative occurs at Colony 6.

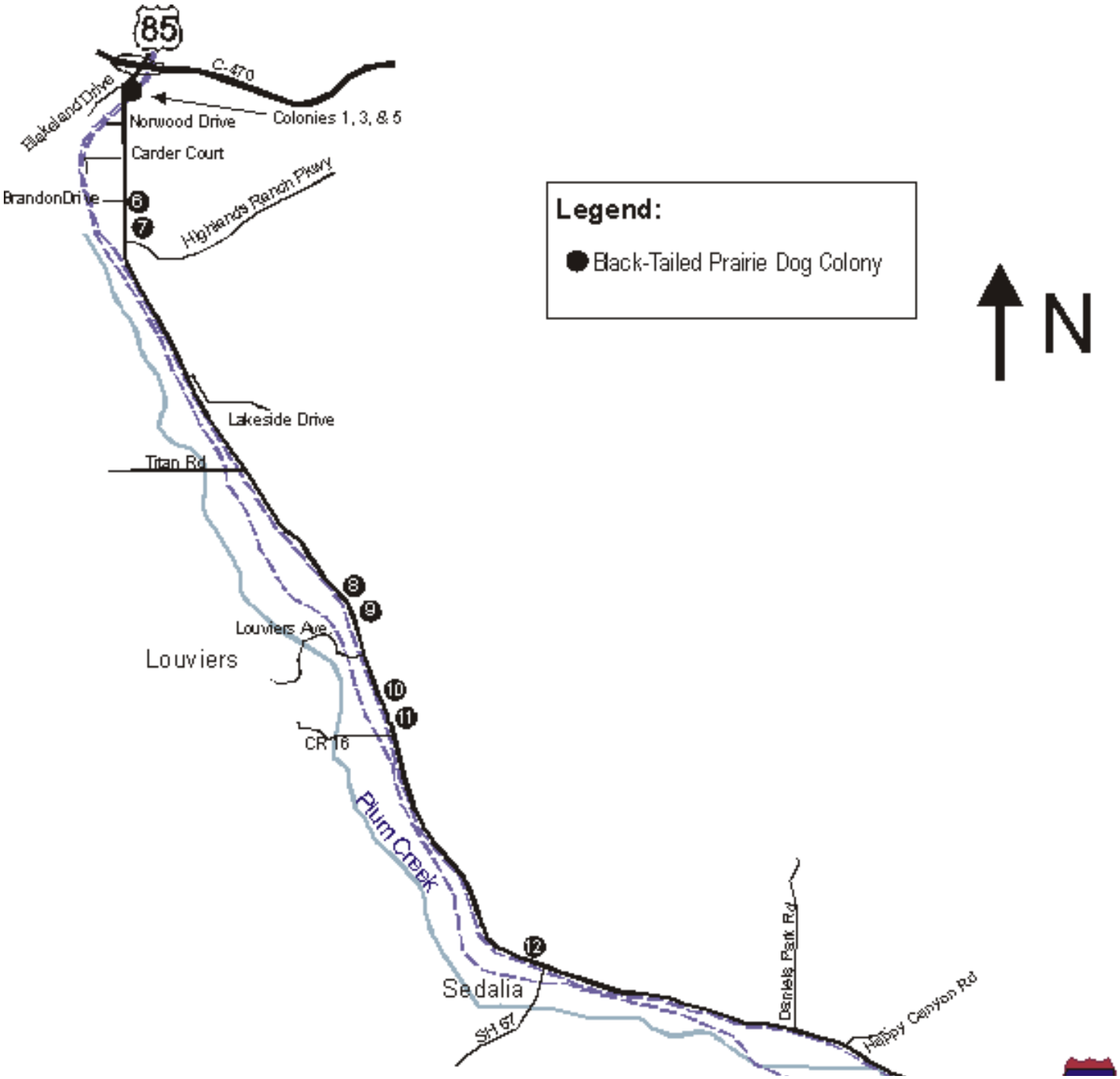
US 85 Corridor Threatened, Endangered, and Other Special-Status Species Impacts (Other Alternative)

The Other Alternative directly impacts the same amount (2.47 hectares [6.1 acres]) of black-tailed prairie dog habitat along the US 85 Corridor as the Preferred Alternative.

Figure 5.6b
I-25 Corridor Preble's Meadow Jumping Mouse Impacts

Figure 5.6c
I-25 Corridor Preble's Meadow Jumping Mouse Impacts

Figure 5.6d
US 85 Corridor Black-Tailed Praire Dog Habitat Impacts



Threatened, Endangered, and Other Special-Status Species Secondary Impacts

Secondary impacts could occur to these and other special-status species, primarily as a result of:

- Reduction in black-tailed prairie dog colonies.
- Degradation of upland and aquatic/riparian habitat.
- Fragmentation of habitat.

Two special-status species have the potential to be secondarily impacted by loss of black-tailed prairie dogs and their habitat. Black-tailed prairie dogs are an important Front Range winter food source for the bald eagle. Burrowing owls require black-tailed prairie dog burrows for cover. Loss of black-tailed prairie dogs and their habitat due to the Preferred Alternatives are relatively small, and therefore, are not expected to cause substantial secondary impacts to ferruginous hawks, bald eagles, or burrowing owls.

The Preferred Alternative and Other Alternative result in an increase in impervious surface area, thereby increasing stormwater runoff, and potentially degrading aquatic and riparian habitats. Potential secondary impacts to the PMJM, northern leopard frog, northern redbelly dace, common shiner, brassy minnow, and Iowa darter may occur. Details on impervious surface increases for each alternative are described in Section 5.3.3.2, *Water Quality*.

Additionally, secondary impacts to PMJM populations may also occur due to increased traffic noise and vibration, and increased lighting from the project. Responses to these impacts are difficult to measure, but it is possible that mouse populations may react to changes in noise, lighting, or vibration by avoiding certain areas of habitat, moving nest site areas, moving hibernacula, changing breeding behavior, and increasing susceptibility to predation. The effects of noise on wildlife, including special-status species, will likely be negligible as most species within the APE habituate to noise levels projected for these corridors. The most serious extinction risk factor for small vertebrate populations is population isolation. However, because habitat impacts are on habitat edges and will not affect PMJM movement, the proposed actions for the Preferred Alternative does not result in additional isolation of PMJM populations in Castle Rock.

Threatened, Endangered, and Other Special-Status Species Cumulative Impacts

The cumulative effect to special-status species is a consideration for their listing under the ESA. Human activities exerting a cumulative impact on black-tailed prairie dog include rangeland conversion to farmland or urban development, poisoning, and shooting. In addition to these human factors, the introduction of the non-native sylvatic plague in 1908, which causes nearly 100 percent mortality to black-tailed prairie dog populations exposed to the bacteria, has had a widespread impact on the species throughout North America. Loss of black-tailed prairie dog habitat from planned or ongoing developments, combined with impacts from transportation projects, historic actions, and the threat of the sylvatic plague have likely contributed to the decline in this species, and the recent status elevation of black-tailed prairie dogs to warranted but precluded.

To better understand the Preferred Alternative's effect on wildlife communities it is necessary to assess cumulative impacts within the I-25 project corridor. The five Early-Action projects on I-25 will impact all five cover types. Grassland habitat has been or will be impacted by the Climbing Lanes Phase I project, Climbing Lanes Phase II project, and the Meadows/Founders Interchange project. Woodlands will be impacted by the Climbing Lanes Phase II project. Shrublands were impacted by the Climbing Lanes Phase I project. Riparian habitat will be impacted by the Wolfensberger Bridge and 5th Street Bridge projects; however, due to the presence of the Preble’s Meadow Jumping Mouse in the these areas, full mitigation will offset impacts to the riparian communities in those areas. In addition, a small amount of riparian habitat along Happy Canyon Creek was impacted by the Climbing Lanes Phase I project. The urban cover type has been impacted by the Meadow/Founders Interchange project. Because of its urban nature, the I-25 Southeast Corridor transportation project is expected to impact grasses and landscaped areas within and adjacent to the ROW.

In addition to these other transportation projects, current and future development in the Chatfield Basin area may create barriers to wildlife movement, fragment habitat, cause habitat loss (including black-tailed prairie dog colonies, riparian and wetland areas) and, increase impervious surface runoff.

Four major residential development areas are planned for the I-25 Corridor and one along the US 85 Corridor. Combined with historic impacts, these current and foreseeable activities will further impact wildlife habitat. See Section 5.3.3.6, *Wildlife Impacts* for a more complete discussion of these impacts.

Land preservation in Douglas County is a beneficial cumulative impact to threatened, endangered, and other special-status species. From 1995 to 2000, the Douglas County Open Space and Natural Resource program has purchased over 6,680 hectares (16,500 acres). These areas, and other significant conservation areas in the vicinity of US 85, include Chatfield State Park, Highlands Ranch Conservation Area, Daniels Park, and Cherokee Ranch Foundation. Preservation of these areas may benefit black-tailed prairie dogs by reducing the total amount of cumulative habitat loss possible to them. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county.

Habitat connectivity is a crucial component to maintaining the habitat quality and biological diversity of this resource. Decreasing permeability of the US 85 Corridor, coupled with loss and degradation of habitat associated with ongoing development, has the potential to undermine conservation area preservation efforts. Currently Douglas County is developing a Habitat Conservation Plan, which will aid land managers and planners in planning additional development and conservation areas within the county.

Human activities exerting a cumulative impact on PMJM habitat include residential and commercial development, highway construction, stream alteration, and grazing. Offsite impacts may also have caused

isolation of sites that rendered them unsuitable for PMJM. Residential developments proposed within the I-25 Corridor and US 85 Corridor (i.e., Meridian, Rampart Range, the Canyons, developments near Douglas Lane, and Highlands Ranch build-out) will likely not impact areas currently designated as mouse protection areas or potential mouse protection areas.

However, cumulative impacts to PMJM habitat are being caused by other transportation projects in Douglas County such as the Wolfensberger Road Interchange, the 5th Street Overpass, and the Wilcox Street Bridge replacement. All three projects occur in Castle Rock, along East Plum Creek. The combined cumulative impact to PMJM habitat is approximately 0.9 hectare (2.22 acres) as shown on Table 5.15. Each of these projects completed Biological Assessments that were submitted to the US Fish and Wildlife Service (USFWS) for review. Compensatory habitat mitigation, totaling approximately 1.35 hectares (3.34 acres), is required to minimize impacts. CDOT is currently proposing to install a series of check dams along East Plum Creek to enhance/restore existing PMJM habitat. If successful, this project could improve a significant mount of contiguous PMJM habitat.

Table 5.15
Impacts to Preble's Meadow Jumping Mouse Habitat in Castle Rock, Colorado

Project Name	Area of Impact hectares (acres)	Area of Mitigation hectares (acres)
Wolfensberger Road Interchange	0.21 (0.51)	0.31 (0.77)
5th Street Overpass	0.42 (1.04)	0.63 (1.56)
Wilcox Street Bridge	0.27 (0.67)	0.41 (1.01)
Total	**0.9 (2.22)**	**1.35 (3.34)**

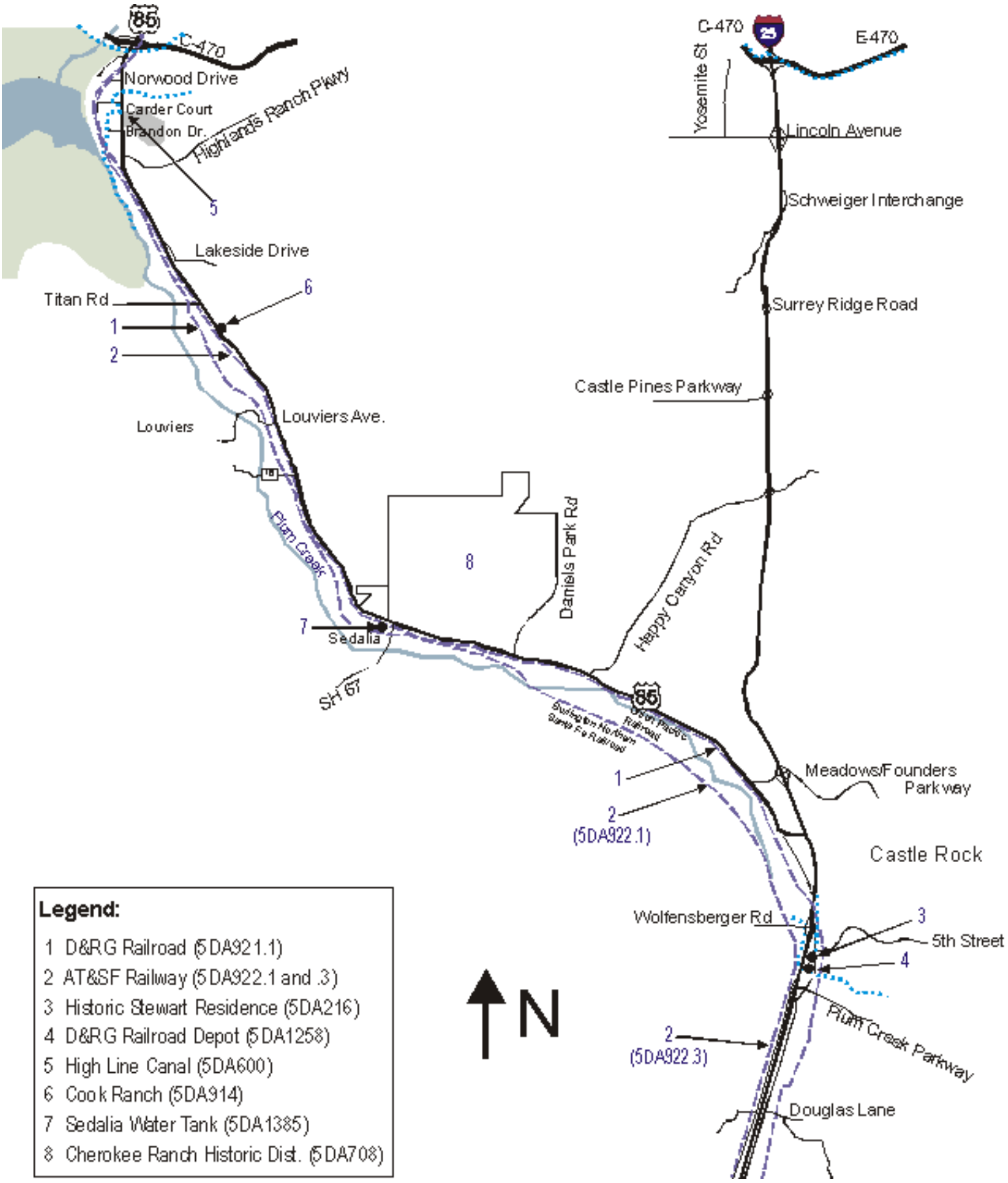
Other cumulative effects include the increase in impervious surface from the Preferred Alternative or Other Alternative combined with historic activities and those resulting from other previously described development projects. The cumulative effect of impervious surface in the corridors has the potential to degrade aquatic habitat quality in East Plum Creek and Plum Creek. For additional information on threatened and endangered species, see the ***Special Status Plant and Animal Species Technical Report,*** May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

5.3.3.10 Historical Resources Effects

Potential impacts to National Register of Historic Places (NRHP) eligible or listed historic architectural resources may occur as a result of structure demolition, highway construction and use (including both noise and ground-disturbing activities), or changes to a resource's setting. This section evaluates potential impacts to historic properties along the I-25 Corridor and the US 85 Corridor. The likelihood of impacts is evaluated based on the proximity of both temporary and permanent impact areas to significant (NRHP listed or eligible) historic properties. The total area of impact to each property is calculated, where appropriate, by overlaying proposed project area maps on parcel maps provided by Douglas County, as well as recent ROW survey mapping. Figure 5.7a shows all historic resources within the APE. Letters of conformance are included at the end of Chapter 6.0, *Section 4(f) Properties Evaluation.*

Figure 5.7a
Historic Resources within the I-25 Corridor and

US 85 Corridor Area of Potential Effect



Preferred Alternative and Other Alternative

This section considers potential effects to historic properties along the I-25 Corridor and the US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives. Table 5.16, at the end of this section, summarizes effects to historic resources.

I-25 Corridor Historical Resource Impacts (Preferred Alternative and Other Alternative)

Denver and Rio Grande Railroad (5DA921.1)

Widening of I-25 impacts one historic resource (the D&RG Railroad). The D&RG Railroad, a NRHP eligible site, lies outside the APE from Douglas Lane until it crosses I-25 between Wolfensberger Road and the existing US 85/I-25 Interchange. Approximately 870 meters (2,850 feet) are impacted by road widening and reconstruction of the new railroad bridge where it crosses I-25. FHWA and the State Historic Preservation Officer (SHPO) have determined that this action will result in an adverse effect to the D&RG Railroad. The D&RG Railroad is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation*. Figure 5.7b shows the location of the potential impacts to the D&RG Railroad.

Denver and Rio Grande Railroad Depot (5DA216) and Stewart Residence (5DA1258)

The Preferred Alternative and Other Alternative do not affect the D&RG Railroad Depot or the Stewart Residence. The FHWA and the SHPO have determined that the proposed action results in no effect to these historic properties.

AT&SF Railway (5DA922.1 and 5DA922.3)

Impacts to Segment 1 of this resource are described in the next section, *US 85 Historical Resource Impacts*. The Preferred Alternative and Other Alternative do not impact Segment 3 of the AT&SF Railway. FHWA and SHPO have determined that this action results in no effect to Segment 3 of 5DA922.

US 85 Corridor Historical Resource Impacts (Preferred Alternative and Other Alternative)

High Line Canal (5DA600 and 5DA600.2)

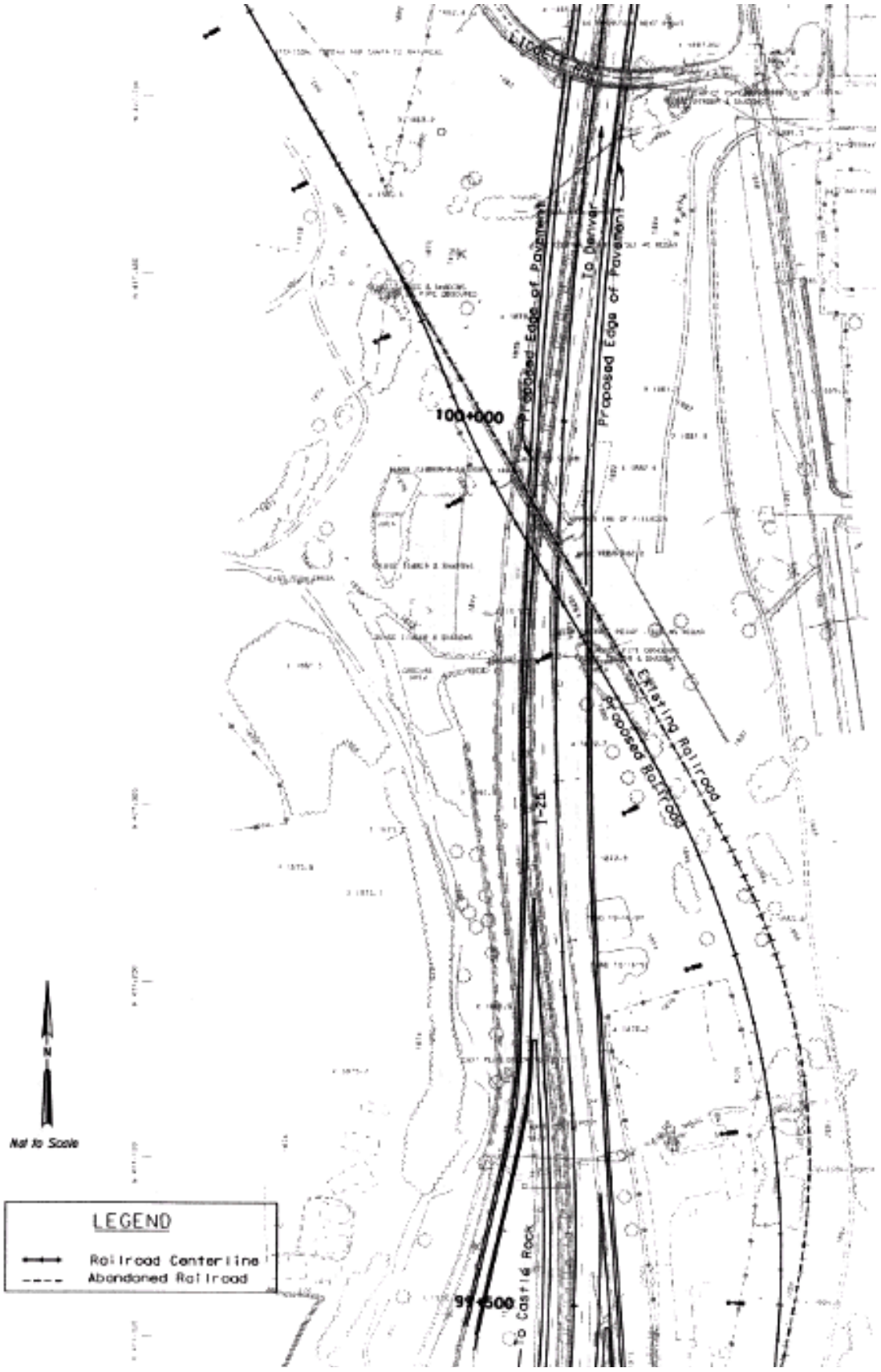
There is no impact to contributing segments of the High Line Canal by the Preferred Alternative and Other Alternative. FHWA and SHPO have determined that the proposed action results in no effect to the High Line Canal.

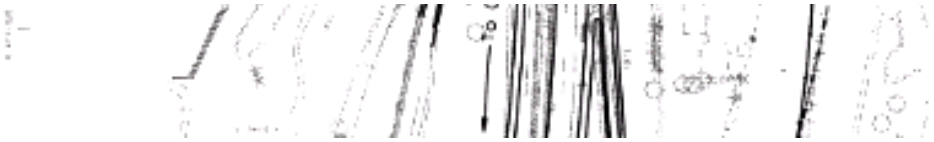
Cook Ranch (5DA914)

The Preferred Alternative and Other Alternative realign US 85 in the vicinity of Cook Ranch to avoid property take. The Preferred Alternative and Other Alternative do not impact the Cook Ranch

property. FHWA and SHPO have determined that the proposed action results in no effect to the Cook Ranch Property.

Figure 5.7b
Preferred Alternative and Other Alternative
Denver & Rio Grande Railroad (5DA921.1)





AT&SF Railroad (5DA922.1)

The Preferred Alternative and Other Alternative make improvements to the existing AT&SF Railroad crossing on SH 67. Improvements include widening and replacing the current road base, but the railroad crossing remains at-grade. The Preferred Alternative and the Other Alternative permanently impacts approximately 4.3 meters (14 feet) of the railroad including 2.7 meters (9 feet) west of SH 67 and 1.6 meters (6 feet) east of SH 67. The AT&SF Railroad is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation*. Figure 5.7c illustrates the impact to this resource. FHWA and SHPO have determined that this action results in no adverse effect to Segment 1 of the AT&SF Railway.

Sedalia Water Tank (5DA1385)

The Preferred Alternative and Other Alternative do not impact the Sedalia Water Tank. FHWA and SHPO have determined that this action results in no effect to the Sedalia Water Tank.

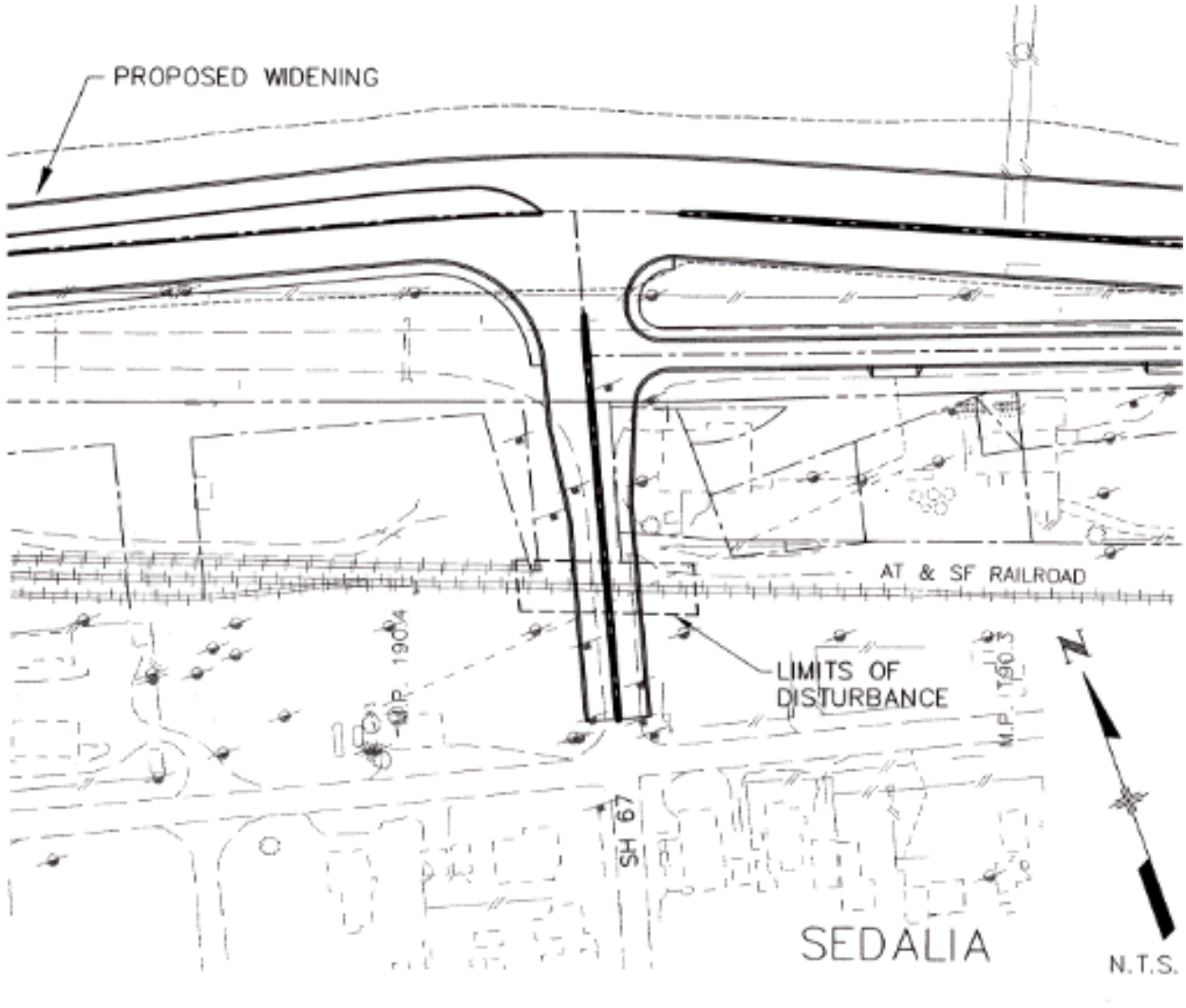
Cherokee Ranch Historic District (5DA708)

The Preferred Alternative and Other Alternative impact approximately 5.1 hectares (12.5 acres) of the Cherokee Ranch Historic District. In addition to the district, the Preferred Alternative and Other Alternative impact the original main gate and Rattlesnake Road. These were built between 1925 and 1926, and are both eligible as contributing elements of the historic district (Figure 5.7d, pages 1-4 at the end of this section). FHWA and SHPO have determined that this action results in an adverse effect on the historic gate and Rattlesnake Road. The Cherokee Ranch Historic District is protected under Section 4(f) of the Department of Transportation Act of 1966. For additional information, see Chapter 6.0, *Section 4(f) Evaluation.*

Table 5.16
Potential Historic Resource Impacts

Corridor	Historic Resource	No-Action Alternative	Preferred Alternative	Other Alternative
I-25	D&RG Railroad Depot (5DA216)	No effect	No effect	No effect
I-25	Stewart Residence (5DA1258)	No effect	No effect	No effect
I-25	D&RG Railroad (5DA921.1)	No effect	Adverse effect	Adverse effect
I-25	AT&SF Railway (5DA922) Segment 3	No effect	No effect	No effect
US 85	AT&SF Railway (5DA922) Segment 1	No effect	No adverse effect	No adverse effect
US 85	High Line Canal (5DA600)	No effect	No effect	No effect
US 85	Cook Ranch (5DA914)	No effect	No effect	No effect
US 85	Sedalia Water Tank (5DA1385)	No effect	No effect	No effect
US 85	Cherokee Ranch Historic District (5DA708)	No effect	Adverse effect	Adverse effect

Figure 5.7c
Preferred Alternative and Other Alternative
AT&SF Railway (5DA922.1) Potential Effects
US 85 at MP 190.4



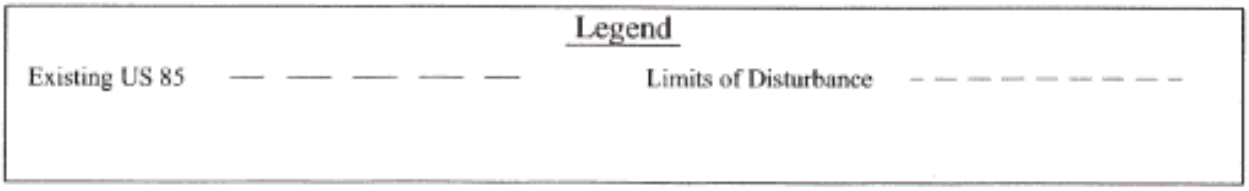


Figure 5.7d
Preferred Alternative and Other Alternative
Cherokee Ranch Historic District (5DA708)
US 85 Between MP 190.3 & MP 188.2
Page 1 of 4

Figure 5.7d (cont.)
Preferred Alternative and Other Alternative
Cherokee Ranch Historic District (5DA708)
US 85 Between MP 190.3 & MP 188.2
Page 2 of 4

Figure 5.7d (cont.)
Preferred Alternative and Other Alternative
Cherokee Ranch Historic District (5DA708)
US 85 Between MP 190.3 & MP 188.2
Page 3 of 4

Figure 5.7d (cont.)
Preferred Alternative and Other Alternative
Cherokee Ranch Historic District (5DA708)
US 85 Between MP 190.3 & MP 188.2
Page 4 of 4

For additional information on historic resources, see the ***Historic Resources Survey Interstate 25/SH 85 Douglas County, Colorado***; and ***Historic Resources Technical Report,*** May 2000, amended November 2000, and the ***Review of the Sugnet (1998) Technical Report: Historic Resources,*** March 1999, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS***.

5.3.3.11 Archaeological Resources Impacts

The Preferred Alternative and Other Alternative will not likely result in adverse effects to archaeological sites. This determination is contingent on site avoidance. Should avoidance not be possible, consultation will be reinitiated with the Native American Tribes and the SHPO. Site recommendations have been formulated in consultation with the SHPO. Archaeological letters of compliance are included in the Appendix of this document.

Preferred Alternative

I-25 Corridor Archaeological Resource Impacts (Preferred Alternative)

Three sites located in the I-25 Corridor may meet the criteria for listing on the NRHP. Test excavations to evaluate the nature and extent of buried cultural deposits have not been conducted in order to preserve the sites in place. If avoidance measures are not feasible test excavations will be required so that a comprehensive National Register significance evaluation can be completed. If any sites are determined eligible for the NRHP, a Memorandum of Agreement (MOA) will be developed and implemented prior to any construction in the site vicinity.

US 85 Corridor Archaeological Resource Impacts (Preferred Alternative)

One site on the US 85 Corridor may meet the criteria for listing on the NRHP. The site is located on the fringe of the project corridor and avoidance will therefore be possible.

Other Alternative

I-25 Corridor Archaeological Resource Impacts (Other Alternative)

The consequences of both alternatives are identical except for the following: one additional site evaluated may meet the criteria for NRHP listing. If this site cannot be avoided test excavations will be required so that a comprehensive National Register significance evaluation can be completed. If any sites are determined eligible for the NRHP, a Memorandum of Agreement (MOA) will be developed and implemented prior to any construction in the site vicinity.

US 85 Corridor Archaeological Resource Impacts (Other Alternative)

Consequences of the Other Alternative are the same as described in the Preferred Alternative.

Full documentation of archaeological resources is included in the following reports in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS***: ***Cultural Resources Management Report,*** January 1999***; An Intensive Archaeological Resources Survey Along Interstate 25 and US Highway 85 In Arapahoe and Douglas Counties, Colorado,*** December 1999***; and Survey Report Addendum for Colorado Department of Transportation Project IM 0252-317, Lincoln Avenue to South Castle Rock (I-25 Frontage Road and Interchange Development),*** April 2000.

5.3.3.12 Paleontological Resources Impacts

Periodic monitoring of highway construction will occur if additional fossil plant localities are uncovered. Plant remains weather quickly and can be discovered only in fresh excavations. Because of the moderate abundance of plant localities discovered during this and other surveys performed by CDOT and the Denver Museum of Nature and Science (DMNS), there is a strong possibility that new localities will be found as excavation creates new exposures that were previously obscured by vegetative cover. If any fossils are encountered during construction, a qualified paleontologist will be notified immediately to assess their scientific importance. Monitoring of areas (sites) identified herein will occur.

Preferred Alternative and Other Alternative

This section considers potential effects to paleontological resources along the I-25 Corridor and US 85 Corridor by the Preferred Alternative and Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Paleontological Resource Impacts (Preferred Alternative and Other Alternative)

One site, DMNS 1200, may be impacted by the Preferred Alternative and Other Alternative; however, previously unexcavated, but potentially fossiliferous areas immediately adjacent to the known areal extent of the locality will be impacted by the Preferred Alternative and Other Alternative. Five other sites were found along the I-25 Corridor: DMNS 916, 917, 2134, 2135, and "new" site. Mitigation measures implemented during construction of the CDOT I-25 Climbing Lanes Phase I project may preclude any future need to monitor or mitigate impacts to these five localities prior to or during construction.

Impacts to previously unrecorded, buried paleontological sites may result from the Preferred Alternative and Other Alternative along the I-25 Corridor.

US 85 Corridor Paleontological Resource Impacts (Preferred Alternative and Other Alternative)

One site, UCM 92164, will be impacted by the Preferred Alternative and Other Alternative. UCM 92164 has previously been partially excavated. Collections made to date are small and most likely do not include a statistically valid representative sample of the preserved paleoflora, so additional mitigation will be necessary.

Impacts to previously unrecorded, buried paleontological sites may result from the Preferred Alternative and Other Alternative along the US 85 Corridor.

Full documentation of paleontological resources is included in the following reports in the Technical Reports Volume of the South I-25 Corridor and US 85 Corridor FEIS: ***CDOT Project #IM 0252-0317 Paleontological Survey of the I-25 Improvement Options Between Castle Pines and Lincoln Avenue and the Extended Burlington Northern Railroad Project Area***, April 2000; and ***Paleontologic Resources Along the Southeast Interstate Corridor, Arapahoe and Douglas Counties, Colorado***, February 1999.

5.3.3.13 Prime and Unique Farmland Impacts

No Prime or Unique Farmlands exist within the APE. However, pockets of soils classified as High Potential Dry Cropland of Statewide Importance occur within both highway corridors and are impacted by the proposed alignments. Impacts to High Potential Dry Cropland occur mainly as direct impact to these areas. Secondary impacts to farmlands such as farmland fragmentation and land conversion from agriculture to urban uses are also of concern to the Natural Resources Conservation Service (NRCS). Additional farmland fragmentation is not of concern for this project due to the current existence of the transportation corridors. Cumulative impacts include the past, present, and planned future loss of farmlands of Statewide Importance. A Farmland Conversion Impact Rating (United States Department of Agriculture [USDA] Form AD-1006) has been completed and is included in the Appendix.

Preferred Alternative and Other Alternative

This section considers potential effects to statewide important farmlands along the I-25 Corridor and US 85 Corridor by the Preferred Alternative and Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Prime and Unique Farmland Impacts (Preferred Alternative and Other Alternative)

The Preferred Alternative and Other Alternative impact approximately 1.34 hectares (3.3 acres) to Bresser Sandy Loam soil (Table 5.17), which is considered High Potential Dry Cropland by the NRCS along the I-25 Corridor. The majority of the impacts would occur just north of the Meadows/Founders Interchange and between the existing I-25/US 85 junction and Wolfensberger Road in Castle Rock.

Conversion of these areas to non-agricultural uses will likely occur due to their proximity to urban areas such as the factory outlet stores and downtown Castle Rock. In fact, some of the areas containing High Potential Dry Cropland located just north of the Meadows/Founders Interchange have already been converted by the construction of the factory outlet stores.

US 85 Corridor Prime and Unique Farmland Impacts (Preferred Alternative and Other Alternative)

The Preferred Alternative and Other Alternative impact approximately 17.4 hectares (43 acres) to High Potential Dry Cropland soil types along the US 85 Corridor (Table 5.17). The majority of this impact occurs in the southern part of the US 85 transportation corridor, from approximately 2.7 kilometers (1.7 miles) north of Daniels Park Road, in the Cherokee Ranch area, south to the intersection of US 85 and Meadows Parkway. The areas in the vicinity of the Cherokee Ranch currently serve as rangeland for cattle grazing.

For additional information on prime and unique farmlands, see the ***Farmland Technical Report,*** May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

Table 5.17
Potential Statewide Important Farmlands Impacts
Hectares (Acres)

	Preferred Alternative	Other Alternative
I-25 Corridor	1.34 (3.3)	1.34 (3.3)
US 85 Corridor	17.4 (43)	17.4 (43)
Total	18.74 (46.3)	18.74 (46.3)

5.3.3.14 Noise Impacts

A noise study was conducted for the FEIS alternatives. The assessment identified noise-sensitive receptors based

on existing and predicted noise levels and was prepared in accordance with 23 CFR 772, Code of Federal Regulations. Because noise levels are sensitive to distances from roadways and relative elevations, additional noise assessments will be done during final design to determine exact locations and heights for constructed noise barriers. The purpose of this assessment is to compare the traffic noise impacts of the No-Action Alternative, the Preferred Alternative, and the Other Alternative; to estimate whether effective noise mitigation can be provided; to determine if the noise mitigation is reasonable and feasible; and to provide recommendations regarding noise mitigation.

This noise analysis focuses on the traffic noise generated by the vehicles traveling along I-25 and US 85. The Burlington Northern Santa Fe Railroad and the Union Pacific Railroad are located within the project area. Both railroads follow along the west side of US 85 to a point south of the existing I-25/US 85 Interchange. At this point, the Burlington Northern Santa Fe Railroad continues along the west side of I-25, and the Union Pacific Railroad crosses over to the east side of I-25 and continues south through Castle Rock. Noise levels were modeled at strategic locations to determine the effect the railroads have on the noise levels of sensitive receivers. At locations where the railroad alignment is close to the receiver, the noise generated by the train affects the noise levels more than the traffic noise. At locations where the railroad alignment is farther away from the receiver, the noise generated by the traffic affects the noise levels more than the noise generated by the train. The noise levels presented in this document do not take into account the noise generated from the trains. For more detailed information describing the effects that the trains have on noise levels, see the Appendix of the ***South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis***, November 2000.

The Early-Action projects include the construction of noise barriers as a result of their individual noise analyses: ***Climbing Lanes, Phase I Noise Technical Memorandum*** and ***Climbing Lanes, Phase II Noise Analysis, Douglas County, Colorado***, September 9, 1999. These barriers are included in the noise model as part of the FEIS noise analysis.

Existing noise levels are measured in the field during peak periods to determine the noise produced by traffic on I-25 and US 85, with noise from background sources being a minor component of the noise. Noise predictions are made with the STAMINA 2.0 (Colorado Emissions) computer model. This model is based on the FHWA method for predicting noise generated by constant speed highway traffic. Existing noise measurements are used to calibrate the noise model.

Inputs to the model include traffic volumes, vehicle speed, the distance between the receiver and road, and existing noise barriers. The receptor locations in the model are intended to represent individual or close groups of residences and businesses. Receivers were chosen for evaluation based on their proximity and likely impacts from the improvements associated with the Preferred Alternative and Other Alternative. Receivers more than 152 meters (500 feet) from the edge of the roadway cannot be adequately modeled or reasonably mitigated. Future noise was projected at the receivers for the alternatives based on future p.m. peak traffic conditions.

The FHWA’s maximum noise level allowed is 67 dBA for residential areas and 72 dBA for commercial districts. CDOT defines noise 1 dBA below these levels (66 dBA for residential areas and 71 dBA for commercial districts) as approaching noise abatement criteria, and mitigation must be evaluated for these receivers. When determining noise impacts, CDOT also considers substantial noise increases. An increase of 10 dBA over existing conditions must be given abatement considerations. Proposed noise abatement can also be modeled with the STAMINA 2.0 program. Noise abatement was evaluated at locations where the noise levels approached the noise abatement criteria.

I-25 is being reconstructed from an asphalt surface to a concrete surface. Concrete road surfaces contain groves called tinings, which change the pitch of the noise. The result is a different noise, which may be perceived as louder because it is a new sound (i.e., pitch). Tinings wear away after three to five years.

Noise Receivers

I-25 Corridor

Receivers along the I-25 Corridor modeled for noise impacts are shown on Figure 5.8a through Figure 5.8i, located at the end of this section. Noise barriers as a result of the Climbing Lanes Phase I Early-Action project have been constructed and are included in the existing noise model as well as all the future models. Noise barriers currently being included in the design of the Climbing Lanes Phase II Early-Action project are assumed to be in place and are included in the future models. A summary of noise levels at the receivers along the I-25 Corridor for the existing conditions, the No-Action Alternative, the Preferred Alternative, and the Other Alternative is shown on Table 5.18. Fifty-five receivers (representing 99 residences, 55 businesses, 6 hotels, 1 high school, and 1 historic building) were modeled along I-25. Some of the receivers represent a cluster of homes or a cluster of businesses (i.e., one receiver may represent 5 residences). Receivers with noise levels at or above the approaching noise abatement criteria (66 dBA for residences; 71 dBA for businesses) are represented by the shaded areas on Table 5.18. The number of receivers at or above 66 dBA is 2 for existing conditions, and 23 for the No-Action Alternative, 25 for the Preferred Alternative, and 25 for the Other Alternative.

Table 5.18
I-25 Corridor Existing (1998) and Future (2020) Noise Levels

Receiver	Number of Units Represented by the Receiver	Noise Activity Category Land-Use	Existing 1998 Noise Level	Future 2020 No-Action Alt. Noise Level	Future 2020 Pref./Build Alt. Noise Level	Noise Increase from Existing
A[1]	2	B: Residential	56.5	60.5	61.0	4.5
B[1]	3	B: Residential	56.5	60.5	61.0	4.5
C[1]	2	B: Residential	58.5	63.0	63.5	5.0
D[1]	2	B: Residential	59.0	63.5	64.0	5.0
E[1]	1	B: Residential	59.5	64.0	64.5	5.0
F[1]	1	B: Residential	60.0	64.0	65.0	5.0
G[1]	2	B: Residential	60.5	64.5	65.5	5.0
H[1]	4	B: Residential	59.0	63.0	64.0	5.0
I[1]	2	B: Residential	60.0	64.0	65.0	5.0
J[1]	5	B: Residential	58.5	63.0	63.5	5.0
K	1	B: Residential	64.5	69.5	70.0	5.5
L	1	B: Residential	63.0	67.5	68.0	5.0
M	2	B: Residential	62.0	66.5	67.0	5.0
N[2]	3	B: Residential	65.0	65.0	64.5	-0.5
O[2]	3	B: Residential	65.5	62.0	62.5	-3.0

P[2]	3	B: Residential	62.5	64.0	64.5	2.0
Q[2]	3	B: Residential	65.5	65.0	65.5	0.0
R[2]	2	B: Residential	65.5	63.5	64.0	-1.5
S	3	B: Residential	64.0	68.5	69.0	5.0
T[3]	3	B: Residential	61.0	65.0	65.5	4.5
U[3]	6	B: Residential	61.5	64.5	65.0	3.5
V	1	B: Residential	63.5	67.0	67.5	4.0
W[2]	3	B: Residential	63.0	60.0	60.5	-2.5
X[2]	4	B: Residential	65.5	64.0	64.5	-1.0
Y	2	B: Residential	65.0	69.0	69.5	4.5
Z[2]	2	B: Residential	65.0	64.5	65.0	0.0
AA	1	B: Residential	62.5	66.5	67.0	4.5
BB[4]	5	B: Residential	58.0	63.0	63.5	5.5
CC[4]	5	B: Residential	60.0	65.0	65.5	5.5
DD	1	C: Commercial	62.5	67.0	67.5	5.0
EE	2	B: Hotel	63.5	68.0	68.5	5.0
FF	22	C: Commercial	61.0	66.0	66.5	5.5
GG	4	B: Residential	65.0	68.5	69.0	4.0
HH	1	B: High School	62.0	65.5	66.5	4.5
II	8	C: Commercial	65.5	69.0	69.5	4.0
JJ	6	B: Residential	62.0	66.5	67.0	5.0
KK	2	B: Residential	65.0	69.5	70.0	5.0
LL	2	C: Commercial	70.0	74.5	75.0	5.0
MM	2	C: Commercial	69.5	74.0	74.5	5.0
NN	4	B: Residential/ Historic	68.0	72.5	73.0	5.0
OO	2	B: Residential	66.0	70.0	70.5	4.5
PP	3	B: Residential	65.0	69.5	70.0	5.0
QQ	2	C: Commercial	66.5	71.5	72.0	5.5
RR	1	B: Residential	65.0	70.0	70.5	5.5
SS	1	B: Residential	61.0	66.0	66.5	5.5
TT	1	B: Residential	60.0	65.0	65.5	5.5
UU	2	C: Commercial	66.0	70.0	70.5	4.5
VV	2	C: Commercial	65.0	70.0	70.5	5.5
WW	1	C: Commercial	68.0	72.5	73.0	5.0
XX	4	C: Commercial	69.0	73.5	74.0	5.0
YY	5	C: Commercial	62.0	66.0	66.5	4.5
ZZ	2	B: Hotel	63.5	68.0	69.0	5.5
AAA	2	C: Commercial	63.5	68.0	69.0	5.5
BBB	3	C: Commercial	65.5	70.5	71.0	5.5

CCC	1	B: Hotel	65.5	70.5	72.0	6.5

Shaded Areas represent receivers exceeding the approaching noise abatement criteria (66 dBA for Residential and 71 dBA for Commercial).

[1]Receivers are located behind existing Climbing Lanes, Phase I barriers

[2] Receivers are located behind future Climbing Lanes, Phase II barriers

[3]Receivers T and U are located behind existing berm in the Castle Pines Village area

[4]Receivers BB and CC are located behind existing 5 meter (16 feet) noise wall at Meadows/Founders Parkway

Several receivers (Table 5.18) have a lower future No-Action noise level than existing noise level due to the construction of noise barriers related to the Climbing Lanes Phase II project. The locations of the existing barriers and proposed Climbing Lanes Phase II barriers are shown on Figure 5.8d, Figure 5.8e, and Figure 5.8f.

US 85 Corridor

Receivers along the US 85 Corridor modeled for noise impacts are shown on Figure 5.8j through Figure 5.8q, located at the end of this section. A summary of noise levels at the receivers along the US 85 Corridor for existing conditions, the No-Action Alternative, the Preferred Alternative, and the Other Alternative is shown on Table 5.19. Thirty-eight receivers (representing 100 residences, 41 businesses, 1 motel, and 1 historic building) were modeled along US 85. Receivers with noise levels at or above the approaching noise abatement criteria (66 dBA for residential; 71 dBA for commercial) are represented on Table 5.19 in the shaded areas. The number of receivers at or above the approaching noise abatement criteria is four for existing conditions, nine for the No-Action Alternative, seven for the Preferred Alternative, and seven for the Other Alternative.

Three receivers, G, Q, and JJ, are proposed relocations as a result of the FEIS conceptual design. Four receivers, K, L, M, and N, are relocated as part of the Titan Road Early-Action project. Therefore, future noise levels are not shown for receivers G, K, L, M, N, Q, and JJ for the Preferred Alternative and Other Alternative. Although receiver Q is relocated, seven residences still remain in the area. These seven residences are represented by receiver Q_{new}.

No-Action Alternative

I-25 Corridor Noise Impacts (No-Action Alternative)

Twenty-three receivers (representing 32 residences, 6 hotels, 1 historic building, and 10 businesses) meet the approaching noise abatement criteria for the No-Action Alternative due to the increase in traffic volumes expected in 2020 as represented by the shaded areas on Table 5.18.

US 85 Corridor Noise Impacts (No-Action Alternative)

Nine receivers (representing 15 residences, 1 hotel, 1 historic building, and 3 businesses) meet the approaching noise abatement criteria for the No-Action Alternative due to the increase in traffic volumes expected in 2020 as represented by the shaded areas on Table 5.19.

Preferred Alternative and Other Alternative

This section considers potential impacts to noise receivers within the I-25 Corridor and US 85 Corridor by the Preferred Alternative and the Other Alternative since the impacts are the same for both alternatives.

I-25 Corridor Noise Impacts (Preferred Alternative and Other Alternative)

Twenty-five receivers are impacted as a result of the Preferred Alternative and Other Alternative. These 25 impacted receivers are comprised of the same 23 receivers impacted in the No-Action Alternative and 2 additional receivers, receivers HH and BBB (representing 1 high school and 3 businesses).

US 85 Corridor Noise Impacts (Preferred Alternative and Other Alternative)

Seven receivers (representing 15 residences) reach the approaching noise abatement criteria as a result of the Preferred Alternative.

Three receivers, G, Q, and JJ, are relocated as a result of the FEIS conceptual design. Four receivers, K, L, M, and N, are relocated as a result of the Titan Road Early-Action project. Therefore, future noise levels are not shown for receivers G, K, L, M, N, Q, and JJ.

As seen on Table 5.19, the noise levels for receivers W, X, Y, BB, and LL are lower or the same for the Preferred Alternative as compared to the No-Action Alternative. This decrease in noise levels is due to sections of US 85 that are realigned further away from the receivers. Receivers W, X, Y, and BB are located in Sedalia to the west of US 85. The reconstruction of the SH 67/US 85 Intersection realigns US 85 further away from receivers to the east and thus the noise levels decrease. Receiver LL represents a Section 4(f) property, the Cook Ranch property. US 85 is realigned away from Cook Ranch to the west to avoid impacts and therefore the noise level decreases.

Noise Mitigation

CDOT considers implementing noise abatement methods wherever the predicted future traffic noise levels meet or exceed the approaching noise abatement (66 dBA for residences; 71 dBA for commercial businesses) or where a substantial (10 dBA) increase in noise level occurs. Noise barriers are constructed only if they are feasible and reasonable to construct and are effective in sufficiently reducing the noise levels. Some factors used to determine feasibility and effectiveness include the following:

Table 5.19
US 85 Corridor Existing (1998) and Future (2020) Noise Levels

Receiver	Number of Units Represented by the Receiver	Noise Activity Category: Land-Use	Existing 1998 Noise Level	Future 2020 No-Action Alt. Noise Level	Future 2020 Pref./Build Alt. Noise Level	Noise Increase from Existing
A	11	C: Commercial	65.5	68.0	70.0	4.5
B	2	C: Commercial	62.5	64.5	66.0	3.5
C	7	C: Commercial	65.5	68.0	68.5	3.0

D	9	B: Residential	55.5	58.0	59.0	3.5
E	7	B: Residential	57.5	59.0	60.0	2.5
F	5	B: Residential	57.0	58.5	59.5	2.5
G	1	B: Residential	72.0	73.5	1	
H	4	B: Residential	60.5	62.0	63.0	2.5
I	4	B: Residential	59.5	61.5	62.5	3.0
J	1	B: Residential	64.0	66.0	66.5	2.5
K	1	B: Residential	68.5	70.0	2	
L	2	C: Commercial	66.5	67.5	2	
M	1	B: Residential	64.0	65.5	2	
N	2	B: Residential	64.0	65.5	2	
O	1	B: Residential	62.5	65.0	66.0	3.5
P	2	B: Residential	64.5	67.0	68.5	4.0
Q	9	B: Residential	68.5	71.0	3	
R	2	B: Residential	63.0	65.5	66.0	3.0
S	2	B: Residential	58.0	61.0	62.0	4.0
T	1	B: Residential	65.0	68.5	69.0	4.0
U	1	C: Commercial	55.0	58.0	59.0	4.0
V	3	B: Residential	57.0	60.0	61.0	4.0
W	2	B: Residential	56.5	58.0	57.5	1.0
X	2	B: Residential	58.0	59.5	59.5	1.5
Y	6	B: Residential	57.5	60.5	60.5	3.0
Z	3	C: Commercial	57.0	60.0	60.5	3.5
AA	8	B: Residential	57.0	58.5	58.0	1.0
BB	3	C: Commercial	69.5	71.0	65.0	-4.5
CC	1	B: Residential	68.0	69.5	70.0	2.0
DD	3	B: Residential	59.5	61.0	62.0	2.5
EE	1	B: Residential	62.0	63.0	64.5	2.5
FF	1	B: Residential	58.0	59.0	60.0	2.0
GG	1	C: Commercial	62.5	66.5	67.0	4.5
HH	22	B: Residential	54.5	58.5	60.0	5.5
II	3	C: Commercial	63.0	65.5	66.0	3.0
JJ	4	C: Commercial	68.0	70.5	1	
KK	4	C: Commercial	59.5	62.5	63.0	3.5
LL	1	B: Historic	65.0	67.5	65.0	0.0
Q_{new}	7	B: Residential	63.0	65.5	67.0	4.0

Shaded Areas represent receivers exceeding the approaching noise abatement criteria (66 dBA for Residential and 71 dBA for Commercial).

[1]Receiver is being relocated as a result of the FEIS conceptual design

[2] Receiver is being relocated as part of the Titan Road Early-Action project

[3]Receiver is being relocated as a result of the FEIS conceptual design, receivers in the area are now represented

by Q_{new}

- Noise barriers should have a continuous length with no breaks or gaps for driveways or walkways.
- Effective noise mitigation should create an insertion loss (the difference in noise levels after mitigation and before mitigation) of 5 dBA or greater.
- An insertion loss in the range of 3 dBA to 5 dBA is considered marginally effective.
- An insertion loss in the range of 0 dBA to 3 dBA is considered not effective; mitigation within these areas is not likely to occur.
- Wherever noise abatement is warranted and determined feasible and reasonable, the property owner must be willing to accept the noise abatement measure.
- Economic analysis of the barrier should show cost effectiveness. The benefit of a barrier is considered to be $3,000 per receiver per decibel reduction. The cost of a barrier should not exceed the benefit to be considered reasonable. A cost of $3,500 per receiver per decibel reduction is considered marginally reasonable and additional local factors should be considered.

Federal regulations allow for construction of barriers even when receivers achieve less than the desirable 5 dBA insertion-loss goal. This is an important consideration when determining the average insertion loss for a neighborhood. These are special circumstances that require extensive input from the affected community and coordination with CDOT and FHWA. Other reasons to reduce the height or elimination of noise abatement measures would be to avoid enclosing a residence or business in an overbearing manner or to limit the encroachment of long shadows on driving lanes.

Other than noise level reduction (as discussed in this FEIS), other factors are taken into consideration upon recommending noise barriers. These factors include cost, viewshed, community value, constructability, and land use. These factors will be part of the noise analysis conducted during design.

Noise mitigation is only effective for homes and businesses within 150 meters (500 feet) from the edge of the roadway. Varying topography is another factor that can cause mitigation to be ineffective. The rolling terrain and sharp topography changes along the I-25 Corridor between Station 107+500 and Station 105+000 make it difficult to mitigate noise in certain locations. At locations where the receiver is located at a higher elevation than the roadway, the barrier is typically more effective next to the receiver. At locations where the receiver is located at a lower elevation than the roadway, the barrier is typically more effective next to the highway. Mitigation measures were modeled along the ROW line for both roadways.

Noise barriers were analyzed for the receivers along I-25 and US 85 that reach or exceed the approaching noise abatement criteria (66 dBA for residences; 71 dBA for commercial businesses). Twenty-five receivers (representing 32 residences, 13 businesses, 6 hotels, 1 historic building, and 1 high school) along I-25 and 7 receivers (representing 15 residences) along US 85 exceed the approaching noise abatement criteria with the construction of the Preferred Alternative and Other Alternative.

Second row receivers are included in the evaluation of mitigation. Second row receivers experience a noise reduction due to protection of the first row receivers. When evaluating mitigation, each second row receiver is assumed to experience a decrease in noise of 3 dBA.

Earthen berms are recommended as the best type of noise barrier to build because of the low construction and maintenance costs and to maintain the aesthetic landscape. Limited CDOT ROW along the I-25 Corridor and US 85 Corridor prevents the construction of berms for the majority of the barriers. Barriers 1, 3, 4, 5, 6, and 13 along the I-25 Corridor are the only barriers in which berms would fit within the CDOT ROW. No berms fit within the CDOT ROW along the US 85 Corridor. The noise barriers were modeled to determine if appropriate mitigation is feasible. Once a barrier is determined feasible, other considerations such as costs, viewsheds, land use, community values, and constructability need to be assessed before any mitigation is approved. The construction of any type of noise mitigation in the project area has not been determined and will not be determined until final design. Noise barrier recommendations based on a cost/benefit analysis are provided at the end of this section.

Preferred Alternative and Other Alternative Noise Mitigation

I-25 Corridor (Preferred Alternative and Other Alternative)

Noise barriers in the form of noise walls and earthen berms were analyzed for the 25 receivers that exceed the approaching noise abatement criteria (Receivers K, L, M, S, V, Y, AA, EE, GG, HH, JJ, KK, LL, MM, NN, OO, PP, QQ, RR, SS, WW, XX, ZZ, BBB, and CCC). Table 5.20 summarizes barrier effectiveness from the proposed mitigation along I-25. The shaded areas on Table 5.20 show the receivers that have effective barriers in terms of noise level reduction. The effective barriers are proposed mitigation and are in no way committed to being constructed until further analysis can be completed with the final roadway design.

With the mitigation measures implemented, the noise levels at all receivers (except receiver JJ) are under the noise abatement criteria. The noise barriers, however, are effective only if the insertion loss (reduction of noise level with the construction of a barrier) is 5 dBA or greater. Barriers with an insertion loss between 3 dBA and 4.9 dBA are considered marginally effective and other factors such as community values, safety, and cost should be considered. Barriers producing an insertion loss below 3 dBA are not considered effective in noise level reduction. Barriers 1, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15, 16, 17, and 18 are effective in noise reduction; Barriers 2 and 9 are marginally effective in noise reduction; and Barrier 10 is not effective in noise reduction as seen on Table 5.20. The width of CDOT ROW in the vicinity of B1, B3, B4, B5, B6, and B13 allows for these barriers to be constructed as earthen berms. Berms typically provide an extra 3 dBA reduction in noise levels as compared to noise walls.

Receivers W and X are located near B5 and although these receivers are not impacted receivers, they experience noise level reductions of 2 dBA and 5 dBA, respectively. Receiver UU is located behind B11 due to its proximity to the impacted receiver OO, and although receiver UU is not an impacted receiver, it does experience a noise level reduction of 6.0 dBA. Receiver AAA is located behind B17 due to its proximity to the impacted receiver ZZ, and although AAA is not an impacted receiver, it experiences a noise level reduction of 5 dBA.

The approximate locations, heights, and lengths of the proposed noise barriers are shown on Table 5.21.

Figure 5.8a through Figure 5.8i show the potential noise barrier locations along the I-25 Corridor.

Table 5.20
Effectiveness of Mitigation Measures along the I-25 Corridor

Barrier	Receiver	Noise Activity Category: Land-Use	Existing 1998 Noise Level	Future 2020 Preferred Alt. Noise Level	Future 2020 Mitigated Noise Level	Insertion Loss
B1	K	B: Residential	64.5	70.0	64.5	5.5
B1	L	B: Residential	63.0	68.0	64.0	4.0
B2	M	B: Residential	62.0	67.0	63.5	3.5
B3	S	B: Residential	64.0	69.0	62.5	6.5
B4	V	B: Residential	63.5	67.5	62.5	5.0
B5	Y	B: Residential	65.0	69.5	61.0	8.5
B6	AA	B: Residential	62.5	67.0	61.5	5.5
B7	EE	B: Hotel	63.5	68.5	62.0	6.5
B8	GG	B: Residential	65.0	69.0	64.0	5.0
B9	HH	B: High School	62.0	66.5	62.5	4.0
B10	JJ	B: Residential	62.0	67.0	66.0	1.0
B11	KK	B: Residential	65.0	70.0	65.5	4.5
B11	LL	C: Commercial	70.0	75.0	61.5	13.5
B11	MM	C: Commercial	69.5	74.5	66.5	8.0
B11	XX	C: Commercial	69.0	74.0	62.5	11.5
B12	NN	I: Residential/ Histori	68.0	73.0	65.5	7.5
B12	OO	B: Residential	66.0	70.5	64.5	6.0
B12	UU	C: Commercial	66.0	70.5	64.5	6.0
B13	PP	B: Residential	65.0	70.0	63.0	7.0
B14	QQ	C: Commercial	66.5	72.0	65.5	6.5
B15	RR	B: Residential	65.0	70.5	64.5	6.0
B15	SS	B: Residential	61.0	66.5	63.0	3.5
B16	WW	C: Commercial	68.0	73.0	68.0	5.0
B17	ZZ	B: Hotel	63.5	69.0	64.0	5.0
B17	AAA	C: Commercial	63.5	69.0	64.0	5.0
B18	BBB	C: Commercial	65.5	71.0	65.0	6.0
B18	CCC	B: Hotel	65.5	72.0	65.5	6.5

Highlighted barriers are considered effective in noise level reduction.

Table 5.21
Proposed Noise Barriers along the I-25 Corridor

Barrier Feature						
Barrier #	Barrier Type	Approximate Height	Approximate Length	Approx. Station #s	Receivers Covered	Receivers Represented
Barrier 1	Earthen Berm	4.2 m (14 ft.)	735 m (2,411 ft)	106+965 to 107+430	K and L	2 residences
Barrier 2	Earthen Berm	4.2 m (14 ft.)	110 m (361 ft)	107+280 to 107+390	M	2 residences
Barrier 3	Earthen Berm	4.2 m (14 ft.)	185 m (607 ft)	105+860 to 106+050	S	3 residences
Barrier 4	Earthen Berm	4.2 m (14 ft.)	60 m (197 ft)	104+97 to 105+100	V	1 residence
Barrier 5	Earthen Berm	4.2 m (14 ft.)	305 m (1,001 ft)	104+520 to 104+830	Y	2 residences
Barrier 6	Earthen Berm	5.0 m (16.5 ft.)	340 m (1,115 ft)	104+000 to 104+345	AA	1 residence
Barrier 7	Masonry Wall	4.2 m (14 ft.)	100 m (328 ft)	102+990 to 103+090	EE	2 hotels
Barrier 8	Masonry Wall	6.0 m (19 ft.)	200 m (656 ft)	100+700 to 100+900	GG	4 residences
Barrier 9	Masonry Wall	6.0 m (19 ft.)	315 m (1,033 ft)	100+340 to 100+650	HH	1 high school
Barrier 10	Masonry Wall	6.0 m (19 ft.)	295 m (968 ft)	99+100 to 98+800	JJ	6 residences
Barrier 11	Masonry Wall	6.0 m (19 ft.)	580 m (1,903 ft)	98+700 to 99+300	KK, LL, MM, and XX	1 residence, 1 hotel, 7 businesses, and 7 second row
Barrier 12	Masonry Wall	5.0 m (16.5 ft.)	280 m (919 ft)	98+400 to 98+680	NN, OO, and UU	5 residences, 2 businesses, 1 historic building, and 11 second row
Barrier 13	Earthen Berm	5.0 m (16.5 ft.)	310 m (1,017 ft)	98+190 to 98+500	PP	3 residences
Barrier 14	Masonry Wall	4.2 m (14 ft.)	225 m (738 ft)	96+200 to 96+450	QQ	2 businesses
Barrier 15	Masonry Wall	4.2 m (14 ft.)	390 m (1,280 ft)	95+250 to 95+650	RR and SS	2 residences
Barrier 16	Masonry Wall	4.2 m (14 ft.)	130 m (427 ft)	97+350 to 97+500	WW	1 business and 1 second row
Barrier 17	Masonry Wall	6.0 m (19 ft.)	245 m (804 ft)	102+500 to 102+750	ZZ and AAA	2 hotels and 2 businesses
Barrier 18	Masonry Wall	4.2 m (14 ft.)	600 m (1,969 ft)	117+400 to 118+000	BBB and CCC	3 businesses and 1 hotel

The cost effectiveness of the barriers was analyzed. In consideration of each potential noise barrier, the cost for mitigation is considered reasonable if it does not exceed $3,000 per receiver per decibel reduction. This value is considered the benefit of the barrier. Mitigation is considered marginally cost effective if it costs between $3,000 and $3,500 per receiver per decibel reduction. Barriers that reduce the noise level by 3 dBA or more (i.e. effective and marginally effective barriers) are considered in the cost/benefit analysis. The 18 barriers shown on Table 5.21 have been modeled and all barriers except Barrier 10, are at least marginally effective in noise reduction. These barriers are considered for the cost/benefit analysis.

Table 5.22 shows the 15 barriers that were analyzed for cost effectiveness. The costs do not include ROW costs.

As seen on Table 5.22, the only marginally cost effective barrier is Barrier 3. The costs of the noise barriers used for this analysis were obtained from CDOT data books and the Climbing Lanes Phase I project which just completed the construction of noise barriers.

Table 5.22
Cost Effectiveness of Noise Barriers for the I-25 Corridor

Barrier	Type of Barrier	Height	Length	Total Insertion Loss	Unit Cost per sq m	Barrier Cost	Cost per Decibel Reduction
1	Earthen Berm	4.3 m (14 ft)	735 m (2,411 ft)	9.5	$76	$235,935	$24,835
2	Earthen Berm	4.3 m (14 ft)	110 m (361 ft)	7.0	$76	$35,950	$5,136
3	Earthen Berm	4.3 m (14 ft)	185 m (607 ft)	19.5	$76	$59,385	$3,045
4	Earthen Berm	4.3 m (14 ft)	60 m (197 ft)	5.0	$76	$19,260	$3,852
5	Earthen Berm	4.3 m (14 ft)	305 m (1,001 ft)	17.0	$76	$97,905	$5,759
6	Earthen Berm	5.0 m (16.4 ft)	340 m (1,115 ft)	5.5	$110	$187,000	$34,000
7	Masonry Wall	4.3 m (14 ft)	100 m (328 ft)	13.0	$267	$112,140	$8,626
8	Masonry Wall	6.0 m (19 ft)	200 m (656 ft)	20.0	$267	$320,400	$16,020
9	Masonry Wall	6.0 m (19 ft)	315 m (1,033 ft)	4.0	$267	$504,630	$126,158
11	Masonry Wall	6.0 m (19 ft)	580 m (1,903)	135.0	$267	$929,160	$6,883
12	Masonry Wall	5.0 m (16.4 ft)	280 m (919 ft)	87.0	$267	$373,800	$4,297
13	Earthen Berm	5.0 m (16.4 ft)	310 m (1,017 ft)	21.0	$110	$170,500	$8,119
14	Masonry Wall	4.3 m (14 ft)	225 m (738 ft)	13.0	$267	$252,315	$19,409
15	Masonry Wall	4.3 m (14 ft)	390 m (1,280 ft)	9.5	$267	$437,346	$46,036
16	Masonry Wall	4.3 m (14 ft)	130 m (427 ft)	8.0	$267	$145,782	$18,223
17	Masonry Wall	6.0 m (19 ft)	245 m (804 ft)	20.0	$267	$392,490	$19,625
18	Masonry Wall	4.3 m (14 ft)	600 m (1,969 ft)	24.5	$267	$672,840	$27,463

Highlighted barriers are considered cost/beneficial
ROW costs are not included

US 85 Corridor (Preferred Alternative and Other Alternative)

Noise barriers in the form of noise walls were analyzed for the seven receivers that exceed the approaching noise abatement criteria (Receivers J, O, P, Qnew, R, T, and CC). The large amount of land that berms require prevents the construction of berms along the US 85 Corridor due to limited CDOT ROW. Table 5.23 summarizes barrier effectiveness from the proposed mitigation along US 85. The shaded areas on Table 5.23 show the receivers that have effective barriers in terms of noise level reduction. The effective barriers are proposed mitigation and are in no way committed to being constructed until further analysis can be completed with the final roadway design.

Table 5.23
Effectiveness of Mitigation Measures along the US 85 Corridor

Barrier	Receiver	Noise Activity Category: Land-Use	Existing Noise Level	Future 2020 Preferred Alt. Noise Level	Future 2020 Mitigated Noise Level	Insertion Loss
B1	J	B: Residential	64.0	66.5	60.0	6.5
B2	O	B: Residential	62.5	66.0	61.0	5.0
B3	P	B: Residential	64.5	68.5	63.0	5.5
B4	R	B: Residential	63.0	66.0	63.0	3.0
B5	T	B: Residential	65.0	69.0	63.5	5.5
B6	CC	B: Residential	68.0	70.0	65.0	5.0
B7	Qnew	B: Residential	63.0	67.0	62.0	5.0

Highlighted barriers are considered effective in noise reduction

All barriers, except B4, are effective barriers because the insertion loss is 5 dBA or greater. B4 is marginally effective in noise reduction. The approximate locations, heights, and lengths of the noise barriers are shown on Table 5.24. Figure 5.8j through Figure 5.8q (located at the end of this section) show the potential noise barrier locations along the US 85 Corridor.

Table 5.24
Proposed Noise Barriers along the US 85 Corridor

Barrier Feature						
Barrier #	Barrier Type	Approximate Height	Approximate Length	Approximate Milepost	Receivers Covered	Receivers Represented
Barrier 1	Masonry Wall	3.7 m (12 ft)	111 m (365 ft)	196.9	J	1 residence
Barrier 2	Masonry Wall	4.2 m (14 ft)	236 m (775 ft)	195.9	O	1 residence
Barrier 3	Masonry Wall	2.4 m (8 ft)	238 m (780 ft)	195.6	P	2 residences & 1 second row
Barrier 4	Masonry Wall	4.2 m (14 ft)	105 m (345 ft)	193.9	R	2 residences & 1 second row
Barrier 5	Masonry Wall	3.0 m (10 ft)	114 m (375 ft)	191.2	T	1 residence
Barrier 6	Masonry Wall	3.0 m (10 ft)	155 m (510 ft)	189.7	CC	1 residence
Barrier 7	Masonry Wall	4.2 m (14 ft)	279 m (915 ft)	194.1	Qnew	7 residences

The freight railroad tracks of the Burlington Northern Santa Fe Railroad and Union Pacific Railroad are located between US 85 and receivers J and R. The traffic noise at these two locations can be mitigated effectively at receiver J and marginally effectively at receiver R. However, the proposed barriers (B1 and B4) will not reduce the noise from the trains at these locations.

The cost effectiveness of the barriers was analyzed. In consideration of each potential noise barrier, the cost for mitigation is considered reasonable if it does not exceed $3,000 per receiver per decibel reduction. This value is considered the benefit of the barrier. Mitigation is considered marginally reasonable if it costs between $3,000 and $3,500 per receiver per decibel reduction. Barriers that reduce the noise level by 3 dBA or more (i.e. effective and marginally effective barriers) are considered in the cost/benefit analysis. The seven barriers shown on Table 5.24 have been modeled and all barriers are at least marginally effective in noise reduction. All seven noise barriers are considered for the cost/benefit analysis.

Table 5.25 shows the seven barriers that were analyzed for cost effectiveness. The costs do not include

ROW costs. As shown on Table 5.25, none of the barriers are cost effective. The costs of the noise barriers used for this analysis were obtained from the Climbing Lanes Phase I project which just completed the construction of noise barriers.

Table 5.25
Cost Effectiveness of Noise Barriers for the US 85 Corridor

Barrier	Type of Barrier	Height	Length	Total Insertion Loss	Unit Cost per sq m	Barrier Cost	Cost per Decibel Reduction
1	Masonry Wall	3.7 m (12 ft)	111 m (365 ft)	6.5	$267	$109,657	$16,870
2	Masonry Wall	4.2 m (14 ft)	235 m (775 ft)	5.0	$267	$263,529	$52,706
3	Masonry Wall	2.4 m (8 ft)	238 m (780 ft)	17.0	$267	$152,510	$8,971
4	Masonry Wall	4.2 m (14 ft)	105 m (345 ft)	9.0	$267	$117,747	$13,083
5	Masonry Wall	3.0 m (10 ft)	114 m (375 ft)	5.5	$267	$91,314	$16,603
6	Masonry Wall	3.0 m (10 ft)	155 m (510 ft)	5.0	$267	$124,155	$24,831
7	Masonry Wall	4.2 m (14 ft)	279 m (915 ft)	35.0	$267	$312,871	$8,939

ROW costs are not included

Summary of Results

The results of the traffic noise impacts analysis conducted for the South I-25 Corridor and US 85 Corridor FEIS project include:

Preferred Alternative and Other Alternative I-25 Corridor Noise Analysis Summary

- Noise barriers discussed in this FEIS are currently proposed but are not certain future actions. These barriers will be re-evaluated at the time of final design. Other elements than noise level reductions will be considered in the determination of the construction of noise barriers including viewshed, land use, sight-distance, wildlife habitat, the location of historic buildings, and topography of the area.

- Twenty-three receivers will have noise levels exceeding the approaching noise abatement criteria (66 dBA for residences and 71 dBA for businesses) in year 2020 if noise barriers are not constructed.

- Barriers 1, 3, 4, 5, 6, and 13 are effective with regard to noise reduction. The barriers are in the form of earthen berms.

- Barrier 2 is marginally effective with regard to noise reduction but is not considered reasonable with regard to cost. This barrier is in the form of an earthen berm.

- Barriers 7, 8, 11, 12, 14, 15, 16, 17, and 18 are effective with regard to noise reduction but are not considered reasonable with regard to costs. The barriers are in the form of masonry walls.

- Barrier 9 is marginally effective with regard to noise reduction, but is not considered reasonable with regard to cost. This barrier is in the form of a masonry wall.

- Barrier 10 is not effective with regard to noise reduction and was not evaluated for cost/benefit.

- Barrier 3 is effective with regard to noise reduction and is considered reasonable with regard to cost. This barrier is the only recommended barrier along the I-25 Corridor.

Preferred Alternative and Other Alternative US 85 Corridor Noise Analysis Summary

- Noise barriers discussed in this FEIS are currently proposed but are not certain future actions. These barriers will be re-evaluated at the time of final design. Other elements that will be considered in the determination of the construction of noise barriers include viewshed, land use, sight-distance, wildlife habitat, and the location of historic buildings.

- Seven receivers will have noise levels exceeding the approaching noise abatement criteria (66 dBA for residences and 71 dBA for businesses) in year 2020 if noise barriers are not constructed.

- Barrier 1 is effective with respect to traffic noise reduction; however, it will not mitigate noise generated by trains. Barrier 1 is not considered reasonable with regard to cost. This barrier is in the form of a masonry wall.

- Barriers 2, 3, 5, 6, and 7 are effective with regard to noise reduction, but are not considered reasonable with regard to costs. These barriers are in the form of masonry walls.

- Barrier 4 is marginally effective with regard to traffic noise reduction and will not reduce train noise. Barrier 4 is not considered reasonable with regard to costs. This barrier is in the form of a masonry wall.

- No barriers achieve effective noise level reduction and reasonable cost. No barriers are recommended along the US 85 Corridor.

Since the horizontal and vertical alignment may shift during final design, another noise analysis will be completed at that time to determine if mitigation recommendations require changes.

Full documentation of noise is included in the ***South I-25 Corridor and US 85 Corridor FEIS Traffic Noise Analysis***, November 2000.

Figure 5.8a
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8b
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8c
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8d
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8e
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8f
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8g
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8h
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8i
I-25 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8j
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8k
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8l
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8m
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8n
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8o
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8p
US 85 Corridor Noise Receiver and Potential Barrier Locations

Figure 5.8q
US 85 Corridor Noise Receiver and Potential Barrier Locations

5.3.3.15 Visual Character Impacts

Visual quality is evaluated for form, line, color, and texture. Foreground and middle ground views are generally

more sensitive than background. Well-known landmarks or visual elements providing strong visual contrast with their surroundings, such as water bodies, large buildings, and mountain ranges, are also sensitive to change in visual quality.

Preferred Alternative

I-25 Corridor Visual Character Impacts (Preferred Alternative)

Proposed improvements to the I-25 Corridor included in this project have limited impact on the visual quality of the corridor.

In the northern area, from the C-470/E-470 Interchange to Meadows/Founders Parkway, the Preferred Alternative widens I-25 from the existing three lanes in each direction to four lanes. No changes are planned to the existing bridges. Views to the east and west remain unchanged, other than changes to the roadbed itself. Between Meadows/Founders Parkway and Douglas Lane, the Preferred Alternative widens I-25 from the existing two lanes in each direction to three lanes. Acceleration and deceleration lanes are provided on both sides of I-25. The impact on the visual environment is minimal because the widening is primarily in the existing I-25 median. Other elements of the Preferred Alternative that may affect the visual character of the I-25 Corridor include:

- **Reconstruction of the Schweiger Interchange**. The reconstruction of the Schweiger Interchange into a half-movement interchange, is constructed with I-25 crossing over Schweiger, limiting visual impact to I-25 travelers. No additional structures are planned over I-25 that may limit views in the area.

- **Reconstruction of the Surrey Ridge Road Interchange**. The reconstruction of the Surrey Ridge Road Interchange into a three-quarter-movement interchange, is constructed with I-25 crossing over Surrey Ridge Road, limiting visual impact to I-25 travelers. No additional structures are planned over I-25 that may limit views to Pikes Peak to the south.

- **Construction of a 500-space car pool lot.** Construction of a 500-space car pool lot at the Castle Pines Parkway Interchange is at-grade with limited visual impact to travelers or local residents. Lighting may be added at the car pool lot as well as at interchanges, which could change the visual character. Lighting design uses hooded features and downward directional lighting design.

- **The Union Pacific Railroad Overpass**. The Union Pacific Railroad Overpass, located between the Liggett Road Overpass and the Wolfensberger Road Interchange, is relocated to the south. The overpass has a longer span than the existing to accommodate the widened I-25 typical section. This results in greater girder depths with the possible use of a truss-type bridge. The views do not change with this additional girder depth.

- **Minor realignment**. A minor realignment of I-25 to the east occurs between Wolfensberger Road and Liggett Road. This improvement does not impact the visual environment of the area since the realignment is minor and the highway already exists in the area.

- **Reconstruction of bridges over Plum Creek and Plum Creek Parkway**. Reconstruction requires the widening and rehabilitation of the bridges over Plum Creek and Plum Creek Parkway. The open space and

bikeway in this area need architectural treatment on the widened bridge structures that is more compatible with the surrounding visual character. Lighting may be upgraded at the interchanges, which could alter the visual character of the corridor. The design of the bridgeway is made to meet the architectural character of the area and lighting is designed for minimal impact to visual integrity.

US 85 Corridor Visual Character Impacts (Preferred Alternative)

The Preferred Alternative reconstructs US 85 to three lanes in each direction from C-470 to Highlands Ranch Parkway and two lanes in each direction from Highlands Ranch Parkway to Meadows Parkway. Widening of the roadway results in the loss of roadside vegetation due to roadside cuts and retaining walls to the east of the roadway. The loss of roadside vegetation has a minimal adverse effect upon the quality of views from the roadway as the primary viewshed is to the west into the Plum Creek floodplain and the Rampart Mountain Range. The view of the road by the permanent residents is moderately changed as a result of the additional pavement. The primary residential areas are located east of US 85 on the higher bluff area with the road located below them. Beneficial aesthetic effects result from improved roadway surface and curb and gutter as the existing roadway has limited access control. The existing roadway has poorly defined shoulders and has lost roadside vegetation due to vehicles traveling off the paved surface throughout the US 85 Corridor. Other elements of the Preferred Alternative that may affect the visual character of the US 85 Corridor include:

- **SH 67/US 85 Intersection Reconfiguration and frontage road.** The intersection of US 85/SH 67 is improved by extending SH 67 to the north with a full-movement signalized intersection. A frontage road is constructed in the southeast quadrant of the US 85/SH 67 Intersection for business access. The proposed intersection improvements at US 85 and SH 67 result in beneficial aesthetic improvements. The relocation of the intersection to the north and construction of the business access frontage road to the east improves the aesthetic quality of this area. The separation between the frontage road and US 85 creates opportunities for a landscaped buffer area providing relief from the extensive paving that exists today. The location of the new intersection to the north of US 85 is in gently sloping grassland topography. The relocated intersection has minimal adverse effect on the view to the north for drivers on US 85 and from the adjacent businesses. Views of the intersection and frontage road from Sedalia's downtown, further west of SH 67, are obstructed by the approach vertical curve.

- **Bicycle/pedestrian facilities along US 85**. The bicycle/pedestrian facilities generally follow the US 85 alignment and therefore have minimal visual effect. A detached bicycle/pedestrian facility is located between Blakeland Drive and Highlands Ranch Parkway and between Daniels Park Road and Meadows Parkway. Between Blakeland Drive and Highlands Ranch Parkway, the user's view is primarily directed across the roadway to the Plum Creek floodplain and the Rampart Mountain Range. Drivers on US 85 can see the bicycle/pedestrian facility, but this would have minimal visual effect because the view is to the west. Residents adjacent to the bicycle/pedestrian facility between Daniels Park Road and Meadows Parkway view the facility as an extension of the roadway section with minimal additional visual impact.

- **Minor realignment**. A minor realignment of US 85 to the west occurs at the Cook Ranch property, approximate MP 195.4. The realignment relocates four businesses in the area, which changes the visual character of the area.

- **High Line Canal Trail grade-separated crossing under US 85.** Grade separation of the High Line Canal

Trail has passageways under US 85, minimizing obstructions to roadside views.

- **Enhanced wildlife crossings**. The improved wildlife crossings have passageways under US 85 minimizing obstructions to roadside views.

Other Alternative

I-25 Corridor Visual Character Impacts (Other Alternative)

In the northern area, from the C-470/E-470 Interchange to Meadows/Founders Parkway, the Other Alternative widens I-25 from the existing three lanes in each direction to four lanes. A two-lane frontage road on the east side of I-25 is constructed between Rampart Range and Castle Pines Parkway. The frontage road is in the foreground of all vistas to the east of I-25 in this section. Between Meadows/Founders Parkway and Douglas Lane, the Preferred Alternative widens I-25 from the existing two lanes in each direction to three lanes. Acceleration and deceleration lanes are provided on both sides of I-25. The impact on the visual environment is minimal because the widening is primarily in the existing I-25 median. Other elements of the Other Alternative that may affect the visual character of the I-25 Corridor include:

- **A new interchange at the Rampart Range Development**. The construction of the Rampart Range Interchange, coupled with the associated development, impacts the visual character of the I-25 Corridor to the immediate south of the Lincoln Avenue Interchange on both sides of I-25. This is consistent with the ***Douglas County Master Plan,*** 1992, that has identified this area being part of the "Primary Urbanization Area". Planned development includes high-density urban infrastructure similar to what is seen further to the north in the Southeast Business District (SEBD).

- **Removal of the Schweiger Interchange ramps**. The elimination of the ramps at the Schweiger Road Interchange has minimal impact on the visual character of the I-25 Corridor.

- **Full diamond interchange at Surrey Ridge Road.** Reconstruction of the interchange at Surrey Ridge Road to a standard diamond configuration is constructed with I-25 crossing over Surrey Ridge Road using the existing underpass. This does not increase the visual impacts to I-25 travelers.

- **East-side frontage road.** An east-side frontage road between Castle Pines Parkway and Rampart Range changes the view for I-25 travelers by adding a road that previously did not exist.

- **Partial cloverleaf interchange in the southeast quadrant of Castle Pines Parkway.** Reconstructing the interchange with the addition of a partial cloverleaf (loop) has minimal visual impacts.

- **Construction of a 500-space car pool lot.** Construction of a 500-space car pool lot at the Castle Pines Parkway Interchange is at-grade, with limited visual impact to travelers or local residents. Lighting may be added at the car pool lot as well as at interchanges, which could change the visual character. Lighting design uses hooded features and downward directional lighting design.

- **Happy Canyon Road Bridge widening.** Widening of Happy Canyon Road over I-25 has minimal impact to views in the area. The bridge does not appear different traveling under it on I-25, but is wider when

traveling over I-25.

- **Minor realignment**. A minor realignment of I-25 to the east occurs between Wolfensberger Road and Liggett Road. This improvement does not impact the visual environment of the area since the realignment is minor and the highway already exists in the area.

- **The Union Pacific Railroad Overpass**. The Union Pacific Railroad Overpass, located between the Liggett Road Overpass and the Wolfensberger Road Interchange, is relocated to the south. The overpass has a longer span than the existing to accommodate the widened I-25 typical section. This results in greater girder depths with the possible use of a truss-type bridge. The views do not change with this additional girder depth.

US 85 Corridor Visual Character Impacts (Other Alternative)

The Other Alternative extends the widening of US 85 to three lanes in each direction from C-470 to Titan Road. Visual impacts are similar to the Preferred Alternative, the primary difference being the width of the roadway, between Highlands Ranch Parkway and Titan Road.

For additional information on visual character, see the ***Visual Resource Technical Memorandum South I-25 Corridor and US 85 Corridor,*** May 2000, amended November 2000, in the Technical Reports Volume of the ***South I-25 Corridor and US 85 Corridor FEIS.***

Photo Simulations

Figure 5.9 illustrates the existing and proposed view (Other Alternative) of I-25 at Surrey Ridge, looking north. The proposed view shows I-25 widened to four lanes in each direction and the frontage road to the east of I-25.

Figure 5.9
Existing and Proposed View of I-25 Corridor at Surrey Ridge (looking north)
(Other Alternative)

Figure 5.10 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at Castle Pines Parkway, looking north. The proposed view shows the existing noise wall (recommended in the Climbing Lanes, Phase I project) and I-25 widened to four lanes in each direction

Figure 5.11 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at Castle Pines Parkway, looking north. The proposed view shows the car pool lot and I-25 widened to four lanes in each direction

Figure 5.12 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) at Happy Canyon Road, looking south. The proposed view shows I-25 widened to four lanes in each direction and the

earthen berms (recommended in the Climbing Lanes projects). The view of Pikes Peak and other mountain ranges is not impacted as seen on this illustration.

Figure 5.13 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of I-25 at 5th Street looking north. The proposed view shows the completion of the 5th Street Overpass Early-Action project and the widening of I-25 to three lanes in each direction. I-25 is widened to the inside, eliminating the grass median as shown on this illustration.

Figure 5.14 illustrates the existing and proposed view (Other Alternative) of US 85, looking north to Highlands Ranch Parkway. The proposed view shows US 85 widened to three lanes in each direction. The retaining walls around the transmission towers prevent the relocation of the towers as shown on the proposed view.

Figure 5.15 illustrates the existing and proposed view (Other Alternative) of US 85 looking south from Lakeside Drive. The proposed view shows a retaining wall along the east side of US 85. There are minimal impacts to the residents living in the Chatfield Estates development.

Figure 5.16 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of US 85 looking north at the Sedalia Intersection (SH 67). The proposed view shows the frontage road located in the southwest quadrant in front of several Sedalia businesses.

Figure 5.17 illustrates the existing and proposed view (Preferred Alternative and Other Alternative) of US 85 at Meadows Parkway, looking north. The proposed view shows US 85 with the additional left-turn lanes and acceleration/deceleration lanes. A bicycle/pedestrian facility located along the east side of US 85 is also illustrated.

Figure 5.10
Existing and Proposed View of I-25 Corridor at Castle Pines Parkway (looking north)
(Preferred Alternative and Other Alternative)

Figure 5.11
Existing and Proposed View of Castle Pines Parkway Car Pool Lot (looking north)
(Preferred Alternative and Other Alternative)

Figure 5.12
Existing and Proposed View of I-25 Corridor at Happy Canyon Road (looking south)
(Preferred Alternative and Other Alternative)

Figure 5.13
Existing and Proposed View of I-25 Corridor at 5th Street Overpass (looking south)
(Preferred Alternative and Other Alternative)

Figure 5.14
Existing and Proposed View of US 85 Corridor at Highlands Ranch Parkway
(looking north)
(Other Alternative)

Figure 5.15
Existing and Proposed View of US 85 Corridor at Lakeside Drive (looking south)
(Other Alternative)

Figure 5.16
Existing and Proposed View of US 85 Corridor at SH 67 (looking north)
(Preferred Alternative and Other Alternative)

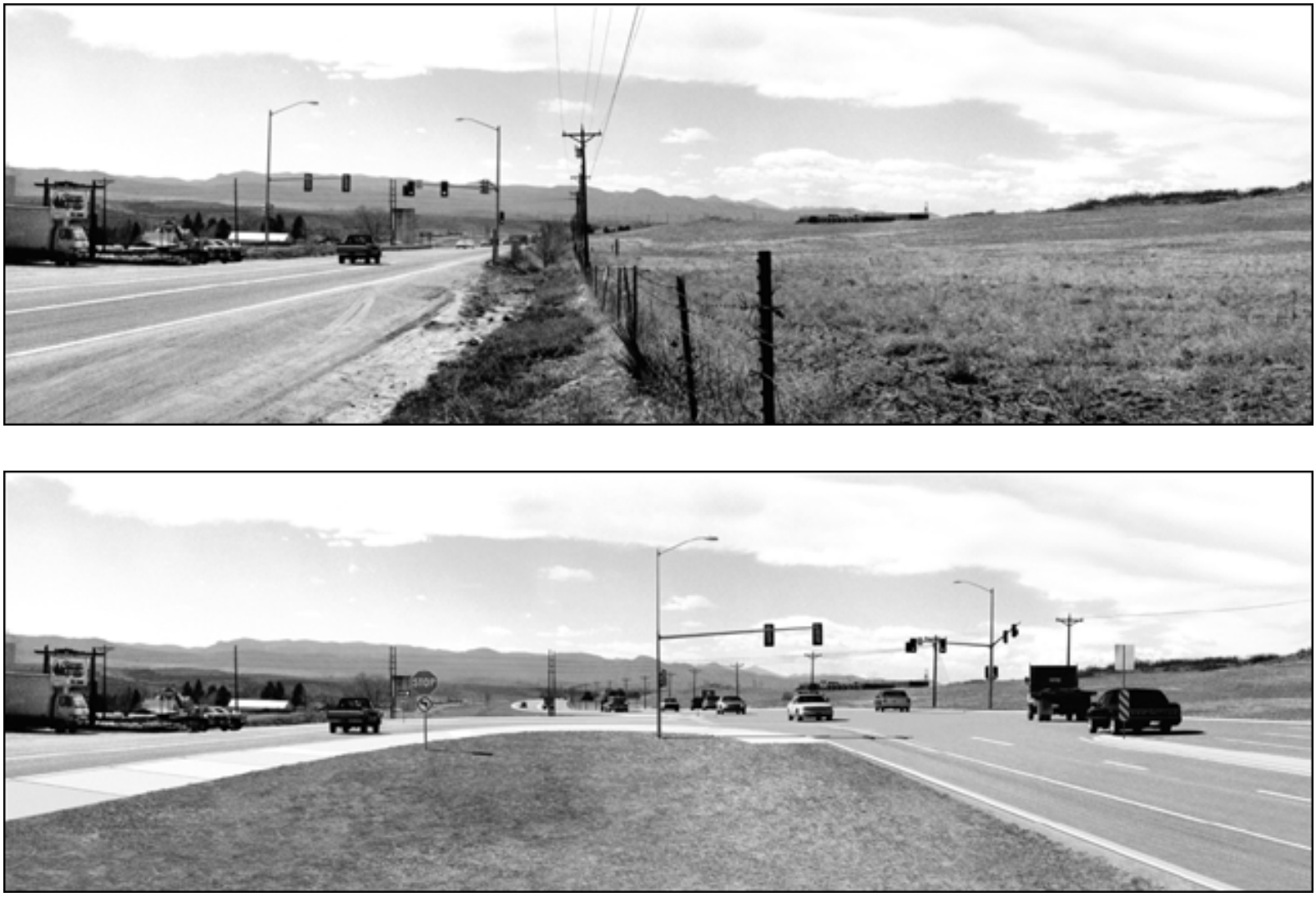


Figure 5.17
Existing and Proposed View of US 85 Corridor at Meadows Parkway (looking north)
(Preferred Alternative and Other Alternative)

5.3.3.16 Potential Hazardous Waste Sites Impacts

Recognized and potential hazardous waste sites within 60 meters (200 feet) of the existing CDOT ROW are identified. This distance was selected as a reasonable limit for investigation in recognition of evidence that hazardous substances can migrate above or below ground from their sources. A recognized hazardous waste site is defined as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into the structures, ground, groundwater, or surface water of the property." Potential hazardous waste sites are sites that have not been identified as a material threat, but due to future construction activities, materials management issues may need to be addressed.

Preferred Alternative

I-25 Corridor Potential Hazardous Waste Sites Impacts (Preferred Alternative)

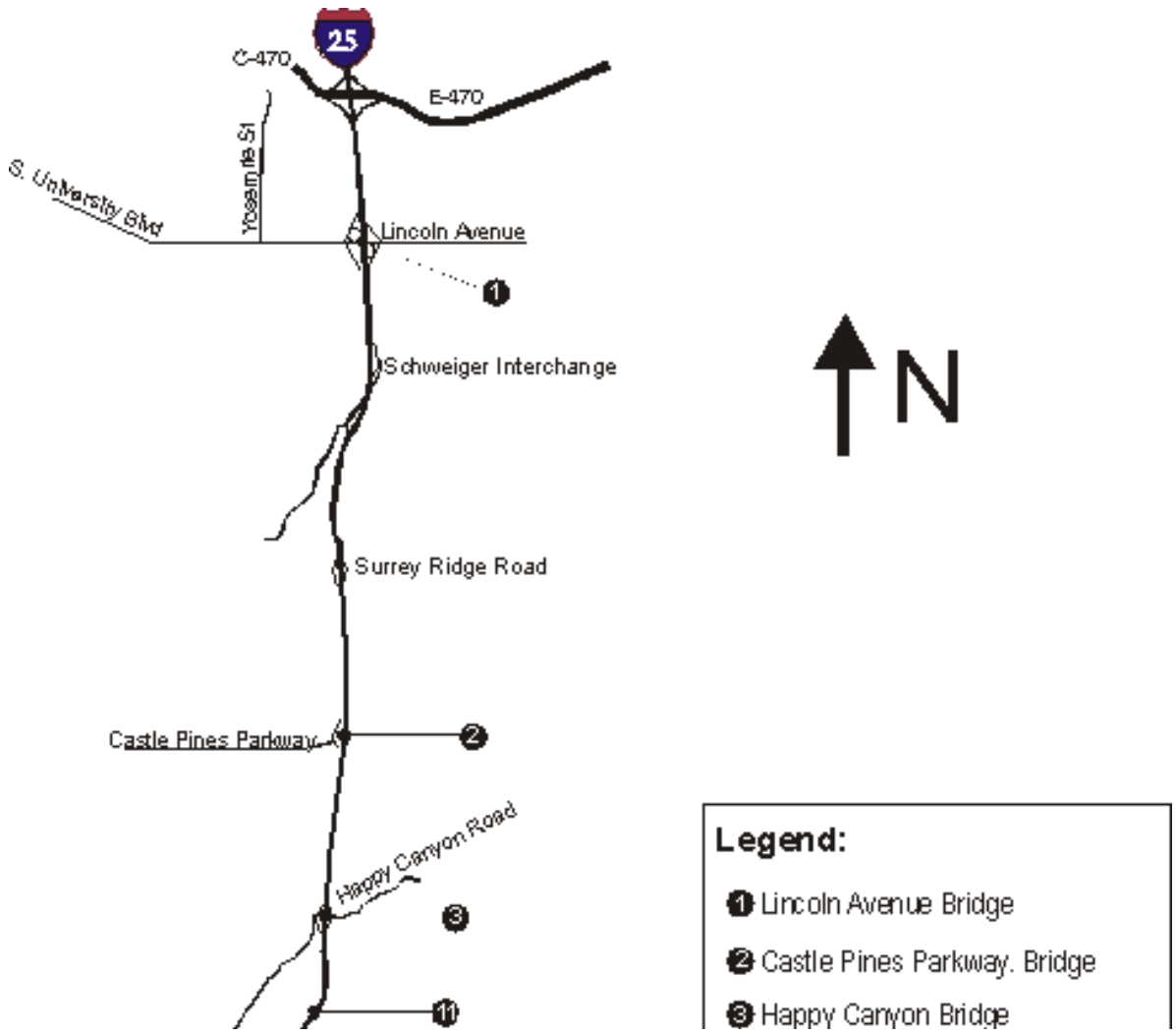
During an initial site assessment (ISA) of the I-25 Corridor, 17 sites have been identified as recognized hazardous waste sites. A list of all the recognized hazardous sites is shown on Table 5.26 with the recommendation for each site. Sites on Table 5.26 labeled as "no impact" are either out of the APE or have been investigated and require no further action. Eleven sites will require further investigation through a preliminary site investigation (PSI) to determine the extent of subsurface contamination. Locations of these sites are shown on Figure 5.18a.

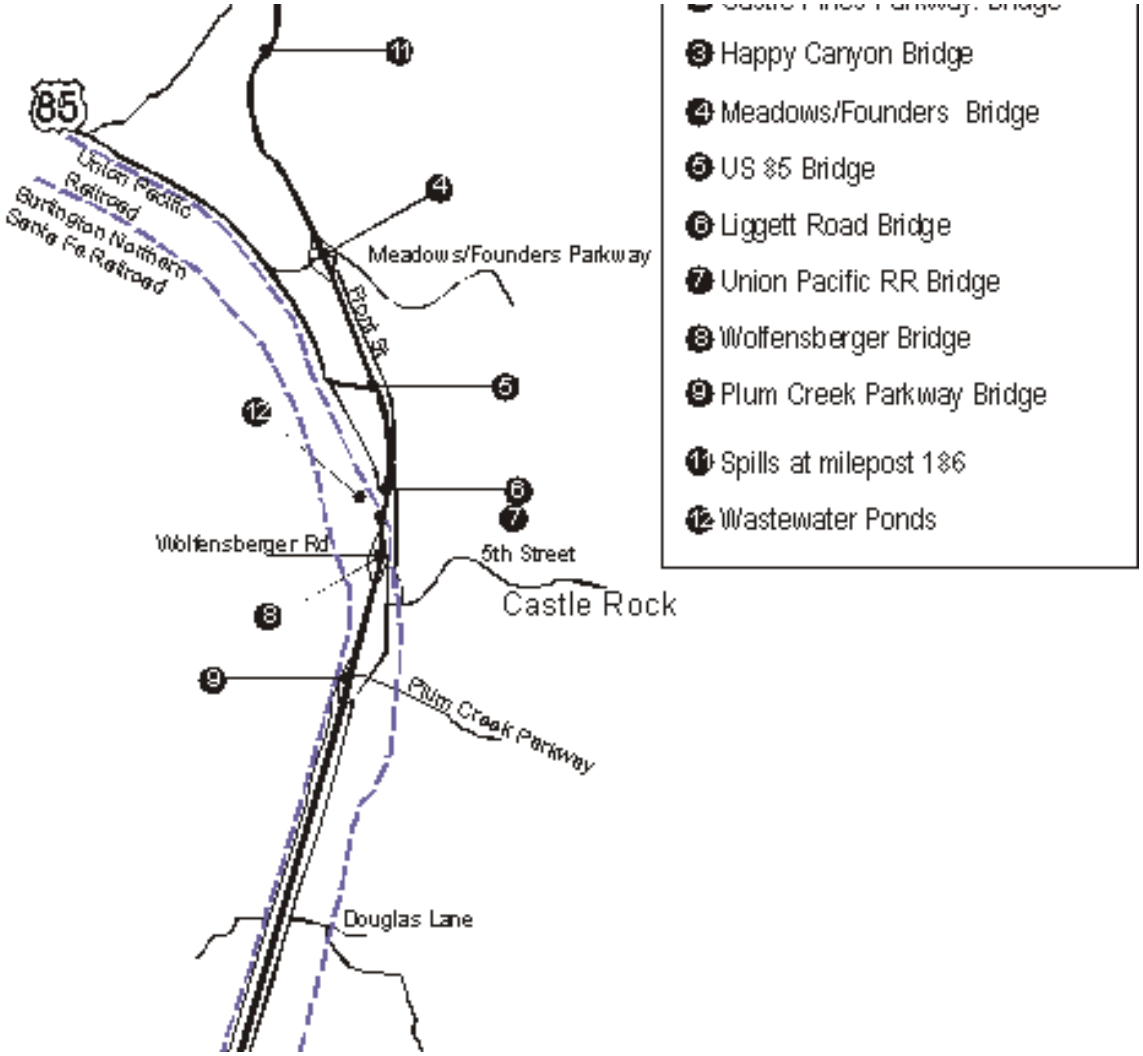
Table 5.26
Recognized Hazardous Waste Sites along the I-25 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Lincoln Avenue Bridge	Requires further investigation
2	Castle Pines Parkway Bridge	Requires further investigation
3	Happy Canyon Road Bridge	Requires further investigation
4	Meadows Parkway Bridge	Requires further investigation
5	US 85 Bridge	Requires further investigation
6	Liggett Road Bridge	Requires further investigation
7	Union Pacific Railroad Bridge	Requires further investigation
8	Wolfensberger Road Bridge	Requires further investigation
9	Plum Creek Parkway Bridge	Requires further investigation
10	CDOT Maintenance Facility	No impact
11	Spills on I-25	Requires further investigation
12	Former Wastewater Ponds	Requires further investigation
13	Sinclair, Diamond Shamrock, and Texaco Leaking Underground Storage Tank (LUST) Sites	No impact
14	Amoco LUST Site	No impact
15	Former Naylor Landfill	No impact
16	Burgess Motors LUST Site	No impact
17	Former Rainbow Laundry Center LUST Site	No impact

Note: Further investigation (PSI) is needed for some sites once the preferred alternative is identified to determine the nature and extent of subsurface contamination.

Figure 5.18a
I-25 Corridor Recognized Hazardous Waste Impacted Sites





Nineteen potential hazardous waste sites were identified along the corridor. A list of the potential hazardous sites is shown on Table 5.27 with the recommendation for each site. Sites labeled on Table 5.27 as "no impact" are either out of the APE or have been investigated and require no further action. Five sites will require further investigation during the final design phase to determine whether the site is contaminated. Locations of these sites are shown on Figure 5.18b.

Table 5.27
Potential Hazardous Waste Sites along the I-25 Corridor

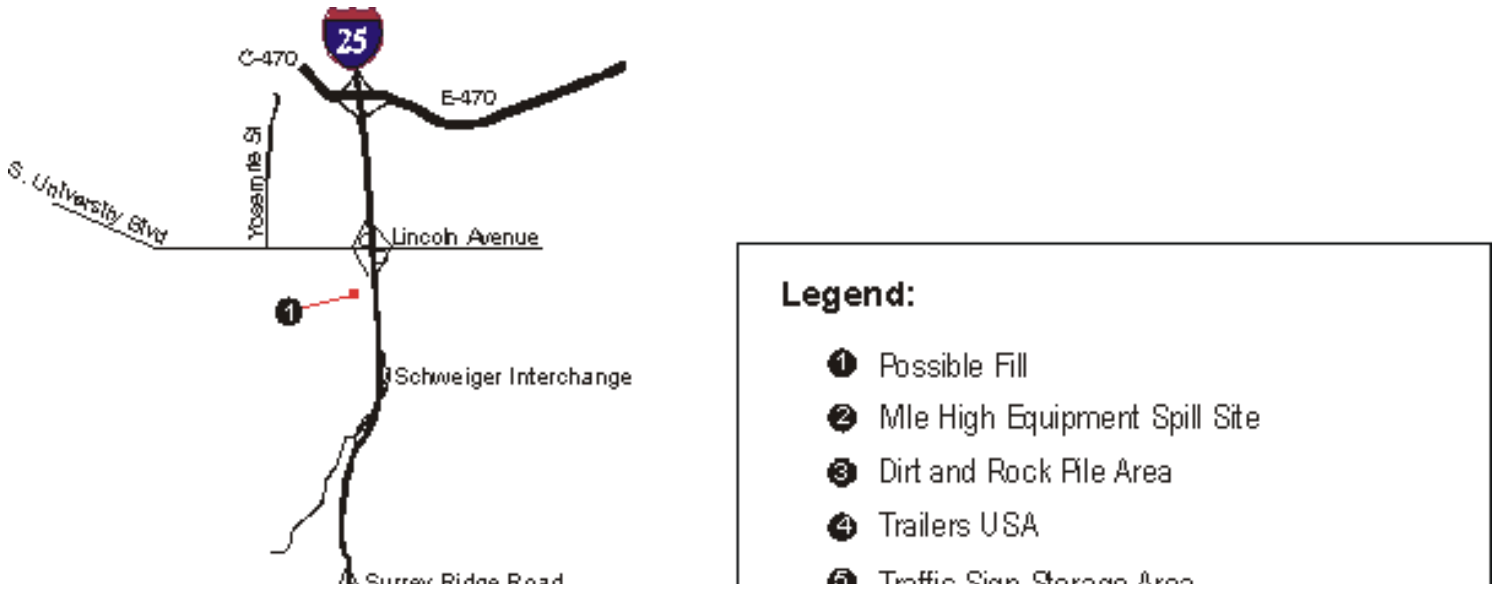
Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Possible Fill	No impact
2	Mile High Equipment LUST Spill Site	No impact
3	Dirt and Rock Pile Area	Requires further investigation
4	Trailers USA	No impact
5	Traffic Sign Storage Area	No impact
6	Bayer Tire Store	No impact
7	Mobile Home Sales Lot	Requires further investigation
8	Car Dealership	No impact
9	Phillips 66 Gas Station	Requires further investigation
10	Western Gasoline Station	No impact
11	Fill Dirt and Disturbed Soil Area	Requires further investigation
12	Abandoned Railroad Station	No impact
13	Self Service Gasoline Station	Requires further investigation
14	Western Truck Stop	No impact
15	Medved Brutyn Ford	No impact
16	Screiber Equipment	No impact
17	Former Douglas County Justice Center	No impact
18	Andrews Addition Landfill	No impact
19	SW of Brick Facility Landfill	No impact

Note: Further investigation is needed for Sites 3,7,9,11,& 13 to determine whether the site contains hazardous waste.

US 85 Corridor Potential Hazardous Waste Sites Impacts (Preferred Alternative)

During a modified environmental site assessment (MESA) of the US 85 Corridor, 8 sites were identified as recognized hazardous waste sites. A list of all recognized hazardous sites is shown on Table 5.28 with the recommendation for each site. Further investigation for the Denver Rio Grande Western Railroad LUST site is not required since the LUST site is located too far away to impact the US 85 ROW. Six sites will require further investigation through a site assessment/site investigation to determine the nature and extent of subsurface contamination. The locations of these sites are shown on Figure 5.19a.

Figure 5.18b
I-25 Corridor Potential Hazardous Waste
Impacted Sites



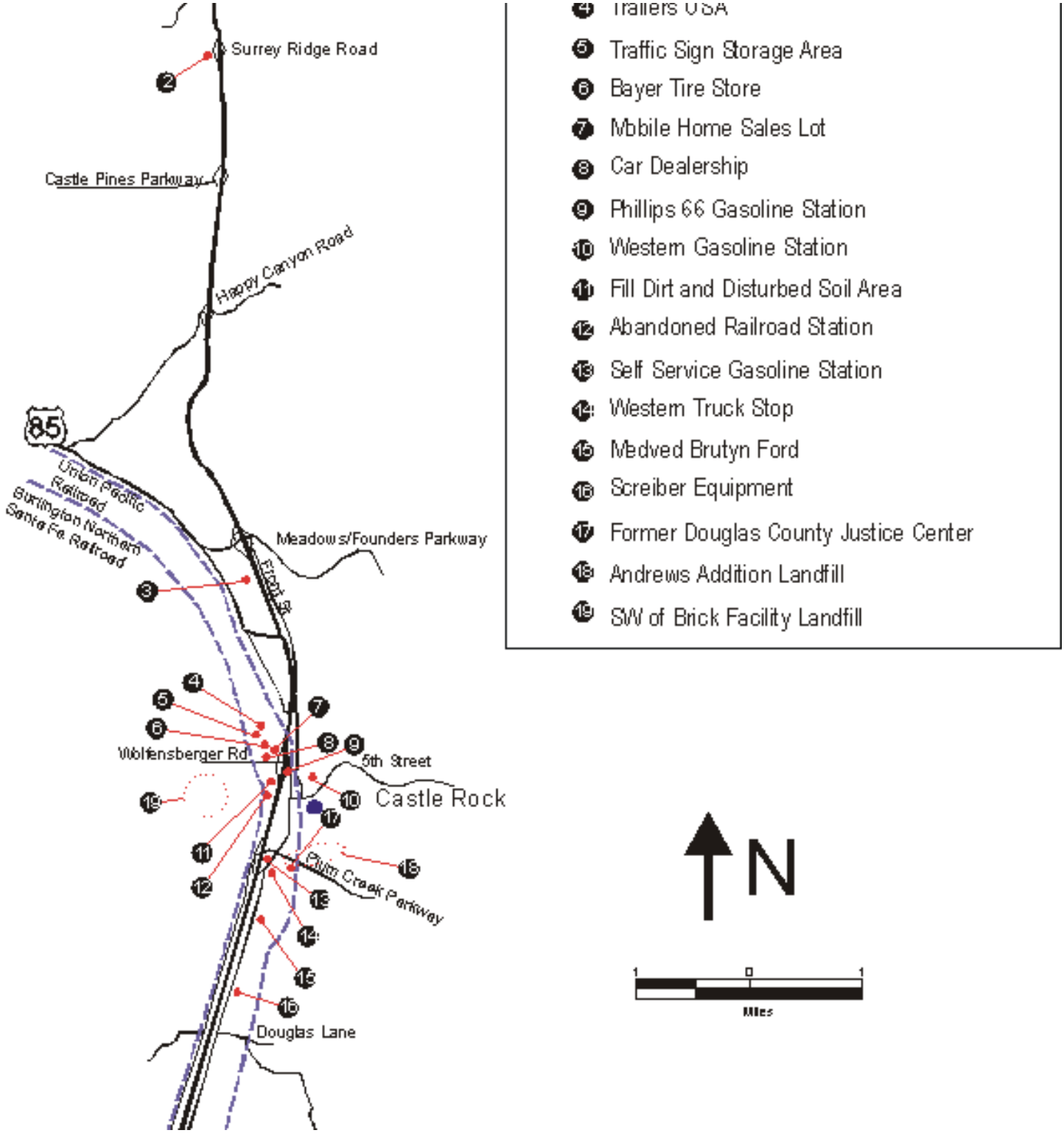


Figure 5.19a
US 85 Corridor Recognized Hazardous Waste Impacted Sites

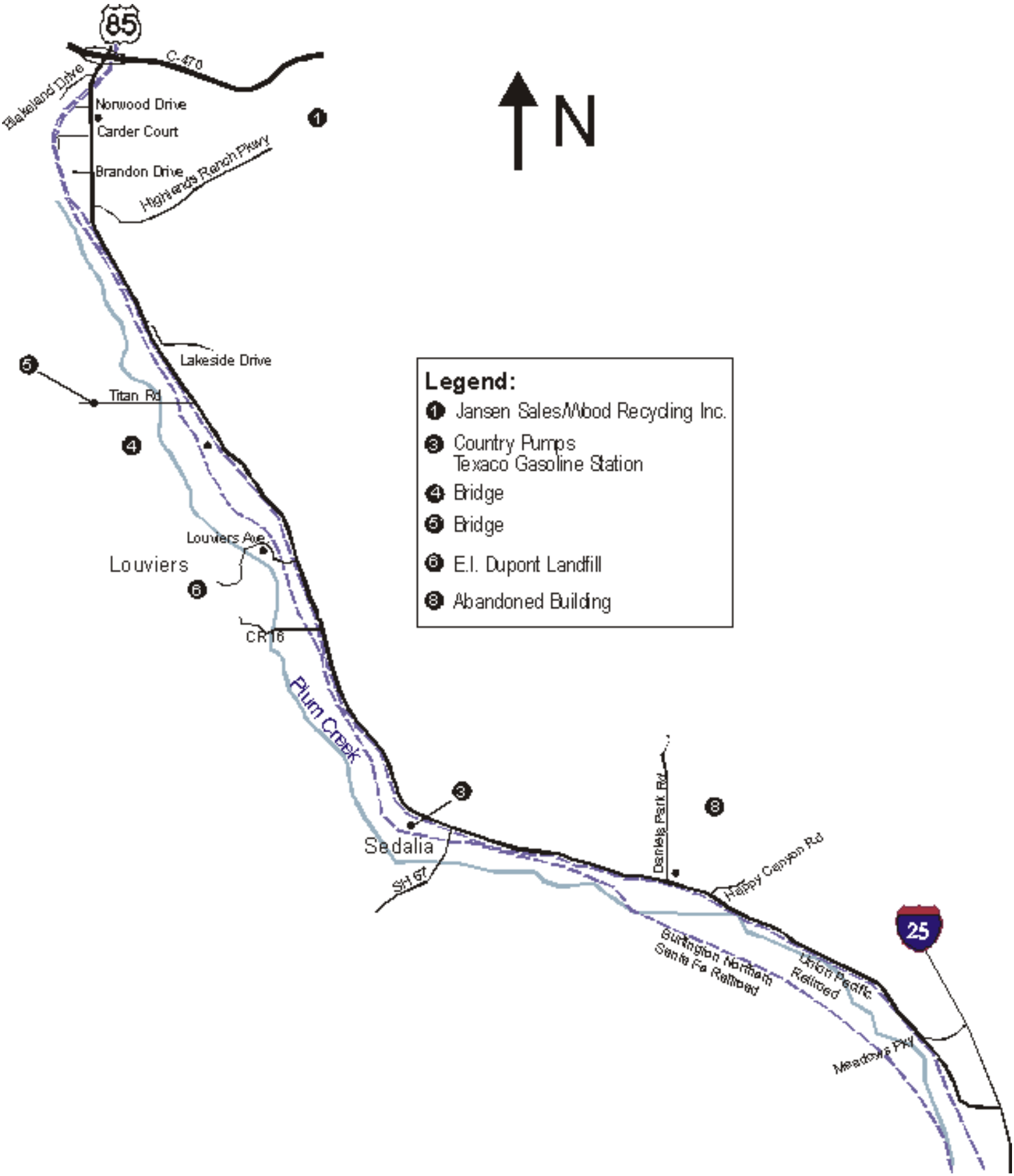


Table 5.28
Recognized Hazardous Waste Sites along the US 85 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Jansen Sales/Wood Recycling Inc.	Requires further investigation
2	Denver Rio Grande Western Railroad LUST site	No impact
3	Country Pumps Texaco gasoline station	Requires further investigation
4	Bridge	Requires further investigation
5	Bridge	Requires further investigation
6	E.I. Dupont Landfill	Requires further investigation
7	Conoco LUST site (Beemans Gas and Grocery)	No impact
8	Abandoned building (possible former gasoline station)	Requires further investigation

Note: Further investigation is needed for Sites 1, 3, 4, 5, 6 & 8, once the Preferred Alternative is identified to determine the nature and extent of subsurface contamination.

Fifty-one potential hazardous waste sites are identified along the US 85 Corridor. A list of all potential hazardous sites is shown on Table 5.29 with the recommendation for each site. Sites with no impact are out of the APE. Twenty-five sites will require further investigation during the final design phase to determine whether the site is contaminated. Locations of these sites are shown on Figure 5.19b.

Full documentation of potential hazardous waste sites is included in the ***Phase I Environmental Site Assessment: I-25 Corridor; Lincoln Avenue to Castle Rock***, January 1999, and in the ***Modified Phase I Environmental Site Assessment: SH 85 Corridor; C-470 to I-25***, July 1999.

Table 5.29
Potential Hazardous Waste Sites along the US 85 Corridor

Site No.	Site Identification	Recommendation for the Preferred Alternative and Other Alternative
1	Cooley Gravel Company	Requires further investigation
2	General Contractors	Requires further investigation
3	Goodyear Tire and Rubber	Requires further investigation
4	Diamond Shamrock 1161	Requires further investigation
5	Former Underground Storage Tank	Requires further investigation
6	Western Paving	Requires further investigation
7	Santa Fe Big Lift	No impact
8	Marcy Gulch Wastewater Treatment Plant	No impact
9	All American Jeep 4-Wheel Drive	No impact
10	Steve Golden	Requires further investigation
11	Resco Roofing	Requires further investigation
12	Littleton Auto Body	Requires further investigation
13	Arapahoe Acres Nursery	No impact
14	Flanagan Ready-Mix	Requires further investigation
15	All-Quip Rental Sales, Inc.	Requires further investigation
16	Plum Creek Elementary School	No impact
17	Lockheed Martin Astronautics	No impact
18	WR Grace	No impact
19	Colorado DS Enterprises, Inc.	Requires further investigation
20	Split Rail Fence Company	No impact
21	Rivera's Chatfield Auto Repair	Requires further investigation
22	Yard at Matchbox Bar and Grill	Requires further investigation
23	Hotline Auto Salvage Yard	No impact
24	Truck Rail Handling, Inc.	Requires further investigation
25	Possible 1991 Asbestos Spill	Requires further investigation
26	Shattuck Chemical Company	Requires further investigation
27	ERS Constructors	Requires further investigation
28	Green By Nature	No impact
29	Arapahoe Acres/John Werling/Gary McElroy	No impact
30	Versa Tech of Denver, Inc.	Requires further investigation
31	RV and Boat Storage	Requires further investigation
32	Septic Waste Hauling and Tanks Storage	Requires further investigation
33	ABB C-E Services, Inc.	No impact
34	Eco-Salvage	No impact
35	Front Range Tire Recycle Landfill	No impact
36	McKnight Equipment	No impact
37	Sedalia Grille	Requires further investigation
38	Winfrey Concrete	No impact
39	Sedalia Landfill	No impact
40	Sedalia Transfer Station	No impact
41	Jarre Canyon Mart, Inc.	No impact
42	Intermountain REA	No impact
43	Douglas County Schools Service Center	No impact
44	Plum Creek Wastewater Authority	No impact
45	Douglas County Public Works	No impact
46	Bronson Bratton, Inc.	Requires further investigation
47	Tri-Valley Gas Co.	Requires further investigation
48	Woerner Engineering, Inc.	Requires further investigation
49	WTCI Titan Earth Station	No impact
50	Zimkor Industries	No impact
51	Douglas County Recycle	No impact

Note: Further investigation is needed for some sites to determine whether the site contains hazardous waste.

Other Alternative

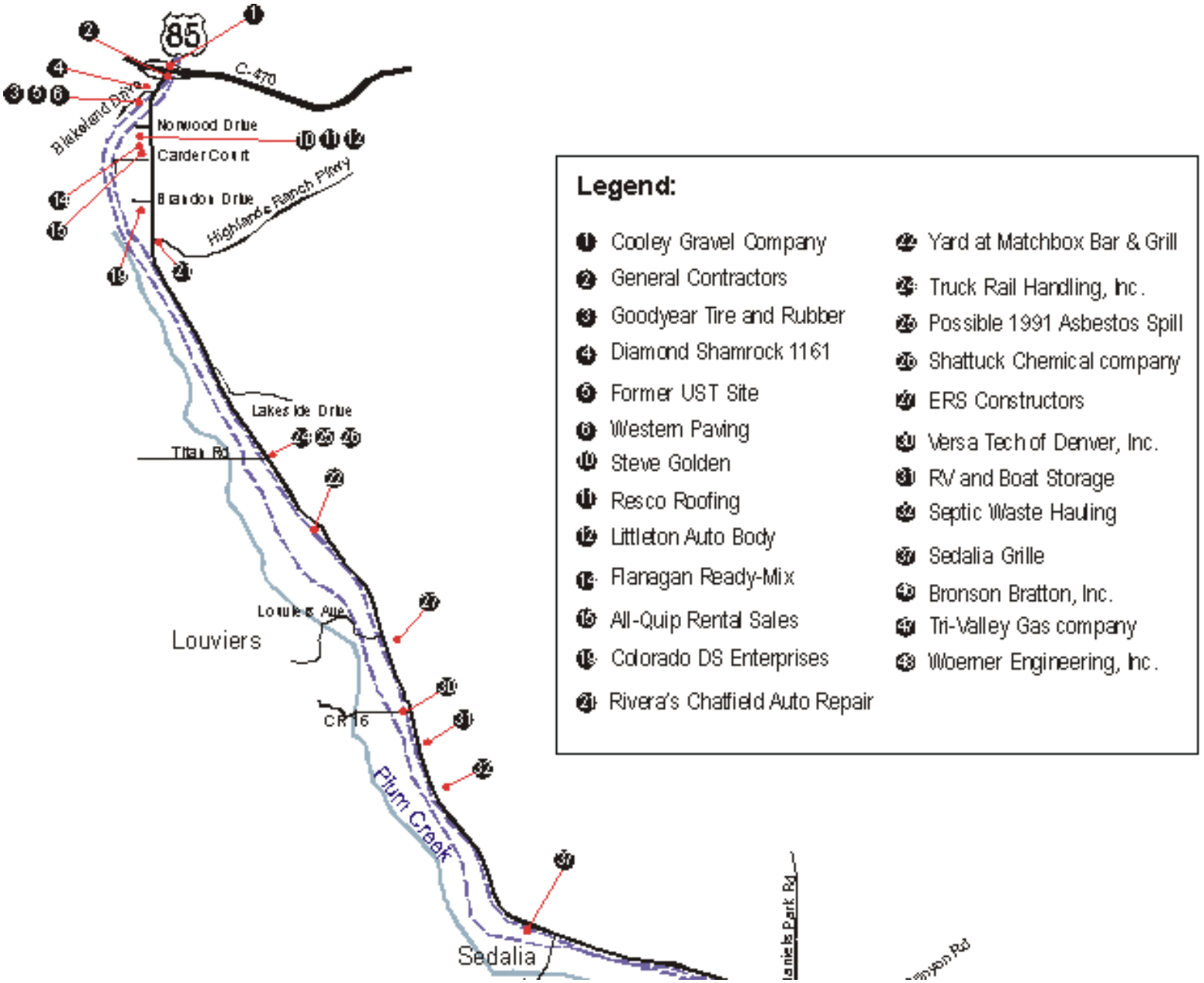
I-25 Corridor Potential Hazardous Waste Sites Impacts (Other Alternative)

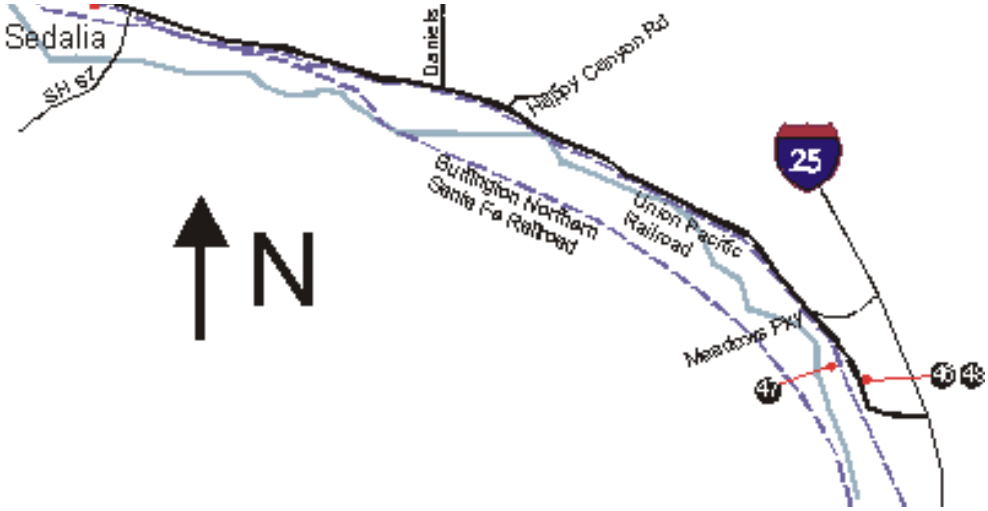
Hazardous waste impacts anticipated as a result of the Other Alternative are the same as described in the Preferred Alternative.

US 85 Corridor Potential Hazardous Waste Sites Impacts (Other Alternative)

Hazardous waste impacts anticipated as a result of the Other Alternative are the same as described in the Preferred Alternative.

Figure 5.19b
US 85 Corridor Potential Hazardous Waste Impacted Sites





5.3.3.17 Energy Impacts

Construction Energy

Each build alternative has construction energy impacts of two types: (1) energy needed to build the transportation improvements, primarily resulting from earthwork, and the erection of retaining walls and bridges; and (2) energy wasted by vehicles delayed by construction activities. The No-Action Alternative, by definition, has no construction energy requirements.

Delays to highway traffic due to construction are minimized by construction phasing. Congestion energy requirements are offset in the long-term by fuel savings due to reduced congestion and improved operational efficiency on the widened highway.

Operational Energy

All of the build alternatives substantially reduce operational energy requirements for the South I-25 Corridor and US 85 Corridor because they reduce congestion and improve the LOS of I-25 and US 85.

Emissions are correlated to energy use and are affected by operational efficiency. Lower capacity facilities incapable of meeting demand result in increased deceleration, acceleration, and idling during peak traffic period. These congested periods increase in duration when demand exceeds capacity. When a facility increases its capacity to meet the demand projected through the transportation plan and program, the congestion is mitigated and the vehicle can operate in a more fuel-efficient mode. Congested travel produces significantly more emissions on a per-mile basis than continuous traffic flow.

5.3.3.18 Temporary Construction Impacts

Temporary construction impacts are addressed by corridor.

Preferred Alternative

I-25 Corridor Temporary Construction Impacts (Preferred Alternative)

Highway construction creates a potential for increasing dust, noise, water runoff, traffic congestion, and access restriction to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM_{10}) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the I-25 Corridor include roadway widening and interchange modifications. Widening activities through Castle Rock require replacement of the bridges over Plum Creek, Plum Creek Parkway, and the Union Pacific Railroad overpass.

In the section of I-25 from Lincoln Avenue to Meadows/Founders Parkway, the mainline widening requires only the addition of an outside shoulder (the existing shoulder is converted into a travel lane). The roadway is currently constructed with three, 3.6-meter (12-foot) lanes plus a 3.6-meter (12-foot) outside shoulder. The existing outside shoulder will be used for the fourth lane, and a new shoulder is constructed. Anticipated construction impacts from this widening consist primarily of closing the existing shoulder to provide the construction platform to build the new shoulder.

Reconstruction of the Schweiger Interchange, Surrey Ridge Road Interchange, and modifications to the Castle Pines Parkway Interchange (including the car pool lot) require careful planning to minimize traveler delay and maintain access to I-25.

Reconstruction, realignment (between Wolfensberger Road and Liggett Road), and widening of I-25 through Castle Rock requires complex construction staging to maintain highway and interchange operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

Construction impacts to the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad are expected from the construction of a new railroad bridge to the south of the existing bridge.

The Plum Creek bike path will be temporarily impacted during construction, yet the bike path will remain operational throughout the construction.

US 85 Corridor Temporary Construction Impacts (Preferred Alternative)

Highway construction presents the potential for increasing dus, noise, water runoff, traffic congestion, and restriction of access to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM_{10}) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the US 85 Corridor include roadway widening and reconstruction, the construction of a frontage road in Sedalia, the construction of bicycle and pedestrian facilities, the construction of the grade-separated High Line Canal Trail, and the enhancements of wildlife crossings.

Construction of the frontage road in Sedalia has minimal impact to traffic operations on US 85. The new US 85 alignment will be constructed first; traffic is then placed on the new alignment while the frontage road is constructed on the existing alignment. Several business located along the existing US 85 alignment may be impacted during construction of the Sedalia frontage road because their access must be altered.

Reconstruction of US 85 requires complex construction staging to maintain highway operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

During construction of the new accesses throughout US 85, temporary impacts will occur to drivers accessing those areas.

Other Alternative

I-25 Corridor Temporary Construction Impacts (Other Alternative)

Highway construction creates a potential for increasing dust, noise, water runoff, traffic congestion, and access restriction to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM_{10}) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the I-25 Corridor include roadway widening, construction of a frontage road between Castle Pines Parkway and Rampart Range, and interchange modifications. Widening activities through Castle Rock require replacement of the bridges over Plum Creek, Plum Creek Parkway, and the Union Pacific Railroad overpass.

In the section of I-25 from Lincoln Avenue to Meadows/Founders Parkway, the mainline widening requires only the addition of an outside shoulder (the existing shoulder is converted into a travel lane). The roadway is currently constructed with three, 3.6-meter (12-foot) lanes plus a 3.6-meter (12-foot) outside shoulder. The existing outside shoulder will be used for the fourth lane, and a new shoulder is constructed. Anticipated construction impacts from this widening consist primarily of closing the existing shoulder to provide the construction platform to build the new shoulder.

Construction of the frontage road between Castle Pines Parkway and Rampart Range has minimal impact to traffic operations on I-25. The road is constructed on an entirely new alignment. Intersections with the east-west roads require some traffic control for the east-west roadways.

Reconstruction of the Surrey Ridge Road Interchange, construction of a new interchange at Rampart Range, modifications (car pool lot and southeast quadrant loop ramp) to the Castle Pines Parkway Interchange, and widening of the Happy Canyon Bridge, require careful planning to minimize traveler delay and maintain access to I-25.

Reconstruction, realignment (between Wolfensberger Road and Liggett Road), and widening of I-25 through Castle Rock require complex construction staging to maintain highway and interchange operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

Construction impacts to the Union Pacific Railroad and the Burlington Northern Santa Fe Railroad are expected from the construction of a new railroad bridge to the south of the existing bridge.

The Plum Creek bike path will be temporarily impacted during construction, yet the bike path will remain operational throughout the construction.

US 85 Corridor Temporary Construction Impacts (Other Alternative)

Highway construction presents the potential for increasing dust, noise, water runoff, traffic congestion, and restriction of access to residences and buildings.

The majority of air emissions during construction will be fugitive dust (PM_{10}) from the excavation of soil and backfill. All contractors are required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements.

Major construction components on the US 85 Corridor include roadway widening and reconstruction, the construction of a frontage road in Sedalia, the construction of bicycle and pedestrian facilities, the construction of the grade-separated High Line Canal Trail, and the enhancements of wildlife crossings.

Construction of the frontage road in Sedalia has minimal impact to traffic operations on US 85. The new US 85 alignment will be constructed first; traffic is then placed on the new alignment while the frontage road is constructed on the existing alignment. Several business located along the existing US 85 alignment may be impacted during construction of the Sedalia frontage road because their access must be altered.

Reconstruction of US 85 requires complex construction staging to maintain highway operations. Construction sequencing, overall construction timeframe, and construction delivery methods have not been determined; they will depend on a critical path analysis and available funding.

During construction of the new accesses throughout US 85, temporary impacts will occur to drivers accessing those areas.

5.3.3.19 Secondary Impacts

Secondary impacts are reasonably foreseeable, project-induced impacts that are removed from the project in time and/or space.

A benefit of the project is improved mobility throughout the corridors. The result of improved mobility and travel times on an existing roadway cannot with any reasonable assurance lead to additional development. Any induced growth would be constrained by the amount of building permits allowed to be approved by the city/county in their respective land use plans. Douglas County is a desirable area as a residential community with or without roadway improvements. The per capita income of Douglas County is one of the highest of all counties in the state and the historic and future growth trends are among the largest in the nation. Impacts to the economy or to the cost of housing are more likely to have impacts to the county's growth.

Secondary air quality impacts that may result from changes in the pattern of land use, population density or growth rate include:

- Increased emissions from natural gas space and hot-water heating systems installed in new residential, commercial, recreational and industrial facilities
- Increased emissions from new commercial and industrial facilities that provide increased employment in the region
- Increased emissions from electric generating systems in the air quality region needed to serve the projected growth
- Increased emissions from new home heating fireplaces and out door barbecue appliances
- Increased emissions from additional lawn mower usage

These secondary or indirect impacts are accounted for in the development and implementation of the SIP, which combines these impacts with the transportation related impacts to ensure compliance with the NAAQS.

Water resources and wetlands may have potential secondary impacts from roadway maintenance. Sediment and salt from snowplows during winter months may impact streams and wetland resources.

Increased runoff is the main secondary impact to water quality and quantity that could occur as a result of both the Preferred Alternative and Other Alternative. This impact is due to an increase in impervious surface area (i.e., pavement). Potential specific secondary impacts caused by higher peak discharges include increased erosion, sedimentation, and ability to transport contaminants commonly associated with urban watersheds.

Secondary impacts to wetlands are expected to be insignificant. Potential sources of secondary impacts include changes in drainage patterns or runoff volumes, increased inputs of non-point source pollution (e.g., sand, salt, etc.) contained in stormwater runoff, and degradation of wetland habitat due to increased noise levels. Secondary impacts related to runoff are expected to be minimal due to adherence of the contractor to mandatory Douglas County and CDOT regulations governing stormwater management. Wildlife that uses wetland habitat in proximity to the highways most likely habituate to increased noise levels.

Wildlife may have potential secondary impacts from the Preferred Alternative and Other Alternative. These

impacts include habitat fragmentation, habitat degradation, impacts to wildlife that use black-tailed prairie dog colonies, and impacts to aquatic/riparian communities due to increased runoff. Noxious weed invasion and wildlife displacement due to increased noise levels are also of concern under these alternatives. The projected increased traffic volumes associated with the reconstruction of US 85 may reduce wildlife permeability among open space areas and habitat may become more fragmented. This is of special concern for ungulates, which are highly mobile, and currently cross at-grade.

Adverse secondary impacts to threatened, endangered, and other special status-species are expected to be negligible. The majority of potential secondary impacts to these special-status species arise from their dependence on the black-tailed prairie dog or the degradation of aquatic and riparian habitat. Direct or indirect loss of black-tailed prairie dogs may secondarily impact special-status species associated with them, including the bald eagle, ferruginous hawk, and burrowing owl. However, impact to black-tailed prairie dog colonies is relatively small, and so adverse secondary impact to these species is expected to be negligible. Predicted increases in impervious surface may generate more runoff within the project area that could impact aquatic and riparian habitats important to the PMJM, northern leopard frog, northern redbelly dace, common shiner, brassy minnow, and Iowa darter. Douglas County and CDOT/FHWA regulations and guidelines on stormwater management are expected to prevent adverse secondary impacts from occurring to aquatic and riparian habitat in East Plum Creek and Plum Creek.

5.3.3.20 Cumulative Impacts

Cumulative impacts are impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future action regardless of responsible agency or person.

The past, present, and reasonably foreseeable future actions were determined based on the current TIP and proposed developments within the study corridor. The actions that are considered included in this FEIS cumulative impacts discussion are:

- I-25 Climbing Lanes, Phase I (CDOT Action)
- I-25 Climbing Lanes, Phase II (CDOT Action)
- Meadows/Founders Interchange (CDOT Action)
- 5th Street Overpass (CDOT Action)
- Wolfensberger Interchange (CDOT Action)
- US 85 and I-25 Interchange (CDOT Action)
- Titan Road (CDOT Action)
- Douglas Lane Interchange (Private Developer and Local Entities Action)
- Wilcox Street Bridge (Town of Castle Rock Action)

- Highlands Ranch Development (Private Action)
- Canyon Development (Private Developer Action)
- Meridian Development (Private Developer Action)
- Rampart Range Development (Private Developer Action)
- Douglas Lane Development (Private Developer Action)
- Preservation of Land (Douglas County Action)

Climbing Lanes, Phase I

This project provides one additional lane in each direction along I-25 between Lincoln Avenue and Castle Pines Parkway designated (but not restricted) as climbing lanes for slow-moving vehicles. The I-25 configuration after the completion of this project is six lanes between Lincoln Avenue and Castle Pines Parkway. This project was completed in October 2000.

Climbing Lanes, Phase II

This project extends the Climbing Lanes Phase I project to Meadows/Founders Parkway. The I-25 configuration after the completion of this project is six lanes between Castle Pines Parkway and Meadows/Founders Parkway. This project is currently under construction and is scheduled to be completed in September 2002.

Meadows/Founders Parkway Interchange

This project improved the existing diamond interchange deficiencies by constructing a partial cloverleaf interchange. This project was completed 1999.

Wolfensberger Road

This project improves the existing I-25 interchange deficiencies by removing and replacing the south half of the Wolfensberger Road Bridge over I-25 and Plum Creek. This project is designed, but construction has been delayed due to a shortfall of funding.

US 85/I-25 Interchange

This project removes the existing US 85/I-25 Interchange ramps and reroutes traffic through the improved Meadows/Founders Parkway/I-25 Interchange. An overpass is constructed at the existing interchange location to connect the east side of Castle Rock to the west side. This project is designed, but construction has been delayed due to a shortfall of funding.

5th Street Overpass

This project improves the local Castle Rock transportation network by providing an overpass from 5th Street on the east side of I-25 to Park Street on the west side of I-25. This project began construction in October 2000 and is scheduled to be completed by Fall 2001.

US 85 and Titan Road Grade-Separated Intersection

This project improves existing safety deficiencies of the railroad crossings by constructing a grade-separated intersection at US 85 and Titan Road and by providing grade separations with Titan Road and the Burlington Northern Santa Fe Railroad and Union Pacific Railroad. With the proposed design, traffic crossing the existing Union Pacific Railroad tracks at the existing at-grade crossing will be limited to local business access. Construction is scheduled to begin in October 2001.

Douglas Lane Interchange

This project provides a new interchange along I-25 at Douglas Lane, approximately 1,450 meters (4,750 feet) south of Plum Creek Parkway. The interchange design is a single-point urban interchange. Funding for the Douglas Lane Interchange will be provided through the cooperative efforts of Douglas County, the Town of Castle Rock, and private entities.

Wilcox Street Bridge (Town of Castle Rock)

This project replaces the existing two-lane bridge over East Plum Creek with a five-lane structure. The new bridge is a single-span structure that includes shoulders and attached sidewalks. Existing piers currently located in the East Plum Creek channel are removed as a result of the single-span structure. This project is being completed by the Town of Castle Rock and construction is scheduled to begin in Spring 2001.

Highlands Ranch Development (Private Developer Action)

Construction began on the Highlands Ranch Development in 1981. The development is located approximately 19 km (12 miles) south of Denver in northern Douglas County. Over 5,261 hectares (13,000 acres) of the community's 8,900 hectares (22,000 acres) have been set aside as open space, parks and community facilities linked by a 35 km (22-mile) trail system - with an additional 32 km (20 miles) planned for walking, jogging and bicycling. The trails provide a link between neighborhoods for transportation and recreation purposes. The Highlands Ranch Metropolitan Districts currently manage and maintain the open space and the Highlands Ranch Community Association operates the recreation centers. More than 650 hectares (1,600 acres) of the master plan are designated for business properties. Currently, Highlands Ranch has over 1,000 businesses ranging from corporate headquarters to research and development facilities, light industrial and commercial outlets. Approximately 36,700 residential units are planned.

Canyon Development (Private Developer Action)

The Canyons is a proposed development just east of I-25 and north of Castle Rock. The development is being constructed in two phases. There is a 1,420-hectare (3,500-acre) phase north of Crowfoot Valley Road and a 810 hectare (2,000 acre) phase south of Crowfoot Valley Road. The current plan does not include any commercial development, but it does include 2,676 home sites. The build out is proposed over the next 20 years with

approximately 600 units being constructed in the next 5 years. Orientation of the houses is on east facing slopes approximately 0.8 kilometers (0.5 miles) east of I-25. Provisions for a 369 hectare (912 acre) golf course, pedestrian trails, and an equestrian center have been included in a proposal that recommends 1,363 hectares (3,366 acres) be set aside for open space.

Meridian Development (Private Developer Action)

Meridian International Business Center totals approximately 580 hectares (1,430 acres) in size and is proposed primarily for business center purposes. The majority of the development is bounded by of I-25 Lincoln Avenue, Peoria Street, and E-470. Approximately 17 hectares (41 acres) of the development extends north of E-470. This land is also planned primarily for business center purposes. Approximately 75 hectares (190 acres) of the Meridian Development extends south of Lincoln. This portion of the development includes 250 single-family homes (10.6 units per hectare [4.3 units per acre]) and 500 multifamily units (40.3 units per hectare [16.3 units per acre]), with a total of approximately 1,500 units.

Rampart Range Development (Private Developer Action)

The Rampart Range Development project covers 1,420 hectares (3,500 acres). Approximately 10,085 housing units and 200 hectares (530 acres) of commercial space south of Lincoln Avenue on both sides of I-25 are proposed. Rampart Range would be similar to Lone Tree or Highlands Ranch along the edges, but include more densely packed commercial, retail and residential areas around a City Center area on the east-side of I-25. The property is scheduled for a 30 to 40-year build-out.

Douglas Lane Developments (Private Developer Action)

Crystal Valley Ranch Development

The Crystal Valley Ranch Development (approximately 590 hectares [1,455 acres]) is located 1.6 kilometers (1 mile) east of the proposed I-25/Douglas Lane Interchange. Approximately 3,475 residential units will be built making the density approximately 5.9 units/hectare (2.3 units/acre). These density figures were reduced approximately 40 percent over the original proposal. The site layout calls for construction of 2,000 single family homes and 1,475 multi-family units. The site layout has approximately 16 hectares (40 acres) set aside for residential low density. This residential low-density land use has not reached final agreement, and it may revert to a resort hotel or small corporate business center before the plan is approved. The scheduled build-out for this property is 15 years. As part of the build-out conditions, roadway connections between Douglas Lane and South Lake Gulch Road are proposed.

Lanterns Development

The Lanterns Development, comprised entirely of single-family homes, will be constructed immediately east of the proposed Douglas Lane/I-25 Interchange. The development size is approximately 345 hectares (850 acres) and will include 540 home sites. The proposed density is approximately 1.6 units/hectare (0.6 units/acre). Construction is scheduled to commence in 2002 and finish in 2012.

Dawson Ridge

The Dawson Ridge Development is proposed for construction on the southwest side of the proposed Douglas Lane/I-25 Interchange. This approximately 765-hectare (1,900-acre) tract will contain approximately 6,700 single-family homes and 1,200 multi-family units. Expected density for this tract is 10.3 units/hectare (4.2 units/acre). Construction of this development will start in Spring 2002 with build-out in 20-30 years.

Preservation of Land (Douglas County Action)

The Douglas County Open Space Program was created in 1994 with the passage of a sixth of a cent sales and use tax. Through revenues generated by the tax, the County seeks to improve the quality of life for its residents by protecting important wildlife habitats, agricultural lands, scenic vistas, community buffers, recreational opportunities, and other open space values.

In 1994, the voters of Douglas County approved a ballot initiative creating the Open Space, Trails, and Parks Sales and Use Tax. This tax generates over $6 million annually for the preservation of open space, the creation of trails, and the development of parks. In 1999, approximately $4.1 million of the total revenue generated by the tax was specifically allocated toward the preservation of open space.

Douglas County seeks to protect open space by accomplishing a variety of conservation objectives, including:

- Preservation of important wildlife habitat and movement corridors
- Perpetuation of the County's rural landscape and agricultural heritage;
- Creation of community buffers
- Protection of scenic views, historic properties, and archaeological resources
- Enhancement of recreational opportunities

Douglas County works with the towns of Castle Rock, Parker, and Larkspur, the beneficiaries of a municipal share back incorporated into the sales and use tax, to implement the towns' parks, trails and open space goals.

In addition, the County has and will continue to work with a wide range of partners to implement its conservation goals, including: American Farmland Trust, Cherokee Ranch and Castle Foundation, Colorado Cattlemen's Agricultural Land Trust, Colorado Division of Wildlife, Colorado Division of Parks and Outdoor Recreation, Colorado Open Lands, Douglas County Land Conservancy, Great Outdoors Colorado, South Suburban Parks and Recreation District, The Conservation Fund, The Trust for Public Land and United States Forest Service.

To date, Douglas County and its partners have successfully preserved over 15,000 hectares (37,000 acres) of land. The county has participated in land acquisition in each of its five priority areas.

The Southeast Corridor project is not included in the cumulative discussion because this project is to the north of the South I-25 Corridor and US 85 Corridor study area. The Southeast Corridor is in an urban growth boundary located north of our corridor. Cumulative impacts from projects within that growth boundary are discussed in the

Southeast Corridor FEIS.

The cumulative impacts discussion includes the following critical environmental resources within the South I-25 Corridor and US 85 Corridor EIS study area:

- Socioeconomic
- Air Quality
- Wetlands
- Water Quality
- Threatened and Endangered Species
- Wildlife

Socioeconomics

Cumulative impacts include the incremental growth and increased governmental complexity of a region within the context of all other inter-related effects of all other relevant projects. An analysis of socioeconomic cumulative impacts takes into consideration impacts resulting from other transportation projects as well as major impacts from other developments that might use the transportation system in the foreseeable future. However, growth will occur in Douglas County regardless of the proposed transportation improvements. The county anticipates a population increase of roughly 180 percent by the year 2020.

Douglas County is home to approximately 60,000 residences, containing over 172,000 people. More than three times this many residences are zoned for residential development in the future; 189,000 units of land are zoned for residential development on over 142,000 hectares (350,000 acres) of land. Approximately 57,000 or 30 percent of these units are within the County's primary urbanization area (PUA), located mainly in the extreme north part of the county. Individual developments in the PUA include Highlands Ranch (36,700 planned units), Meridian (1,500 planned units) and Rampart Range (10,085 planned units).

Other large master planned areas of development include the Town of Castle Rock with 65,000 planned units, the High Plateau area near I-25 with 1,200 planned units (includes Happy Canyon, Oak Hills and Surrey Ridge), and the West Plum Creek area further south near I-25 with 6,167 planned units. The Canyons development will also be located in the High Plateau area, to the east of I-25. Although the exact number of planned units has not been approved by the County, it is estimated that at least 10,000 residential units will be built in this development. Within the West Plum Creek subarea, located south of Castle Rock near I-25, the largest planned development is Douglas Park, with 3,493 planned units. The Chatfield subarea, along US 85, has a total of 867 planned units. Less development is planned for the US 85 Corridor than the I-25 Corridor.

The county planning process controls the rate of growth in the county. In the past, the county has exhibited concern about the scale of several developments and has worked with the developers to reduce the number of planned units while increasing the amount of land set aside for infrastructure, recreation, and open space. Ultimately, the county will determine the level of growth desired, and may not allow development of all of the

zoned units.

Douglas County is already easily accessible from the northern Denver metropolitan area by existing transportation facilities including I-25 and US 85. Improvements to the I-25 Corridor and US 85 Corridor do not stimulate growth, rather they are responding to the proposed land use.

For additional information on wetland cumulative impacts, see Section 5.3.2.8, *Socioeconomic Cumulative Impacts*.

Air Quality

The direct air quality cumulative impacts from other transportation related impacts from past, present and foreseeable future projects are accounted for during the conformity analysis of the RTP. The indirect air quality cumulative impacts are accounted for in the development and federal approval of the SIP, which incorporates the analyses of transportation (direct) and non-transportation (indirect) related emissions, and ensures compliance with the NAAQS.

For additional information on air quality cumulative impacts, see Section 5.3.3.1, *Air Quality Impacts*.

Wetlands

Cumulative impacts to wetlands have occurred, and are occurring, in Douglas County due to land conversion. However, other transportation projects in the area, and the reconstruction and widening of the I-25 Corridor and the US 85 Corridor are not expected to contribute substantially to the cumulative loss of wetlands in Douglas County. This is due to CDOT's and FHWA's commitment to avoidance, minimization, and compensatory wetland mitigation.

For additional information on wetland cumulative impacts, see Section 5.3.3.4, *Wetland Impacts*.

Water Quality

Cumulative impacts may generate from Douglas County developments within the South I-25 Corridor and US 85 Corridor study area. Cumulative impacts to Plum Creek and Cherry Creek water quality are possible in the short-term because multiple construction activities, both road and non-road, may occur simultaneously. However, Douglas County's erosion control criteria and CDOT's erosion control manual will keep sedimentation at historic levels over the long term, and the combination of proper drainage design and reduced vehicle wear are expected to reduce contaminants transported to Waters of the US.

An increase in impervious surfaces associated with mainline widening and selected alternatives will generate additional runoff volume during storm events. Consequently, 100-year flood surface elevations downgradient from the project area could change. This type of secondary impact is primarily of concern as a cumulative impact, especially when combined with the rapid rate of urbanization occurring in Douglas County. The customary measures taken by CDOT to preserve historic drainage patterns and to minimize increased runoff associated with this project will therefore be of special importance in preventing significant cumulative impacts to 100-year floodplains. Temporary impacts due to construction in the floodplains will be minimized through BMPs.

Residential, commercial, and industrial development in the Cherry Creek and Chatfield Basins are contributing elements to cumulative impacts to water quality. Combined with the Preferred Alternative and Other Alternative, historic impacts may contribute to the cumulative degradation of water quality in the Chatfield and Cherry Creek Basins. Recognizing the importance of water quality and quantity, it is expected that Douglas County and CDOT/FHWA regulations, guidelines, and BMPs on stormwater management and runoff can minimize the cumulative impacts to water resources in Douglas County.

For additional information on water quality cumulative impacts, see Section 5.3.3.2, *Water Quality Impacts*.

Threatened, Endangered, and Other Special-Status Species

Due to of their role in grassland ecosystems, the cumulative loss of black-tailed prairie dog colonies is of concern in the areas where they still occur. The widening and reconstruction of both highways, combined with planned residential and commercial development in the area represent a cumulative loss of black-tailed prairie dogs.

Cumulative impacts to PMJM habitat have and are occurring along the Front Range of Colorado. The cumulative effect of the Preferred Alternative, the Other Alternative, and all current and future unrelated actions on PMJM habitat will be offset by strict conservation measures required by the USFWS.

For additional information on threatened, endangered, and other special-status species cumulative impacts, see Section 5.3.3.9, *Threatened, Endangered, and Other Special-Status Species Impacts.*

Wildlife

As roads and highways are reconstructed and upgraded, impacts on wildlife will increase as traffic increases. Potential impacts include direct habitat loss, mortality, displacement through avoidance of areas affected by increased traffic and human presence. All of these impacts currently exist under the No-Action Alternative.

Cumulative impacts to wildlife occur primarily as a loss of habitat and habitat fragmentation. Large residential developments along both highway corridors are currently planned and potentially impact important habitat such as black-tailed prairie dog colonies and riparian areas, and could increase runoff into Plum Creek and East Plum Creek. Continued development may eventually cause a shift in species composition from the existing grassland specialists such as ferruginous hawks and burrowing owls, to suburban generalists such as European starlings, and raccoons. This type of shift can lead to a loss in regional biodiversity.

For additional information on wildlife cumulative impacts, see Section 5.3.3.6, *Wildlife Impacts.*

5.4 SUMMARY OF IMPACTS

Information presented in this chapter is summarized in tables for the Preferred Alternative (Table 5.30) and the Other Alternative (Table 5.31).

Table 5.30
Preferred Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	10.1 ha (25.0 ac)	49.4 ha (122 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,048,801 m^2 (11,285,096 ft^2)	Potential improvements to water quality Impervious Area: 711,452 m^2 (7,655,223 ft^2)
Vegetation	73.6 ha (182 ac)	68 ha (169 ac)
Wetlands	0.10 ha (0.25 ac) wetlands 0.19 ha (0.48 ac) Other Waters of US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	67.5 ha (166.8 ac) loss of habitat	61.0 ha (151 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.10 ha (0.24 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)
Archaeological Resources	Potential impacts to two sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site
Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43.0 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed

Table 5.31
Other Alternative Summary of Impacts

Resource	I-25 Corridor	US 85 Corridor
Neighborhood	None	None
Environmental Justice	None	None
Relocation	None	Nine relocations
Right-of-Way	28.9 ha (71.4 ac)	51.4 ha (127 ac)
Recreational Resources	None	Centennial Trail: 2 m (6.5 ft) High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac)
Land Use	Changes to higher density use	Changes to higher density use
Air Quality	None	None
Water Quality and Quantity	Minimal impacts to water quality Impervious area: 1,191,194 m^2 (12,817,247 ft^2)	Potential improvements to water quality Impervious Area: 732,544 m^2 (7,882,178 ft^2)
Vegetation	104.1 ha (257.4 ac)	70.5 ha (174.2 ac)
Wetlands	0.15 ha (0.38 ac) wetlands 0.35 ha (0.85 ac) Other Waters of the US	0.10 ha (0.25 ac) wetlands 0.46 ha (1.14 ac) Other Waters of the US
Geology	None	None
Wildlife	98 ha (242.2 ac) loss of habitat	63.1 ha (156 ac) loss of habitat
Wild and Scenic Rivers	None	None
Floodplains	Happy Canyon Creek #1 and #2, Tributary A, Tributary D, Hangman's Gulch, and East Plum Creek #1 and #2 are expected to be directly impacted	Marcy Gulch, No Name #1, No Name #2, No Name #3, Indian Creek, Tributary A, Tributary B, and Tributary C are expected to be directly impacted
Threatened, Endangered, and Other Special-Status Species	Black-tailed prairie dog: 0.07 ha (0.18 ac) PMJM: 1.76 ha (4.36 ac)	Black-tailed prairie dog: 2.47 ha (6.1 ac)
Historic Resources	D&RG RR: 870 m (2,850 ft)	AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac)
Section 4(f) Properties	D&RG RR: 870 m (2,850 ft)	High Line Canal Trail: 124 m (410 ft) Spring Gulch: 0.2 ha (0.6 ac) AT&SF Railway: 4.3 m (14 ft) Cherokee Ranch: 5.1 ha (12.5 ac) Cherokee Ranch Conservation Easement: 6.5 ha (15.9 ac)
Archaeological Resources	Potential impacts to three sites	Potential impacts to one site
Paleontological Resources	Potential impacts to one site	Potential impacts to one site
Prime and Unique Farmland	No Prime and Unique Farmland impacts 1.34 ha (3.3 ac) of High Potential Dry Cropland	No Prime and Unique Farmland impacts 17.4 ha (43 ac) of High Potential Dry Cropland
Noise	25 receivers	7 receivers
Visual Character	Change in visual character	Change in visual character
Hazardous Waste Sites	Further investigation needed	Further investigation needed