Chapter 3.0: Affected Environment and Environmental Consequences

3.1 Introduction

This chapter provides a concise description of the general social, economic and environmental setting for the area that may be affected by the alternatives presented in Chapter 2. It also provides an evaluation of possible impacts that could occur as a result of implementation of the Preferred Alternative or the No-Action Alternative.

3.2 Land Use

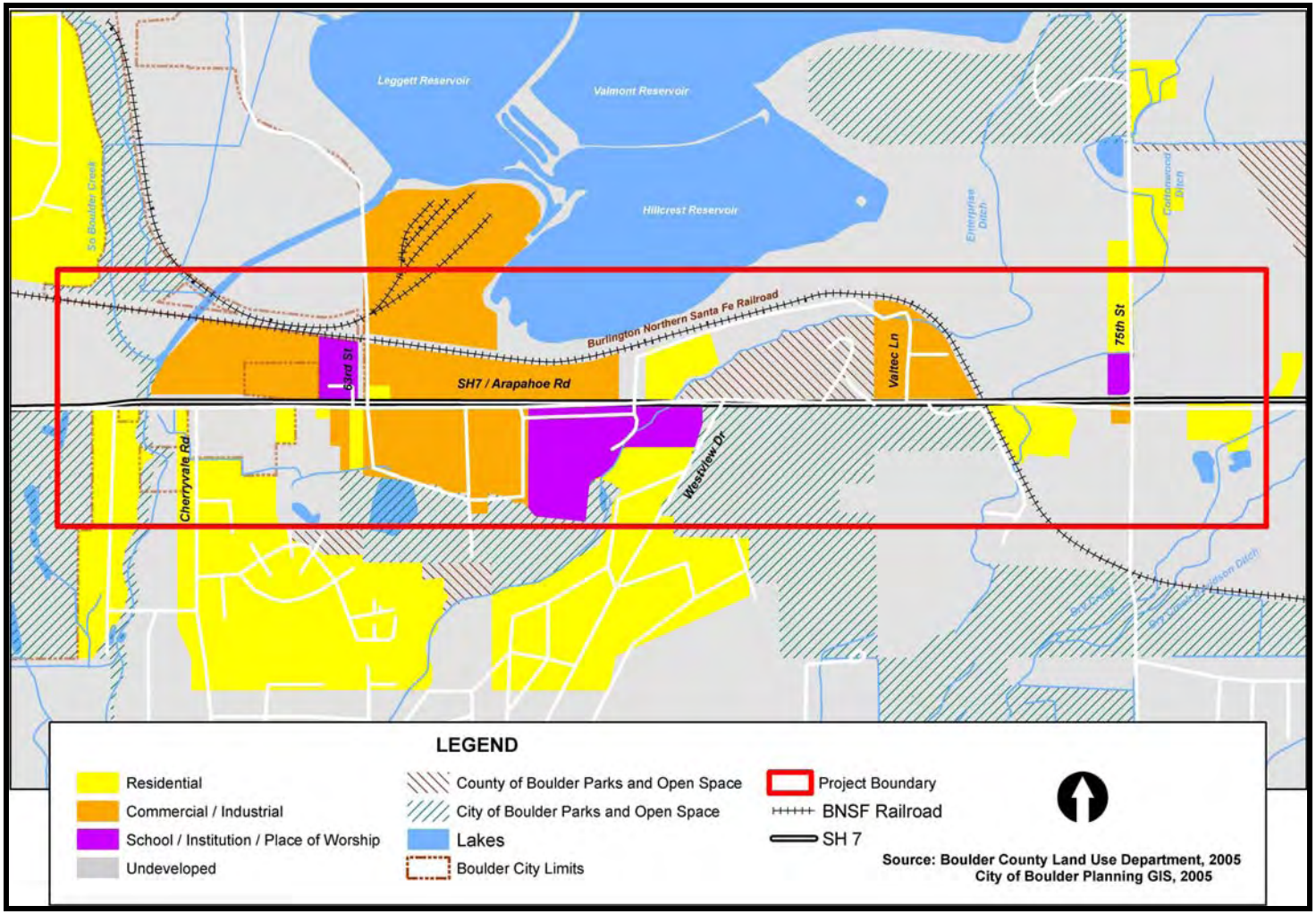
3.2.1 Existing Conditions

The extreme western limit of the project is within the incorporated boundaries of the City of Boulder. The city limit is between Cherryvale Road and 63rd Street. The remainder of the project is located in unincorporated Boulder County, but is within the area covered by the *Boulder Valley Comprehensive Plan* (BVCP) for the City of Boulder and Boulder County. The existing land use for the study area is shown in **Figure 3-1**. Existing land uses were identified through the use of aerial photography, property ownership information, Boulder County Zoning maps and field observation. Following is a description of the uses adjacent to SH 7.

- **Cherryvale Road to 63rd Street:** On the south side of SH 7 there is undeveloped property, several single-family residences, a self-storage facility and a mobile home park. On the north side of SH 7, there is a car dealership, a tofu factory, other commercial businesses and a satellite campus of the Naropa University.

- **63rd to Just East of Westview Drive:** There is commercial development along the north side of SH 7. Businesses include storage facilities, automobile repair shops, a carpet business and parts supply businesses. Along the south side of SH 7, there are storage facilities, a lumber business, Boulder Valley School District (BVSD) offices and bus facility and the Vocational and Technical Education Center (VoTec). There is a church at the southwest corner of the intersection of SH 7 and Westview Drive. On the north side of SH 7, just west of Westview Drive, there is a private residence with equestrian facilities.

Figure 3-1
Existing Land Use



- **Westview Drive to the Burlington Northern Santa Fe (BNSF) Railroad Overpass**: On the south side of SH 7, the land is owned by the agricultural division of the City of Boulder's Open Space Department. It is not currently being farmed and is not open to the public. On the north side of SH 7, the Legion Park is owned and maintained by Boulder County's Open Space Department. This park is open to the public. Just west of Legion Park is the Valtec Industrial Park, which is the location of approximately 12 commercial and industrial businesses.

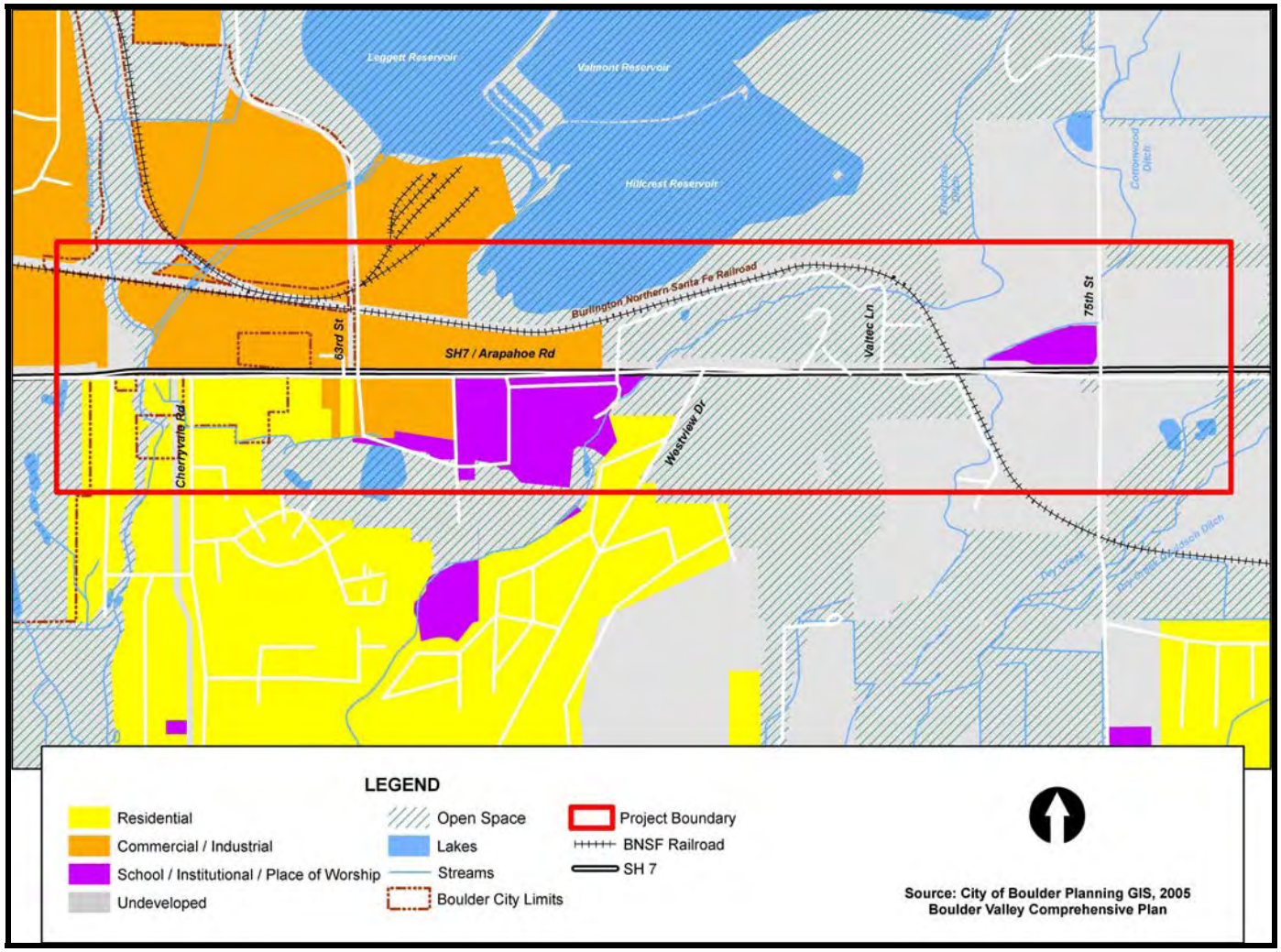
- **BNSF Overpass to the Eastern Extent of the Project**: The south side of SH 7 is zoned rural residential with the exception of the businesses on the southwest corner of the intersection of 75th Street, which are zoned transitional and include a gas station, a restaurant and approximately seven small business to the south of the restaurant. On the north side of SH 7, there is undeveloped land from east of the railroad to the end of the project limits with the exception of a church (State and Locally eligible historic Arapahoe School) and several single-family residences on the west side of 75th Street north of the church.

3.2.2 Future Conditions

The City of Boulder and Boulder County have jointly adopted a land use plan. The BVCP was first adopted in 1978 and was updated in 1982, 1990, 1995 and 2000. This plan guides land use decisions in the study area. The future land uses as outlined in the BVCP are shown in **Figure 3-2**. The following paragraph outlines the changes in land use in the proposed plan as compared with existing conditions.

The southeast quadrant of Cherryvale Road and SH 7 is designated for low-density residential. This primarily undeveloped land is owned by Cherryvale Commons and is currently going through the City of Boulder building approval process. The BVCP designates the current light industrial use surrounding Valtec Lane as open space. Undeveloped land around the reservoir, southwest of the intersection of 63rd Street and SH 7 and southeast of the intersection of 75th Street and SH 7 is designated as future open space land use.

Figure 3-2
Future Land Use



3.2.3 Land Use Impacts

No-Action Alternative
The No-Action Alternative would have no direct impacts on existing land use.

Preferred Alternative
The direct land use impact of the project would be in areas where right-of-way acquisition is required. In these areas, the current land use would be changed to a roadway use.

As discussed in Section 3.5, the total right-of-way acquisition required for the Preferred Alternative is 6.6 acres of right-of-way from 27 owners.

The local agencies of the City of Boulder and Boulder County anticipate improvements as defined by the Preferred Alternative, which is consistent with local planning.

3.2.4 Land Use Mitigation

Mitigation for the change in land use will be through compensation to the landowner during the right-of-way acquisition process. The right-of-way mitigation is discussed in Section 3.5.

3.3 Social Conditions (including Environmental Justice)

Boulder, located at the base foothills of the Rocky Mountains and 35 miles northwest of downtown Denver, maintains a mountain community feel infused with urban culture. Boulder is home to the University of Colorado, and just north of the university is downtown Boulder, an entertainment/shopping district centered around a pedestrian mall. Downtown Boulder is adjacent to five historic neighborhoods and is home to a growing residential population in the downtown district itself. Residential areas spread from downtown to the north, east and south, becoming more rural in character as the distance from the city center increases. Unincorporated Boulder County is generally rural in character with a large amount of land dedicated to open space.

Boulder has been growing steadily but slowly since a growth management ordinance was enacted in 1976. This ordinance regulates the number of residential building permits to no more than two percent annually.

3.3.1 General Population Characteristics

As shown in **Table 3-1** the total population in the study area is approximately 988 persons. The study area is about 1.0 percent of the total population of the City of Boulder and 0.3 percent of the population of Boulder County.

Table 3-1
Population Statistics

Area	1990	2000	Change
Boulder	83,312	94,673	13.6 %
Boulder County	225,339	291,288	29.3 %

Source: 1990 Census, 2000 Census.

3.3.1.1 Race and Ethnicity

The study area is predominately white at almost 91 percent. The largest non-white group is Hispanics at 5.7 percent. Hispanic (or Latino) is a group separate and distinct from race. Persons of Hispanic origin can be of any race. At 2.9 percent, persons listed as "other" make-up the largest racial group, followed by Blacks and Asians at 2.1 percent and 1.9 percent, respectively. See **Table 3-2** for a complete listing.

Table 3-2
Race and Hispanic Origin Statistics

Race/Ethnicity	Study Area*		Boulder		Boulder County	
	Pop.	%	Pop.	%	Pop.	%
White	897	90.8%	83,627	88.3%	257,909	88.5%
Black	21	2.1%	1,154	1.2%	2,559	0.9%
American Indian	4	0.4%	450	0.5%	1,787	0.6%
Asian	19	1.9%	3,806	4.0%	8,915	3.1%
Pacific Islander	0	0.0%	48	0.1%	171	0.1%
Other	29	2.9%	3,318	3.5%t	13,596	4.7%t
Two or More Races	18	1.8%	2,270	2.4%t	6,351	2.2%t
Hispanic	56	5.7%	7,801	8.2%t	30,456	10.5%

Source: 2000 Census.
*Figures for blocks extending beyond study area are not adjusted.

Minority persons are defined by FHWA as a person who is Black, Hispanic, Asian American, or American Indian or Alaska Native. The evaluation of impacts to minority populations is included in Section 3.3.4, Environmental Justice.

3.3.1.2 Persons with Disabilities

On February 24, 2004, President Bush issued Executive Order 13330, which includes persons with disabilities as meeting criteria for being transportation-disadvantaged. The Americans with Disabilities Act (ADA) defines a disability as "a physical or mental impairment that substantially limits one or more of the major life activities of such an individual; a record of such an impairment; or being regarded as having such an impairment." According to the 2000 Census, the City of Boulder has 16,306 disabled persons (17 percent of the population) and Boulder County has 55,338 disabled persons (19 percent of the population).

3.3.1.3 Advanced Age

Persons of advanced age are also included in Executive Order 13330 as persons meeting criteria for being transportation-disadvantaged. The limits of advanced age are not federally defined, so for this study, advanced age will mean persons 60 years of age and older. The senior population grew by 25 percent since 1990 and, according to the Colorado Department of Local Affairs (DOLA), is expected to be 13 percent of the total population in Colorado by 2020.

Though seniors constitute only 10.8 percent of the Boulder County population, they account for 28 percent of all disabilities in Colorado. Generally speaking, an advanced-age person is 3.5 times more likely to have a disability than a person under the age of 60.

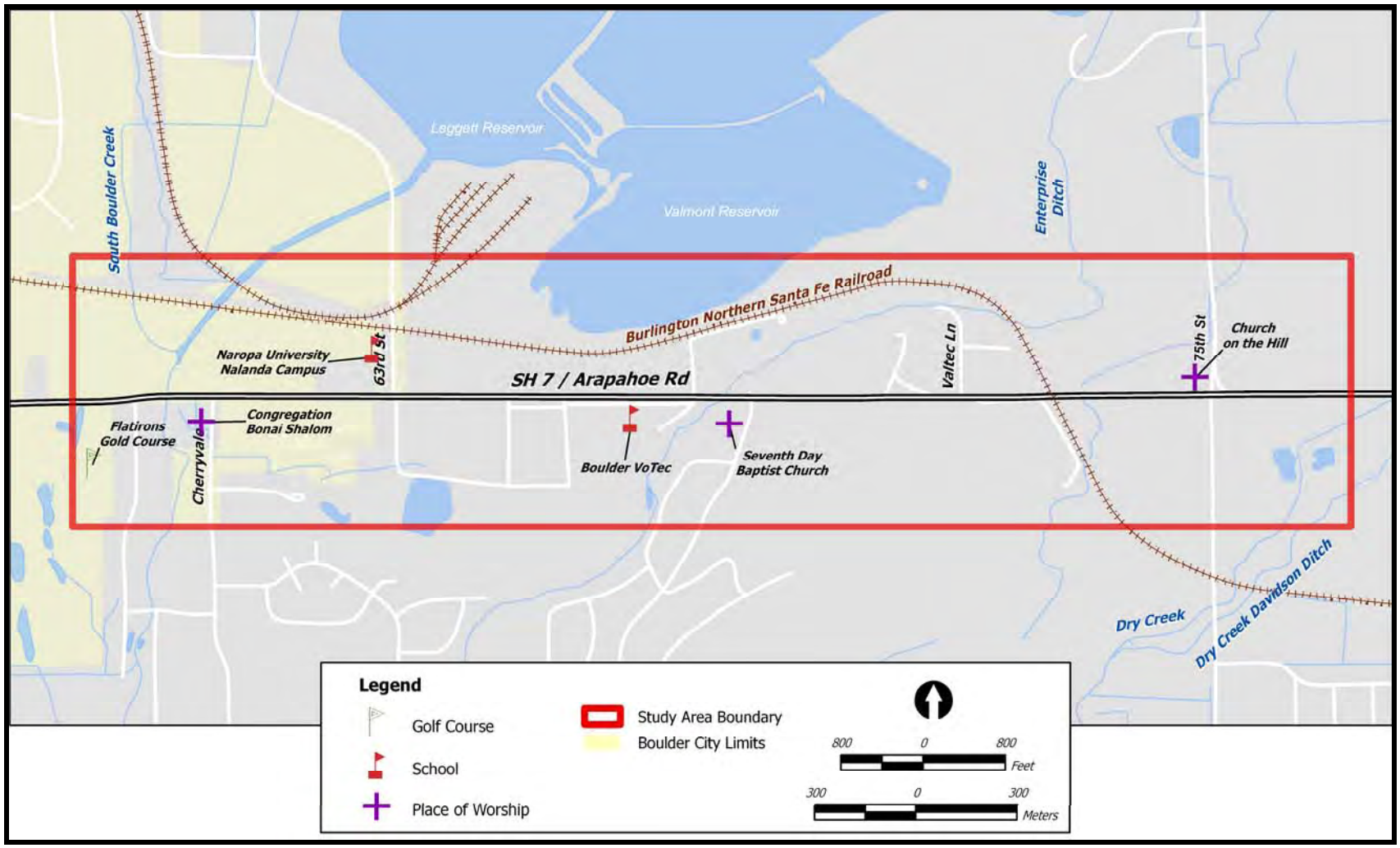
3.3.2 Community Facilities/Resources

The community facilities mentioned in this section are shown by location in **Figure 3-3**.

The study area is served by the Boulder Valley School District (BVSD). There are two schools located within the study area boundary. These include the Boulder Technical Education Center (VoTec) - Arapahoe Campus and the Naropa University–Nalanda Campus. VoTec, which is open to all Boulder Valley School District students, offers state-approved vocational secondary programs for several disciplines. The Naropa University is an accredited university with undergraduate and graduate programs.

There are three worship facilities located within the study area. These include the Seventh Day Baptist Church, located directly in the middle of the study area south of SH 7; Congregation Bonai Shalom, located on the west side of Cherryvale Road near the

Figure 3-3
Community Facilities



western edge of the study area; and City on the Hill Church, located on the northwest corner of SH 7 and 75th Street. Flatirons golf course is located in the southwest corner of the study area. It is a city course open to the public.

3.3.2.1 Public Safety

Police

The western part of the study area lies within Boulder city limits, and is protected by the Boulder Police Department. The Boulder Police Department provides general law enforcement, community services, and crime prevention. The unincorporated areas in the study area fall under the jurisdiction of the Boulder County Sheriff's Office, which meets public safety needs. The Sheriff maintains the County Jail, coordinates search and rescue efforts, handles civil process and evictions, provides animal control services, responds to hazardous materials events, oversees the operation of a cooperative, countywide radio and telecommunications center, and provides public safety services to the nearly 57,000 residents of unincorporated Boulder County.

Fire

The study area west of 63rd Street is served by the Boulder Fire Department, which provides emergency services, non-emergency functions, fire prevention, fire safety education, and wildland fire management. The Emergency Services division provides emergency response to fires, natural and man-made disasters, hazardous releases, rescue situations and medical emergencies within the City of Boulder. The Emergency Services function also includes routine Fire Code inspections, public education efforts, coordination with other public safety agencies and maintenance of apparatus and fire stations. The study area east of 63rd Street is protected by the Cherryvale Fire Department, which offers a complete line of emergency medical services (EMS), fire, and rescue services to areas within its jurisdiction.

3.3.3 Housing

According to 2000 Census data, there are 394 housing units in the study area (see **Table 3-3**); 1.8 percent of the units are vacant. The vacancy rate includes 43 percent that are for sale, 14 percent that are for rent, and 14 percent that are for migrant workers. According to the Boulder County Assessor, the average price of a home in Boulder in 2003 was $375,000, and $286,900 in Boulder County.

Table 3-3
Housing Statistics

Area	Households		Housing Units			
	Total	Average Persons	Total	Owner Occupied	Renter Occupied	Vacant
Study Area	387	2.55	394	269	118	7
Boulder	39,596	2.2	40,726	19,605	19,991	1,130
Boulder County	114,680	2.47	119,900	74,237	40,443	5,220

Source: 2000 Census.

3.3.4 Environmental Justice

On February 11, 1994, Federal Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* was issued to reinforce Title VI of the Civil Rights Act of 1964. The Civil Rights Act states that "No person in the United States shall, on the grounds of race, color or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Executive Order 12898 states "Each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

Subsequent Orders at the state and federal level, including US Department of Transportation (DOT) Order 5610.2 issued in February 1997, have reinforced the legislation outlined in Executive Order 12898. The order requires federal agencies to use the NEPA planning process to satisfy Environmental Justice (EJ) requirements by taking the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. As an entity utilizing federal funds for the development of the SH 7 EA, the Colorado Department of Transportation (CDOT) is responsible for successfully integrating environmental justice into its program and planning activities.

In order to determine any issues or concerns, minority and/or low-income populations within 0.25 mile from either side of SH 7 are included in this analysis. This analysis has been carried out in accordance with the CDOT Title VI and Environmental Justice Guidelines for NEPA Projects (October 2005).

3.3.4.1 Minority Populations

As defined in FHWA Order 6640.23 Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, December 2, 1998 minority means a person who is Black, Hispanic, Asian American, or American Indian or Alaskan Native. As stated in CDOT's Environmental Justice Guidelines, US Census data are the best primary source of data for defining minority populations.

The racial classifications used by the US Census Bureau include White, Black, American Indian and Alaska Native, Asian, Native Hawaiian or other Pacific Islander, some other race, and two or more races. The US Census Bureau separates Hispanic from race, and addresses this category under ethnicity. Ethnicity is tied to character, background or affiliation. The US Census Bureau separates race from the Hispanic category since people who identify their origin as Spanish, Hispanic, or Latino may be of any race. To identify minority populations, then, the total population of the census block is subtracted from the total White, non-Hispanic population of the census block.

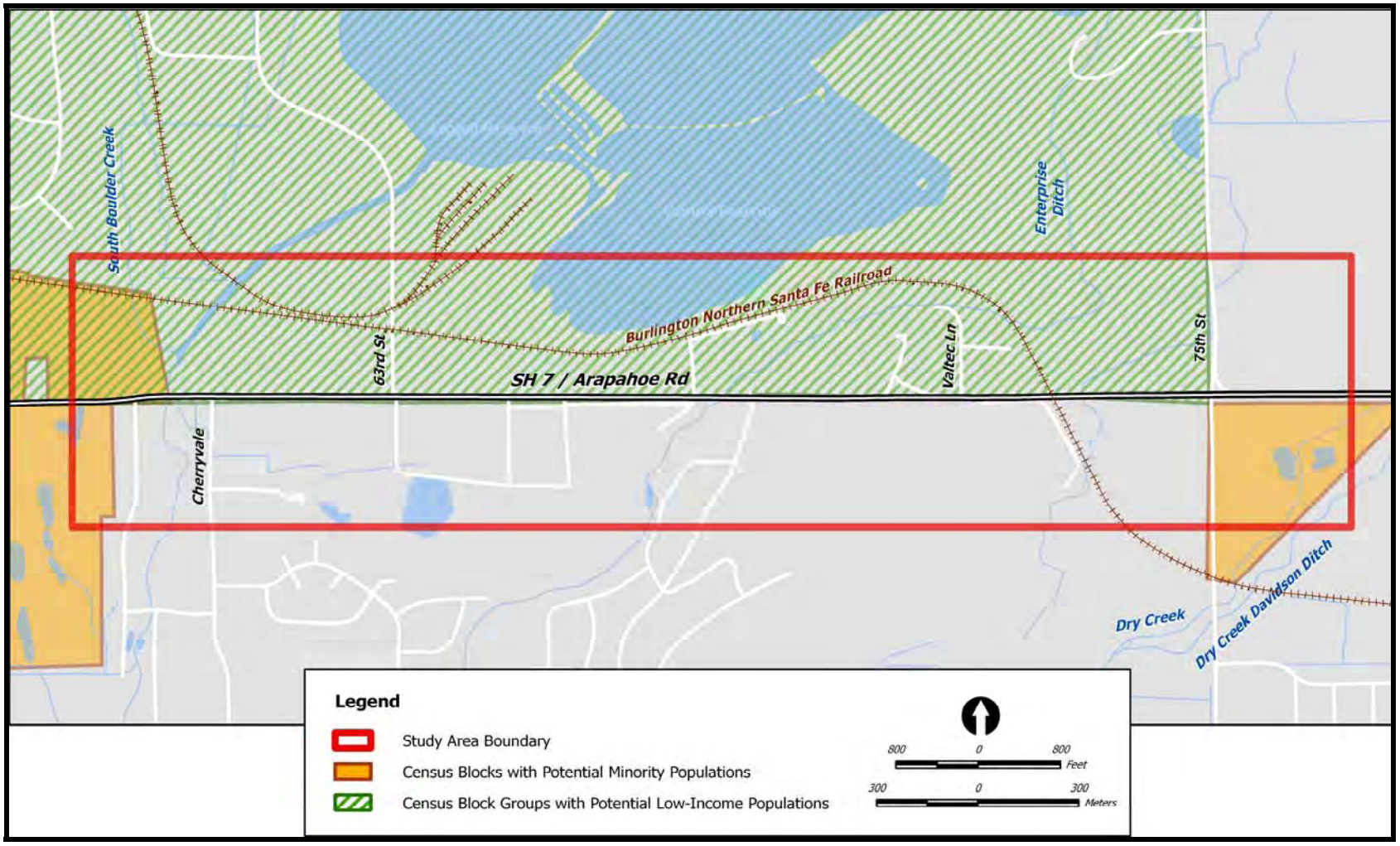
According to the 2000 Census, 16.4 percent of Boulder County residents categorize themselves as minorities. Census Blocks with a higher percentage of minority populations than the rest of Boulder County will be evaluated for disproportionately high and adverse impacts.

Portions of three Census Blocks that contain minority populations above 16.4 percent occur in the study area. The Census Block located at the southeast corner of the study area contains 5 minorities out of a total population of 14 persons. This block is made up of four households total, one of which contains 4 minorities. The Census Block located at the northwest corner of the study area, contains 3 minorities out of a total population of 5 persons. This Census Block has two households, one of which contains 3 minorities out of a total population of 5. The Census Block located at the southwest corner of the study area is 20 percent minority. All of the households within this Census Block fall outside of the study area boundary. See **Figure 3-4**.

3.3.4.2 Low-Income Populations

US Census data collected from the 2000 Census for income is only released at the Census Block Group level for confidentiality reasons, which are larger areas than Census Blocks. To identify concentrations of low-income populations the following data sources were used: 2000 census data, county data, and income thresholds established for the year by the US Department of Housing and Urban Development (HUD) prepared for the distribution and allocations of Community Development Block Grant (CDBG) funds. Both HUD and the state of Colorado establish low-income definitions based upon household income as a percentage of median household income. Low-income households are defined using different criteria depending on the program to

Figure 3-4
Census Blocks and Block Groups with Potential Minority and Low-Income Populations



which it applies. For this study, low-income is defined as 30 percent of the Median Family Income (MFI).

The MFI for the Boulder-Longmont Primary Metropolitan Statistical Area (PMSA) is $81,600 (HUD, 2006). The PMSA is the area specifically selected by HUD for which data was gathered. The average household size in Boulder County is 2.47 persons. The income limits for 30 percent of the MFI is $22,122. Since Census income statistics are divided into increments of $5,000, the income threshold of $25,000 is used. Any households in the study area with household incomes below $25,000 will be evaluated for disproportionately high and adverse impacts.

In Boulder County, 20 percent of households fall below the $25,000 threshold. Of the five Census Block Groups in the study area, only one contains a higher percentage of low-income households than the County. The portion of this Block Group that is in the study area is located north of SH 7 between 75th Street and the western project terminus. Twenty-six percent of the households in this Block Group fall below the $25,000 threshold. It is important to note that this Block Group extends well outside of the study area (approximately 1.5 miles to the north). Because the study area in this location is predominantly commercial/industrial with little residential, it is reasonable to assume that the majority of these households are located outside of the study area. In the remaining Block Groups in the study area less than 12 percent of households fall below the $25,000 threshold.

3.3.4.3 Additional Data Collection Efforts

Census data alone is too broad to accurately represent the social and economic make-up of the households within the study area. For this reason, the following additional efforts were made to identify low-income and minority populations in the study area:

- Boulder County Social Services, Boulder County Planners, and the Colorado Demography Department were contacted, but were not able to provide data identifying low-income populations within the study area.
- City of Boulder Housing and Human Services and City of Boulder Planning Department were contacted to identify low-income population in the study area, but they were unable to provide data more specific than existing 2000 Census data.
- Field research was conducted on August 25, 2004. The former manager of the Columbine Mobile Home Park, located at the southwest corner of SH 7 and 63rd Street was interviewed. According to the information provided by the property manager, the majority of homes in the Columbine Mobile Home Park are low-income. Approximately 7 out of 26 units are occupied by minorities.

Section 8 Housing Facilities and Other Low-Income Populations

Locations of known government-subsidized housing within the study area (also known as Section 8 Housing under the Tenant Based Assistance: Housing Choice Voucher Program) were not found.

Specialized Outreach

In an effort to gather more information about the potential impacts of the project alternatives on low-income and minority populations, all potentially affected business owners were contacted to ask about their ownership, employees, customers, and clients. Sixty-three percent responded to the survey. Business owners and managers were assured that the results of individual surveys would be kept confidential and all statistics used in the EA would be generalized for each alternative. Only one of the businesses surveyed is minority owned. This business has two employees, one of which is a minority. Eight other businesses in the study area reported having a combined total of 25 minority employees. This number is an approximation because in some cases survey respondents estimated the number of minority employees.

All mobile home units at the Columbine Mobile Home Park were provided with hand-delivered announcements of each public meeting held for the project.

3.3.5 Social and Environmental Justice Impacts

3.3.5.1 Social Impacts

No-Action Alternative

The No-Action Alternative would not change population growth trends or development patterns within the study area. Demand for community facilities, services, and housing would continue to increase in response to the projected population growth. The location of facilities would generally follow development and land use plans already identified by the city and county. Access to and from driveways along SH 7 would continue to be hampered by congestion; this congestion would also hamper the provision of emergency services.

Preferred Alternative

The Preferred Alternative would reduce congestion and improve road conditions along SH 7, thereby improving accessibility to businesses and neighborhoods in the study area. Safety conditions would also be improved with this alternative, which also would improve access to local businesses and neighborhoods. Access changes and some out-of-direction travel may occur as a result of construction.

The Preferred Alternative would require the relocation of three business structures and one residence.

Pedestrian and bicycle safety and access would be improved with the addition of the bicycle lanes and sidewalks, along the roadway.

This alternative would temporarily reduce or degrade access to businesses and neighborhoods during construction, which could possibly impact businesses in the study area.

Because there are very few residential land uses in the study area, adverse impacts on persons of advanced age or with disabilities are not anticipated. In addition, this alternative would address roadway safety concerns and include the addition of multi-use pathways, benefiting persons living in or traveling through the study area.

3.3.5.2 Environmental Justice Impacts

As defined in FHWA Order 6640.23, a disproportionately high and adverse effect on minority and low-income populations means an adverse effect that: (1) is predominantly borne by a minority population and/or a low-income population; or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non minority population and/or non low-income population.

Potential impacts associated with the alternatives are assessed in terms of their relationship to property acquisitions or relocations; changes in access to employment areas; and changes in low-income and minority communities based upon changes in the physical environment, such as increases in noise levels, air pollution levels, and the presence or introduction of hazardous materials. These impacts can result from the acquisition of properties needed to construct improvements, the displacement of low-income and minority households based upon property acquisitions, or a change in low-income and minority neighborhoods based upon the placement of facilities or improvements.

No-Action Alternative

The No-Action Alternative would result in continued and increased congestion along SH 7, and the attendant traffic safety and access concerns for residents and businesses in the study area. There would be no displacement of minority or low-income residents, businesses, or employees.

Preferred Alternative

Minority populations are limited to three Census Blocks on the outer edges of the study area. These blocks extend well outside of the study area. The small number of households within these blocks (some possibly occurring in the portion of the Census Block that is outside of the study area) does not indicate a concentrated minority population.

Impacts experienced by minority persons would be the same as those experienced by the non-minority population and would include temporary construction related impacts such as access changes, dust, noise, and construction related traffic and delays as well as longer term impacts including increased traffic, noise, and added pavement to the viewshed. Roadway improvements would also address traffic safety and access concerns, provide pedestrian and bicycle facilities, and increase mobility in the study area. These impacts would benefit minorities in the study area. In addition, several Census Blocks within the study area adjacent to the proposed improvements contain much larger non-minority populations that would bear these impacts. Therefore, impacts to minority populations are not considered to be disproportionately high and adverse.

The Preferred Alternative would relieve congestion along SH 7, thereby improving accessibility to community resources, businesses, and residences for residents, employees, and customers in the study area.

The Preferred Alternative would require the relocation of three business structures. One of these businesses is minority owned and has two full-time employees, one of which is a minority. Relocation impacts will be borne by all three businesses and associated employees and therefore, does not constitute a disproportionately high and adverse impact to minority owned businesses or minority employees. This alternative would require driveway reconstruction for twenty properties, as well as impacts to access for eight properties.

One of the structures that would be removed is a mobile home at the Columbine Mobile Home Park. Due to the sensitivity of the data and to protect confidentially, it is unknown whether this specific structure contains minority or low-income residents. Conversations with the property manager indicated that the majority of the residents of the mobile home park are low-income. Therefore, it is reasonable to assume that the residents of the impacted property are low-income. Additional impacts anticipated at the mobile home park include some right-of-way acquisition and access modifications. This would move SH 7 55 feet closer to the first mobile home in the park. This would result in increased noise and visual impacts at this mobile home park (more information is included in Section 3.7). This would not be considered a disproportionately high and adverse impact because other noise impacts of greater magnitude occur to the general population areas along SH 7.

3.3.6 Social Mitigation Measures

Good communication with emergency service providers, the community, and residents with regard to road delays, access, and special construction activities is recommended

during the construction phase. This may be accomplished by radio and public announcements, newspaper notices, on-site signage, and the use of the City's Web site.

3.3.7 Environmental Justice Mitigation Measures

Every effort was made to avoid or minimize potential impacts to low-income and/or minority populations in the study area. This included eliminating the auxiliary/queue jump lane in order to narrow the width of the roadway in front of the mobile home park. Because of these efforts, no disproportionate impacts to low-income or minority populations are anticipated, and therefore, no mitigation measures are required.

All property acquisition will follow the procedures outlined in the CDOT *Right of Way Manual*. CDOT follows the Federal Uniform Relocation and Real Property Acquisition Act of 1970 (Public Law 91-646), as amended in 1987 (Public Law 100-17), 1991 (Public Law 102-240) and 1997 (Public Law 105-117). The purpose of the act is "To provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally assisted programs."

3.4 Economic Conditions

3.4.1 Existing Conditions

The study area, along with the rest of Colorado, experienced significant population growth and an economic boom in the late 1990s. In the early part of the 2000s, however, Colorado's economy weakened and economic growth has flattened. Growth is expected to continue in the future, but at a more moderate and steady pace than what was seen in the 1990s.

Employment

Boulder began as a supply base for miners looking for gold and silver in the mountains. Three decades after Boulder was incorporated in 1871, its economy faltered and the city turned to tourism. Tourism continued to be a dominating force for the economy until World War II. Beginning in the 1950s, technical and high tech industries located in Boulder, making it one of the largest high tech employment centers in the state.

The North American Industry Classification System (NAICS) was developed by the United States, Canada, and Mexico to provide comparability in statistics about business activity across North America. The NAICS is designed to organize industries into meaningful sectors for consistency, adaptability, and comparability. See **Table 3-4** for the main NAICS industries in the City of Boulder and Boulder County by the number of paid employees.

Table 3-4
Top NAICS Industries by Paid Employees

Area	Manufacturing	Retail Trade	Professional, Scientific, Technical Services	Administrative & Support & Waste Management & Remediation	Health Care & Social Assistance	Accommodation & Food Service
Boulder	9,940	9,587	See note	4,293	2,990	8,098
Boulder County	26,225	17,269	16,458	9,865	11,661	13,844

Source: 1997 Economic Census.
Note: ranging from 5,000 – 9,999 paid employees.

Unemployment rates have increased since 2000. Boulder County unemployment rates remained at or below Colorado's rates but grew by over 51 percent from 2001 to 2002. The change in the unemployment rate for Colorado for that same period was approximately 54 percent. Colorado and Boulder County saw only slight unemployment rates changes in 2003 (5.1 percent and 1.7 percent respectively), and both saw a decline in unemployment in 2004. In the 5 years prior to 2000, unemployment rates fluctuated between 4.1 percent and 2.6 percent for Boulder County and 4.2 percent and 2.9 percent for Colorado. See **Table 3-5** for unemployment rates from 2000 to 2003.

Table 3-5
Unemployment Rates

	2000		2001		2002		2003		2004	
Area	Rate	Change*	Rate	Change	Rate	Change	Rate	Change	Rate	Change
Colorado	2.6	3.6 %	3.9	50 %	5.9	51.3 %	6.2	5.1 %	5.5	-11.3 %
Boulder County	2.4	8.3 %	3.8	58.3 %	5.9	55.3 %	6.0	1.7 %	4.9	-18.3 %

Source: Colorado Department of Labor and Employment.
*Change = percent change from previous year.

Over 28,000 jobs were lost from 2001 to 2002 alone, mostly in the Information, Manufacturing, and Professional and Technical Services industries. The largest change in employment was in the Management of Companies and Enterprises at -55.3 percent, followed by Information, Manufacturing, Retail Trade, and Professional and Technical Services (-28.6 percent, -22.1 percent, -21.7 percent, and -21.7 percent, respectively). Only two industry categories gained employment: Health Care and Social Assistance at 1.6 percent, and Non-Classifiable Government at 0.3 percent. In 2003, employment was down by almost 6,000 jobs compared to 2002, but these numbers increased in 2004 to almost 153,500 by the third quarter.

Retail Sales and Tax

As shown in **Table 3-6**, the City of Boulder's 2004 sales tax rate is 3.41 percent, and Boulder County's is 0.65 percent. The Colorado state sales and use tax rate is 2.9 percent. Purchases within Boulder County are also subject to a Regional Transportation District (RTD) tax of 1.0 percent, plus a 0.1 percent cultural district tax and a 0.1 percent stadium tax.

Table 3-6
Sales Tax Rates

Type of Tax	City (percent)	State (percent)	County (percent)	RTD (percent)	Other* (percent)	Total (percent)
Sales	3.41	2.90	0.65	1.0	0.2	8.16

Source: Colorado Department of Revenue.
* Comprised of 0.10 percent Scientific and Cultural Facilities District and 0.10 percent Football Stadium District.

Boulder saw a decrease in retail sales in 2001 and 2002 at 9.6 percent and 7.7 percent, respectively, from the prior year. Retail sales in Boulder County decreased by 14.5 percent from 2001 to 2002. Though sales increased in Boulder County in both 2003 and 2004, sales in Boulder increased only in 2003 and decreased in 2004 by 3.3 percent. See **Table 3-7** for actual figures.

Table 3-7
Retail Sales in Dollars ($)

Area	2000	2001	2002	2003	2004
Boulder	3,392,755,582	3,360,208,677	3,101,078,133	3,119,118,849	3,016,300,349
Boulder County	7,033,522,392	7,146,997,346	6,110,463,577	6,386,679,551	6,550,736,737

Source: Colorado Department of Revenue.

Economic Areas

The study area is characterized by a number of different economic areas. On the eastern end of the study area, there is a skateboard park and youth church north of SH 7 at 75th Street. Across from the church to the south is a Conoco station, a restaurant, and a small business center. There are several self-storage facilities along the corridor, as well as trailer storage across from the Boulder Valley Public Schools Education Center. On the west end of the corridor there are car dealerships and other car care businesses. There is a large grouping of businesses at Valtec Lane, most of which are north of SH 7 and at 63rd Street.

3.4.2 Economic Impacts

No-Action Alternative

The No-Action Alternative would not change population growth trends or development patterns within the study area. Direct impacts would be caused by the increased demand for commercial facilities, services, and construction in response to the projected population growth. The location of these development areas would generally follow development and land use plans identified by the county and city.

Under the No-Action Alternative, the level of service LOS during AM and PM peak periods would approach LOS F by 2030. As traffic volumes grow, it would become increasingly difficult for commuter, truck, transit, and delivery traffic to traverse SH 7 during peak periods. With the anticipated growth in Boulder, Lafayette, Louisville, and Erie and no improvement to intersections and the roadway from Cherryvale Road to 75th Street, this could become a more critical issue.

Preferred Alternative

Selection of a build alternative could temporarily boost the economy of the study area during the construction period by providing employment of construction workers and revenue generated by the purchase of construction material from local sources. Additional employment could provide a temporary economic boost to the region, through increased wages and retail sales to firms in the project vicinity, partially offsetting any lost revenue from temporary increase in congestion and access restrictions during construction.

With the Preferred Alternative there would likely be no direct permanent impacts to economic conditions in the study area.

Short-term temporary impacts would occur during construction. Access to businesses located near construction sites may be impaired which could cause consumers to go elsewhere. This could be offset by sales to construction workers in the area.

Due to improved access and mobility, this alternative could be expected to enhance the economic condition of the majority of the study area and would be consistent with economic growth areas identified in the comprehensive plans. Ease of access into and out of the businesses would be improved.

3.4.3 Economic Mitigation Measures

Good communication with the community, business owners, and residents with regard to road delays, access, and special construction activities is recommended during the construction phase. This may be accomplished by radio and public announcements,

newspaper notices, on-site signage, and through the CDOT's Web site. Mitigation for relocation impacts is addressed in Section 3.5, Right-of-Way.

3.5 Right-of-Way

3.5.1 Existing Conditions

There are 63 ownerships within the study area. The existing right-of-way width varies throughout the project. The existing right-of-way between Cherryvale Road and 63rd Street is generally 120 feet to 128 feet. Between 63rd Street and Westview Drive, the right-of-way is 60 feet to 70 feet in width with a segment at the BMC Lumber business being 80 feet in width. From Westview Drive to Valtec, adjacent to City of Boulder and Boulder County Open Space, the right-of-way varies from 160 feet to 180 feet in width. West of Legion Park to the BNSF railroad overpass, the right-of-way is 130 feet in width. From the railroad overpass to the eastern extent of the project, the right-of-way is generally 60 feet in width. Existing right-of-way and ownerships are shown on the Preferred Alternative plans in Appendix B.

3.5.2 Right-of-Way Impacts

A preliminary assessment of right-of-way requirements, permanent easement requirements, and building acquisitions for the Preferred Alternative was completed. **Table 3-8** summarizes this information for each property along the project. For specific impacts to low income and minority communities, see Section 3.3.5.

No-Action Alternative
The No-Action Alternative would require no additional right-of-way.

Preferred Alternative
The Preferred Alternative would require the removal of four structures. **Figure 3-5** depicts the location of these structures. Two structure removals are located near 63rd Street on the south side of SH 7 where the roadway improvements would be shifted south. The improvements are 55 feet south of the existing pavement. The first is the mobile home on the southwest corner of 63rd Street and SH 7. The proposed sidewalk is within four feet of the house. The second is a house that has been converted to an office for the storage facility business on the southeast corner of 63rd Street and SH 7. The proposed improvements would fall within the footprint of the building.

Figure 3-5
Locations of Structures to be Removed

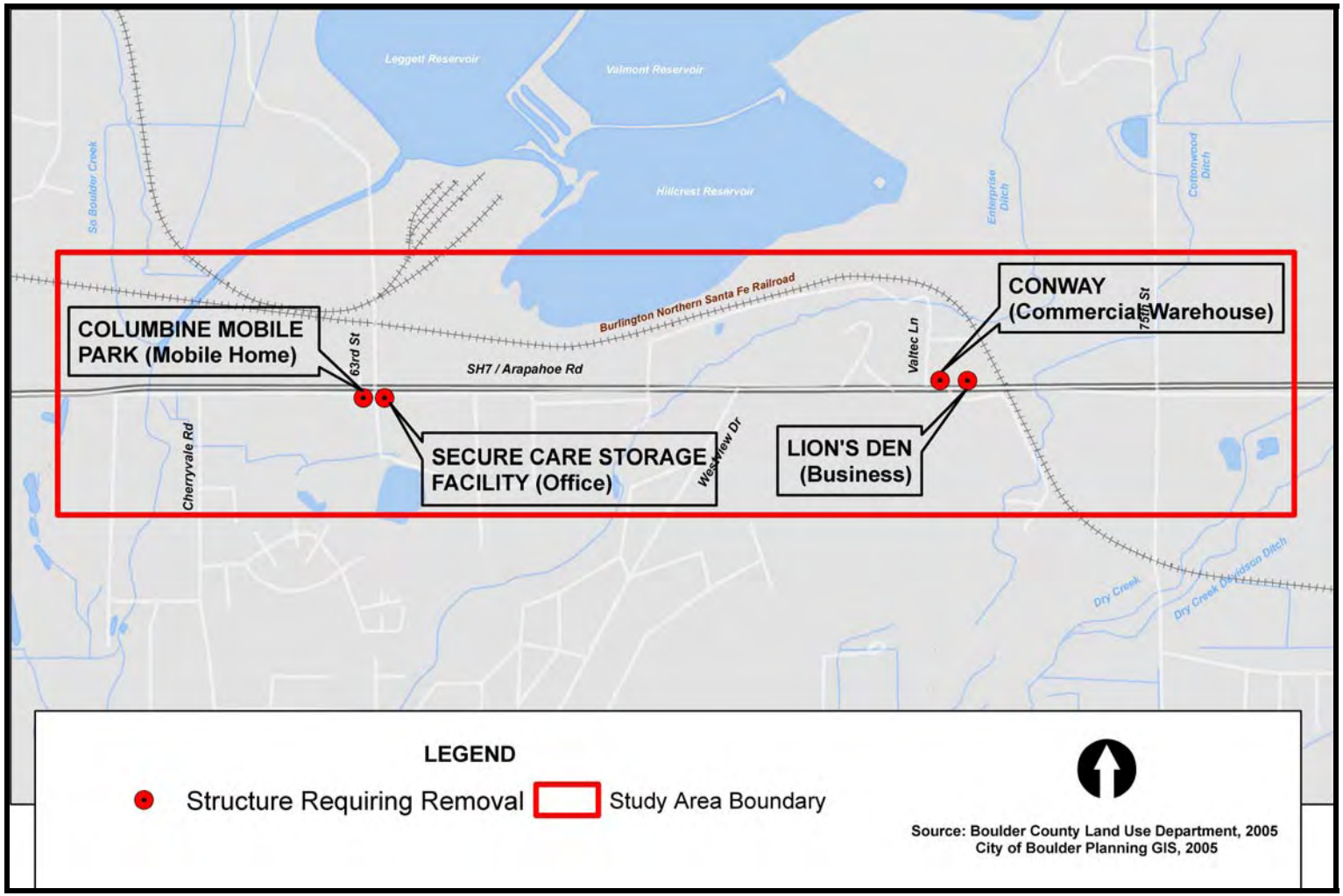


Table 3-8
Right-of-Way Summary

Property Address	Area of Acquisition for Preferred Alternative		Land Use	Building Acquisition for Preferred Alternative
	Right-of-Way (sf)	Perm. Esmt. (sf)		
6025 Arapahoe Road	3,800		Commercial	None
6287 Arapahoe Road	22,400		Commercial	None
6307 Arapahoe Road	250		Commercial	None
6325-6333 Arapahoe Road	0	300	Commercial	None
6367 Arapahoe Road	0	1,500	Commercial	None
6389 Arapahoe Road	1,200	3,700	Commercial	None
6389 Arapahoe Road	1,200	1,200	Commercial	None
?? Arapahoe Road	2,500	1,500	Residential	None
6437-6439 Arapahoe Road	7,000	4,200	Residential	None
6519 Arapahoe Road	5,500	3,300	Commercial	None
6551 Arapahoe Road	10,000	3,900	Commercial	None
6585 Arapahoe Road	3,200	4,500	Commercial	None
6655 Arapahoe Road	2,100	3,900	Commercial	None
6661 Arapahoe Road	1,050	2,000	Commercial	None
6681 Arapahoe Road	0	3,000	Commercial	None
6687 Arapahoe Road	0	5,000	Commercial	None
6775 Arapahoe Road	0	0	Residential and Equestrian Facilities	None
Arapahoe Road	0	0	Public Park	None
7123 Arapahoe Road	3,600	5,300	Commercial	None
7183 Arapahoe Road	3,900	1,200	Commercial	One Commercial Structure
7185 Arapahoe Road	9,100	0	Commercial	None

continued

Table 3-8 (continued)
Right-of-Way Summary

Property Address	Area of Acquisition for Preferred Alternative		Land Use	Building Acquisition for Preferred Alternative
	Right-of-Way (sf)	Perm. Esmt. (sf)		
7195 Arapahoe Road	2,600	0	Commercial	None
7209 Arapahoe Road	7,950	0	Commercial	One Commercial Structure
Arapahoe Road	9,400	0	Vacant	None
7483 Arapahoe Road	15,100	0	Church	None
1599 Cherryvale Road	0	0	Farm Land and Residence	None
5980 Arapahoe Road	17,100	0	Vacant	None
6160 Arapahoe Road	0	0	Residential	None
6180 Arapahoe Road	2,600	0	Residential	None
6234 Arapahoe Road	14,800	0	Vacant	None
6270 Arapahoe Road	4,700	0	Commercial	None
6280 Arapahoe Road	4,600	0	Commercial	None
6292 Arapahoe Road	6,800	0	Residential Mobile Homes	One Residential Structure
6338 Arapahoe Road	23,900	0	Commercial	One Commercial Structure
6400 Arapahoe Road	20,400	0	Commercial	None
6500 Arapahoe Road	73,300	13,000	School	None
6710 Arapahoe Road	12,400	0	Church	None
Arapahoe Road	0	0	Open Space	None
6908 Arapahoe Road	0	0	Open Space	None

continued

Table 3-8 (continued)
Right-of-Way Summary

Property Address	Area of Acquisition for Preferred Alternative		Land Use	Building Acquisition for Preferred Alternative
	Right-of-Way (sf)	Perm. Esmt. (sf)		
7280 Arapahoe Road	0	0	Residential	None
7394 Arapahoe Road	0	0	Farm Land and Residence	None

The second two structures requiring removal are on the north side of SH 7 near Valtec Lane just west of the Burlington Northern Santa Fe Railroad (BNSF) overpass where the proposed improvements would be in the transition of the north shift of the roadway alignment. The first is a commercial warehouse. The second structure is a house that has been converted into a business.

According to the Boulder County Assessor, the average price of a home in Boulder in 2003 was $375,000 and $286,900 for Boulder County. According to Census 2000 data, Boulder County had 119,900 housing units shown, of which 5,220 were identified as vacant. The City of Boulder had 40,726 housing units shown, of which 1,130 were identified as vacant. Within the study area, there were 394 housing units shown, of which 7 were vacant.

While the total number of commercial and retail properties in the Boulder area is not readily available, numerous realtors have listings of commercial and retail buildings and vacant property for sale or lease. Prices are highly variable depending on location and amenities.

Replacement housing for displaced residents and commercial space for displaced businesses is at a premium in the Boulder area. Some displaced businesses and residents may be able to relocate within the study area, depending on the availability of space or land at the time, price, and location and amenity needs.

The Preferred Alternative would require a total of approximately 6.6 acres of right-of-way from 27 owners along the project and approximately 0.9 acre of permanent slope easement.

3.5.3 Right-of-Way Acquisition Process, Compensation, and Relocation Benefits

All property acquisition will follow the procedures outlined in the CDOT *Right of Way Manual*. CDOT follows the Federal Uniform Relocation and Real Property Acquisition

Act of 1970 (Public Law 91-646), as amended in 1987 (Public Law 100-17), 1991 (Public Law 102-240) and 1997 (Public Law 105-117). The purpose of the act is "To provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally assisted programs."

For permanent right-of-way acquisitions, under CDOT right-of-way policy, owners will be compensated in a fair and equitable manner. Depending on the estimated value of the property, monetary compensation is determined through independent and impartial appraisals by qualified professionals (over $5,000) or by value finding (under $5,000). For permanent slope easements acquisitions, similarly to right-of-way acquisitions, owners will be compensated in a fair and equitable manner through the use of appraisals (over $5,000) or by value finding (under $5,000). For permanent slope easements, owners are compensated for the property but retain limited usage in ways that do not cause negative impacts to the roadway.

For properties requiring relocation, the relocation benefits provided to those displaced are determined by eligibility guidelines based on federal regulations. For eligible businesses, this includes reimbursement of actual reasonable and necessary moving and related expenses and certain re-establishment costs, or a fixed payment in lieu of all other possible relocation benefits. For eligible residences, this includes reimbursement of moving and related expenses, a replacement housing benefit for owners, or a rental supplement for renters. The rental supplement payment may also be used towards the down payment for the purchase of a replacement dwelling to encourage renters to become property owners. The replacement housing benefit and rental supplement benefit have certain monetary limitations; however, these limitations can be exceeded in certain circumstances.

3.6 Existing and Forecasted Transportation Conditions

3.6.1 Roadway Existing Conditions

West of Westview Drive, SH 7 is classified as a Federal-Aid Urban Principal Arterial. East of Westview Drive, SH 7 is classified as a Federal-Aid Rural Minor Arterial. SH 7 is a two-lane rural facility with the exception of the western limit of the project in the City of Boulder, which is a four-lane urban divided arterial.

The project is located in rolling terrain, with the middle section of the project dominated by a hill that is higher in elevation than the east and west ends of the project limits by approximately 120 feet. Approach grades are 7 percent on the west side of the hill and 6 percent on the east side of the hill. The approach grades can be difficult for drivers to maneuver during inclement weather. The posted speed in the vicinity of the hill is 50

mph, which correlates to a minimum stopping sight distance of 425 feet. The existing crest vertical curve has a stopping sight distance of 250 feet, which corresponds to a 35 mph design speed.

The west end of the project (Cherryvale Road to approximately 500 feet east of Westview) is posted at 45 mph. The eastern remainder of the corridor is posted at 50 mph with the exception of the direct vicinity of the 75th Street intersection, which is posted at 45 mph.

The existing paved roadway section is 28 to 30 feet in width with additional 2- to 6-foot gravel shoulders. The roadway was originally paved with a width of 16 feet of concrete pavement. Widening and overlays have been done with asphalt. Roadside ditches are steep sided and are directly adjacent to the shoulder. The existing roadway section provides little room to pass an incapacitated vehicle and does not provide warranted auxiliary lanes. Roadside clear zone is inadequate or nonexistent for vehicle recovery. In many cases culvert end sections have been crushed due to their close proximity to the travel lanes.

Along segments of the project, there is not enough slope across the lanes to allow for adequate drainage. Also, warranted right- and left-turn lanes are either nonexistent or substandard, including the right-turn lanes for eastbound traffic at the BVSD signal, and Westview Drive. Substandard left-turn lanes are present at Cherryvale Road, 63rd Street and at the BVSD signalized intersection.

3.6.2 Transit Facilities Existing Conditions

The Go Boulder/RTD provides the "JUMP" bus service every 10 minutes to the BVSD VoTec school and a bus that continues to the Lafayette park-n-Ride every 30 minutes. There are bus stops along SH 7 at 63rd Street, the BVSD signal, Valtec Lane and at 75th Street. In addition, there are bus stops within the BVSD VoTec internal circulation routes. Ridership along the JUMP route is approximately 1,800 passengers per day. Bus stops do not have bench facilities, shelters, sidewalk facilities or pedestrian access to adjacent land uses.

3.6.3 Existing and Forecasted Traffic Operations and Impacts

3.6.3.1 Existing Traffic Data

Traffic data for this project was initially collected in May 2001. Additional traffic data was collected in the July 2004, and more data in the corridor was collected in January 2007. **Table 3-9** shows traffic trends on SH 7 between 63rd and 75th Street dating back to 1988.

Table 3-9
Traffic Trends on SH 7 Between 63rd And 75th Street Dating Back To 1988

Year	Daily Traffic
1988	10,600*
1990	13,000*
1995	14,200*
2001	16,000
2004	18,500
2007	19,300

*The counts prior to 2001 are Average Annual Daily Traffic (AADT), while more recent counts are weekday traffic counts.

Hourly traffic counts were also done in the three years of 2001, 2004, and 2007 and provide information on trends in peak hour traffic (see **Figure 3-6**). The graphs show the effect of the improvement at 75th Street, which allows more westbound traffic in the AM peak hours. The counts also show a continuing increase in PM peak traffic, and a continuing trend of traffic growth throughout the day in both directions.

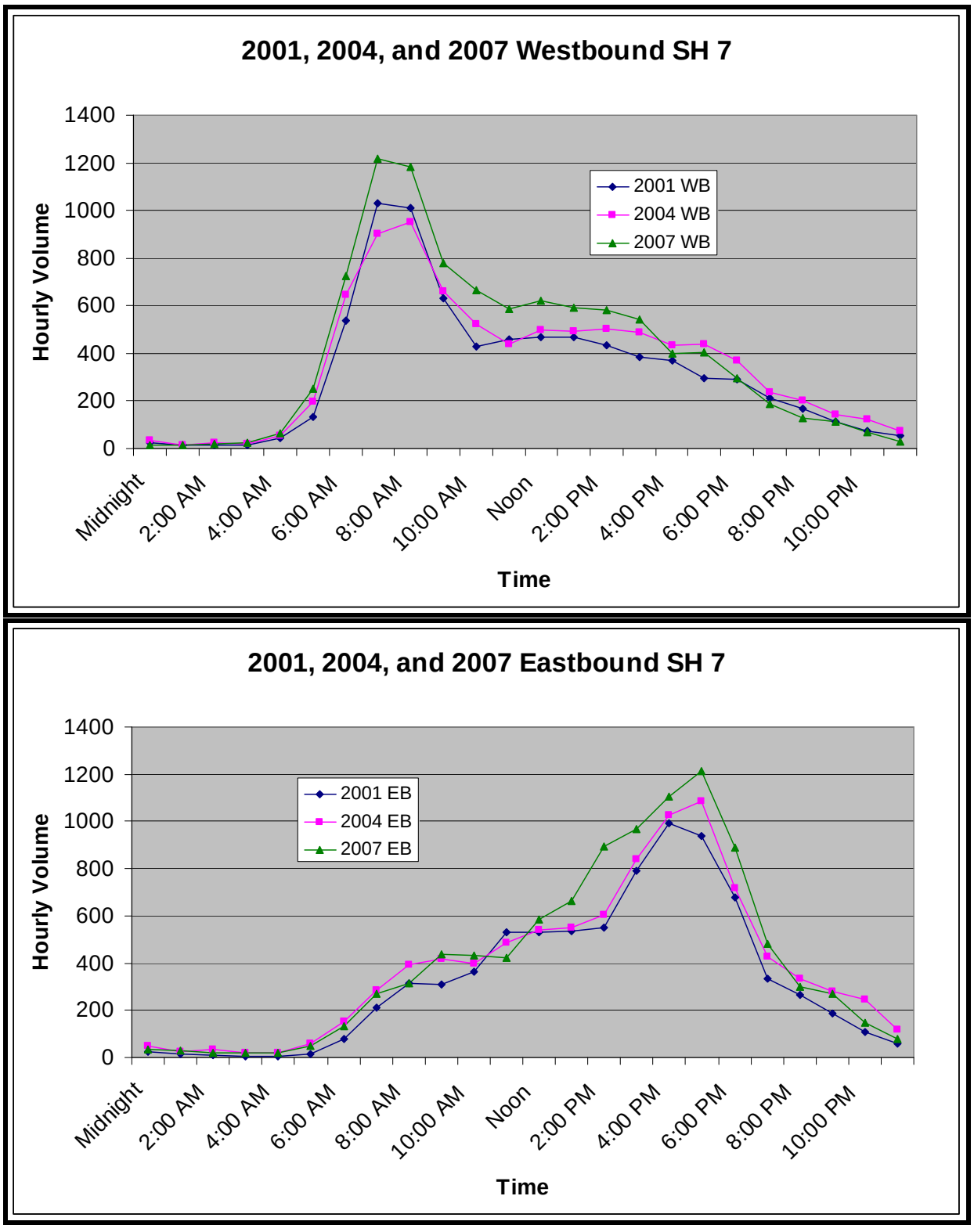
The LOS of the existing condition is similar to the No-Action LOS described in the next section.

3.6.3.2 Future Traffic Data

Traffic forecasting for 2030 was done using the Denver Regional Council of Governments (DRCOG) regional transportation plan (RTP) sketch plan model. The RTP model has the Cherryvale to 75th section of SH 7 at two-lanes. The model appears to be recognizing this capacity constraint, thus the ability for the traffic model to assign more traffic to this segment is limited. Below are comparisons of forecasts from different points in time looking forward to different horizon years:

- 2020 forecasting from the *Consortium of Cities Transportation Study* done in the mid-late 1990s showed this section of SH 7 with 21,000 vpd.
- 2020 forecasting using the DRCOG RTP sketch model from the late 1990s had a forecast of 21,500 vpd on the same section of SH 7.
- 2025 forecasting using the DRCOG RTP sketch model during the improvement assessment study of SH 7 had a forecast of 23,000 vpd on this section of SH 7.
- 2030 forecasting done in 2005 using the DRCOG RTP sketch model for this section of SH 7 forecasted 22,000 vpd.

Figure 3-6
2001, 2004, and 2007 Hourly Volume Comparison



- The most recent 2030 forecasting from DRCOG includes the regional trip adjustment for FasTracks projects, 2 lanes on SH 7, and a forecast of 23,100 vpd on SH 7 west of 75th.

All of the different forecasting periods from the DRCOG model show that the model is basically filling up the available two-lane capacity of SH 7. The conclusion is that if SH 7 is two lanes, those two lanes will fill to capacity at some time, regardless of the horizon year that is evaluated. SH 7 is already near capacity in the peak hours and peak direction, so much of the traffic growth in the future will have to occur outside the peak hours and/or in the off-peak traffic direction.

The above model forecasts are appropriate to use for a No-Action forecast for SH 7 as well as the Preferred Alternative, since a substantial segment of SH 7 will still be two through lanes. Since the model forecasts SH 7 at capacity in 2030, and the LOS of the two-lane section is nearing capacity with LOS E operations in 2004 and 2007, an alternative model run with four lanes on SH 7 from Cherryvale to 75th Street was done. The results of that model run show about 27,300 vpd on SH 7 west of 75th Street, an increase of 20% over the two-lane model run. Other notable results from the four-lane model run:

- The traffic forecasts on Baseline Road and Cherryvale drop by 28%-35% with four lanes on SH 7. The model recognizes Baseline/Cherryvale as an alternative route to a two-lane SH 7 at capacity. This is notable because Cherryvale is residential and has traffic calming features, and there is an elementary school and residential driveways along Baseline Road.

- The traffic forecasts on Valmont drop by about 7% with four lanes on SH 7.

- The 27,300 vpd forecast for a four-lane SH 7 is well below the capacity of a four-lane section; it appears that the two-lane section of SH 7 east of 75th Street (toward 95th Street) is constraining the ability of the four-lane section to approach its capacity.

The DRCOG forecasts were used in conjunction with the updated 2007 traffic counts to develop 2030 forecasts for analysis. The forecasts for both the No-Action and the Preferred Alternative were augmented with the trips generated by the proposed park-n-Ride for the commuter rail station, which is planned to be on the north side of SH 7 at the BVSD/Votec signal. The DRCOG regional model is not detailed enough to specifically forecast trips from this park-n-Ride, so these trips were estimated using ITE trip rates for an 800 parking space facility.

The added turning volumes at the park-n-Ride will add the most conflicting traffic at an intersection in the corridor. Park-n-Ride traffic was determined from trip calculations for an 800 space park-n-Ride and 75% of the patrons to/from the west. The turning traffic to/from the park-n-Ride has the following characteristics:

- AM peak traffic into the park-n-Ride may occur mostly between 6:30 a.m. and 7:30 a.m., assuming a 45 minute to one hour train ride to Denver, assuming most rail users are going toward Denver. The peak of the AM traffic toward Boulder is currently 7:30 a.m. to 8:30 a.m., but that period will likely expand in the future to slightly overlap the peak inflow at the park-n-Ride. There will still be a conflict of inbound park-n-Ride traffic versus heavy westbound SH 7 through traffic.

- PM peak traffic patterns from the park-n-Ride and SH 7 will not conflict substantially with each other. Heavy right turns out of the park-n-Ride do not conflict with the heavy eastbound through traffic.

3.6.3.3 Future Traffic Operations

The traffic operations were evaluated for the key signalized intersections in the study area, and for the key roadway segment being evaluated for widening to four lanes. The LOS analysis was done using the Highway Capacity Manual (HCM) methodology for signalized intersections and for roadway segments. The results are shown in **Table 3-10.**

Table 3-10
Traffic Alternatives, Level of Service

	Level of Service (LOS) AM Peak / PM Peak			
	Cherryvale Intersection	63rd Intersection	Votec \ RTD Intersection	Road Segment (BVSD to 75th)
Existing	C/C	C/C	B/B	E/E
2030:				
No-Action	C/D	E/D	D/D	E/E
Preferred Alternative	C/D	B/B	B/B	E/E

The HCM methodology for analysis of two-lane highways is based on highways that are more rural in character than this portion of SH 7. The methodology considers the capacity effects of improved shoulders but does not consider the effect of left-turn lanes at intersections. The LOS E for the two-lane alternatives is a reflection of the single-lane

of peak traffic being at capacity. Although the two-lane LOS is E, the difference in travel times between the two-lane and four-lane alternative is minimal.

Safety and accidents should be considered when comparing the No-Action to the Preferred Alternative. While it is difficult to predict accident rates for roadways due to the complexity and abundance of variables on different roadways, the majority of research conducted on the relationship of congestion and accident rates has determined that a U-shaped pattern will result when graphing number of accidents (vertically) versus traffic volume (horizontally).

At low traffic congestion levels, single-vehicle accident rates are high, and gradually decrease as congestion rises. This could be attributed to drivers taking more risks with fewer vehicles on the road, and could also include time-of-day factors.

Multiple-vehicle accidents most closely follow the U-shaped pattern. Accident rates are at the lowest levels when traffic levels are near LOS C, and the accident rates increase along with worsening congestion levels.

3.6.4 Safety Existing Conditions

CDOT completed a Safety Assessment Report for SH 7 from Cherryvale Road through the 75th Street intersection in May 2001. Accident data for the safety assessment was collected and compiled by CDOT for the period from March 1, 1996, to February 29, 2000. In addition, to supplement the information developed as part of the Safety Assessment report, CDOT collected and compiled accident data for the period from March 1, 2000, to December 31, 2002. This supplemental accident data was obtained to confirm that the conditions identified in the Safety Assessment report were still valid.

The Safety Assessment Report identified that there were 128 accidents along the corridor. Of those, 40 percent of the accidents resulted in injuries to 74 persons. The overall Weighted Hazard Index for the studied section of SH 7 was 1.76, slightly better than average when compared with other, similar highways statewide. Approximately 50 percent of the accidents occurred in the peak hour periods. Accidents associated with intersections and driveway accesses accounted for 87 percent of the accidents. A concentration of the accidents occurred at the intersection with 75th Street. Following are other observations made as part of the Safety Assessment Report with regard to the accident data:

- Five of the accidents on SH 7 at Cherryvale Road involved eastbound vehicles during wet pavement conditions.

- Ten rear-end accidents (nine were westbound), six involving injuries, occurred at or immediately east of the intersection of SH 7 at Westview Drive.
- Eight accidents, six being rear-end, occurred at the SH 7 intersection with Valtec Lane.
- Sixteen accidents occurred at the business accesses just west of 75th Street. Six broadsides involved vehicles turning left out of the accesses onto SH 7 and two approach turns involved vehicles turning into the accesses.
- Thirteen accidents occurred at the 75th Street intersection, with 54 percent being broadsides.

The supplemental accident data supported the findings of the Safety Assessment Report with no noted changes in type or frequency of accidents.

At Cherryvale Road the most frequent occurring accident types are approach turn and broadside. Based upon operational characteristics, consideration should be given to providing protected/permitted phasing for westbound left turns. A high proportion of the accidents at the intersection, particularly those involving eastbound vehicles, occurred during wet pavement conditions. In addition, CDOT Maintenance confirmed that there is a drainage problem at the intersection that causes ponding water.

Rear-end accidents were the only type of accident to occur at Westview Drive with 90 percent of them being westbound. Stopping sight distance of 250 feet (35 mph design speed) at the crest of the hill and the 7 percent westbound downgrade could be contributing to the rear-end collisions.

At and near the Valtec Lane intersection with SH 7, the most common accident types were rear end and approach turn.

3.6.5 Transit Facilities Impacts

No-Action Alternative
With the No-Action Alternative, the existing conditions described above would continue (no bike lanes, sidewalks, and improved bus stops).

Preferred Alternative
The Preferred Alternative would improve transit for the corridor. This alternative would include pad and bench facilities along with sidewalk facilities for bus users. In the case of the intersection at 63rd Street, westbound deceleration and acceleration lanes are warranted and can be used as queue jump lanes for buses.

3.6.6 Safety Impacts

No-Action Alternative
With the No-Action Alternative safety would not be improved.

Preferred Alternative
The Preferred Alternative would improve the deficient roadway condition and thus improve safety by enhancing vertical geometry, improving drainage, improving sight distance, providing clear roadsides, providing required auxiliary lanes, consolidating and controlling access and providing refuge for stalled vehicles.

Incorporation of accident counter measures into the final design and designing a roadway consistent with CDOT and American Association of State Highway and Transportation Officials (AASHTO) design standards would help to reduce accidents and thus provide a benefit to the users of the facility.

3.6.7 Transportation Mitigation

Because there are no adverse impacts, mitigation is not necessary.

3.7 Noise

3.7.1 Existing Conditions

FHWA and CDOT have established criteria by which to determine noise impacts from traffic sources on certain land uses. These are shown in **Table 3-11**.

Table 3-11
CDOT Noise Abatement Criteria (NAC)

Activity Category	CDOT Leq (h) (hourly)	Description of Activity Category
A	56 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	71 (exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	--	Undeveloped lands.

The above criteria are typically applied to outdoor areas of use, which for residences is usually described as a first-floor outdoor patio/deck area. For example, for a residential area, a noise impact would occur if the project results in a noise level of 66 dB(A) or greater. If a project would result in noise levels that reach or exceed these thresholds, noise mitigation would need to be considered as a part of the project. In addition, a noise impact is considered to be substantial if the project would result in a noise increase of 10 dB(A) or greater over existing noise levels.

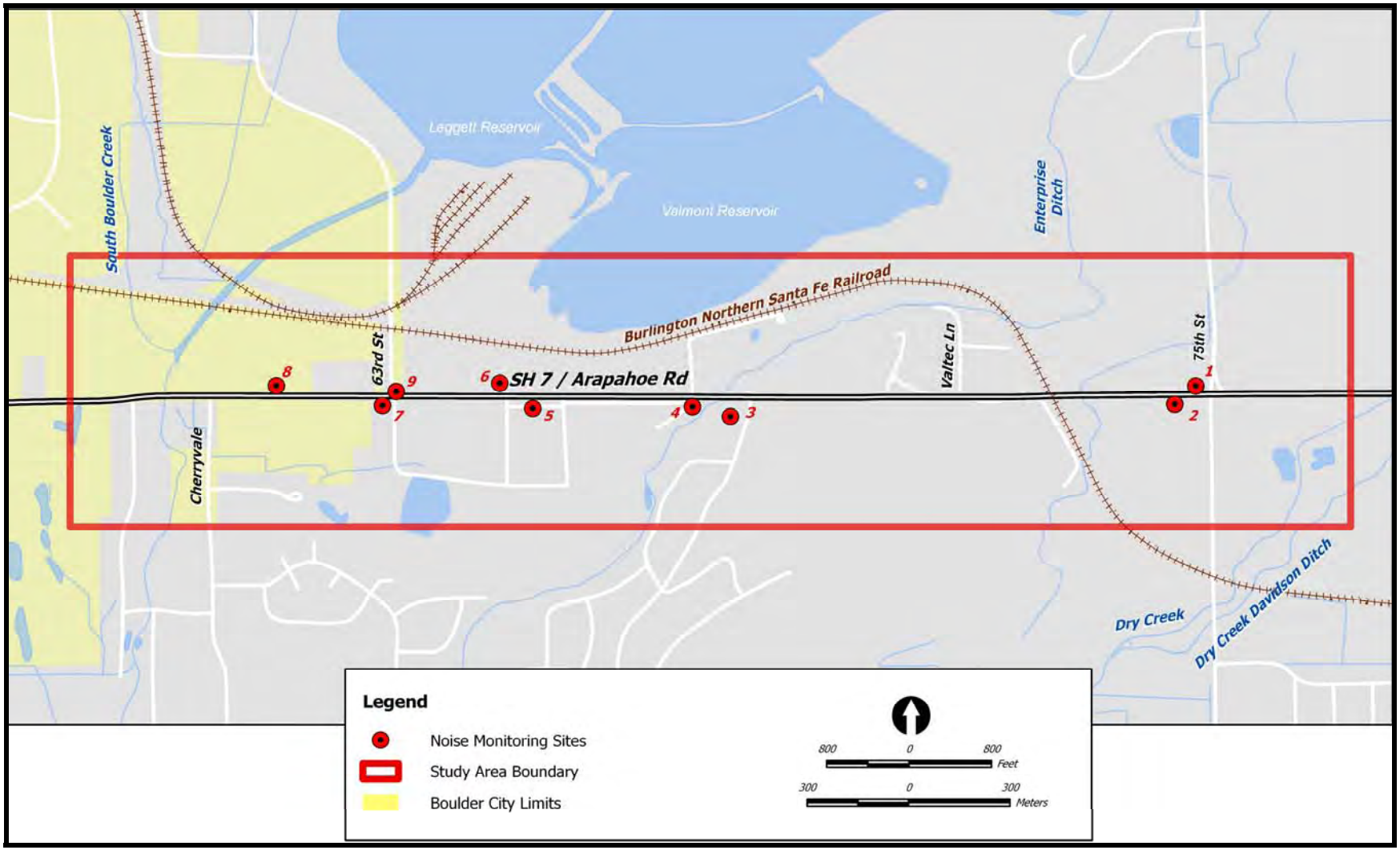
Noise measurements were taken at nine different sites to determine the existing noise conditions (see **Figure 3-7**). Land uses within the study area are primarily residential and commercial, with some light industrial, open space and agricultural uses. "Noise-sensitive" land uses, including a mobile home park, a church, a school and numerous single-family residential units, are present along the project.

The on-site measurements ranged from 60.6 to 69.9 dB(A). All on-site noise measurements were taken during the PM (4:00 p.m. to 6:00 p.m.) peak periods. Field measurements at the monitoring locations were generally taken at the closest point of the structure or closest outdoor use area to the roadway. **Table 3-12** summarizes the results of the on-site measurements. The existing noise levels do not reach or exceed the NAC, as defined in **Table 3-11**, at any of the monitoring locations.

Table 3-12
Existing Noise Levels

Site	Category	Location	Monitored Noise (dB(A))	Modeled Noise (dB(A))
1	B	Church at northwest corner of SH 7/75th Street	65.3	63.8
2	C	Restaurant at southwest corner of SH 7/75th Street	63.5	62.8
3	B	Church at southwest corner of SH 7/Westview Drive	60.9	59.5
4	B	Trailers at BVSD site	62.8	60.2
5	B	Tech school at 6500 Arapahoe Road (SH 7)	61.8	60.4
6	B	Abandoned residence at 6437-6439 Arapahoe Road (SH 7)	61.1	62.2
7	B	Trailer park southwest of SH 7/63rd Street	60.6	64.9
8	C	Commercial site at 6123 Arapahoe Road (SH 7)	67.5	65.6
9	C	Historic structure at northeast corner of SH 7/63rd Street	69.9	70.7

Figure 3-7
Noise Monitoring Sites



In order to accurately model future noise conditions, the STAMINA noise model must be validated to emulate the existing field conditions. The model run for existing conditions resulted in noise levels that were within 3 dB(A) as required by CDOT guidelines, except at one location. At location 7, the field measurements were approximately four decibels lower than the noise level predicted by the model. Although the model tended to over-predict noise levels at this location, overall the noise model was found to perform acceptably for this project.

Noise levels were modeled at 39 locations along SH 7 to represent the receptors along the study area (see **Figure 3-9**). These locations are listed in **Table 3-13**.

Figure 3-8
Noise Modeling Sites

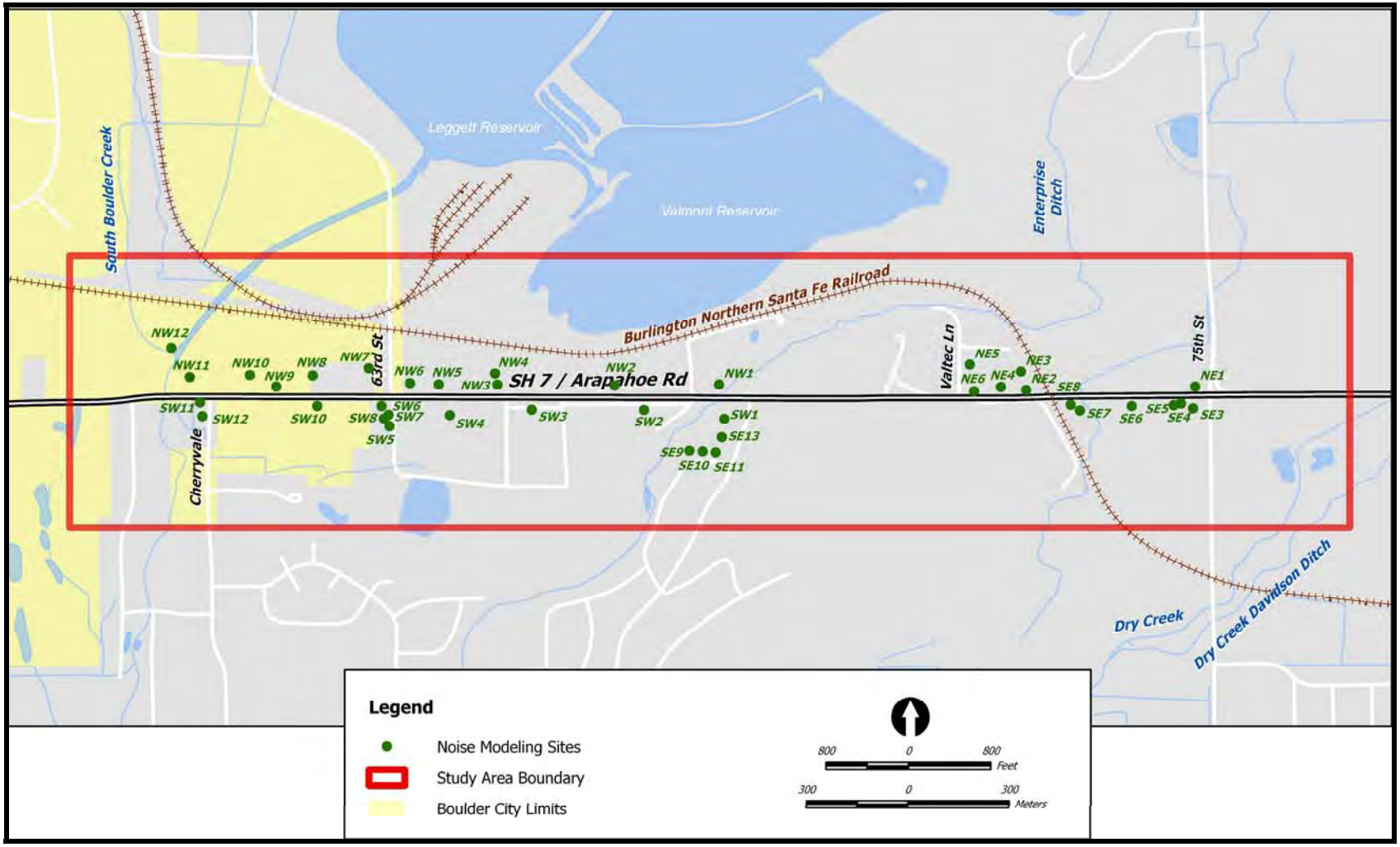


Table 3-13
Noise Model Results (Peak Hour 2004 and 2030)

Site ID	Activity Category (# Of Receptors)	AM 2004 Modeled Noise Level (dB(A))	PM 2004 Modeled Noise Level (dB(A))	AM 2030 No-Action and Preferred Alternatives Modeled Noise Level (dB(A))	PM 2030 No-Action and Preferred Alternatives Modeled Noise Level (dB(A))	Impact
NE1	B(1)	62.3	61.5	62.6	63.2	No
NE2	C(1)	71.8	71.0	Acquired	Acquired	No
NE3	B(1)	58.9	59.0	60.5	60.4	No
NE4	C(1)	66.9	66.5	68.0	68.4	No
NE5	C(1)	56.6	56.8	58.2	58.0	No
NE6	C(1)	70.7	69.9	Acquired	Acquired	No
SE3	C(1)	56.8	58.4	59.5	57.8	No
SE4	C(1)	59.2	61.4	62.6	60.3	No
SE5	B(2)	58.0	60.2	61.4	59.1	No
SE6	B(1)	60.3	60.6	62.0	61.7	No
SE7	B(1)	59.8	60.5	61.9	61.2	No
SE8	B(1)	62.4	63.3	64.7	63.8	No
SE9	B(1)	52.6	53.3	54.2	54.1	No
SE10	B(1)	52.5	53.2	54.2	54.0	No
SE11	B(1)	52.4	53.1	54.1	53.8	No
SE13	B(1)	54.6	55.3	56.3	56.1	No
NW1	B(1)	62.7	63.0	63.8	64.1	No
NW2	C(1)	64.2	64.5	65.3	65.6	No
NW3	B(1)	63.5	64.0	65.4	65.3	No
NW4	B(1)	58.7	59.3	60.8	60.5	No
NW5	C(1)	61.8	62.3	63.8	63.6	No
NW6	C(2)	61.3	61.8	63.1	63.0	No
NW7	C(1)	57.7	58.3	59.4	59.0	No
NW8	C(1)	54.8	55.6	56.6	56.1	No
NW9	C(1)	67.8	67.6	68.6	68.9	No
NW10	C(1)	61.1	61.4	62.4	62.3	No
NW11	C(1)	53.5	54.1	55.2	54.7	No
NW12	C(1)	67.6	67.6	68.7	69.0	No
SW1	B(1)	58.7	59.6	60.5	60.2	No
SW2	B(1)	61.7	62.7	63.6	63.3	No
SW3	C(1)	61.6	62.7	64.1	63.6	No
SW4	C(1)	60.5	61.5	62.9	62.4	No
SW5	B(2)	62.2	63.2	64.4	63.6	No
SW6	B(2)	58.3	59.2	60.4	59.8	No
SW7	B(1)	68.1	69.7	Acquired	Acquired	No
SW8	B(2)	60.7	61.7	62.8	62.1	No
SW10	B(2)	65.9	**67.4**	**68.4**	**67.2**	**Yes**
SW11	B(1)	57.9	58.8	59.8	59.1	No
SW12	B(1)	55.4	56.4	57.5	56.6	No

3.7.2 Noise Impact Assessment

No-Action Alternative
There would be no noise impacts with the No-Action Alternative.

Preferred Alternative
According to the model, the Preferred Alternative would cause four of the modeled locations to have noise levels above the NAC in 2030. These four receptors approach or exceed the NAC with predicted future noise levels increasing between 3 and 5 dB(A). One of the sites, Receptor SW10 representing two residences, would experience noise levels above the impact NAC for Category B if the Preferred Alternative was constructed. Mitigation should be considered for this location. Receptors NE2, NE6 and SW7 would be acquired and removed, and therefore no mitigation needs to be considered for these locations.

All remaining receivers falling below the NAC have modeled noise levels ranging from 53.8 to 67.2 dB(A) for Category B receivers and from 56.0 to 71.3 dB(A) for Category C receivers. Of these receivers, the greatest projected increase over existing noise levels is 3.4 dB(A).

3.7.3 Mitigation Analysis

Once a noise impact is determined to result from the proposed improvements, a reasonableness and feasibility analysis must be conducted to determine if mitigation is warranted at these locations. Mitigation should consider all possible noise abatement measures for reasonableness and feasibility. These include providing noise barriers or walls, earth berms, creating buffer zones of undeveloped land, planting vegetation, traffic management, installing noise insulation on buildings and relocating the highway.

According to CDOT guidelines, the "feasibility and reasonableness" of mitigation needs to be considered for all locations that are projected to experience noise impacts. The feasibility analysis of mitigation considers such factors as the effectiveness of a barrier to achieve a 5-dB(A) reduction in predicted future noise levels, construction, engineering, maintenance or other design issues. Mitigation measures are considered feasible if they can achieve a noise reduction of 5 dB(A) for at least one receiver. They should not create any safety or unacceptable maintenance problems. Noise mitigation is considered reasonable if it meets certain criteria, such as the cost per receiver per decibel of noise reduction and type of land use protected. For example, business districts typically do not receive noise mitigation, as noise barriers would block the view of businesses from motorists.

Relocating the highway, creating buffer zones, constructing earth berms and planting vegetation are not feasible in this situation because these abatement measures require large amounts of land to achieve the necessary noise reductions. The surrounding land use in the study area prohibits acquiring the space needed for these abatement measures. Traffic management, such as limiting truck traffic on the highway, is not feasible because of the status of SH 7 as a major highway and the commercial and light industrial uses along the highway. Because of the high cost, installing noise insulation on buildings is usually reserved for public buildings such as schools or hospitals. For these reasons, noise barriers seem to be the most appropriate noise abatement measure for this project. Noise mitigation models were run to test the reasonableness and feasibility of noise walls. Note that a unit noise wall cost of $30.00 per square foot was used in all of the calculations, according to current CDOT guidelines. Noise abatement structures were analyzed for one impacted area according to CDOT guidelines.

Mitigation Barrier

Mitigation Barrier at SW10

A noise barrier was analyzed for Site SW10, which consists of two residences located at 6160 and 6180 Arapahoe Road. Noise mitigation at this site is not recommended because the resultant cost-benefit was unreasonable according to CDOT and FHWA guidelines. The feasible and reasonable analyses are detailed in Appendix B of the SH 7 *Noise Analysis Technical Memorandum*, which is located in **Appendix E** of this document.

An effective noise reduction of 5.7 decibels could be achieved at this location by constructing a continuous six-foot noise wall that is 310 feet long. The noise wall would require relocation of the two residential driveway accesses. Any gaps in the wall would decrease the effectiveness of the noise abatement, making the wall infeasible. The wall is shown **Figure 3-9**, illustrating the gaps created by intervening driveway access points. Construction of a continuous wall should not create safety hazards for vehicles or pedestrians along SH 7. The cost of a continuous wall of these dimensions would be approximately $55,800. Using the CDOT criterion for cost benefit in determining the reasonableness of noise abatement discussed in the paragraphs above, the cost benefit of this noise wall would be approximately $4,895 per receiver per decibel noise reduction. CDOT considers any amount over $4,000 not reasonable. Noise mitigation at this location is not recommended because, although relocating the two accesses would make this wall feasible, the extraordinary cost/benefit ratio would make the wall unreasonable.

Figure 3-9
Analyzed Noise Barrier Location SW10

3.8 Air Quality

3.8.1 Existing Conditions

Air quality issues in the SH 7 study area include visibility and gaseous pollutant levels related to motor vehicle emissions and street sanding sources.

The transportation and circulation system evaluated for air quality impacts consists of major intersections of 63rd Street, the Boulder Valley School District signalized access, and 75th Street with SH 7. Data pertinent to traffic volumes and LOS in this section are drawn from traffic data presented in Section 3.6.3 *Existing and Forecasted Traffic Operations and Impacts*. LOS values for the various intersections of interest are listed in **Table 3-14**. Project level air quality analyses are typically completed for signalized intersections demonstrating deficient levels of service, LOS D or worse.

Table 3-14
Project Intersection Level of Service

Intersection	Existing	No-Action	Preferred Alternative
75th Street & SH 7	F/F	D/D*	C/C
Boulder Valley School District Rd & SH 7	B/B	D/D	B/B
63rd Street & SH 7	C/C	E/D	B/B

*This includes constructed improvements.

3.8.1.1 National Ambient Air Quality Standards

The US Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for each of the six criteria pollutants to protect the public from the health hazards associated with air pollution. These six criteria pollutants are carbon monoxide (CO), ozone (O_3), nitrogen oxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). The State of Colorado has adopted the NAAQS for these criteria pollutants as shown in **Table 3-15**.

The Colorado Department of Public Health and Environment (CDPHE) Air Pollution Control Division (APCD) monitors concentrations of these pollutants. Geographic areas that violate a particular NAAQS pollutant standard are considered "non-attainment" areas for that pollutant. Violations are determined by a prescribed number of exceedances of the particular standard.

Table 3-15
National Ambient Air Quality Standards for Criteria Pollutants

Pollutant/Averaging Time	Primary Standard	Secondary Standard
Particulate Matter less than 10 microns (PM_{10})		
Annual	50 ug/m^3	50 ug/m^3
24-hour	150 ug/m^3	150 ug/m^3
Particulate Matter less than 2.5 microns ($PM_{2.5}$)		
Annual*	15 ug/m^3	15 ug/m^3
24-hour*	65 ug/m^3	65 ug/m^3
Sulfur Dioxide (SO_2)		
Annual	80 ug/m^3 (0.03ppm)	--
24-hour	365 ug/m^3 (0.14ppm)	--
3-hour	--	1300 ug/m^3 (0.5ppm)
Nitrogen Dioxide (NO_2)		
Annual	100 ug/m^3 (0.053ppm)	100 ug/m^3 (0.053ppm)
Ozone (O_3)		
1-hour	235 ug/m^3 (0.12ppm)	235 ug/m^3 (0.12ppm)
8-hour	157 ug/m^3 (0.08ppm)	157 ug/m^3 (0.08ppm)
Carbon Monoxide (CO)		
8-hour	10,000 ug/m^3 (9 ppm)	--
1-hour	40,000 ug/m^3 (35 ppm)	--
Lead (Pb)		
Calendar Quarter	1.5 ug/m^3	--

*The ozone 8-hour standard and the PM2.5 standards are included for information only. These standards are currently not in use.
ug/m3 = micrograms per cubic meter.
ppm = parts per million.

The APCD also monitors for pollutants that do not have a national standard established. These "non-criteria" pollutants include nitric oxide, total suspended particulate, cadmium, arsenic, sulfates, and visibility.

The APCD completed installation of $PM_{2.5}$ monitors in 2000 and has been acquiring data in the Denver metropolitan area, including Boulder County, without an exceedance of NAAQS since that time.

Greenhouse gases (water vapor, carbon dioxide, methane, and nitrous oxide) and emissions are discussed in the 1998 CDPHE report, *Climate Change & Colorado – A Technical Assessment* and the November 2000 supplement. The APCD has developed several CO_2 reduction strategies and will be considering regional programs to reduce stationary, area and mobile CO_2 sources.

3.8.1.2 Climate & Meteorology

The study area is situated within the Colorado Front Range at an average elevation of 5250 feet above sea level at SH 7 and 75th Street. The climate is moderate with average temperatures ranging from 36°F in January to 75°F in July, with low relative humidity. The average annual precipitation is 15 to 20 inches with annual snowfall averaging 79 inches since 1961. The predominant winds are from the southeast. Wind speeds can be highly variable. Gusty system front-generated winds over 50 mph are not uncommon.

3.8.1.3 Air Pollution Sources

The SH 7 study area contains neither industrialized areas nor power generating plants. Emission sources for this study area are generated from re-entrained dust and motor vehicle emissions.

3.8.1.4 Air Quality Monitoring

There are six monitoring stations near the study area. The monitoring station types are highlighted in **Table 3-16**. There are no monitors within the actual study area.

Table 3-16
Air Quality Monitoring Stations near Study Area

Monitoring Station	Monitored Critical Pollutants			
	CO	O_3	PM_{10}	$PM_{2.5}$
2150 28th Street, Boulder	X			
1405 ½ South Foothills, Boulder		X		
2102 Athens Street, Boulder				X
2440 Pearl Street, Boulder			X	X
3rd Avenue, Longmont			X	X
440 Main Street, Longmont	X			

Class I and II Visibility Areas

There are no Class I or Class II visibility areas in the study area.

State Implementation Plans and Air Quality Conformity

Section 176(c) of the Clean Air Act and related requirements mandate that federally related transportation plans, programs and projects must demonstrate and assure air quality conformity for non-compliance or redesignated attainment areas (i.e., maintenance plan). Boulder County was historically classified as a moderate non-attainment area for PM_{10} but was redesignated by the EPA for PM_{10} attainment in August 2002. The EPA redesignated Boulder County as in attainment for CO in January 2002 for ozone in September 2001. The area is currently under approved maintenance implementation plans for all three pollutants. There are no non-attainment areas within

the study area, and no violations of the NAAQS in the study area have been reported since 1991.

The federal Clean Air Act requires states to submit plans, known as State Implementation Plans (SIPs) to demonstrate how the state will meet the NAAQS for which they are designated non-attainment. As a part of the SIP development process, an emissions budget is established for non-attainment and attainment/maintenance areas to maintain the NAAQS. Because Boulder County is classified as an attainment/maintenance area for PM_{10}, ozone and CO, projected emissions of these pollutants resulting from transportation improvement plans (TIP) and regional transportation plans (RTPs) must not exceed the emissions budgets set forth in the SIP.

Multiple violations of the 8-hour ozone standard from 2002 through 2003 led the Regional Air Quality Council and the State of Colorado to pursue a deferral of the effective date of non-attainment of the 8-hour ozone standard and related requirements through an Early Action Compact (EAC) with EPA. The EAC covers the Front Range counties of Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson, as well as portions of Larimer and Weld counties. The EAC established a plan to expedite a return to ozone compliance and must implement milestones to achieve this goal before December 31, 2007, to avoid a non-attainment declaration by EPA. Ozone is formed as a by-product of combining the precursor pollutants of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) with sunlight. Dispersion and point source air quality modeling are establishing emission levels for base 2002 and target 2007 years, incorporating mobile source and non-road, industrial, and agricultural source ozone precursor emissions of NO_x and VOCs. As part of EAC milestones, precursor pollutant reduction and educational outreach programs were developed and implemented by the Regional Air Quality Council to achieve EAC area ozone compliance. EPA originally deferred designating the northern Front Range area as an 8-hour ozone non-attainment area as long as an enforceable plan was developed to demonstrate compliance with the ozone standard by the end of 2007. The non-attainment designation decision for the Front Range currently has been moved forward to July 1, 2007, rather than April 15, 2008, as is the case for the 13 other EAC areas in the nation.

In addition, the Colorado Air Quality Control Commission sets the requirements for air quality analysis for regional and "hot-spot" air quality on a project level. This includes the requirements for modeling and screening analysis of the selected project. These requirements have been incorporated in the air quality analysis for the study area.

The Colorado Air Quality Control Commission on April 19, 2001, adopted the current PM_{10} Re-designation Request and Maintenance Plan for the Denver metropolitan area.

Re-entrained dust from road sanding is a prime contributor to PM_{10}. CDOT reduces street sanding emissions through the use of alternative de-icing compounds such as magnesium chloride, lower temperature "M-Caliber 1000 and 2000", and "Ice-slicer" and rapid sand clean up. Transportation control measures (TCM) have been proposed in the SIP to induce reduction of PM_{10} emissions from mobile sources.

3.8.2 Air Quality Impact Assessment

The study area is located in Boulder County, which is included in the Denver metropolitan attainment/maintenance area for carbon monoxide (CO), ozone, and particulate matter (PM_{10}). Therefore, the conformity provisions of the federal Clean Air Act apply. The impacts of motor vehicle emissions in the study area on concentrations of CO, ozone and PM_{10} were analyzed for the Preferred Alternative. Pollutant concentrations, rather than total emissions, are a better indicator of project-level air quality impacts because they can be compared to the federal standards that were established to protect public health.

Carbon Monoxide

Carbon monoxide concentrations in the study area were calculated for future (2025) traffic conditions representing approximations of the Preferred Alternative. CO concentrations were modeled using the 2025 peak hour traffic volumes included in **Table 3-17** and motor vehicle emission rates. Traffic volumes consistent with the most recent RTP, *MetroVision 2030 Plan*, are slightly lower than the estimates used in the 2025 modeling (see **Table 3-17**). Because emission rates have been consistently decreasing from 2025 to 2030 plans, the original CO modeling for this intersection represents the most conservative calculation of CO concentrations likely at any location along the corridor. The numbers shown are "worst-case" CO concentrations for receptors located near the edge of the highway shoulder within 10 to 12 feet from the travel lane. CO concentrations at buildings and sensitive resources near the highway would be lower because most of the buildings are at least 40 feet from the highway and vehicle-related emissions would experience some dispersion by wind and turbulence. Thus, future violations of the CO standard are not likely to occur.

Table 3-17
Carbon Monoxide Concentrations

Alternative	2025 Traffic Volume (vpd)	2030 Traffic Volume (vpd)	NAAQS 8-hour CO	Maximum 8-hour CO concentration
Preferred Alternative	24,800	23,700	9 ppm	5.5 ppm

PM_{10}

Motor vehicle-related PM_{10} emissions are the primary source of PM_{10} in the study area. About 80 percent to 90 percent of vehicle related PM_{10} is due to re-entrained dust

associated with winter sanding operations. The remainder is due to exhaust, and brake and tire wear. Maximum PM_{10}concentrations are based upon comparison with regional PM_{10} modeling. The sixth highest PM_{10} average daily concentration over a 5-year period is typically used for comparison. The nearest point of comparison from the 2030 Denver regional attainment/maintenance PM_{10} model with a similar or higher VMT is at I-25 near SH 7. This regional grid receptor (#155) for 2030 PM_{10} concentrations provides a value of 89 ug/m^3. The federal 24-hour PM_{10} standard is 150 ug/m^3. This suggests that PM_{10}concentrations within the study area would remain below the federal standard.

Ozone

Ozone is not directly emitted by motor vehicles; it is an indirect by-product of motor vehicle emissions. Ozone is created by the reaction of nitrogen oxides (NOX) and volatile organic compounds (VOCs), primarily on hot summer days. Since ozone formation depends on the dispersion and reaction of the NOX and VOCs and occurs over several hours, ozone is predominantly a regional pollutant and cannot be quantified at the project level. It takes a 3-year average of the fourth-highest measured ozone level over 0.080 ppm (mathematically over 0.085 ppm) to create a violation similar to those that occurred in the 2003 season. The ozone situation in the summer of 2007 has led to a violation of the 8-hour ozone standard. EPA and APCD are currently evaluating how and when the non-attainment plan will be implemented.

3.8.3 Mobile Source Air Toxics

In addition to the NAAQS, the EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. See document No. EPA420-R-00-023 (December 2000).

In the 2001 rulemaking, EPA identified six priority MSATs: acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1, 3 butadiene (66 FR 17230). EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS

database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken verbatim from EPA's IRIS database and represents the agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Under the proposed revised Carcinogen Risk Assessment Guidelines (US EPA, 1996), **benzene** is characterized as a known human carcinogen.
- Under the Draft Revised Guidelines for Carcinogen Risk Assessment (US EPA, 1999), the potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- Under EPA's 1999 Guidelines for Carcinogen Risk Assessment (US EPA, 1999), **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Using US EPA's revised draft 1999 Guidelines for Carcinogen Risk Assessment (US EPA, 1999), **diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

As noted, EPA is the lead federal government agency responsible for the establishment of national air quality standards, national guidance and guidelines for the uniform and scientifically reliable study of air pollutants. To date, neither National Ambient Air Quality Standards for MSATs nor national project level guidelines or guidance to study MSATs under various climatic and geographic situations have been developed. Such limitations make the study of MSAT concentrations, exposures, and health impacts difficult and uncertain. Thus, accurate and reliable estimates of actual human health or environmental impacts from transportation projects and mobile source air toxics are not scientifically possible at this time.

EPA has also not established toxicity factors for diesel particulate matter, although one study asserts that this pollutant accounts for a large portion of MSAT health risk in certain situations, using a toxicity factor that is unique to California.

On February 3, 2006, the FHWA released its interim guidance on when and how to analyze MSATs in the NEPA process for highways. The following discussion and discussion in the air quality technical report (Appendix F) are in accordance with the interim guidance.

3.8.3.1 Project Level MSAT Discussion

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions—if any—from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

For the Preferred Alternative in the EA, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Preferred Alternative is slightly higher than that for the No-Action Alternative because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. The increase in VMT would lead to higher MSAT emissions for the action alternative along the highway corridor; along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT under each of the alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT

growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the Preferred Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSATs could be higher under the build alternatives than the No-Action Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded SH 7 roadway sections that would be built between Cherryvale Road and 75th Street under the Preferred Alternative. However, as discussed above, the magnitude and the duration of these potential increases compared to the No-Action Alternative cannot be accurately quantified due to the inherent deficiencies of current models. In sum, when a highway is widened and, as a result, moves closer to receptors, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-Action Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

3.8.4 Mitigation

Motor vehicle emissions in the study area would not result in any exceedance of the NAAQS; therefore, no direct project air quality mitigation is necessary. During construction, dust emissions should be minimized by including techniques to control fugitive dust.

3.8.5 Coordination

All proposed improvements will be included in the DRCOG 2030 or 2035 fiscally-constrained, conforming RTP prior to FHWA adoption of the final Decision Document. This project has been coordinated with CDOT and the APCD of the CDPHE. APCD concurrence was received January 19, 2006.

3.9 Wetlands

This section describes existing wetland resources in the study area, which were delineated in Summer 2001 and reviewed in Spring 2005. Wetlands are transition zones between aquatic and upland habitats. Wetlands were delineated following Executive Order 11990 and the guidelines and criteria of the US Army Corps of Engineers (USACE) *1987 Wetlands Delineation Manual* (Environmental Laboratory 1987) based on

characteristics of vegetation, soils, and hydrology. According to the 1987 manual, wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances / conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands types are described in detail in the Wetland Finding prepared for this EA (**Appendix D**).

3.9.1 Existing Conditions

As shown in **Figure 3-10**, there are seven wetland sites within the study area totaling approximately 0.66 acre. As determined by the USACE, three clusters of jurisdictional wetlands are present within the study area (correspondence from the USACE in **Appendix G**). **Table 3-18** lists the wetlands and their size and type. Emergent wetlands are typically cattail, bulrush, grass sedge and/or rush. Scrub shrub wetlands are low-growing woody plants, typically willow.

Table 3-18
Study Area Wetlands

Site ID	Acres within Study Area	USACE Jurisdictional?	Wetland Type*	Comments
1	<0.01	Yes	Emergent	Adjacent to East Boulder Ditch
2 a, b, c, d, e	0.29	No	Emergent with Scrub Shrub	Roadside ditches
3	0.08	No	Emergent	Detention basin
4 a, b	0.03	Yes	Emergent with Scrub Shrub	Adjacent to Enterprise Ditch
5 a, b, c, d, e	0.14	No	Emergent with Scrub Shrub	Adjacent to BNSF railroad embankment
6 a, b, c, d	0.08	Yes-a, b, d; No-c	Emergent with Scrub Shrub	Adjacent to Cottonwood Ditch
7 a, b, c	0.03	No	Emergent	Roadside ditches
Total	0.66	*Cowardin, L.M. et al. 1979. Classification of Wetland and Deepwater Habitats of the United States. United States Fish and Wildlife Service, Biological Services Program; FWS/OBS-79/31		

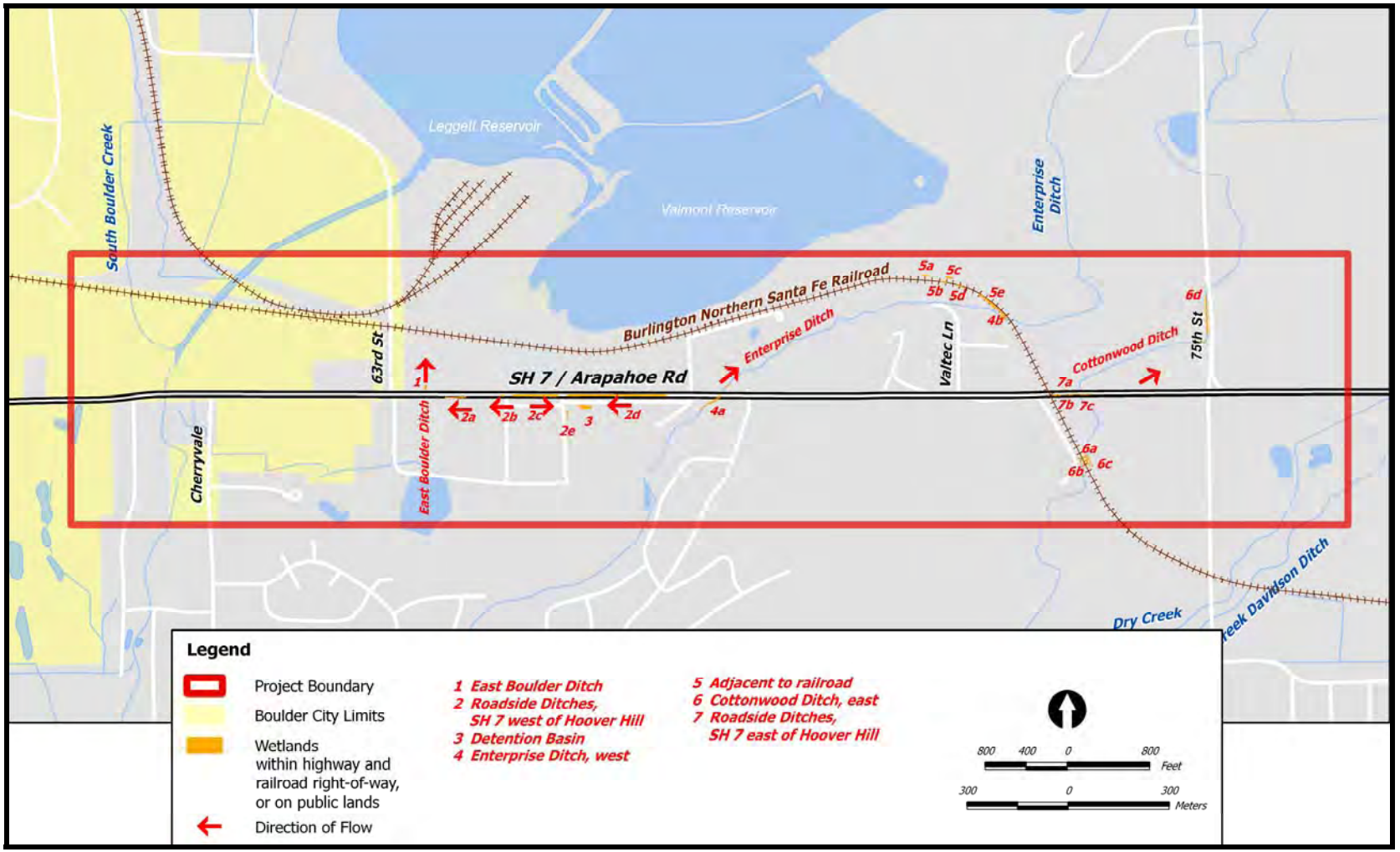
Wetlands within the study area are generally small and scattered. Nearly all wetlands are associated with irrigation or roadside ditches. The major wetland type within the study area is palustrine emergent with some areas of scrub-shrub wetland. Wetland vegetation includes cattail, sedges, spikerush, grasses and forbs.

Wetland functions and values include bank stabilization, sediment/toxin retention, nutrient removal/transformation, food chain support, wildlife habitat, and visual quality. The wetlands are approximately 70 percent palustrine emergent persistent and non-persistent and 30 percent palustrine scrub-shrub.

3.9.2 Practicable Alternatives

Refinement of the design plans to further minimize impacts to wetlands will occur throughout the final design process and during construction. Where feasible, surface flows will be directed into ditches to maintain wetland bands. Mitigation measures to offset unavoidable impacts to wetlands are discussed in Section 3.9.4.

Figure 3-10
Wetlands



3.9.3 Wetland Impacts

Table 3-19 presents wetland impacts for the Preferred Alternative.

Table 3-19
Wetland Jurisdictional Determination, Areas, and Permanent Impacts

Wetland	USACE Jurisdiction	Preferred Alternative Permanent Impacts (acres)
1	Yes	0.002
2a	No	0.035
2b	No	0.006
2c	No	0.110
2d	No	0.135
2e	No	0.001
3	No	0
4a	Yes	0.011
4b	Yes	0
5a	No	0
5b	No	0
5c	No	0
5d	No	0
5e	No	0
6a	Yes	0
6b	Yes	0
6c	No	0
6d	Yes	0
7a	No	0.001
7b	No	0.003
7c	No	0.018
Total		0.322 acre

No-Action Alternative
No wetlands would be impacted by the No-Action Alternative.

Preferred Alternative
Wetland impacts are based on 2001 wetland delineations and Spring 2005 field review. Based on these boundaries and preliminary design plans, the Preferred Alternative would permanently impact approximately 0.309 acre of non-jurisdictional wetlands and 0.013 acre of jurisdictional wetlands (see **Table 3-19**).

Best management practices (BMPs) will be implemented to prevent temporary and indirect impacts that could also result from construction and operation activities, including sedimentation from erosion during earth moving, fuel spills in construction

staging areas, and winter sanding operations. Measures to reduce impacts are discussed in further detail in Section 3.9.4.

3.9.4 Wetland Impact Minimization and Mitigation Measures

The Preferred Alternative design includes avoidance and minimization of impacts to most study area wetlands. Impacts to wetlands will be avoided and minimized as much as practical during the final design process. The design shall comply with the policy of Executive Order 11990 regarding impacts to wetlands. The following specific BMPs from the *Erosion Control and Storm Water Quality Guide*, CDOT, 2002, will be required during construction to reduce the potential for wetlands to be indirectly affected by sedimentation from accelerated erosion or by hazardous materials (e.g., fuel, equipment lubricants):

- All disturbed areas will be revegetated with native grass and forb species. Seed, mulch and mulch tackifier will be applied in phases throughout construction.
- Where permanent seeding operations are not feasible because of seasonal constraints (e.g., summer and winter months), disturbed areas will have mulch and mulch tackifier applied to prevent erosion.
- Erosion control blankets will be used on 3:1 or steeper, newly seeded slopes to control erosion and to promote the establishment of vegetation. Slopes should be roughened at all times.
- Temporary erosion control blankets will have flexible natural fibers.
- Erosion bales, erosion logs, silt fence or other sediment control device will be used as sediment barriers and filters adjacent to wetlands, surface waterways and at inlets where appropriate.
- To minimize the loss of sand from the road surface during winter sanding operations, sediment catch basins will be included during construction and put in place permanently with continual maintenance.
- Where appropriate, slope drains will be used to convey concentrated runoff from top to bottom of the disturbed slopes. Slope and cross-drain outlets will be constructed to trap sediment.
- Storm drain inlet protection will be used where appropriate to trap sediment before it enters the cross-drain.
- Check dams will be used where appropriate to slow the velocity of water through roadside ditches and in swales.

Additionally, the following BMPs to minimize additional wetland impacts during construction will be employed:

- All wetland areas and water bodies not impacted by the project will be protected from unnecessary encroachment by temporary fencing and will be seeded in phases throughout construction. Sediment control such as silt fence or erosion logs will also be used where needed to protect the area from sediment. Siltation control devices (e.g., fences) will be placed on the down-gradient side of construction areas to prevent soil from entering wetland areas.

- No staging of construction equipment, equipment refueling or storage of construction supplies will be allowed within 50 feet of a wetland or any water-related area.

- Standard erosion/sediment control measures will be observed and an erosion control plan will be developed prior to and for inclusion in the construction bid plans. All bare fill or cut slopes adjacent to streams or intermittent drainages will be stabilized as soon as practicable.

- No fertilizers, hydrofertilizers, or hydromulching will be allowed anywhere on the project.

- Work areas will be limited as much as possible to minimize construction impacts to wetlands.

3.9.5 Wetland Creation/Restoration

Wetlands, as well as their associated functions permanently impacted by the Preferred Alternative will be mitigated at a 1:1 ratio by purchase of credits at one of the three wetland mitigation banks within the primary service area. Wetland impacts will be reduced as much as possible during final design. Replaced wetland functions and values are anticipated to include bank stabilization, sediment/toxin retention, nutrient removal/transformation, food chain support, wildlife habitat, and visual quality.

Wetland areas temporarily impacted by construction activities will be restored as soon as possible following completion of the activity.

3.10 Vegetation

3.10.1 Vegetation Existing Conditions

A mix of vegetation communities are present in the study area. Landscaped areas of trees, lawn and flowerbeds are adjacent to residences and businesses. Mature trees are

common in and adjacent to the highway right-of-way for both SH 7 and 75th Street. Typical tree species are plains cottonwood (*Populus deltoides* subsp. *monilifera)*, crack willow (*Salix fragilis*), box-elder (*Negundo aceroides*), ponderosa pine (*Pinus ponderosa*), pinon pine (*Pinus edulis*), Chinese elm (*Ulmus pumila*), Russian-olive (*Elaeagnus angustifolia*), locust (*Robinea* spp.), Douglas fir (*Pseudotsuga menziesii*), spruce (*Picea engelmannii*), and juniper (*Juniperus* spp.). Chokecherry (*Padus virginiana*) and wild plum (*Prunus americana*) are present adjacent to flowing ditches and other more mesic sites. Common highway right-of-way grasses include smooth brome (*Bromopsis inermis*), cheatgrass (*Bromus tectorum*), quackgrass (*Elytrigia repens*), and bluegrass (*Poa* spp.). Many weedy species are present and are discussed in Section 3.10.1.1.

The Hoover Hill middle portion of the study area in the vicinity of Legion Park from approximately the SH 7 crossing of Enterprise Ditch on the west to the BNSF railroad crossing on the east (except for the commercial area in the vicinity of Valtec Lane) contains mostly plantings that are native to Colorado, and understory species unusually well developed for the urbanized Front Range area. Dominant woody species are native ponderosa pine, pinon pine, juniper, skunk brush (*Rhus aromatica* subsp. *trilobata*), wild rose (*Rosa woodsii*), mountain mahogany *(Cercocarpus montanus)* and introduced Chinese elm and Russian olive. Understory species include western wheatgrass (*Pascopyron smithii*), yucca (*Yucca glauca*), prickly-pear cactus (*Opuntia macrorhiza*), snakeweed (*Gutierrezia sarothrae*), sand lily (*Leucocrinum montanum*), and yellow violet (*Viola nuttallii*). Invasive weed cover in this area is low.

3.10.1.1 Noxious Weeds

Noxious weeds are invasive, non-native plants introduced to Colorado by accident or which spread after being planted for another purpose and which result in lands with decreased economic and environmental value. The Colorado Noxious Weed Act of 2003 (35-5.5-101 through 119, C.R.S.) recognizes that, "certain undesirable plants constitute a present threat to the continued economic and environmental value of the lands of the state and if present in any area of the state must be managed." The legislation places all public and private lands in Colorado under the jurisdiction of local governments to manage noxious weeds. According to the Act, a noxious weed means an alien plant or parts of an alien plan that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board and meets one or more of the following criteria:

- Aggressively invades or is detrimental to economic crops of native plant communities.
- Is poisonous to livestock.
- Is a carrier of detrimental insects, diseases, or parasites.

- Has direct or indirect effects that are detrimental to the environmentally sound management of natural or agricultural ecosystems.

Under the Noxious Weed Act, the State of Colorado Noxious Weed lists are categorized by control priority:

- High Priority (List A): Rare noxious weeds and all county noxious weeds in dispersal conduits. High-priority species are targeted for eradication or suppression.
- Medium Priority (List B): Well-established noxious weeds with discrete statewide distributions.
- Low Priority (List C): Extensive, well-established infestations for which control is recommended but not required.

Boulder County lists 13 weed species. These plants may not be sold in Boulder County, and if present on private property must be controlled.

Study area weeds were noted in early May 2005. Much of the herbaceous vegetation cover in the study area is by non-native species although not all these species are currently listed as weeds. No weed species from the State of Colorado High Priority List (List A) were noted in the study area during weed surveys. Weed species from the Boulder County Noxious Weed List, CDOT's Top 25 List, State Medium Priority List (List B), and State Low Priority List (List C) were observed in the study area during the surveys. These weed species are listed in **Table 3-20**. A map of high and medium priority weed species locations, details on weed species, and a commitment to prevent further establishment of noxious weeds during and following project construction will be presented in the Integrated Weed Management Plan, to be completed prior to construction.

Other undesirable plants not currently listed by the State of Colorado or by CDOT but which noted as having large infestations in the study area include kochia (*Bassia sieversiana*), yellow alyssum (*Allysum alyssoides*), flixweed (*Descuriana sophia*), blue mustard (*Chorispora tenella*), and Japanese knotweed (*Reynoutria japonica*).

Table 3-20
Boulder County, CDOT, and State of Colorado Listed Weed Species Observed in the SH 7 Study Area

Common Name	Species	Boulder Co. Weed List*	CDOT Weed List**	State Noxious Weed List***
Canada thistle	*Cirsium arvense*	X	X	B
Chicory	*Cichorium intybus*			C
Common mullein	*Verbascum thapsus*			C
Downy brome	*Bromus tectorum*			C
Field bindweed	*Convolvulus arvensis*		X	C
Hoary cress	*Cardaria draba*			B
Musk thistle	*Carduus nutans*	X	X	B
Perennial sowthistle	*Sonchus arvensis*			C
Poison hemlock	*Conium maculatum*			C
Quackgrass	*Elytrigia repens*			B
Redstem filaree	*Erodium cicutarium*			B
Russian-olive	*Elaeagnus angustifolia*		X	B
Scotch thistle	*Onopordum* spp.	X	X	B

*Boulder County Web site: http://www.co.boulder.co.us/openspace/resources/weeds/weeds_noxious.htm.
**CDOT Noxious Weed Management Plan top 25 weed species to be mapped.
***Colorado Department of Agriculture Plant Industry Noxious Weeds Web site, including 2003 Revised Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act (8 CCR 1203-19), includes County lists. State management plans include the following designations: A = species to be eradicated, B = stop continued spread, and C = species left to local jurisdictions and use of integrated weed management controls supported.

3.10.2 Vegetation Impacts

No-Action Alternative
No impacts to vegetation would occur under the No-Action Alternative.

Preferred Alternative
Direct impacts to vegetation would occur from clearing, excavation and grading for the proposed improvements. It is anticipated that numerous mature trees including cottonwood, box elder, Ponderosa pine, piñon pine, Chinese elm, and Russian-olive would be removed prior to construction. There are no conservation sites or sensitive plant communities within the study area. The Preferred Alternative would impact approximately 4.3 acres of well-developed vegetation in the Hoover Hill/Legion Park area. In this area, the Preferred Alternative would require the removal of approximately 100 trees on the south side of SH 7 (adjacent to and within City of Boulder Open Space) and 10 trees on the north side of SH 7 (in Legion Park). During final design, efforts will be made to minimize impacts to existing vegetation.

3.10.2.2 Noxious Weed Impacts

No-Action Alternative

No soil disturbing activities would occur that would initiate new noxious weed infestation. Existing patches of noxious weeds would continue to exist within the highway right-of-way and would not be disturbed or made to spread. CDOT-integrated weed management would continue to be implemented along the exiting highway right-of-way.

Preferred Alternative

Soil disturbance associated with construction of the Preferred Alternative is anticipated to provide further conditions for invasion of noxious weeds. Construction would disturb areas already inhabited by weeds as well as areas that currently have very minor weed cover, such as the grass and woodland community in and adjacent to Legion Park, and result in the potential for accelerated weed infestation of a park site. Temporary work areas would also be susceptible to weed invasion.

3.10.3 Vegetation and Noxious Weed Mitigation

All CDOT revegetation BMPs and guidelines will be followed to ensure adequate revegetation of the study area. All disturbed areas will be seeded in phases throughout construction. Although specific BMPs to be used will not be determined until final design, mitigation measures are anticipated to include:

- Minimize the amount of disturbance of grading to 10 feet beyond the toe of slope. Project will follow CDOT standard specifications for amount of time that disturbed areas are allowed to be non-vegetated.
- Avoid existing trees, shrubs and vegetation, to the maximum extent possible, especially wetlands and riparian plant communities. Coordinate with CDOT landscape architect prior to construction to determine which vegetation will be protected during construction.
- Salvage weed free topsoil for use in seeding.
- Implement temporary and permanent erosion control measures to limit erosion and soil loss. Erosion control blankets will be used on steep, newly seeded slopes to control erosion and to promote the establishment of vegetation. Slopes should be roughened at all times.
- All disturbed areas will be revegetated with native grass and forb species. Seed, mulch and mulch tackifier will be applied in phases throughout construction.

- Develop acceptable revegetation plan with the CDOT Landscape Architect, City of Boulder, and Boulder County.

- A Senate Bill 40 (SB 40) Certification will be required by the Colorado Division of Wildlife for stream crossings or adjacent streambanks to avoid adverse effects to waterways and adjacent riparian vegetation. In these areas, trees and shrubs must be replaced at a 1:1 basis (trees) and square foot basis (shrubs).

Since soil disturbance with accompanying invasion by noxious weed species can be associated with highway construction, an Integrated Weed Management Plan will be incorporated into the project design and implemented during construction. Specific BMPs will be required during construction to reduce the potential for introduction and spread of noxious weed species, such as:

- Mapping will be included in the construction documents along with appropriate control methods for noxious weeds.

- Highway right-of-way areas will periodically be inspected by the City of Boulder or its consultants during construction and during post-construction weed monitoring for invasion of noxious weeds.

- Weed management measures will include removal of heavily infested topsoil, herbicide treatment of lightly infested topsoil, limiting disturbance areas, phased seeding with native species throughout the project, monitoring during and after construction, other herbicide and/or mechanical treatments.

- Use of herbicides will include selection of appropriate herbicides and timing of herbicide spraying, and use of a backpack sprayer in and adjacent to sensitive areas such as wetlands and riparian areas.

- Certified weed-free hay and/or mulch will be used in all revegetated areas.

- No fertilizers will be allowed on the project site.

- Supplemental weed control measures may be added during design and construction planning.

Preventative Control Measures for project design and construction may include:

- Native Plants: Use of native species in revegetation sites.

- Weed Free Forage Act: Materials used for the project will be inspected and regulated under the Weed Free Forage Act, Title 35, Article 27.5, CRS.

- Topsoil Management: When salvaging topsoil from on-site construction locations, the potential for spread of noxious weeds will be considered. Importing topsoil onto the project site will not be allowed.

- Equipment Management: Equipment will remain on designated roadways and stay out of weed-infested areas until the areas are treated. All equipment will be cleaned of all soil and vegetative plant parts prior to arriving on the project site.

3.11 Wildlife and Aquatic Resources

3.11.1 Wildlife Existing Conditions

Topographical maps of the study area and a data review of information pertaining to endangered, threatened, sensitive and rare wildlife and vegetative species from Colorado Division of Wildlife (CDOW), the Colorado National Heritage Program (CNHP), and US Fish and Wildlife Service (USFWS) was completed in preparation for the field survey.

Potential wildlife of the study area includes mammals (deer, raccoon, opossum, squirrels, skunk, cottontail rabbit, prairie dog), reptiles (turtles and snakes), and birds (hawk, eagle, songbirds, heron, geese, duck, and burrowing owl). State threatened, endangered, and sensitive species potentially occurring within the project, as documented by the CNHP, can be found in **Table 3-21**. Based on mapping provided by CNHP, there are two areas south of the project location that are listed as having "very high" and "high biodiversity significance".

One raptor nest has been observed within the study area. The nest is located in an isolated cottonwood tree along an irrigation ditch that crosses 75th Street about 0.25 mile north of SH 7. Active Osprey nests have been identified by NDIS mapping in an area South of Hillcrest Lake.

There are two black-tailed prairie dog colonies located near the project area. One is located on the north side of Legion Park, and the other is located south of Legion Park, south of SH 7 in some open space. Neither colony is likely to be affected by work along SH 7. Burrowing owl surveys conducted at these colonies did not find any owls. Additional burrowing owl surveys will be conducted prior to construction.

Table 3-21
State Threatened, Endangered, and Sensitive Species

Name	Listing	Occurrence Within Study Area
Ferruginous Hawk (*Buteo regalis*)	State Species of Special Concern	Not likely to occur
Northern redbelly dace (*Phoxinus eos*)	State Endangered	Not likely to occur
Townsend's big-eared bat (*Plecotus townsendii pallescens*)	State Species of Special Concern	Not likely to occur
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	State Threatened	Not likely to occur
Burrowing owl (*Athene cunicularia*)	State Threatened	Not likely to occur
Black-tailed prairie dog (*Cynomys ludovicianus*)	State Species of Special Concern	Potentially occurring

3.11.1.1 Migratory Bird Treaty Act

As stated in the Migratory Bird Treaty Act of 1918 (MBTA), and amended 1989, the take (possess, hunt, pursue, wound, shoot, kill, capture, trap, collect or attempt to do so) of a migratory bird is prohibited. Bird species not protected by the MBTA include English sparrow, European Starling, feral pigeon (also known as rock dove), and resident game birds (please see note in Section 3.11.4). The MBTA also states that it is illegal to collect, possess, and by any means transfer possession of any migratory bird nest; however, it does not contain any prohibition that applies to the destruction of a bird nest alone (without birds or eggs), provided that no possession occurs during the destruction. Statutes other than the MBTA legally protect some unoccupied nests, including nests of threatened and endangered migratory bird species, bald, and golden eagles, within certain parameters.

The principal concern for road construction projects is impacting occupied nests during the course of clearing activities. While the MBTA permits the clearing of nests that are unoccupied, with no birds or eggs, because there is no incidental take provision in the MBTA, no permit may be granted for the taking of an occupied nest unless it can be demonstrated that failure to take the occupied nest results in an immediate threat to human health and safety. Though costly, delaying the clearing of right-of-way does not typically result in an immediate threat to human health and safety.

3.11.2 Aquatic Resources Existing Conditions

The study area is located between Valmont Reservoir and Baseline Reservoir, and crosses over the East Boulder, the Enterprise and the Cottonwood irrigation ditches.

The irrigation ditches have flowing water intermittently throughout the year, and do not provide viable fish habitat. Based on CNHP inventories, the northern redbelly dace and the hornyhead chub potentially exist in the reservoirs around the study area.

3.11.3 Wildlife and Aquatic Resources Impacts

No-Action Alternative
The No-Action Alternative would result in no impacts.

Preferred Alternative
The Preferred Alternative consists of widening the current road and would generally follow the existing roadway alignment. The southern border of Legion Park and vegetated area across from Legion Park on the south side of existing SH 7 would have temporary impacts from clearing and grading for the new roadway. Removal of vegetation in these areas could impact migratory bird nesting areas and reduce habitat for mammal species. No impacts are anticipated to the black-tailed prairie dog colonies, or to burrowing owls.

3.11.4 Wildlife and Aquatic Resources Mitigation

- Disturbance to native plant communities will be minimized.
- Tree removal will be minimized.
- Erosion control techniques, such as silt fence or erosion logs, will be used to protect surrounding areas from construction related erosion.
- Noxious weeds will be spot sprayed. In locations where spot application is not practical a wildlife biologist will inspect the area prior to spraying to ensure crucial habitat is not impacted.
- Temporary erosion control blankets will have flexible natural fibers.
- Follow requirements of the Colorado Department of Transportation, outlined in the note below:

Note: The Migratory Bird Treaty Act (MBTA) protects all migratory birds, nests and eggs except English sparrow, European starling, and rock dove and resident game birds. For projects that could potentially result in the killing, taking, harassing, or harming of these birds, the following conditions must be adhered to:

Tree Trimming/Removal
Tree trimming and/or removal activities shall be completed before birds begin to nest or after the young have fledged. In Colorado most nesting and rearing activities occur between April 1st and August 31st. However, since some birds nest as early as February a nesting bird survey must be conducted by a biologist before any tree trimming or removal activities begin.

Bridge/Box Culvert Work
Bridge or box culvert work that may disturb nesting birds must be completed before birds begin to nest or after the young have fledged. No bridge or box culvert work may take place between April 1st and August 31st. If work activities are planned between these dates, nests must be removed (before nesting begins) and appropriate measures taken to assure no new nests are constructed. Failure to remove and keep nests from becoming established could postpone construction of the project.

Clearing/Grubbing Activities
Clearing and grubbing of vegetation that may disturb ground nesting birds must be completed before birds begin to nest or after the young have fledged. If work activities are planned between April 1st and August 31st, vegetation must be removed and/or trimmed to a height of six (6) inches or less prior to April 1st. Once vegetation has been removed and/or trimmed, appropriate measures (i.e. repeated mowing/trimming) must be implemented to ensure vegetation does not grow more than six (6) inches. Failure to maintain vegetation height of six (6) inches or less could provide habitat suitable for nesting birds that could postpone construction of the project.

Birds of Prey
For birds or prey that could potentially nest near the project site, please refer to the Colorado Divisions of Wildlife's "Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors" guidelines, available at Colorado Division of Wildlife district offices.

- Work activities, including the movement and placement of vehicles, shall not disturb black-tailed prairie dog colonies. If any sites are encountered, CDOT Region 4 Environmental Unit shall be notified so that all applicable clearances and permits may be obtained, including following CDOT prairie dog policy.
- Although no Burrowing owls were observed in or near the study area, they are a state threatened species and are protected under MBTA. No human encroachment or disturbance within 75 yards of a nest site shall occur from April 1 to July 31. If project activities are scheduled to take place between March 1 and October 31, a burrowing owl survey must be completed before construction activities begin. If owls are identified on or adjacent to the project, CDOT Region 4 Environmental Unit shall be notified immediately.

3.12 Threatened, Endangered or Sensitive Species

3.12.1 Threatened and Endangered Wildlife

Federally threatened and endangered species are protected under the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.). Significant adverse effects to a federally listed species or its habitat would require consultation with the USFWS under Section 7 of the ESA.

Section 7 of the ESA of 1973, as amended, requires federal agencies to ensure that actions which they authorize, fund, or carry out are not likely to jeopardize the continued existence of proposed, threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

Populations of the following federally listed threatened or endangered species potentially occur in Boulder County:

- Bald Eagle (*Haliaeetus leucocephalus*): The bald eagle was listed as endangered in 1967, in 1995 it was reclassified as threatened, and in 1999 it was proposed for removal from the U.S. Fish and Wildlife Service list of threatened and endangered species. High mortality from shooting, loss of habitat, and use of the organochlorine pesticide DDT all contributed to the population decrease. Bald Eagle habitat typically is comprised of mature trees, areas of quiet isolation, and clean waterways. The bald eagles in Colorado are often found near reservoirs or water systems with abundant fish. Although outside of the study area, Valmont Reservoir is located near the northwestern project boundary and may provide possible habitat for the Bald Eagle.

- Preble's Meadow Jumping Mouse (*Zapu hudsonius preblei)*: In May 1998 the Preble's meadow jumping mouse (PMJM) was listed as threatened in its entire range under the ESA. Currently, PMJM is being proposed for removal from the ESA because of recent research indicating that PMJM should not be classified as a separate subspecies of meadow jumping mouse. Typically, along Colorado's Front Range, PMJM inhabits relatively undisturbed riparian areas below 7,600 feet in elevation that includes dense herbaceous vegetation including grasses, thick shrubs providing cover, and forbs. No PMJM habitat will be impacted by this project.

3.12.2 Threatened and Endangered Plants

- Colorado Butterfly Plant (*Gaura neomexicana* spp. *coloradensis*): The Colorado Butterfly Plant (CBP) was listed as a threatened species under the ESA in October 2000, and is found within a small area in southeastern Wyoming, western Nebraska, and north-central Colorado. Colonies normally occur on sub-irrigated, alluvial soils often found in low depressions or along bends in wide, active, meandering stream channels just above the actual channel. No Colorado Butterfly Plant habitat will be impacted by this project.

- Ute Ladies'-Tresses Orchid (*Spiranthes diluvialis*): The Ute Ladies'-Tresses Orchid (ULTO) was listed as a threatened species under the ESA in January 1992. Typical soils inhabited by the orchid are silty loam alluvial soils associated with wetlands or floodplains of perennial streams in intermontane valleys. There were no open, wet riparian areas, or alluvial meadows located with the study area, therefore the proposed project would not have a negative affect on this species.

3.12.3 Threatened and Endangered Species Impacts

No-Action Alternative
No impacts to federally listed threatened or endangered species would occur under the No-Action Alternative.

Preferred Alternative
No direct impacts to any federally listed threatened or endangered species would be expected from the Preferred Alternative. Potential habitat for Bald Eagle could exist around the perimeter of Valmont Reservoir. Any nesting eagles near the reservoir could occasionally occur in the study area and could be slightly affected by either of the two build alternatives because of noise and disturbance during construction. Since the build alternatives would be widening an existing roadway, any resident eagles are most likely adapted to vehicular presence in the area and would not be negatively affected in the long term.

3.12.4 Threatened and Endangered Species Mitigation

Mitigation is not necessary since there will be no impacts.

3.13 Water Resources and Water Quality

Water resources are integral to vegetation, wildlife, economic development, agriculture and recreational uses. The degradation of the quality of the water in the environment has a far-reaching impact on the ecological matrix. Water resources evaluated in the EA include streams, irrigation ditches, groundwater, and floodplains.

The study area is located within the St. Vrain watershed of the South Platte River Basin. The South Platte River Basin drains 19,000 square miles in Colorado, Wyoming and Nebraska. Flow in the basin is primarily snowmelt. The region's climate is semi-arid with an average annual precipitation of 18 inches. Typical rainfall in the region is high intensity and short duration.

3.13.1 Surface and Groundwater Resources

3.13.1.1 Creeks and Surface Drainage

Stormwater runoff from the study area outflows to two creeks: South Boulder Creek and Dry Creek No. 3. South Boulder Creek crosses SH 7 500 feet west of Cherryvale Road. South Boulder Creek is a perennial stream. Dry Creek No. 3 crosses SH 7 1,000 feet east of 75th Street and is also a perennial stream. South Boulder Creek begins above Eldorado Springs, west of Rollinsville. Dry Creek No. 3 flow begins at Baseline Reservoir. Both creeks outfall to Boulder Creek with an ultimate confluence with the St.

Vrain Creek east of Longmont. Water flow in the creeks tends to be at a minimum in the winter and a maximum in early summer. Both creeks have been modified by municipal, industrial, and agricultural uses.

There are three major drainage basins located along the SH 7 project limits. One basin drains on the north side of SH 7 from a ridge-line (high point) located approximately 500 feet east of Westview Drive to the 75th Street intersection. Another basin drains from the same high point, but on the south side of SH 7 to the 75th Street intersection. Both of these basins are tributary to Dry Creek No. 3. The third major basin includes the south side of SH 7 and is located from the high point east of Westview Drive to the Cherryvale Road intersection. This basin is ultimately tributary to South Boulder Creek, located just west of the Cherryvale Road intersection. On the north side of SH 7 from the high point to Westview Drive, the land drains away from the roadway.

3.13.1.2 Irrigation Ditches

There are three irrigation ditch crossings located within the study area. These ditches serve agricultural uses.

- Cottonwood Ditch No. 2 crosses SH 7 east of the existing railroad bridge in a siphon pipe. The ditch also crosses the BNSF railroad south of SH 7. The primary ditch flow is from April to September.
- Enterprise Ditch crosses SH 7 just west of Westview Drive. The ditch also crosses the BNSF railroad alignment north of SH 7 in a siphon pipe.
- East Boulder Ditch crosses SH 7 east of 63rd Street. The base flow in East Boulder Ditch is approximately 30 cubic feet per second (cfs), but currently a large portion of the storm water from SH 7 enters East Boulder Ditch.

3.13.2 Groundwater

The Colorado Division of Water Resources maintains a database of Colorado wells, applications, and permits. According to the database, water levels and well depths in the study area range between 12 and 460 feet. The study area falls within the "complex" region of the mapped aquifer.

There is evidence of possible high groundwater in the vicinity of the railroad overpass. The water would be captured and directed to the storm sewer system that is being constructed as part of the 75th Street intersection improvements.

3.13.3 Water Quality

The Clean Water Act (CWA) was established in 1972 to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." It controls most surface water quality requirements in the United States.

Section 303 (d) requires that states submit to the EPA waters within the state where applicable water quality standards have not yet been attained. These streams are considered impaired. South Boulder Creek and Dry Creek No. 3 are not listed on Colorado's 303(d) list. However, Boulder Creek, which both creeks outfall to is listed for e. coli impairment upstream of the South Boulder Creek outfall. Boulder Creek also has e. coli impairment downstream of the South Boulder Creek entrance between Coal Creek and Saint Vrain Creek. Both segments are considered a high priority to improve water quality in relation to other impaired streams in the area.

The CDPHE Water Quality Control Division (WQCD) establishes standards for selected stream segments in Colorado.

South Boulder Creek is classified as:

- Aquatic Life Warm 1
- Recreation 1a
- Water Supply
- Agriculture

Dry Creek No. 3 is classified as:

- Aquatic Life Warm 2
- Recreation 1a
- Water Supply
- Agriculture

These classifications require a minimum dissolved oxygen level of 5.0 mg/l, a pH of 6.5 to 9.0, a fecal coli bacteria less than 200 counts per 100 ml, and an escherichia coli less than 126 counts per 100 ml.

Under Section 402 of the Clean Water Act, a National Pollution Discharge Elimination System (NPDES) permit for point discharge and stormwater is required if a proposed project impacts more than a specific size of land. Under the NPDES and Colorado regulations, a Colorado Pollution Discharge System (CPDS) permit is required if one or more acres of land disturbance is anticipated on a construction project, or if the project is part of a larger plan. Since the Preferred Alternative disturbs more than one acre, a CPDS permit is required for stormwater discharge associated with construction activities.

3.13.4 Water Resource Impacts

No-Action
The No-Action Alternative would result in no new direct impacts to water resources.

Preferred Alternative
The Preferred Alternative would add curb and gutter with a storm sewer system between Cherryvale Road and Westview Drive and between the BNSF railroad crossing and 75th Street. The addition of impervious area and a storm sewer system would cause the storm flows to reach the outfalls more rapidly and with more concentrated flows. Increased impervious area would result in larger quantities of sediment and pollutants to enter in the surrounding surface waters. From the crest of the hill to the west, stormwater would be captured in a storm sewer system that would outfall into South Boulder Creek. From the crest of the hill to the east, stormwater would flow in roadside ditches to the BNSF railroad crossing. It would then be captured in a storm sewer system being constructed as part of the SH 7 and 75th Street intersection improvements (a No-Action programmed improvement) and outfalls into Dry Creek No. 3.

Temporary impacts to water resources during construction are also expected. The primary pollutant carried from a construction site is sediment or total suspended solids (TSS). Erosion is prevalent when the surface vegetation is disturbed as is required for roadway widening side slope construction.

The Preferred Alternative would result in an increased impervious surface area from an existing 11 acres with the No-Action Alternative to approximately 20 acres.

3.13.5 Water Resource Mitigation

For the high groundwater in the proximity of the railroad overpass, the design will accommodate this groundwater and direct it to the storm drainage system.

This project commits to following CDOT's Erosion Control and Stormwater Quality Guide, sections 107.25 & 208 of the specifications for the Standard Specifications for Road and Bridge Construction and the Stormwater Management Plan. CDOT follows The Municipal Separate Storm Sewer System (MS4) requirements for water quality. These requirements will be followed on this project by the process outlined in Appendix I of the CDOT Drainage Design Manual.

A Stormwater Management Plan (SWMP) will be completed during final design. It will address specific methods of reducing pollutants in stormwater runoff during construction. Stormwater BMPs for a site during construction would consist of five major elements:

- Implementation of BMPs for erosion control. These include, but are not limited to, phased seeding with mulch and tackifier, the use of erosion control blankets, the use of embankment protectors, the use of berm diversions or check dams, and outlet protection for storm sewer pipes.

- Implementation of BMPs for sediment control. These include, but are not limited to, erosion bales or logs, silt fence, storm drain inlet and outlet protection, sediment traps, concrete washout and saw water containment basins, and stabilized construction entrances.

- Implementation of BMPs for materials handling and spill prevention. These include, but are not limited to, stockpile management, material management, material use, and spill prevention and control.

- Implementation of BMPs for waste management. These include, but are not limited to, concrete, hazardous, and contaminated waste management to ensure that solid or liquid wastes are not carried off the site by stormwater.

- Implementation of BMPs for pollution prevention. These include treatment during dewatering and paving operations. It also includes the use of street sweeping and temporary waterway crossings.

Permanent BMPs will be designed to protect stormwater quality and reduce pollutant discharges after construction is complete. The permanent BMPs are developed with the intention of mitigating the potential impacts typical of a roadway corridor. These can include petroleum or other vehicle fluids, hazardous spills, sand or other snow melting chemicals, and litter. General BMPs for this project will include the vegetation of all disturbed areas with erosion control blankets on slopes 3:1 or steeper. In addition to maintaining BMPs installed on the project, maintenance activities after construction will include consistent roadway sweeping and removal of sediment from storm inlets and basins.

The EA evaluated a wide range of Best Management Practices (BMPs) for the use on SH7. The following outlines the process for choosing the appropriate BMPs that should be incorporated for the project. During final design, a determination will be made of exact methods and locations of stormwater management during construction and will be outlined in the SWMP.

Sensitive Waters Evaluation

SH 7 improvements will fall under a "Tier 1" Best Management Practice (BMP) Management Level. Tier 1 of CDOT's BMP Management Levels is the most restrictive and requires maximum design criteria. In order to meet CDOT MS4 permit requirements, the SH 7 project needs to provide 100 percent water quality capture

volume (WQCV) for a BMP or remove 80 percent of the average annual TSS. The WQCV, as defined by CDOT, includes the first 0.5-inch of runoff from all impervious surfaces.

Physical Design Constraints

The physical design constraints for the project area include the following:

- Topography-Steep slopes occur in the central portion of the project eliminating the feasibility of some BMPs
- 4(f)-4(f) properties adjacent to the roadway eliminate possible locations for BMPs
- ROW- Development adjacent to the roadway on both the east and west end of the project constrain the possible locations for BMPs

Adjacent Land Owner Concerns

Coordination with the water quality requirements for Boulder County and the City of Boulder has occurred. By meeting CDOT MS4 requirements, the project will also comply with water quality requirements for both municipalities. Coordination will continue with these local agencies during final design to ensure compliance with local requirements.

Maintenance Considerations

CDOT Region 4 has committed to maintaining the permanent BMPs installed on the project. Close coordination will occur with maintenance personnel during the final design stages.

The EA evaluated the feasibility of all acceptable BMPs including those listed in **Table 3-22** (western portion of the project tributary to South Boulder Creek) and **Table 3-23** (eastern portion of the project tributary to Dry Creek No. 3).

Table 3-22
Permanent BMP's Applicability for West of Project Highpoint

BMP	Applicable to this reach of Project?	Comments
Infiltration Trench	No	Right-of-way constraints due to commercial properties
Infiltration Basin	No	Right-of-way constraints due to commercial properties
Bioretention	Yes	
Extended Detention Basin/Detention Pond	Yes	
Wetlands	Yes	
Underground Filters	Yes	Would require multiple structures due to size of basin
Surface Sand Filters	Yes	

continued

Table 3-22 (cont'd.)
Permanent BMPs Applicability for West of Project Highpoint

BMP	Applicable to this reach of Project?	Comments
Organic Medial Filters	No	Right-of-way constraints due to commercial properties
Vegetated Swales	No	Right-of-way constraints due to commercial properties
Vegetated Filter Strips	No	Right-of-way constraints due to commercial properties
Oil-Grit Separators	Yes	Would require multiple structures due to size of basin
Catch Basin Inserts	Yes	Would require multiple inserts due to number of inlets
Manufactured Systems	Yes	Would require multiple structures due to size of basin
Porous Pavement	No	Not appropriate for large traffic volumes

Table 3-23
Permanent BMP's Applicability for East of Project Highpoint

BMP	Applicable to this reach of Project?	Comments
Infiltration Trench	No	Topographic constraints (large grade changes)
Infiltration Basin	No	Topographic constraints (large grade changes)
Bioretention	No	Topographic constraints (large grade changes)
Extended Detention Basin/Detention Pond	No	Topographic constraints (large grade changes)
Wetlands	No	Topographic constraints (large grade changes)
Underground Filters	No	Topographic constraints (large grade changes)
Surface Sand Filters	No	Topographic constraints (large grade changes)
Organic Medial Filters	No	Topographic constraints (large grade changes)
Vegetated Swales	Yes	
Vegetated Filter Strips	No	Swale adjacent to roadway, no room for veg. strip
Oil-Grit Separators	Yes	
Catch Basin Inserts	Yes	
Manufactured Systems	No	Topographic constraints (large grade changes)
Porous Pavement	No	Not appropriate for large traffic volumes

Based upon the above outlined evaluation, the following are site-specific BMPs proved a well-reasoned approach to water quality. During final design, contingent upon right-of-way being available, the following site-specific BMPs will be refined and incorporate into the project.

- **East of the Project Highpoint**: Roadway runoff to the east of the highpoint on the project will be collected in roadside ditches before the outfall to Dry Creek No. 3. The length of ditches will allow pollutants to settle out or become trapped in the vegetation of the ditch before entering the storm sewer system that begins near the BNSF railroad bridge. Channel stabilization in this area will be required

and will include small check dams and erosion control blankets or mats. Manufactured Systems will also be considered to capture additional sediment and pollutant. Since vegetated swales alone do not provide CDOT MS4 requirements.

- **West of the Project Highpoint**: To the west of the highpoint on the project, roadway storm drainage outfalls to South Boulder Creek. Riprap stabilization will be required at the storm sewer outfall at South Boulder Creek. Roadway drainage will collect in roadside ditches in the rural section without curb and gutter east of Westview Drive. West of Westview Drive, roadway runoff will collect in the curb and gutter and enter the proposed storm sewer system. The best option for the basin's tributary to South Boulder Creek (west side of hill) would be to construct water quality ponds. As a part of this EA, feasible locations for the water quality ponds were evaluated. It was determined that two smaller water quality ponds would meet capture volume requirements. These ponds are shown in **Figure 3-11**. One pond with a volume of 1.8 acre-feet could be located on the northwest corner of 63rd Street and SH 7 in front of Naropa University. This pond would utilize existing right-of-way and also require the purchase of right-of-way from Naropa University. The second pond with a volume of 0.4 acre-feet could be located on Cherryvale Commons LTD property on the southeast corner of Cherryvale and SH 7. This pond would also require the purchase of private right-of-way. The areas for both ponds are currently undeveloped.

The discussions above of temporary and permanent BMPs are conceptual. During final design, a determination will be made of exact methods and locations of stormwater management during construction and will be outlined in the SWMP. For permanent BMPs during final design other locations for water quality ponds may be evaluated based on changes in land use and any additional constraints before final design stages. If it is determined that a water quality pond is not feasible, other BMPs will be evaluated.

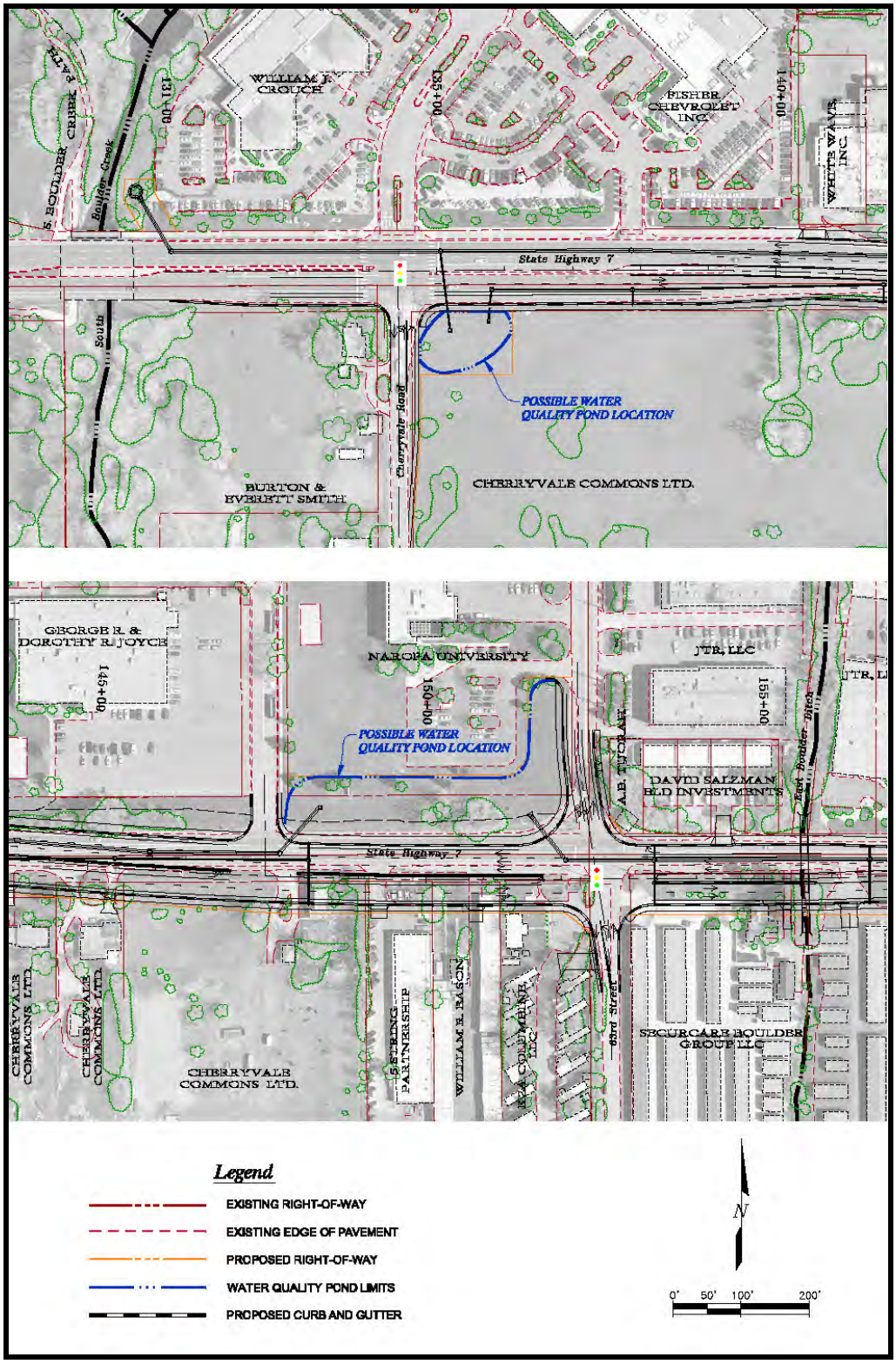
Through the implementation of the temporary and permanent BMPs discussed above, impacts to water resources caused by the Preferred Alternative should be minimal.

3.14 Wild and Scenic Rivers

3.14.1 Existing Conditions

There are currently no rivers near the study area designated or being studied for inclusion in the Wild and Scenic Rivers System.

Figure 3-11
Possible Water Quality Pond Locations



3.15 Floodplains

3.15.1 Existing Conditions

There are two major channels located within the study area that have floodplain delineations on Federal Emergency Management (FEMA) Flood Insurance Rate Maps (FIRM) for Boulder County, Colorado and Incorporated Areas. South Boulder Creek is located just west of Cherryvale Road and is mapped in Panel 415 of 595 on map No. 08013CO415F, Effective Date June 2, 1995. Floodplain changes were completed as part of an 11/01/95 Letter of Map Revision issued by FEMA. Dry Creek No. 3 is located approximately 1,000 feet east of 75th Street and is mapped in map No. 08013CO420F in Panel 420 of 595 on map No. 08013CO420F, Effective Date June 2, 1995.

3.15.2 Floodplains Impacts

No-Action
The No-Action Alternative would have no direct or indirect impact to floodplains.

Preferred Alternative
The storm sewer outfall pipe into South Boulder Creek falls within the floodplain. The proposed 54-inch concrete pipe would outfall to a tail-water basin. There would be no additional fill required for the improvements; therefore, the floodplain would not be adversely impacted. All remaining improvements are outside the mapped floodplains.

3.15.3 Floodplains Mitigation

Since the improvements within the floodplain would not cause a rise in the floodplain, no mitigation measures are required for floodplains. A floodplain development permit from Boulder County would be required since work is taking place in the floodplain. This permit would be obtained during the final design of the project.

3.16 Geology

3.16.1 Existing Conditions

Based on document review and field reconnaissance, the site is underlain by Cretaceous and Tertiary sedimentary bedrock units. Thinner units (less than 25 feet thick) of Quaternary stream and windblown deposits also are exposed at the surface in the study area. Each geologic unit is briefly described as follows:

- The west extent of the study area (Cherryvale Road to just west of 63rd Street) is underlain by Broadway Alluvium, a humic clayey silt and sand with sections of cobbly pebble gravel.

- Between 63rd Street and the crest of the hill (to approximately 500 feet west of the Legion Park entrance), SH 7 is underlain by Pierre Shale, which can be up to 8,000 feet thick and consists of an olive-gray shale and interbedded brown fine-grained sandstone layers. Pierre Shale can have low permeability and locally high swelling potential.

- In the vicinity of the Legion Park entrance, Foxhills Sandstone, a fine- to medium-grained crossbedded sandstone, underlies the highway.

- In the vicinity of the Valtec Lane, Eolian Sand and Silt, a wind-deposited medium sand and silt is prevalent. This deposit may contain some loose, unconsolidated zones that are prone to settlement and hydrocompaction when water saturates the deposit.

- From just west of the BNSF railroad overpass to approximately 800 feet west of 75th Street, alluvial deposits (Slocum Alluvium and Colluvium) consisting of course gravels that are deeply altered by weathering are present.

- The east extent of the study area (800 feet west of 75th Street to the eastern extent of the study area) is underlain by the Louviers Alluvium, a pebbly to bouldery alluvium.

According to the Global Seismic Hazard Map, the study area falls in the low hazard zone with 0.2 m/s^2 peak ground acceleration during the next 50 years with 10 percent probability. However, a potentially active fault has been mapped approximately one mile north of SH 7. The Class B Valmont Fault runs east-west near the Valmont Reservoir and is exposed in a road cut on North 75th Street.

3.16.2 Geology Impacts

No-Action
There would be no geology impacts associated with the No-Action Alternative.

Preferred Alternative
No signs of major slope instability were observed. Natural hillsides in the area appear to have a stable geologic history. Construction activity in the vicinity of the Pierre Shale (between 63rd Street and the crest of the hill) may require slope stabilization when large cuts are made. These Pierre Shales can also exhibit expansion potential when exposed to moisture.

3.16.3 Geology Mitigation

The final design stages of the project will include a detailed geotechnical and pavement design to provide structural integrity of the roadway for the geological conditions. Bridge foundations, retaining walls and culvert structures will be designed based on specific geologic conditions. Deep foundations will be considered based upon the presence of potentially swelling or collapsible soils. Some locations east of Legion Park where sandstone and alluvial sands are present may allow structures founded on spread footings.

The improvements will be designed to meet the seismic requirements for the area. Therefore, seismic events typical of the region will not affect the project.

3.17 Historic Preservation

Section 106 of the National Historic Preservation Act, as amended, and implementing regulations found at 36 CFR Part 800, require that federal agencies take into consideration any effect a proposed action may have on historic properties. This is generally accomplished through the Section 106 compliance process, which consists of the following steps:

- Identify consulting parties.
- Identify and evaluate historic properties located within the Area of Potential Effect established for an undertaking.
- Assess adverse effects to properties listed on, or eligible for listing on, the National Register of Historic Places (NRHP).
- Consult with the State Historic Preservation Officer (SHPO) and, as appropriate, the Advisory Council on Historic Preservation (ACHP) and other interested parties to resolve adverse effects.

There are four main criteria used to determine if a property is eligible for inclusion on the NRHP. A property is considered eligible if it meets one or more of those criteria, which are listed below:

- **Criterion A:** Associated with events that have made a significant contribution to the broad pattern of our history.
- **Criterion B:** Associated with the lives of persons significant in our past.
- **Criterion C:** Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or that possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.

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

3.17.1 Native American Consultation

Section 106 of the National Historic Preservation Act (as amended) and the Advisory Council on Historic Preservation regulations [36 CFR 800.2(c)(2)(ii)] mandate that federal agencies coordinate with interested Native American tribes in the planning process for federal undertakings. Consultation with a Native American tribe recognizes the government-to-government relationship between the United States government and sovereign tribal groups. Federal agencies must be sensitive to the fact that historic properties of religious and cultural significance to one or more tribes may be located on ancestral, aboriginal, or ceded lands beyond modern reservation boundaries. Consulting tribes are offered the opportunity to identify concerns about cultural resources and comment on how the project might affect them. If it is found that the project will impact cultural resources that are eligible for inclusion on the National Register of Historic Places and are of religious or cultural significance to one or more consulting tribes, their role in the consultation process may also include participation in resolving how best to avoid, minimize, or mitigate those impacts. By describing the proposed undertaking and the nature of any known cultural sites, and consulting with the interested Native American community, CDOT and FHWA strive to effectively protect areas important to Native American people.

In August 2004, FHWA contacted 15 federally recognized tribes with an established interest in Boulder County, Colorado, and invited them to participate as consulting parties:

- Ute Mountain Ute Tribe (Colorado)
- Southern Ute Indian Tribe (Colorado)
- Ute Tribe of the Uintah and Ouray Agency ("Northern" Ute) (Utah)
- White Mesa Ute Tribe (Utah)
- Cheyenne River Sioux Tribe (South Dakota)
- Crow Creek Sioux Tribe (South Dakota)
- Oglala Sioux Tribe (South Dakota)
- Rosebud Sioux Tribe (South Dakota)
- Standing Rock Sioux Tribe (North Dakota)
- Cheyenne and Arapaho Tribes of Oklahoma (two tribes administered by a unified tribal government)
- Pawnee Nation of Oklahoma
- Comanche Nation of Oklahoma
- Kiowa Tribe of Oklahoma
- Northern Arapaho Tribe (Wyoming)

- Northern Cheyenne Tribe (Montana)

The Southern Ute Indian Tribe responded to the invitation, expressing the desire to be a consulting party for the project (**Appendix G**). None of the remaining tribes conveyed an interest in the undertaking to either FHWA or CDOT. The Southern Ute Tribe requested notification in the event Native American artifacts and/or human remains are exposed during construction, but did not otherwise raise specific issues of concern in the context of known places of religious or cultural significance.

The Southern Ute Indian Tribe has continued to receive information about the project as it became available, and every opportunity was taken to involve them in the NEPA planning and project development process. In so doing, FHWA and CDOT fulfilled their legal obligations for tribal consultation under federal law.

3.17.2 Archaeological Properties

A search of the study area and project files housed at the Office of Archaeology and Historic Preservation (OAHP), Denver, and at the CDOT Archaeological Unit revealed that portions of the study area were previously surveyed, but no archaeological resources had been documented within or near the Area of Potential Effect (APE). The APE included the SH 7 right-of-way corridor between the project termini, in addition to a narrow segment of adjacent property to the north and south. Segments of 63rd and 75th Streets, as well as a long segment of the rail corridor, were also included in the APE. A pedestrian survey of the APE by a CDOT archaeologist resulted in the documentation of three historic archaeological resources, none of which were determined eligible for listing on NRHP. Correspondence with the SHPO regarding these determinations is located in Appendix G.

3.17.3 Historic Properties

Historic Resources were evaluated for the defined APE. Activities undertaken to identify historic resources in the APE included a file search at the Colorado Office of Archaeology and Historic Preservation, a review of the NRHP and State Register of Historic Places (SRHP) listings, a review of the information on historic properties from Boulder County staff, and a review of previous historical resource assessments in the general area. In addition, a field assessment was conducted to assess potential historic properties in the study area.

There are seven properties in the area of potential effects that are identified as eligible for or listed on NRHP. **Table 3-24** and accompanying details describe the eligible properties.

Section 106 consultation on eligibility and effect of the historic resources took place in March 2002, March 2005, and August 2005. Copies of those letters are located in **Appendix G**.

Table 3-24
Historic Properties in the SH 7 Area of Potential Effects

Historic Properties	Site #	SHPO Determination of Eligibility for NRHP
Butler/Smith Property	5BL8917	Eligible
Gas Station and Small House	5BL9021	Eligible
The Harburg House, Barn and Gazebo	5BL9024	Eligible
DeBacker-Tenenbaum House	5BL9029	Eligible
Colorado and Southern Railroad- Burlington Northern Railroad	5BL400.5	Railroad segment eligible; bridge not eligible and non-contributing
Cottonwood Ditch #2	5BL4488.2 and 5BL4488.3	Eligible
Enterprise Ditch	5BL4164.2 and 5BL4164.4	Entire ditch eligible; segments in study area have low degree of integrity

Source: Colorado Historical Society, State Historic Preservation Office, 2002.

3.17.3.1 Description of Historic Properties

Butler/Smith Property

Site #5BL8917 is the only property in the study area with a 19th Century house and barn. It is an excellent example of a 1880s farmhouse with clapboard siding and a Victorian front porch. This house meets Criterion C for a type, period, and method of construction. This is the earliest surviving house in this area of SH 7.

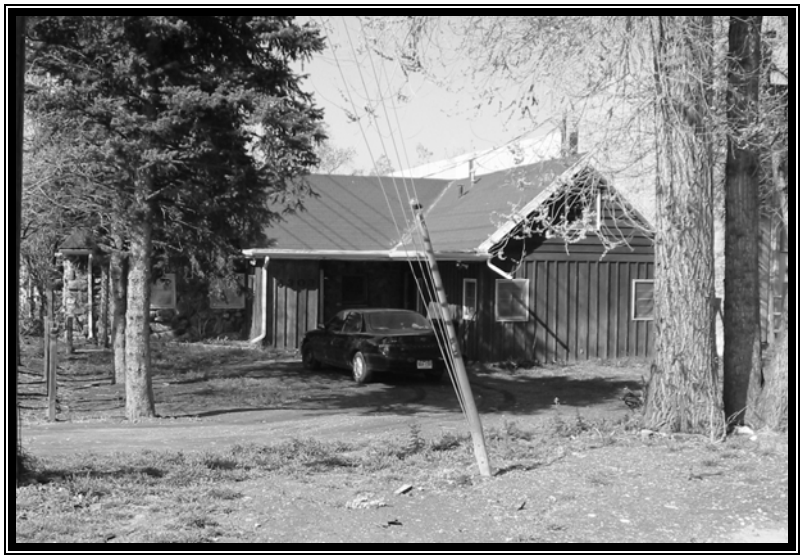
Butler/Smith House (barn)
1599 Cherryvale Road

Butler/Smith House (rear)
1599 Cherryvale Road

Gas Station and Small House

Site #5BL9021 meets Criterion C for its characteristics as a 1920s Craftsman style gas station in rural Boulder County. The combination of cinder block sheathed in wood siding is somewhat rare, as are early gas stations of any style.

Gas Station
6301-6303 Arapahoe Road

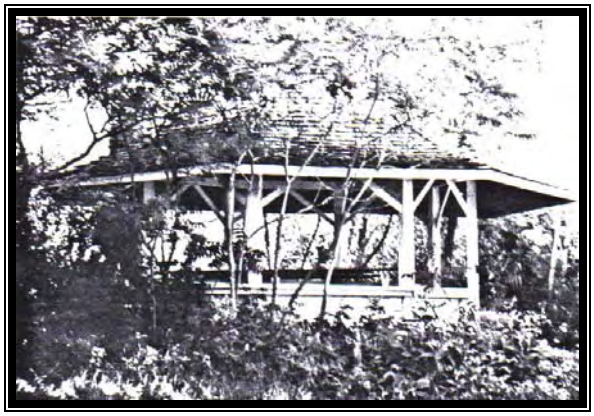


House (south side)
6301-6303 Arapahoe Road

The Harburg House, Barn and Gazebo

Site #5BL9024 is a complex of buildings that meets Criterion C for architectural significance relating to a 1930s rural complex in the Boulder Valley. The house and gazebo are excellent examples of Craftsman style. The property also meets Criterion A as one of the important farms and for its association with the history of the area and its agricultural development from the 1880s.

The Harburg House
6775 Arapahoe Road



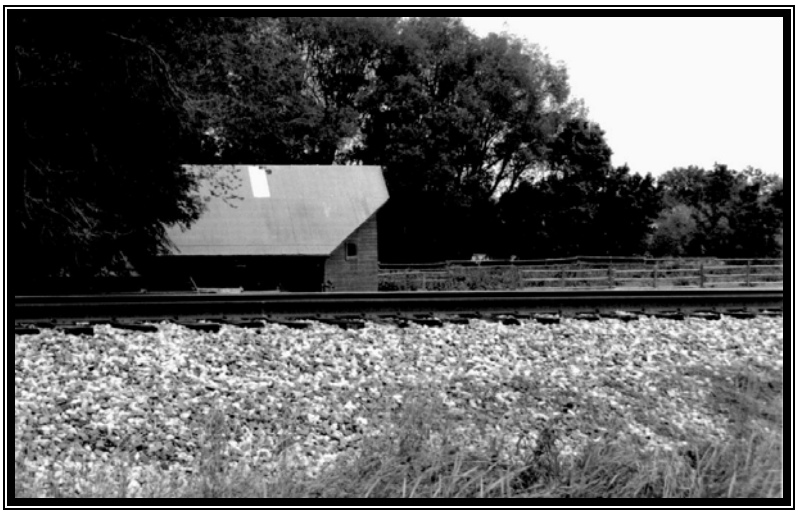
Harburg Gazebo
6775 Arapahoe Road

Harburg Barn
6775 Arapahoe Road

DeBacker-Tenenbaum House

Site #5BL9029 contains the distinctive characteristics of a type, period, and method of construction seen in the original house and older out buildings and meets Criterion C. The house, built in 1913 by a member of the DeBacker family, is notable for the fine decorative brickwork and wood shingle siding. In addition, the landscaping consists of the original 1913 plantings on the property that have grown into outstanding specimens not commonly seen. This building complex is one of the few intact farm properties in the survey area that retains its rural setting and represents the former rural agricultural nature of the area. According to the site form, the original landscaping is part of what makes the property significant.

DeBacker-Tenenbaum House
(yard and house looking east)
7280 Arapahoe Road

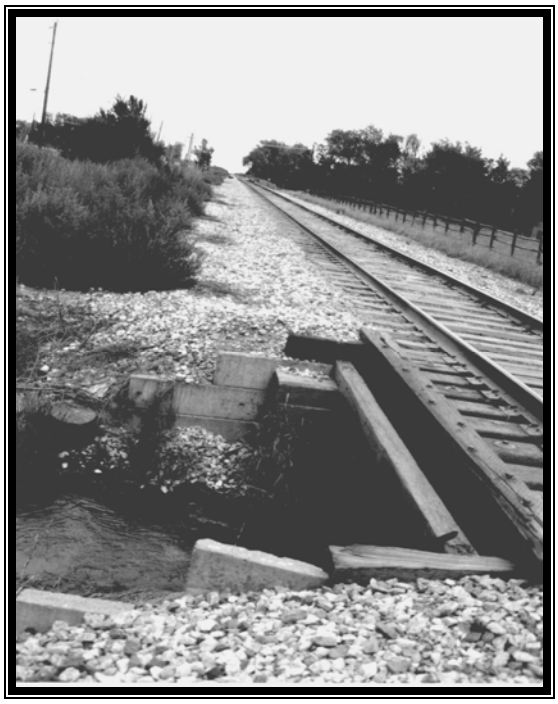


Barn looking east

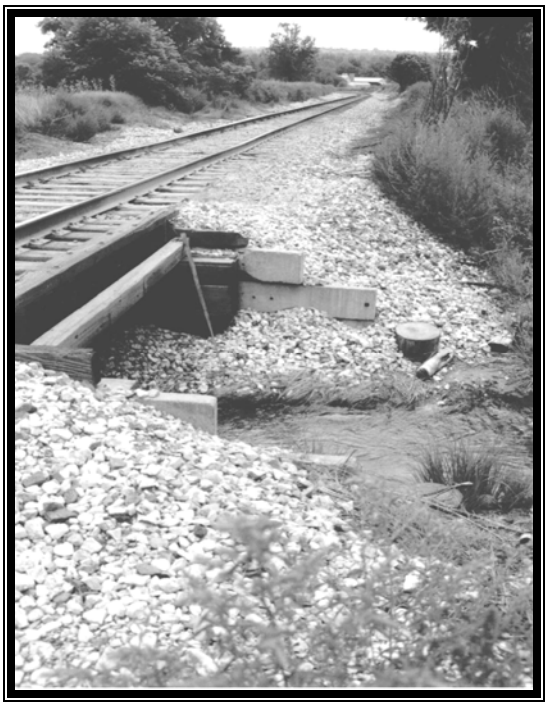
Colorado and Southern Railroad-Burlington Northern Railroad

Site #5BL400.5 played a significant role in the development of Boulder County and meets Criterion A. This railroad line served to transport freight in the 19th century and both freight and passengers in the early part of the 20th century. The segment in the current area of potential effects meets Criterion C because it retains integrity of setting, design, location, feeling and association. The bridge over SH 7 (1931) was determined not eligible during the most recent CDOT bridge survey because its technology is not significant—steel stringer bridges are the most common bridge type in Colorado.

View to North



View to South



Colorado & Southern-Burlington Northern Railroad crossing over Cottonwood Ditch southwest of DeBacker-Tenenbaum property

Cottonwood Ditch #2

Site #5BL4488 meets Criterion A for its importance in the agricultural history of the development in this area of Boulder County. This ditch was begun in 1863 Segments 5BL4488.2 and 5Bl4488.3 still retains integrity of design, setting, feeling and association. The ditch still flows past farms in a rural setting that has not been redeveloped. It may also be eligible for local landmark designation.

Cottonwood Ditch #2
north side of Arapahoe Road

Cottonwood Ditch #2
south side of Arapahoe Road

Enterprise Ditch

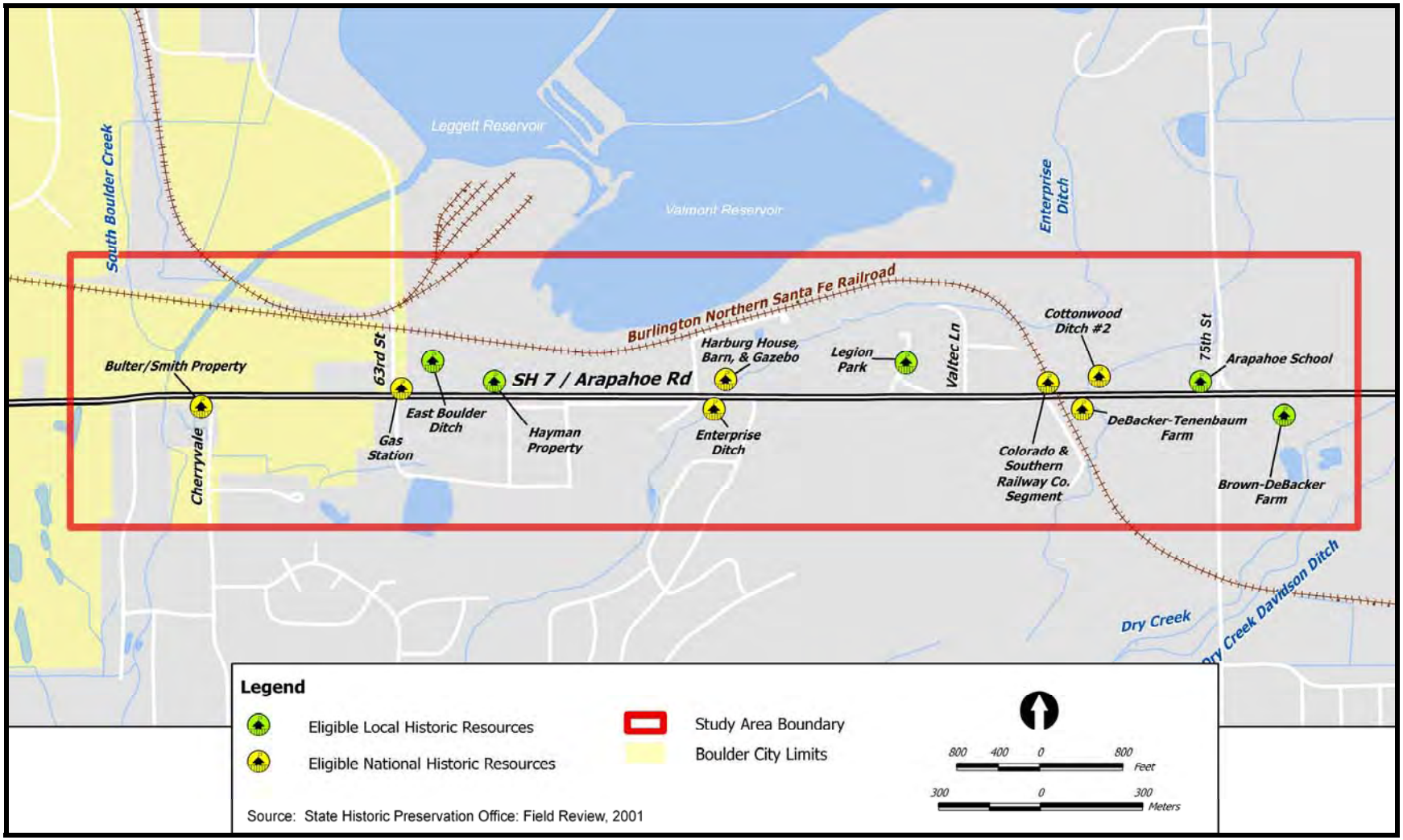
Site 5BL4164 is eligible under National Register Criterion A. The ditch is very important in the agricultural development of Boulder County, but segments of it have lost historical integrity due to recent residential and commercial development. There are two segments of the ditch that are located in the project area. Segment 5BL4164.2 is located at SH 7 just west of Westview Drive. Segment 5BL4164.4 is a 1000-foot segment that extends north of SH 7 and crosses under the railroad in a siphon.

Enterprise Ditch

Enterprise Ditch

These findings described above were submitted to the SHPO; concurrence was provided in correspondence dated March 29, 2005 and August 15, 2005. See **Figure 3-12** for the location of all historic properties.

Figure 3-12
Historic Resources



In addition to the seven NRHP qualifying parcels, there are five properties determined eligible for the State Register or local designation. These parcels do not qualify as historic resources under NEPA guidance and therefore will not be analyzed for impacts. However, a brief description of the state or locally registered properties is provided below:

- **Arapahoe Elementary School (5BL409):** State and locally eligible property. School building does not meet the NRHP criteria because of additions, but appears to meet criterion for listing in State Register and/or as a Local Landmark for its association with rural Boulder County architecture and history. The addition on the north rear is sensitively done and is attached to the west side by a glassed walkway. The front and east sides of the original building are still visible.

- **Brown-DeBacker Farm (5BL5712):** Locally eligible for historical value. The Brown-DeBacker Farm is important in the history of agriculture in Boulder County, but has lost integrity through alterations. It is also important for its association with the DeBacker family.

- **East Boulder Ditch (5BL4163.2):** Locally eligible for historical value. This ditch may qualify as a county landmark for its importance in agricultural history. However, the ditch has lost integrity of original agricultural setting, feeling, and association. Recent residential and commercial development has impacted the agricultural "feel" of the ditch.

- **Hayman Bungalow (5BL9022):** Locally eligible for it unique method of construction. However, the house was demolished in August 2004.

- **Goodview Hill- Veteran's Memorial (5BL516) in Legion Park:** State and locally eligible for historical value. This site is important to the history of Boulder County and is associated with the pioneer settlement in the county. The site also has good examples of C.C.C. rock wall construction.

3.17.4 Paleontological Resources

On September 29, 2004, a paleontological field survey was conducted by a CDOT paleontologist along SH 7 between Cherryvale Road and North 75th Street. The APE for paleontological resources extends from MP 54.6 to MP 57.0, with a 1,312-foot buffer to the north and south of the right-of-way.

Within the study area, bedrock and surficial deposits outcrops are largely covered by artificial fill, roads, buildings, and vegetation. These outcrops are primarily exposed at the surface on Hoover Hill, especially in Goodview/Legion Park. The exposures and

many anthills associated with them were examined for fossils. Information about fossil localities and paleontological resources from the geologic units cropping out within and near the study area was gathered from existing publications and fossil locality databases at the University of Colorado and the Denver Museum of Nature and Science.

No fossils were found in bedrock or surficial deposits exposures or associated anthills within the study area. No fossil localities from within the study area are recorded in either the University of Colorado Museum or Denver Museum of Nature and Science databases. The Upper Pierre Shale transition member is known to contain *Baculites clinolobatus* in its lower part and rare *Sphenodiscus* (*Coahuilites*) spp. in the upper shale in other areas. The Fox Hills Sandstone can contain rare marine mollusk shells, and the trace fossil *Ophiomorpha*. The Louviers Alluvium, the Broadway Alluvium, and unnamed colluvium (slopewash) and eolian (windblown) deposits all can contain vertebrate fossils in the region, but none are known from within the study area.

3.17.5 Historical Preservation Impacts

3.17.5.1 Archaeological Properties Impacts

There are no NRHP eligible archaeological properties that would be impacted by the build alternatives.

3.17.5.2 Historic Properties Impacts

No-Action Alternative
There would be no direct impacts to any of the historic properties with the No-Action Alternative.

Preferred Alternative
Roadway improvements have been planned in order to avoid permanent adverse impacts to the NRHP eligible sites with the exception of the Cottonwood Ditch and a segment of the BNSF railroad. **Table 3-25** describes different impacts to each site.

3.17.5.3 Paleontological Resources Impacts

No fossils are known to occur in the SH 7 study area, though fossils are known from the same geologic units elsewhere in the Denver-Boulder region. As a result, no impacts can be predicted.

Table 3-25
Summary of Effects to National Register Eligible Properties

Site No.	Name and Address	Impacts
5BL8917	Butler-Smith Property (1880) 1599 Cherryvale Road	SH 7 would be widened in front of the Butler-Smith House and additional vegetation would be removed in the right-of-way between the road and the house. All improvements would stay within existing roadway right-of-way. There would be no direct impact to the house or the barn and no impact to the qualities that made this property significant. Very small temporary easement for construction of curb return may be required. As determined by CDOT and FHWA, the improvements to SH 7 would have no affect to the historic structures on this property. The temporary easement for construction would constitute no adverse effect to the property as a whole as concurred by SHPO.
5BL9021	Gas Station (1920) and House 6307 (6301) Arapahoe Road	When SH 7 is reconstructed, the corner of this property, which is currently paved and used as roadway, would continue to be used as a roadway. In consultation with SHPO, it was determined that the corner of the property does not contribute to the significance of the property. All other improvements to SH 7 would occur to the south. Curb cut from 63rd would be installed on existing roadway right-of-way. Temporary easement for construction would be required to construct private access on private property. Tree removal may be required for access construction. As determined by CDOT and FHWA, the improvements to SH 7 would have no affect to the historic structures on this property. The temporary easement for construction would constitute no adverse effect to the property as a whole as concurred by SHPO.
5BL9024	Harburg House w/Barn & Gazebo (1930) 6775 Arapahoe Road	When SH 7 is widened some of the vegetation in the CDOT right-of-way would be removed, but would have no impact on the setting or direct impact on the Harburg property. Constructing two private driveways to match proposed improvements would require a temporary easement for the Preferred Alternative and may require some limited vegetation removal. Public road on the west side of the Harburg property would require reconstruction and may require a temporary easement. If headwall and wingwalls of Enterprise Ditch outlet are replaced in current location, this construction may be on Harburg property. As determined by CDOT and FHWA, the improvements to SH 7 would have no affect to the historic structures on this property. The temporary easement for construction would constitute no adverse effect to the property as a whole as concurred by SHPO.
5BL9029	DeBacker-Tenenbaum House (1913) 7280 Arapahoe Road	When SH 7 is widened a retaining wall may be constructed along a portion of the roadway right-of-way, north of the DeBacker-Tenebaum property, but would not have a direct impact to the landscaped setting or the buildings. The BNSF railroad would be temporarily realigned to be east of the existing location, but there would be no direct impact to the landscaped setting or the buildings. There will be temporary fill slope impacts within this historic property. The ultimate railroad alignment would follow its existing alignment. A temporary easement may be required to build the temporary fill slope for the temporary railroad alignment. As determined by CDOT and FHWA, the improvements to SH 7 would have no affect to the historic structures on this property. The temporary easement for construction would constitute no adverse effect to the property as a whole as concurred by SHPO.

Table 3-25 (cont'd.)
Summary of Effects to National Register Eligible Properties

Site No.	Name and Address	Impacts
5BL4488.2	Cottonwood Ditch #2 (1863) North side Arapahoe to North 75th	The Cottonwood Ditch #2 currently crosses SH 7 just east of the Colorado Southern (BNSF) railroad bridge in an inverted siphon pipe. This existing structure would be replaced with a new inverted siphon. In order to accommodate the improvements, the inlet end of the siphon pipe (south end) would be located at the existing inlet end and the north end of the siphon pipe would be located approximately 20 feet north of the existing outlet end of the siphon pipe. This 20-foot portion (north end) of the existing open ditch would be removed and be in the pipe. Regrading of ditch at outlet end (north end) would be required when siphon is replaced. This has been determined as an adverse effect by CDOT and FHWA and confirmed by SHPO.
5BL4488.3	Cottonwood Ditch #2 (1863) South side Arapahoe around 7280 Arapahoe	This segment crosses under the railroad south and west of the DeBacker-Tenenbaum property. In order to construct a new BNSF railroad bridge over SH 7, a temporary railroad alignment would be required 25 feet to the east of the current alignment. The temporary BNSF alignment would require a temporary bridge to be constructed over the Cottonwood Ditch. The temporary bridge would be removed when the temporary alignment is removed. The ultimate railroad alignment would be along its current alignment and would not result in a direct impact to the Cottonwood Ditch since it would be restored to its original function and appearance. This has been determined as no adverse effect by CDOT and FHWA and confirmed by SHPO.
5BL400.5	Colorado and Southern Railway Company Segment. (1870s) N and S of Arapahoe Road	The widening of SH 7 would require the removal of approximately 25 to 35 feet of existing track on the north side of the highway. This portion of the track alignment would ultimately be on the future bridge structure over SH 7. The Preferred Alternative involves the construction of a temporary railroad alignment offset 25 feet to the east of the existing alignment and the construction of a temporary bridge along this alignment over SH 7. This temporary alignment is required so that the new, longer bridge over SH 7 can be constructed while train operations can continue on the temporary alignment. The ultimate railroad alignment would follow the existing alignment. To construct the temporary alignment, approximately 500 feet of the existing railroad track would be temporarily impacted along the southern curve and approximately 600 feet of existing track would be temporarily impacted along the northern curve. A temporary bridge would be required to carry the temporary railroad alignment over the Cottonwood Ditch. This temporary bridge would be removed following the need for the temporary alignment.

Table 3-25 (cont'd.)
Summary of Effects to National Register Eligible Properties

Site No.	Name and Address	Impacts
		This has been determined as an adverse effect by CDOT and FHWA and confirmed by SHPO. (The existing railroad bridge over SH 7 is officially not eligible.)
5BL4164.2	Enterprise Ditch Segment – North and South of Arapahoe Road	For the Preferred Alternative, a 120-foot concrete box culvert would replace the southern 60 feet of the existing box culvert. Additionally, 250 feet of the existing ditch on the south side of SH 7 would be realigned and reconstructed as an open ditch. This has been determined as no adverse effect by CDOT and FHWA and confirmed by SHPO.
5BL4164.4	Enterprise Ditch Segment – North of SH 7 Crossing Under the BNSF Railroad	For the Preferred Alternative, a temporary railroad alignment would require approximately 100 feet of the ditch to be placed into a pipe. Once the temporary alignment is removed, the ditch would be restored to its original function and appearance. This has been determined as no adverse effect by CDOT and FHWA and confirmed by SHPO.

3.17.6 Historic Preservation Mitigation Measures

Agreement among the SHPO, ACHP, FHWA, and the Certified Local Government, represented by the Boulder Landmarks Preservation Board, has been reached through the Section 106 process of the National Historic Preservation Act on measures to minimize harm. Those measures are incorporated into the alternatives designs. A Memorandum of Agreement has been prepared and was signed by FHWA on December 4, 2006.

No mitigation for paleontological resources has been recommended for the alternatives. However, if these resources are uncovered during construction, the CDOT Paleontologist will be notified immediately.

3.17.7 Summary of Coordination

Coordination with appropriate agencies and other parties has occurred relative to archaeological resources and Native American interests. Coordination with the SHPO relative to historic properties has been extensive, including several meetings with the SHPO's representative individually and several meetings where the SHPO attended along with other agencies. These meetings have included:

- April 9, 2004, scoping meeting with SHPO
- May 11, 2004, field meeting with SHPO
- October 26, 2004, pre-CLG meeting
- November 4, 2004, CLG meeting

The letter of eligibility and effects was sent to the SHPO on August 4, 2005. Concurrence was received on August 15, 2005.

3.18 Hazardous Waste

This section provides information about hazardous waste sites identified within the SH 7 study area. The term hazardous waste as used in this EA is inclusive of all waste materials that require specific handling, worker health and safety, and disposal because of the product's contaminated waste nature. Hazardous waste encompasses materials regulated as solid waste, toxic substances, hazardous materials, hazardous waste, radioactive materials, petroleum fuels, and others as defined and regulated by various state and federal laws.

Hazardous waste can be generated in a number of ways and is considered any waste product that is flammable, corrosive, reactive or toxic. These wastes are found in various forms and can originate from a variety of industrial, mining, and municipal land uses. Hazardous wastes can be toxic to plants and animals.

3.18.1 Methodology

In accordance with the American Society for Testing and Materials (ASTM) procedures and CDOT requirements, a Phase 1 Environmental Site Assessment was conducted for SH 7 between Cherryvale Road and 75th Street. The Phase 1 covers the properties adjacent to the SH 7 right-of-way and approximately 0.5-mile north and south of the highway. The Phase 1 included searching environmental databases, reviewing records at public agencies, examining historical aerial photographs and conducting a site reconnaissance. Carter & Burgess conducted initial on-site inspection on June 11, 2001, and sites identified by records review were checked.

The Phase 1 identified three sites within the study area with recommendations for soil and groundwater sampling. One of these sites is a leaking underground storage tank (LUST) located at 75th Street and SH 7. This site was addressed under the separate project that is taking place at this location. The other two sites are listed below:

- **Transmission Technology Services, 6270 Arapahoe Road:** This property is an active auto repair shop located on the south side of SH 7. A search of the US EPA database revealed no documentation of environmental issues. A limited

subsurface site investigation of the property was conducted on July 8, 2003, to detect any potential contamination of the soil or groundwater. The soil constituents were detected at low levels, while no groundwater was encountered during the investigation.

- **Historic Gas Station & House, 6301-6303 Arapahoe Road:** Three underground storage tanks (USTs) were identified at the historic gas station located on the north side of SH 7. Carter & Burgess conducted initial soil and groundwater investigation in January 2002 and found soil samples heavily impacted by petroleum constituents. A follow-up investigation by EnviroClean Rocky Mountain (ERM) in 2003 found no impact by petroleum constituents. ERM noted that a steel line in the area of the Carter & Burgess soil boring might have had a line leak that impacted the findings in 2002. ERM recommended that the USTs be closed before further development of the site occurs. Should petroleum-impacted groundwater or soil be encountered during construction, special management would be required.

3.18.2 Hazardous Waste Impacts

No-Action Alternative

No impacts to or from any identified hazardous waste sites are anticipated as a result of the No-Action Alternative since there would be no property acquisitions or excavations.

Preferred Alternative

- **Transmission Technology Services, 6270 Arapahoe Road:** The Preferred Alternative would shift the roadway closer to this property. Should right-of-way acquisition become necessary, mitigation requirements would be obtained from the appropriate regulatory agency.

- **Historic Gas Station and House, 6301-6303 Arapahoe Road:** The Preferred Alternative would have no impact in this area since no right-of-way would be obtained, and testing has been completed.

3.18.3 Hazardous Waste Mitigation

During construction, CDOT utilizes its Environmental Health and Safety Management Specification (250 Specification) on projects to address issues related to the transportation, handling, monitoring, and disposal of any hazardous or solid waste materials encountered during construction, including contaminated soils, lead-based paint, and other toxic substances. If deemed necessary, a materials management plan would be prepared regarding the removal and disposal of contaminated soils. A Health and Safety Plan would also be developed to protect workers during construction.

During final design when right-of-way and access requirements are further developed, CDOT will obtain the status of any suspect sites in the study area and will take the necessary precautions during future construction activities.

When contaminated properties are encountered, either during or prior to construction, CDOT coordinates with the affected property owners through the right-of-way process, as well as with the appropriate state, local and federal authorities. Prior to a construction project, CDOT ascertains the status of adjacent properties and updates all available information at that time. Construction contractors are required to comply with Section 250, Environmental Health and Safety Management (CDOT Standard Specifications), when applicable, during construction.

Specific mitigation is unknown at this time, but will be incorporated into final design plans when more detailed design information becomes available. At the Historic Gas Station, further testing of soils and groundwater on site and off site may be necessary. At the time of final design, the necessary right-of-way acquisition and relocation processes would be initiated in accordance with the CDOT right-of-way manual, FHWA, and other federal guidance procedures involving acquisition and relocation. CDOT procedures concerning hazardous waste issues would also be followed to determine necessary project mitigation requirements.

3.19 Parks and Recreation

3.19.1 Open Space/Recreation Existing Conditions

Parks and recreational resources, which include parks, open space areas, and trails, are a primary attraction for both Boulder residents and regional users. Common recreational activities include hiking, biking, wildlife viewing, and picnicking. Amenities at the recreational parcels include parking, trailhead information, picnic areas, and trail networks. The following properties qualify as recreational/open space parcels:

Legion Park is owned and operated by the Boulder County Open Space department. Located on the north side of SH 7 between Valtec Lane and Westview Drive, Legion Park is open to the public and used for recreational purposes. On-site facilities include a multi-use trail, parking areas, and benches for scenic viewing. Currently Boulder County has no future plans for improvements to the park.

Sombrero Marsh Open Space is located south of the Boulder Valley Schools Technical Education Center along the southern boundary of the study area. Sombrero Marsh is open to the public and owned and operated by both the City of Boulder and Boulder County. Seasonal trails allow for hiking and wildlife viewing. The primary goals of the

open space are to: restore and sustain the ecological health of the Sombrero Marsh, and use the educationally rich outdoor setting for teaching children and adults about wetland ecology, environmental restoration, and land stewardship. (*Site Management Plan for Sombrero Marsh*. City of Boulder Open Space and Mountain Parks Department, December 5, 2001 pp. 3).

City of Boulder Open Space parcel is located alongside SH 7 between Westview Drive and the BNSF railroad tracks. The property is managed by the City as an agricultural preservation area and there is no public access or active recreation on this site.

South Boulder Creek Path is located at the western end of the study area along South Boulder Creek. The path crosses under SH 7 just west of Cherryvale Road and continues westward on the south side of the roadway. The path is used by the public and is maintained by the City of Boulder.

See **Figure 3-13** for parks, open space and recreational sites.

3.19.2 Open Space/Recreation Impacts

No-Action Alternative

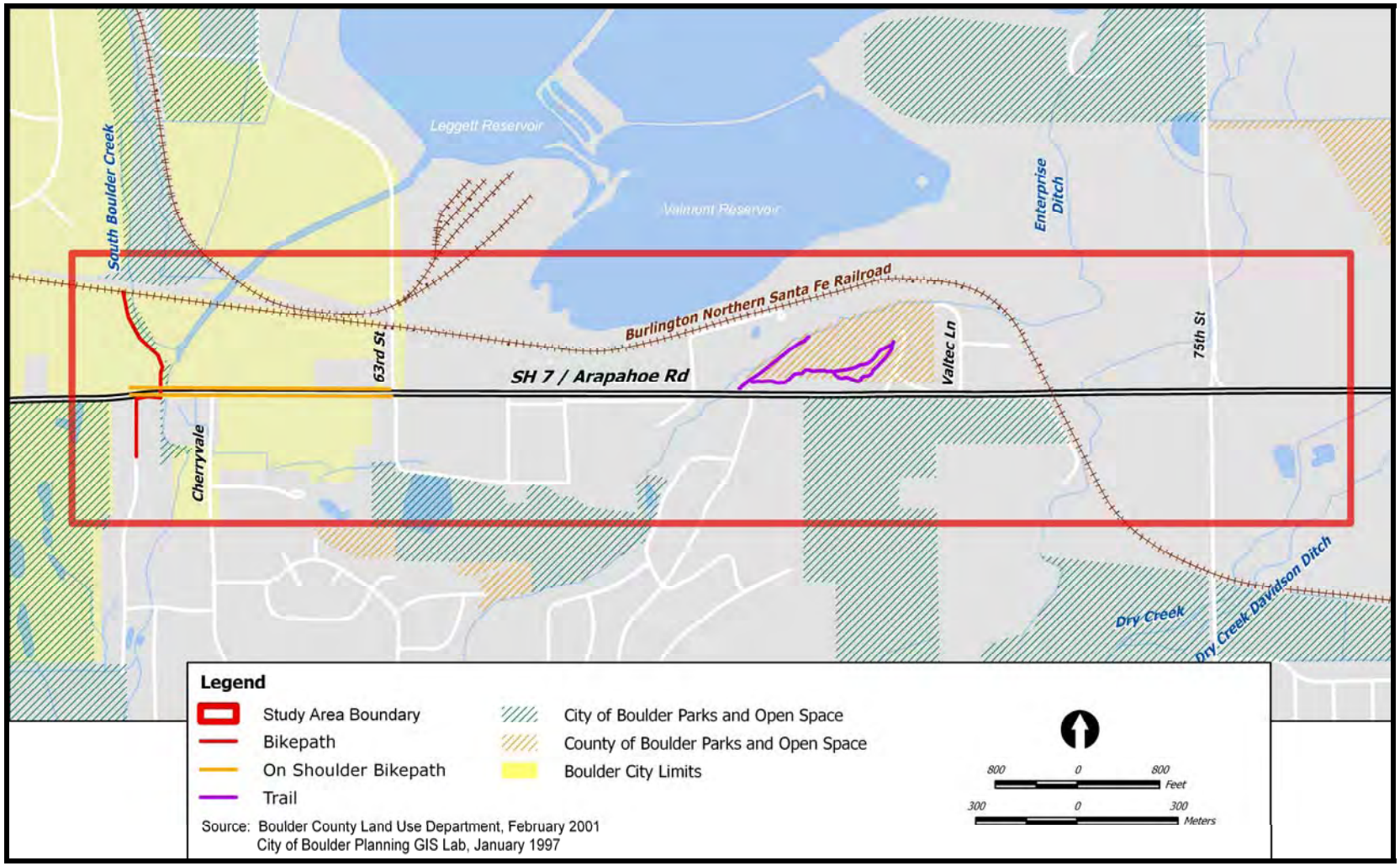
The No-Action Alternative would have an indirect impact on all parks and recreational facilities within the study area. As traffic increases over time, congestion would result in diminished accessibility to the parks and recreational facilities along SH 7. There would be no direct impacts to parks and recreational facilities under the No-Action Alternative.

Preferred Alternative

The Preferred Alternative would have beneficial indirect impacts on all parks and recreational facilities within the study area by alleviating congestion along SH 7, thereby improving accessibility. There would be short-term increases in emissions from vehicles due to construction and both long-term and short-term increases in noise that may impact users' experience. Direct impacts to each individual property are described below.

Bicycle improvements included for this alternative include a five-foot on-street bike lane in each direction on the west segment of the alignment and 10-foot shoulders serving as bike lanes along the eastern segment. In addition, a 12-foot multi-use path is included on the north side of SH 7 for the entire length of the corridor. On the south side of SH 7, an 8-foot sidewalk would be constructed between Cherryvale Road and Westview Drive.

Figure 3-13
Park and Recreation Facilities



There is currently one access drive to the Legion Park that splits into a "Y" that has two access points onto SH 7. Direct impacts at Legion Park would consist of cut slopes that would require a temporary construction easement in an area of the park that has no public use, and the closure of the eastern leg of the "Y" access point. The western leg of the access point would be improved to accommodate all the traffic going in and out of the park. The proposed limits of the cut slope would require the removal of some vegetation. The eastern leg of the access point would be removed.

There would be no direct impacts to the Sombrero Marsh Open Space under the Preferred Alternative. There would be improvements made to the SH 7 and 63rd Street intersection that would allow the public to more easily access the open space area.

There would be no direct impacts to the South Boulder Creek Path with this alternative. SH 7 improvements would begin to the east of where the path crosses the roadway.

There would be some intrusion on Legion Park and on the City of Boulder Open Space parcel across the road from Legion Park. Approximately 0.5 acre of temporary easement would be needed to accommodate the grading for the road lowering and widening at Legion Park. Also, there would be a substantial amount of vegetation located along SH 7 that would need to be removed from the Legion Park property. For the City of Boulder Open Space, approximately 2.4 acres of temporary easement for grading would be required.

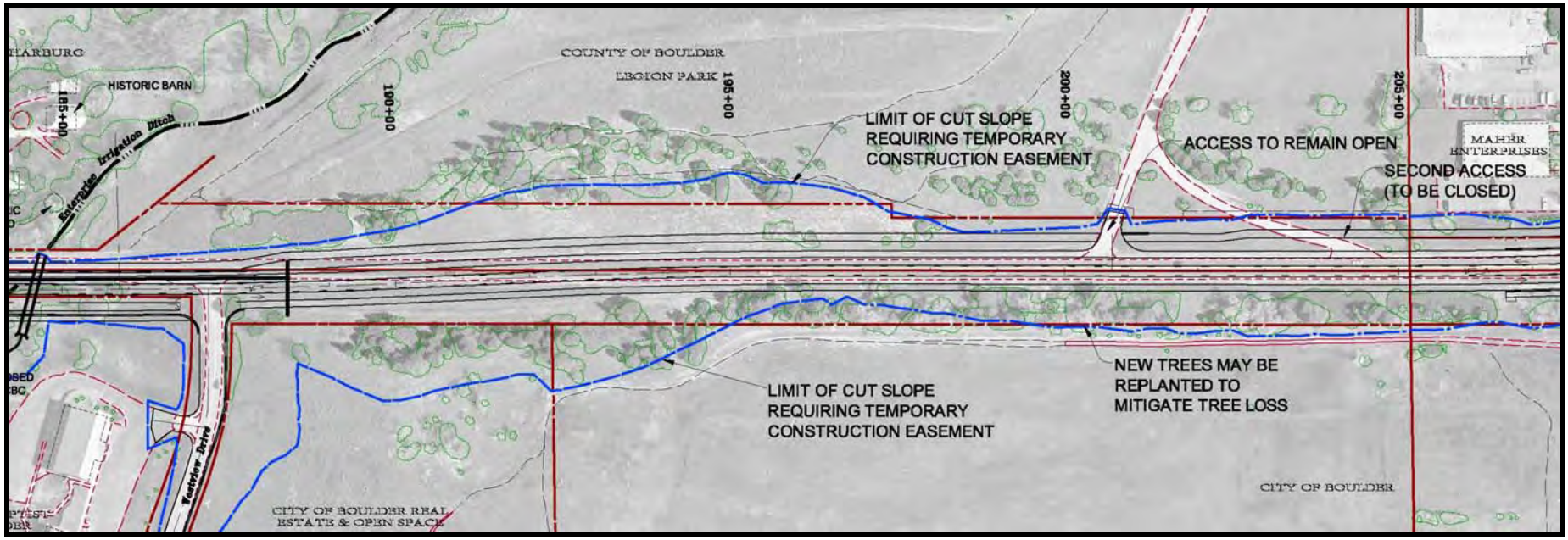
See **Figure 3-14** for the proposed impacts to Legion Park.

3.19.3 Open Space/Recreation Mitigation

The land where the eastern leg of the access into Legion Park is removed will be revegetated with native plant seed mixtures. No other mitigation measures are necessary for any of the parks or recreation facilities. The following BMPs will mitigate the build alternative's impacts:

- Minimize the amount of disturbance of grading to 10 feet beyond the toe of slope. Project will follow CDOT standard specifications for amount of time that disturbed areas are allowed to be non-vegetated.
- Develop and implement a noxious weed management plan. This will be completed during final design.
- Salvage weed free topsoil for use in seeding.
- Implement temporary and permanent erosion control measures to limit erosion and soil loss.
- Reseed all disturbed locations except rock cuts with native plant seed mixtures

Figure 3-14
Impact to Legion Park



- Develop acceptable revegetation plan with the CDOT Landscape Architect, City of Boulder, and Boulder County. Removed trees and shrubs in the Boulder Creek riparian zone will be replaced on a 1:1 basis as required by SB 40.

3.20 Visual Quality

3.20.1 Visual Quality Existing Conditions

The SH 7 study area is located on the east side of the City of Boulder and includes approximately two miles of SH 7 between 75th Street and Cherryvale Road. The study area is generally characterized by level grades with one steep slope that reaches its maximum height just east of Westview Drive. The area contains a variety of land uses that include residential subdivisions, irrigated farmland, commercial and industrial development, business parks, public open space, and educational facilities.

Landscape Character

Landscape character can be broken down into landscape units containing similar landscape elements that are different from other distinct areas. The physical elements of a landscape form the visual patterns that strongly influence our response to the landscape. These physical elements include landform and vegetation, water and wildlife features and other manmade modifications, such as residential and commercial development. Foreground landscape units are those immediately visible from the highway and define the local character of the area. The foreground is defined as the area within 0.0 to 0.5 mile. The middleground is defined as 0.5 to 4 miles. The background views are 4.0 miles or greater.

Looking west from SH 7, just west of 75th Street. The BNSF bridge dominates the middleground view. Notice the Rocky Mountains in the distant background.

The existing landscape character within the study area is varied, consisting of agricultural land, rural undeveloped land, and residential, commercial, and industrial development. The Rocky Mountains, Front Range, and Flatirons are the most significant features of the study area and are visible from many viewpoints in the area. The BNSF railroad crosses the study area on a bridge west of 75th Street.

A detailed description of the study area from east to west is provided below. Photos of the study area were taken in March 2005. Photo simulations are shown in the public meeting graphics in Appendix H.

Looking northwest from SH 7. As the grade becomes steeper, foreground elements dominate the landscape; the middleground and background views become obstructed.

East of 75th Street to the Highest Point of the Study Area

In this portion of the study area, the foreground element is pavement, with agricultural, commercial, and rural residential land adjacent to the roadways. Commercial land uses in this area are clustered around the SH 7 and 75th Street intersection. The middleground views are primarily of agricultural and rural residential lands. The BNSF bridge dominates the middle ground view to the west. As the roadway grade becomes steeper, coniferous trees become visible in the foreground and the hillside begins to obstruct the middleground. The background views to the west, northwest, and southwest are of the Rocky Mountains. Background views to the north, south, and east consist primarily of agricultural land. To the south and east, long stretches of roadway surrounded by trees are also present in the background view.

Looking east from SH 7. Commercial development and the BNSF bridge dominate the middleground view; background views consist of trees and rural land uses.

Looking west from the BNSF and SH 7 crossing. Agricultural and rural residential land uses dominate the middleground views.

The Highest Point of the Study Area to Cherryvale Road

This portion of the study area is characterized by numerous variations in the visual landscape. From the top of the grade looking west, the viewshed widens considerably, enhancing scenic quality. Descending from this point, the middleground views include Hillcrest Lake, Valmont/Leggett-Owen Reservoirs, industrial development, and the Seventh Day Baptist Church. Background views of the Rocky Mountains, Front Range, and Flatirons continue to dominate the landscape. The foreground element is pavement, with agricultural land and coniferous trees adjacent to the roadway. Traveling west toward Cherryvale Road, industrial and commercial land uses begin to dominate the foreground until the roadway widens from two lanes to four lanes. In this area, the middleground views to the north and south are somewhat obstructed by commercial developments. To the east, the middleground view is dominated by the increasing roadway grade. The background views to the west, northwest, and southwest are of the Rocky Mountains, Front Range and Flatirons. Background views to the north and south consist of agricultural lands. Background views to the east are somewhat obstructed by the elevated grade.

Looking west from the highest point of the study area. The viewshed widens considerably, enhancing scenic quality.

Looking southwest from SH 7, descending from the highest point of the study area, view of the Seventh Day Baptist Church. The Flatirons dominate the background view at this location.

Looking west from SH 7. Power lines and commercial establishments dominate the landscape in the foreground.

Looking east from SH 7. The middleground view is dominated by the increasing grade. Background views are obstructed.

3.20.2 Visual Quality Impacts

No-Action Alternative

The No-Action Alternative would result in no visual alterations or impacts on the visual setting of the SH 7 roadway corridor.

Preferred Alternative

Between Cherryvale Road and the Boulder Valley School District, added pavement and a raised median would alter foreground and middleground views. Because this portion of the study area is currently a four-lane urban section, these changes would be consistent with existing land uses and visual character.

To accommodate roadway design speeds, the existing hill near Legion Park would have to be lowered approximately 13 feet, which may widen the viewshed and improve background views. At the top of Hoover Hill, 10 trees would be removed on the north side of the road and 100 trees on the south side of the road, exaggerating the presence of the roadway. Retaining walls up to 21 feet high (adjacent to the BNSF crossing) would alter foreground and middleground views where erected in the vicinity of the railroad overpass.

Pedestrian and bicycle improvements include the addition of bicycle lanes and pedestrian pathways. These improvements would increase the amount of pavement in the viewshed, most notably near Legion Park.

This alternative would not impact background views of the Rocky Mountains, Front Range, and Flatirons where currently visible throughout the study area.

Overall, impacts to the visual quality of the study area would be most prominent east of the Boulder Valley School District (approximately 0.25 mile east of 63rd Street), where the existing roadway consists of two-lanes and the landscape begins to become more rural in character. In this area, a third two way left turn lane and twelve-foot detached concrete path would be added to the viewshed as travelers approach Legion Park.

3.20.3 Visual Mitigation Measures

Visual mitigation measures could include:

- Choose wall colors and textures that will fit into the landscape visually and aesthetically by complimenting the surrounding area to reduce visual impact to the community.
- Revegetation of disturbed areas in a manner that is consistent with adjacent landscape features. Use native and indigenous species for revegetation.
- Where feasible, slope modifications will be completed in a manner that maintains or accentuates foreground views. Techniques could include creating pockets for native vegetation, undulating finished grades, and application of erosion control measures.

3.21 Farmland

US Congressional Public Law 95-87 (Federal Register January 31, 1978: Part 657) requires the US Department of Agriculture, Natural Resources Conservation Service (NRCS) to identify and locate soils that are considered prime and unique farmland. These farmlands are protected in accordance with the Farmland Protection Act of 1981. Prime farmlands are considered to be of national importance and have been defined as land with the best characteristics for producing feed, forage, fiber, and oilseed crops, and are available for these uses. Unique farmland is land other than Prime farmland that is used for the production of specific high-value crops. In addition, the Important Farmland Program has encouraged the NRCS or other appropriate local or state agencies to identify soils that can be considered farmland of statewide or local importance.

3.21.1 Existing Conditions

A letter was sent to the Natural Resources Conservation Service (NRCS) on September 5, 2001, requesting information on soils that can be classified as prime or unique farmlands. A response was received on September 21, 2001. Approximately 70 percent of the study area contains soils that are considered Prime farmland, as defined by the

NRCS. However, only about 10 percent of these soils are actually being used for farming activities. There are no soils considered to be of statewide or local importance within the study area. A copy of the letter from the NRCS is located in Appendix G.

3.21.2 Farmland Impacts

Direct farmland impacts would result from removal of cultivated lands by placement of impervious (paved) surface, cut and fill slopes and/or acquisition of right-of-way.

No-Action Alternative
There would be no impacts to Prime farmland with the No-Action Alternative.

Preferred Alternative
The Preferred Alternative would result in conversion of approximately 5.0 acres of Prime farmland from several parcels. This is based on additional right-of-way that would be required. A Farmland Conversion Impact Rating form (AD-1006) was completed in accordance with the Farmland Protection Policy Act (FPPA – 7 USC 4201, et seq.). This rating form indicated that 6.06 acres would be impacted. Since that time, the design has been refined to impact less farmland. There will be no impacts to the ability to irrigate the remaining farmland, nor to the access to and from fields.

3.21.3 Farmland Mitigation

The total points on the Farmland Conversion Rating form (AD-1006) for impacts are less than 260. Therefore, under the provisions of 7 CFR 658.4 (c), no mitigation is required by the NRCS. Any crops that are damaged during construction will be compensated by CDOT.

3.22 Energy/Utilities

3.22.1 Utilities Existing Conditions

The Utility Notification Center of Colorado (UNCC) was contacted to identify private utility companies with facilities in the study area. Each of the utility owners was contacted for available mapping information related to the location of their facility. ICG Communications has an exclusive easement in the BNSF railroad right-of-way. The irrigation ditches also have exclusive prescriptive right-of-way. No other utility owner was aware of exclusive easements within the study area. Numerous utilities exist within the study area and those affected by the proposed improvements are listed below:

- Xcel Energy Natural Gas and Electric
- City of Boulder (water and sewer)

- Comcast (formerly AT&T Cable)
- QWEST
- MCI
- ICG Communications
- East Boulder Ditch
- Enterprise Ditch
- Cottonwood Ditch

Approximate existing utility locations were obtained from key maps from each utility company. Locations are shown in the conceptual design plans of the Preferred Alternative in **Appendix B**. The following sections provide general information about the utilities identified in the study area by utility type.

Electric Lines
Xcel Energy provides electric power to residential and commercial customers in the study area. Electrical lines are primarily overhead with the exception of recently installed underground lines between the east property line of the BVSD and Valtec Lane. The underground line was installed outside the south edge of the existing pavement.

Gas
Xcel Energy also provides natural gas to residential and commercial customers in the study area. A 2- to 3-inch gas line runs the length of the corridor. A 12-inch high-pressure gas line crosses SH 7 west of the BVSD west entrance.

Water and Sanitation
The City of Boulder owns and operates water and sewer facilities for the western portion of the project. Water lines run from Cherryvale Road to the BVSD east entrance. The water line is 12 inches in diameter west of the BVSD west entrance and 8 inches in diameter to the east. The water main is in the existing pavement of SH 7. An 8-inch sewer main runs from the BVSD west entrance to the west, south of the existing pavement.

Cable TV
Comcast has an underground cable TV line on the south side of SH 7 within the roadway right-of-way adjacent to the BVSD property. From the underground line to the west, the cable lines are overhead on shared poles with Xcel.

Telephone/Fiber Optic

Buried and overhead fiber optic and telephone cables are located throughout the study area. Qwest Communications, MCI, and ICG Communications own these lines. All MCI lines are in leased Qwest conduit. On the west end of the study area, Qwest/MCI have underground telephone lines and overhead fiber optic lines on the south side of SH 7 up to the BVSD west entrance. An underground telephone line continues east from the BVSD property to 75th Street on the south side of SH 7. Between 63rd Street and the east entrance to the BVSD property, overhead telephone lines also exist on the north side of SH 7. An underground telephone line serves the commercial properties along Valtec Lane on the north side of SH 7.

ICG Communications has an underground fiber optic line that runs within the BNSF right-of-way. To cross SH 7, the line traverses approximately 760 feet along the north side of SH 7 in CDOT right-of-way, crosses SH 7, and then continues back along the south side of SH 7. ICG does not know the depth of the line.

Irrigation Ditches

There are three irrigation crossings located within the study area. **Table 3-26** summarizes the irrigation ditches within the study area. Communication with all of these irrigation ditch companies has been established.

Cottonwood Ditch # 2 is eligible as a historic resource. See Section 3.17.3. The ditch crosses SH 7 east of the existing railroad bridge. The existing structure below SH 7 is a siphon. The ditch also crosses the BNSF railroad south of SH 7. The railroad traverses the ditch on a timber bridge. The primary ditch flow is from April to September.

Enterprise Ditch is also eligible as a historic resource. The ditch crosses SH 7 just west of Westview Drive. The existing structure under SH 7 is a 10-foot by 5-foot box. The ditch crosses the BNSF railroad alignment north of SH 7 in a siphon.

East Boulder Ditch is not eligible as a historic resource. The ditch crosses SH 7 east of 63rd Street. The existing structure is a box culvert, with approximate dimensions of 10 feet by 5 feet.

Table 3-26
Irrigation Ditch Summary

Irrigation Ditch	Ditch Contact	Existing Structure	Required Replacement Structure	Other Comments and Requirements
Cottonwood Ditch #2	Bob Pherson President (303) 494-7036	Siphon, dimensions unknown	Same as existing	This ditch is eligible as a historic resource. Primary ditch flow April to Sept. Upstream end of siphon damaged, improvements needed.
Enterprise Ditch	Nancy Love, Love and Associates (Ditch Engineer) (303) 673-9795	10-foot by 3-foot box	Same as existing	This ditch is eligible as a historic resource. Require guardrails and handrails. Require trash rack on upstream side. Require regular cleaning of trash rack and new structure. Design review fee required by engineer.
East Boulder Ditch	Randy Rhodes, President (720) 497-2123	10-foot by 3-foot box (approximate)	Same as existing	Ditch eligible as a historic resource; segment in study area non-contributing Base flow approx. 30 cfs, but also take storm water upstream. Operates April through October.

There is also irrigation water from Cottonwood Ditch #2 that is routed to the DeBacker property. A turnout for this Cottonwood lateral is located on the Tenenbaum property. The irrigation water is routed to the east by open ditch and pipe from the turnout to the DeBacker property. The Cottonwood lateral outfalls in the southwest corner of the DeBacker property on the southeast corner of the SH 7 and 75th Street intersection.

Personal Water Supply Wells
The Colorado Division of Water Resources was contacted for existing personal water well system information within the study area. The resulting information included an extensive list of well locations. However, not all information pertaining to the well locations was listed. Only the quarter corner of the section was listed in most instances. Based upon the permit information gathered, there are numerous wells that are located adjacent to the project. Some of the information indicated that more than one well permit has been issued for several of the adjacent properties.

Personal Septic Disposal Systems
The Boulder County Health Department was contacted for Personal Septic Disposal System records. Numerous systems exist on both the north and south sides of the proposed alignments.

3.22.2 Utilities Impacts

No-Action Alternative
There would be no impacts to utilities with the No-Action Alternative.

Preferred Alternative
The Preferred Alternative would impact several existing utilities. The lowering of the roadway profile east of Westview Drive and subsequent cut slopes from the widening would require the utility lines to also be lowered. This lowering would affect the 2-inch Xcel gas line and the underground telephone and electrical lines. Overhead and underground electric lines exist along the roadway alignment would be impacted. The power poles in conflict with the roadway work would require relocation to accommodate excavation and embankment activities. Fiber optic lines run between manholes in the existing roadway pavement. It is anticipated that the proposed roadway vertical profile and widening would create earthwork cut/fill activities. The fiber optic lines may be in conflict and the manholes would require reset work. The ICG fiber optic near the BNSF railroad may be impacted, depending on the depth of the existing line. Roadway widening activities may also impact existing underground Comcast cable television coaxial cable. Initial utility locating efforts show that more investigation would be required.

In addition to the utilities mentioned above, underground sanitary sewer lines, water lines and fire hydrants are present. These features would be reset or adjusted in order to maintain service and match the proposed roadway section.

Several drainage structures also exist adjacent to the existing roadway. The structures are part of a network of drainage ditches in the area. Widening activities for the two build alternatives would impact the drainage ditches and structures.

The Cottonwood Ditch No. 2 siphon under SH 7 would require replacement. The temporary offset railroad alignment east of the existing alignment would require a temporary bridge crossing over the Cottonwood Ditch.

The box culvert for the Enterprise Ditch crossing below SH 7 would be replaced in kind to accommodate the wider roadway improvements. The Enterprise Ditch siphon under the railroad would likely not require replacement.

The East Boulder Ditch box culvert would be replaced in kind to accommodate the larger roadway footprint and the south shift of the improvements.

All wells within the proposed right-of-way and construction easements would be located in the first stages of final design.

Personal Septic Disposal Systems may be impacted by the build alternatives. It is anticipated that the footprint for the roadway widening may necessitate relocation of these systems.

3.22.3 Utilities Mitigation

All utility locations will be identified and field verified prior to construction. Exposed utilities will be protected during construction activities. If utility service must be interrupted, temporary service will be provided as needed and maintained during the disruption. It is expected that some of the utilities will be in conflict with the proposed improvements and require reset and/or relocation work to a new permanent location. Impacted utility owners will be contacted during the early stages of the design process to closely coordinate this work and design.

An effort will be made to minimize impacting the existing ditches and drainage structures through efficient design and coordination with the owners.

The exact location of personal wells and septic systems adjacent to the proposed action will be determined during the design process and noted on the plans, if applicable. Protection and/or relocation of the wells and septic systems might be needed and will be mitigated during the right-of-way acquisition process. Coordination with the affected residents, CDOT, Boulder County, and the City of Boulder will be necessary to minimize conflicts. Adequate public notice will be given for proposed work activities. Coordination with impacted residents will be maintained throughout the construction process.

If it is determined that the improvements will impact the existing system, the owner will be notified in advance of roadway work for coordination efforts to protect or relocate the system. Design modifications, such as retaining wall installations instead of embankment or excavation roadway slopes, may be preferred.

3.23 General Construction Impacts and Mitigation

3.23.1 General Construction

Major construction issues include the lowering of the existing hill east of Westview Drive by 13 feet requiring the construction of large cut slopes. Additionally, the existing BNSF crossing would require the construction of a temporary offset railroad track and bridge east of the existing alignment and the construction of the replacement bridge in the current bridge location. The proposed centerline shift in the Preferred Alternative is designed to avoid impacts to historic properties and provide opportunities to construct future traffic lanes outside the existing roadway. The following summarizes the

possible construction phases (actual phasing would be determined during construction):

- Construct track and temporary railroad bridge to the east of the existing BNSF alignment. Construct detour pavement to the south of existing SH 7. In the area of the historic gas station at 63rd Street and the historic house near Westview Drive, the proposed roadway alignment is shifted south. This would allow for proposed eastbound lanes to be constructed while existing traffic remains on SH 7.

- Shift existing traffic south and construct proposed westbound lanes and railroad east onto temporary alignment. Lower hill for westbound lanes and construct cut slopes on north side of SH 7 at Legion Park. Excavate and construct north portion (including center pier) of proposed BNSF bridge.

- Shift existing traffic north and construct remainder of eastbound lanes. Construct south portion of railroad bridge. Shift traffic into final configuration and railroad back to existing alignment.

3.23.2 General Construction Impacts

No-Action Alternative

There would be no impacts with the No-Action Alternative.

Preferred Alternative

The Preferred Alternative would have temporary impacts during the construction period. The construction period for this alternative would likely be two years. Detailed construction phasing will be addressed during final design. It is anticipated that one lane of traffic in each direction in addition to a center left-turn lane at intersections would be maintained at all times and that most construction would take place during normal work hours. The contractor would be required to maintain access to all residences and businesses along the corridor.

Construction of this alternative would have potential temporary impacts to the following resources:

- Air Quality
- Noise
- Water Quality
- Visual
- Section 4(f)

3.23.2.2 Air Quality

Construction activities could have a temporary impact on air quality. These include fugitive dust during earthmoving operations and stockpiling. PM_{10} (particles less than 10 microns in diameter) dust particles are of particular pollution concern because the particles can travel further and are more likely to be inhaled by humans.

Emissions from construction equipment can also contribute to air pollution. Gasoline and diesel engines emit exhaust, including particulate matter, carbon monoxide, sulfur dioxides, nitrogen oxides and other pollutants. Increased emissions would also result if congestion occurs as a result of construction closures or delays.

3.23.2.3 Noise

Temporary noise impacts to receptors along the construction corridor are expected. The increased noise during construction would be primarily due to construction equipment including earth moving, hauling, pile driving and paving equipment.

3.23.2.4 Water Quality

Construction activities can affect water quality through erosion and sedimentation. Erosion is usually greater during construction due to the exposed soil during grading and dirt moving operations. This sediment can reach waterways and impact water quality if not properly managed. Another concern during construction is water contamination from spilled fuels or other hazardous materials.

3.23.2.5 Visual

During the construction period, visual impacts would occur through the use of traffic control devices, dirt and construction material stockpiles, and equipment storage areas.

3.23.2.6 Section 4(f)

Impacts to 4(f) properties would include the construction of cut slopes north of SH 7 at Legion Park in an area of the park where there is no public use. Because of the lowering of the hill east of Westview Drive, grading of side slopes would be required for the Preferred Alternative. Removal of approximately 10 trees on park property would be required. During the construction of the cut slopes and during seeding operations, construction equipment would require access to Legion Park property. A temporary easement would be required during construction.

3.23.2.7 Sustainability

Both the Preferred and No-Action Alternative may affect environmental resources not regulated at the federal, state, or local level. Such impacts can include the consumption of natural resources such as fossil fuels and raw materials like gravel. The type of alternative selected may also affect social resources such as landfill capacity. In most cases, such impacts cannot be quantified, and cannot entirely be avoided. It is recognized that these impacts should be minimized to the extent practicable.

3.23.3 Mitigation of Construction Impacts

3.23.3.1 Air Quality

To mitigate impacts to air quality during construction, water as a dust palliative will be used. Stockpile areas can be stabilized through covering or the application of water. Haul trucks should be covered during transport. Finally, to reduce emissions, the contractor can be encouraged to retrofit equipment to reduce pollution, to use clean burning fuels and to properly maintain construction equipment.

3.23.3.2 Noise

To limit noise impacts to residents, it is recommended that the construction activities be limited to daytime work hours. Also, the contractor shall be encouraged to phase as much of the noise inducing activities together to help limit the duration of higher noise levels. Finally, the contractor shall be required to use mufflers or noise blankets on equipment and quiet generators.

3.23.3.3 Water Quality

Impacts to stormwater quality can be mitigated during construction. This project commits to following CDOT's Erosion Control and Stormwater Quality Guide and sections 107.25 and 208 of the Standard Specifications for Road and Bridge Construction. An erosion control plan will be developed during final design and followed during construction. Inspections of erosion control and water quality devices should occur during construction. The following are stormwater quality methods to be implemented during construction:

- Implementation of BMPs for erosion control. These include but are not limited to seeding, the use of erosion control blankets, the use of embankment protectors, and outlet protection for storm sewer pipes.
- Implementation of BMPs for sediment control. These include but are not limited to erosion bales, silt fence, storm drain inlet protection, sediment traps, and stabilized construction entrances.

- Implementation of BMPs for materials handling and spill prevention. These include but are not limited to stockpile management, material management, material use, and spill prevention and control.

- Implementation of BMPs for waste management. These include but are not limited to concrete, hazardous, and contaminated waste management.

- Implementation of BMPs for pollution prevention. These include treatment during dewatering and paving operations. It also includes the use of street sweeping and temporary waterway crossings.

3.23.3.4 Visual

Visual impacts will be minimized during construction by limiting stockpiles and equipment storage to designated areas. Any traffic control devices can be removed promptly after use.

3.23.3.5 Section 4(f)

Mitigation for temporary impacts to the Legion Park 4(f) property will include seeding with a native seed mix approved by Boulder County.

3.23.3.6 Sustainability

Sustainable practices incorporated into the project planning, construction, and maintenance can minimize resource impacts. As part of its environmental ethic and policy, CDOT encourages its staff, consultants, and contractors to identify and utilize opportunities and methods to reduce the impact of projects and programs on environmental resources through innovative programs and by providing flexibility in project planning and construction for the use of sustainable processes and materials. This may include such concepts as: natural resource conservation, waste minimization, materials reuse, minimal use of native virgin materials, conservation and efficient use of water and energy, air pollution prevention, preference for "green" purchasing including recycled, minimally processed and packaged items, and preference for locally-available resources. CDOT encourages the identification and incorporation of proven alternative materials that are as long or longer-lasting, and which require the same or less amount of maintenance, as long as such materials do not impact CDOT's ability to meet its primary obligations for providing a safe and efficient transportation system.

3.24 Cumulative Impacts

3.24.1 Methodology

This section addresses the cumulative impacts associated with the Preferred Alternative. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

To identify cumulative impacts, a baseline is established which includes development from a specified period of time for past actions, added to present and reasonably foreseeable actions. This baseline establishes the impacts, which have or would occur without the proposed action.

The environmental resources identified for analysis within the cumulative impacts discussion are based on those which are impacted by the Preferred Alternative and which are also of concern for cumulative effects based on scoping comments, other comments, or environmental analysis. Not all resources impacted by the proposed action are evaluated for cumulative effects.

For this EA, the resources that have been identified for cumulative effects analysis are land use changes, wildlife, wetlands, and water quality. The cumulative analysis addresses the "incremental impacts" of the proposed action related to these resources. To determine the impacts to these resources on a cumulative basis, the impacts of the proposed action are added to the baseline and analyzed as the incremental impacts of the proposed action.

Geographic Area

The cumulative study area was chosen to represent an analysis of the likely land use effects of widening SH 7. In this section, the cumulative study area is referred to as the study area. The boundary for land use changes, wildlife, and wetlands is (approximately) an 8,600-acre area bounded by Foothills Parkway to the west, 95th Street to the east, Baseline Road to the south and Valmont Road to the north. The study area for water quality is the 1,160-square-kilometer Boulder Creek watershed. The cumulative study area for land use changes, wildlife, and wetlands is shown in **Figure 3-15**.

Time Period

The timeframe used for this analysis is (approximately) 40 years in the past based on the earliest available aerial photography (which is 1963). The future timeframe is to the year 2030 based on the project time horizon.

Resource Data

Data was collected for the resources of concern from readily available data sources for the cumulative impacts study area. Data on past and existing conditions were derived from aerial photography, Boulder County, the City of Boulder, the Colorado Division of Wildlife—Natural Diversity Information Source (DOW-NDIS) and the US Geological Survey (USGS). A list of reasonably foreseeable land use and transportation projects was compiled by Boulder County and the City of Boulder.

Figure 3-15
Cumulative Impacts Study Area

3.24.2 Past Actions and Conditions

3.24.2.1 Land Use

In 1963, much of the land within the study area was used for agricultural, open space, and low-density residential purposes. In 1967, Boulder voters approved a 4/10 of a cent sales tax specifically to buy, manage and maintain open space. This was the first time citizens in any United States city had voted to tax themselves specifically for open space. Because of this aggressive approach toward open space preservation, a significant amount of land in the study area has been protected from development. This is especially true for the eastern portion of the study area, which contains the largest areas of open space and agricultural land.

In 1963, low-density residential developments existed north of Baseline Road/East of 75th Street, north of Baseline Road/West of 55th Street, and north of Baseline Reservoir. In the eastern portion of the study area, most residences were on large lots attached to farms along SH 7, 95th Street, and Valmont Road. Valmont and Leggett-Owen Reservoirs, Hillcrest Lake and numerous smaller lakes and creeks dominated the landscape in much of the study area. A few industrial facilities were located in the vicinity of these reservoirs. Aerial photography shows the Flatirons golf course in its early stages of development.

Over the past 40 years, the most significant changes in land use have been the intensification of residential and commercial/industrial development. Residential land uses have intensified south of SH 7 and west of Baseline Reservoir. In the east, residential development has occurred along the Dry Creek riparian corridor and north and south of Baseline Road to the eastern edge of the study area.

Commercial/industrial land uses have intensified north of SH 7 from Leggett-Owen Reservoir to the western boundary of the study area and along the north and south sides of SH 7 near Hillcrest Lake. From 1963 to 2003, land used for residential and commercial/industrial purposes increased by approximately 1,865 acres. This represents an increase of 987 acres of residential land and 878 acres of commercial/industrial land.

3.24.2.2 Wildlife

Black-Tailed Prairie Dogs

Prior to European settlement, the majority of the study area contained habitat suitable for the black-tailed prairie dog except for wetlands and riparian zones. Over time, the conversion of short grass prairie to agriculture, flood irrigation, and agricultural practices throughout Boulder County have altered or destroyed much of the suitable

habitat for prairie dogs. The spread of sylvatic plague through the central Great Plains has compounded the impact of habitat reduction.

More recently, the loss of prairie dog habitat has been attributed to urban development. During the past 40 years, urban development has removed, altered, and fragmented prairie dog habitat within the study area.

Raptors

The presence of prairie dog towns, agricultural fields, pastureland, wetlands and fallow cropland within the study area most likely provided suitable habitat for raptor foraging, nesting, and prey species. Raptors that may have nested in the area include bald eagle, red-tailed hawk, Swainson's hawk, northern harrier, American kestrel, great horned owl, long-eared owl, short-eared owl, burrowing owl, and ferruginous hawk.

The number of raptors may have declined with the loss of habitat to development. Over the past few decades, however, several wetlands have been constructed within the study area. These sites may have provided additional habitat for raptors and their prey.

Additional Wildlife

Based on existing wildlife patterns in the area, wildlife which may have occurred within the study area and surrounding lands include geese, pheasant, great blue heron, pelican, white tailed deer, mule deer, mountain lion, the Preble's meadow jumping mouse, red-headed woodpecker, bobolink and johnny darter. Over time the CNHP has listed several of these species as species of concern.

3.24.2.3 Wetlands

Many natural wetlands once existed along Boulder Creek where today, agricultural and urban developments have clustered. Pre-settlement wetlands were probably found along streams and rivers and in landscape depressions. Abandoned or seldom used channels usually supported wetlands as well. Most of these backwater areas, particularly along Boulder Creek, have been filled and the wetlands lost. Sombrero Marsh, located approximately 0.5 mi. east of South Boulder Creek, is the only naturally occurring perennial open water body still present in the study area today.

Over the years several reservoirs and numerous ditches have been constructed within the study area. Leakage from these reservoirs and ditches have created large and biologically diverse wetlands in areas that were previously dry.

Alteration of riparian systems began with the settlement of the Boulder Valley. Riparian systems within the study area were most likely concentrated along Dry Creek, Bear Creek, Boulder Creek, Valmont Reservoir, Leggett-Owen Reservoir and Hillcrest Lake.

3.24.2.4 Water Quality

The study area for water quality is the 1,160 km^2 Boulder Creek Watershed. Major water features within the study area include Boulder Creek, South Boulder Creek, Bear Creek, Dry Creek, Valmont Reservoir, Leggett-Owen Reservoir, Baseline Reservoir and Hillcrest Lake.

Boulder Creek originates as headwater streams at the Continental Divide and flows through historical mining districts and mountain communities to the mouth of Boulder Canyon. Upon exiting Boulder Canyon, Boulder Creek flows through Boulder and eastward through the plains to the confluence with St. Vrain Creek, 46 miles downstream from the headwaters.

Historically, water quality has been impacted by mining activities, agricultural operations, and development. Between 1963 and 2003 approximately 1,865 acres of new development occurred within the study area. This development has converted natural landscapes in the area to impervious surfaces. Water now runs off of these impervious surfaces, carrying pollutants directly into rivers and lakes, instead of filtering through the soil into underground aquifers.

3.24.3 Existing Actions and Conditions

3.24.3.1 Land Use

Boulder geographic information system (GIS) data shows that more than 80 percent of the land within the cumulative study area is classified as open space, agriculture and low-density residential. Agricultural uses dominate in the area east of 75th Street. Boulder County has identified much of this land as being farmland of national and/or statewide importance. The NRCS has classified 24.5 acres just north and south of SH 7 as Prime farmland if Irrigated.

Industrial uses constitute approximately 12 percent of the land within the cumulative study area. Industrial uses are concentrated from SH 7 to the northern border of the study area and west of Valmont Reservoir to the eastern border of the study area. Other land uses within the study area include medium to high density residential (mostly south and west of 55th Street), commercial (west of 55th Street along SH 7), and public (mostly west of 75th Street).

Valmont, Leggett-Owen and Baseline Reservoirs, Hillcrest Lake and numerous smaller lakes and creeks continue to be dominating features in the study area although there is now a much stronger presence of residential and industrial development.

3.24.3.2 Wildlife

Black-Tailed Prairie Dogs

Data from the NDIS shows numerous black-tailed prairie dog towns scattered throughout the study area.

A colony of several acres is located along both sides of the Colorado Southern Railroad just north of Legion Park. The town appears to be very active and well populated. A second colony is located south of Legion Park in pastureland south of SH 7. One of the largest colonies in the study area (approximately 97 acres) is adjacent to Valmont Reservoir. Several additional colonies can be found in close proximity to Valmont Reservoir and Hillcrest Lake.

Raptors

Segments of the study area provide foraging and potential nesting habitat for numerous raptor species. Black-tailed prairie dog towns within the study area provide foraging areas for raptors. Agricultural fields, pastureland, wetlands and fallow cropland in the area also provide habitat for rabbits, mice and other prey species. Numerous large trees typically associated with waterways or homesteads are scattered throughout the area and provide nesting substrate for raptors. Raptors likely to nest in this portion of Boulder County today include Bald Eagle, Red-tailed Hawk, Swainson's Hawk, Northern Harrier, American Kestrel, Great Horned Owl, Long-eared Owl, Short-eared Owl, Burrowing Owl, and Ferruginous Hawk.

One raptor nest has been observed within the study area. The nest is located in an isolated cottonwood tree along an irrigation ditch that crosses 75th Street about 0.25 mile north of SH 7. Active Osprey nests have been identified by NDIS mapping in an area South of Hillcrest Lake.

No known active bald eagle nests currently exist in Boulder County. The closest active bald eagle nest is located near Standley Lake south of the study area.

Additional Wildlife

Wildlife identified by NDIS mapping with some part of their range occurring in the study area include geese, pheasant, great blue heron, pelican, white tailed deer, mule deer, and mountain lion. The Preble's Meadow jumping mouse may occupy approximately 373 acres of land between SH 7 and Baseline Road west of 75th Street.

The Boulder County Comprehensive Plan (BCCP) has identified the area north and south of Baseline Road along South Boulder Creek as critical wildlife habitat for the following CNHP species of concern: Red-headed woodpecker, Bobolink, and Johnny Darter.

3.24.3.3 Wetlands

Approximately 113 acres of wetlands are present within the study area based on field surveys conducted in the study area in June 2001, as well as wetlands identified through Boulder County GIS and the Boulder Valley Comprehensive Plan for the larger cumulative study area. This does not include riparian habitat as delineated by NDIS. According to current Boulder County GIS data, much of the wetlands occur along Dry Creek throughout the study area. There are also three man-made wetlands (irrigation ponds) along the eastern side of 95th Avenue. There are two separate subsurface wetland treatment systems created for wastewater treatment at the Valmont Power Plant. These wetlands also have some wildlife and aesthetic value because of the varied plant communities in the wetland cells and because they are located adjacent to the reservoirs.

Sombrero Marsh consists of over 20 acres of naturally functioning wetland that contains wetland soils, hydrology and vegetation, which combine to create important habitat for many birds, mammals, amphibians, and invertebrates. The site management plan for the marsh identifies the publicly owned portion (east of 63rd Street) as an Environmental Preservation and Marsh Restoration Area.

Riparian areas, as mapped by the CDOW, are inclusive of jurisdictional wetland areas. To identify wetland areas, the CDOW's *Riparian Mapping Project* delineates wetland associated vegetation. Within the study area wetland associated vegetation is located along numerous creeks, ditches and canals including Dry Creek, Dry Creek No. 3 and New Dry Creek Ditch, McGinn Ditch, South Boulder Canyon Ditch, Enterprise Ditch, East Boulder Ditch, Wellman Canal Ditch, Davidson Ditch, Leyner-Cottonwood Ditch, Marshallville Ditch, Boulder Creek, South Boulder Creek and Bear Creek.

3.24.3.4 Water Quality

In 2000, the USGS collaborated with the City of Boulder and the University of Colorado to produce a report entitled *Comprehensive Water Quality of the Boulder Creek Watershed, Colorado During High-Flow and Low-Flow Conditions*. The findings of this report are summarized below.

Water quality of Boulder Creek is affected by discharge variations from snowmelt, agricultural diversions, wastewater treatment plant effluent, point and non-point sources, and in-stream processes. Seasonal variations in flow affect water quality by diluting pollutants during high-flow conditions (from April to July) and slowing dispersion during low-flow conditions (from October to March). Low-flow conditions, as well as diversions, result in higher concentrations of pollutants because there is less water to support dilution.

Bedrock geology is an important control of water chemistry in the watershed. As bedrock is weathered, a greater amount of mineral dissolution occurs. Although Boulder Creek passes through historical metal mining districts, historical hardrock mining has not had a major effect on existing stream chemistry.

Treated effluent from the 75th Street Wastewater Treatment Plant, which meets Colorado state water quality standards, dominates the chemistry of lower Boulder Creek, in part because upstream flow is diverted for municipal and agricultural uses and cannot provide in stream dilution.

Concentrations of dissolved ions, calcium, chloride, magnesium, silica, sodium, bicarbonate and sulfate have been found to increase slightly between the mouth of Boulder Canyon and upstream of 75th Street.

Several pesticides have been detected during both high and low flow periods in Boulder Creek, most likely originating from urban and agricultural land uses. The USGS estimates that 7,890 kilograms of pesticides are applied annually to agricultural land in Boulder County. The most frequently detected pesticide is diazinon. The pesticide found at the highest concentration is dichlobenil.

3.24.4 Planned Development and Transportation Actions

Other than the roadway improvements that are identified in this EA, no major transportation projects are planned by either the City of Boulder or Boulder County along SH 7. The only County property along SH 7 that could potentially be developed is currently zoned commercial. In the future, any County property zoned agricultural will remain agricultural or will become open space. No projects for Legion Park are planned at this time.

A significant portion of Sombrero Marsh is still in private ownership on the northwest corner of the Marsh (which extends all the way to the corner of Cherryvale Road and SH 7). According to the *Site Management Plan for Sombrero Marsh* prepared in 2001 by the City of Boulder Open Space and Mountain Parks Department, there is a high likelihood that the property adjacent to the marsh will be developed in the future. The City of Boulder has considered opportunities for working with the landowner to preserve this non-public land through landscaping (buffering from potential development) and limiting access.

The Northwest Rail EA process will be initiated in 2007. This is likely to identify commuter rail as the preferred technology for the 28-mile corridor between Denver Union Station and Boulder.

Table 3-27 lists the land use, transportation and infrastructure projects that are "reasonable foreseeable" within the cumulative study area.

Table 3-27
Reasonably Foreseeable Future Development and Transportation Projects

Project Location	Jurisdiction	Description	Status
5550 Arapahoe Road	City of Boulder	Annexation of a small used car dealership	Review
5675 Arapahoe Road	City of Boulder	Office and multi-family residential	No Recent Progress
5729 Arapahoe Road	City of Boulder	Annexation of a small industrial site	Review
5980 Arapahoe Road	City of Boulder	Boulder Jewish Community Center	Planning Stages
5995 Arapahoe Road	City of Boulder	Office Development	No Recent Progress
6032 Butte Mill Road	City of Boulder	Annexation of Industrial Lot	Review
5880 Butte Mill Road	City of Boulder	Annexation and potential development of small service industrial	Review
1121 75th Street	City of Boulder	Subdivision of a 9.5-acre parcel into a 3.4-acre and 6.1-acre parcel to allow for the preservation of a historic farmstead and to create open space.	Application Approved
Valmont Road, 57th Street to 61st Street	Boulder County	Widen to four lanes, traffic signals, reconfigure the intersection with Butte Mill Road and replace the Valmont Road bridge over South Boulder Creek.	Construction 2004-2005
Valmont Road, 57th Street to 95th Street	Boulder County	Major overlay/surface reconstruction, improve curve alignments at two locations and add paved shoulders.	Construction 2007-2008
North 95th Street	Boulder County	Intersection improvements from Longmont to Lafayette, including the Valmont Road/Isabelle Road Intersection.	Construction 2006-2008
95th Street Corridor from Longmont to Broomfield	Boulder County	New Transit Service - includes transit stops and queue jumps at undetermined intersections along the route.	Construction 2005-2006
US 36	CDOT/RTD	Transportation and Bus Rapid Transit alternatives being considered for the US 36 corridor.	Draft EIS being prepared
FasTracks	RTD	Commuter rail added along the BNSF railroad line. A station is included at East Boulder Station (63rd Street and SH 7).	NEPA will begin in 2007.

Source: City of Boulder and Boulder County, 2004.

3.24.5 Impacts

3.24.5.1 Land Use

Land uses within the cumulative study area have remained fairly consistent in recent years. A large percentage (80 percent) of the cumulative study area is classified as open space, agriculture and low-density residential. Much of the open space and agricultural

lands within the cumulative study area are owned by the City of Boulder and Boulder County and are protected from future development. As such, reasonably foreseeable development actions are limited and would have negligible impacts to land uses within the cumulative study area.

The proposed commuter rail station at 63rd and Arapahoe would require the acquisition of approximately 12 acres of existing industrial and storage uses and convert those uses to a park-n-Ride. This change in use may affect the trail along the site. There may also be some conversion of use to higher density in the surrounding area. All of this will result in impacts to traffic, air quality, noise and other resources.

Because much of the land within the cumulative study area is protected from future development, it is unlikely that substantial development or changes in existing development patterns would occur as a result of the construction of the Preferred Alternative.

3.24.5.2 Wildlife

Habitat for black-tailed prairie dogs, raptors and other wildlife has been negatively impacted by agricultural and land development activities in the area. It is, therefore, reasonable to assume that there have been significant reductions in the extent of these species within the study area. Today, the cumulative study area is for the most part, developed or preserved. Open space and agricultural lands that are owned by the City of Boulder and Boulder County will generally remain used for recreational and agricultural purposes. Future development and transportation projects planned for the area are few and would not result in a significant loss of habitat for wildlife within the cumulative study area; however, the proposed commuter rail station at 63rd and Arapahoe would create minor disturbances to wildlife habitat.

Construction of the Preferred Alternative would impact 5.8 acres of vegetation in the Hoover Hill/Legion Park area and would require the removal of approximately 110 trees along the corridor. Even though this would be in an area that is immediately adjacent to the existing roadway, vegetation removal would contribute to the cumulative loss of habitat in the area. These impacts would not result in effects that would exceed the ability of wildlife to sustain itself or remain productive. Under the Preferred Alternative there would be no impact to black-tailed prairie dogs or burrowing owls.

3.24.5.3 Wetlands

Development adjacent to Sombrero Marsh could potentially degrade the quality of this only naturally occurring perennial open water body still present in the study area today. The remainder of Sombrero Marsh is under the management of the City of

Boulder Open Space and Mountain Parks Department. Reasonably foreseeable development actions are limited and would have negligible impacts to the remaining wetlands and riparian corridors within the cumulative study area.

There are wetlands and other Waters of the U.S. along the BNSF alignment north of Arapahoe Road in this study area. The proposed commuter rail project and park-n-Ride would directly impact approximately 0.5 acre of wetlands and 0.2 acre of impact to Boulder Creek. Other indirect impacts would occur to these resources, including sedimentation, erosion, noxious weed invasion, and loss of vegetation due to shadowing of bridges.

Construction of the Preferred Alternative would impact several riparian corridors crossing SH 7 and would impact 0.322 acre of wetlands. Under the Preferred Alternative there would be no impact to any portion of Sombrero Marsh.

3.24.5.4 Water Quality

Similar to many Front Range areas, the Boulder Creek Watershed area has experienced significant population growth over the years. Changes in land use, increased growth, and the conversion of agricultural lands to developed lands have collectively impacted water resources over time. Development throughout the cumulative study area will increase the impervious surface area, change runoff characteristics, and potentially degrade water quality. If the population of Boulder County were to increase as projected by the US Census (by approximately 71,000 persons or 25 percent), there would be an increased demand for water supplies and water treatment. Water depletion and treatment capacity may become a concern for the city.

The new park-n-Ride at 63rd and Arapahoe will result in increased impervious surface (approximately 12 acres) which will increase contaminated stormwater runoff into surface waters. The treatment of this runoff will be done in compliance with Boulder County water quality standards.

The length of roadway along SH 7 that is proposed for improvement under the Preferred Alternative consists of approximately two miles. The cumulative impacts study area for water quality consists of the 1,160-km^2 Boulder Creek Watershed. Because the proposed action is so small in scope, the cumulative impact of the project to this resource is negligible. In addition, because the proposed action would occur in the lower basin of the Boulder Creek Watershed, impacts to Boulder Creek headwater streams would be avoided.

3.24.6 Mitigation

The following measures could reduce the proposed action's portion of the cumulative impacts to the resources of concern:

- Prior to construction, an NPDES Permit would be obtained from the CDPHE, in accordance with Section 402 of the Clean Water Act. Under the NPDES permit stipulations, BMPs would be detailed in the project plans for implementation in the field.

- Use of Stormwater BMPs during construction. These are detailed in Section 3.13.5, Water Resources Mitigation, and would comply with local ordnances.

- All CDOT revegetation BMPs and guidelines will be followed to ensure adequate revegetation of the study area. These are detailed in Section 3.10.3, Vegetation and Noxious Weed Mitigation.

- Adherence to the conditions outlined by CDOT ensure compliance with the Migratory bird Treaty Act. These provisions are detailed in Section 3.11.4, Wildlife and Aquatic Resources Mitigation.

- Implementation of BMPs from the *Erosion Control and Storm Water Quality Guide*, CDOT, 2002 will reduce the potential for impacts to wetlands and riparian areas. These are detailed in Section 3.9.4, Wetland Impact Minimization and Mitigation Measures.

3.25 Permits Required

The following permits and coordination activities may be required to support the construction of the proposed action:

- **National Pollutant Discharge Elimination System (NPDES**). An NPDES Permit will be obtained prior to construction by CDOT from the CDPHE, in accordance with Section 402 of the Clean Water Act. This stormwater discharge permit is required to ensure the quality of stormwater runoff.

  An NPDES stormwater permit (CWA, Section 402) is required for all CDOT construction projects that impact one acre of land or more, or are part of a larger plan. Therefore, all proposed future projects along the SH 7 study area will be issued permits through CDPHE prior to the onset of highway construction activities. Under the NPDES permit stipulations, CDOT will prepare a site-specific SWMP that outlines in detail the specific BMPs in the project plans for implementation in the field. Included in the SWMP are such aspects as BMP locations, turbidity and monitoring requirements, seed mix, concrete washout

containment provisions, and other relevant information that is provided to the CDOT contractor(s).

This project is located within the Phase I and Phase II areas under CDOT's Municipal Separate Storm Sewer System (MS4) permit, which is a subset of the NPDES regulations. Thus, requirements for capturing 100 percent WQCV (water quality control volume, or the first 0.5 inch of precipitation in a storm) or 80 percent TSS (total suspended solids) apply. In order to meet water quality standards, and to reduce impacts from sediments, permanent BMPs will be implemented, as noted in Section 3.13, Water Resources and Water Quality.

- **Section 404 Permit.** A Section 404 Permit, issued by the USACE is required whenever construction projects or maintenance activities requiring filling occur below the ordinary high-water line in any body of water considered a water of the United States (navigable waters of the United States and adjacent wetlands; all tributaries to navigable waters and adjacent wetlands; interstate waters and their tributaries and adjacent wetlands).

- **Section 402 Permit.** A Section 402 Permit, issued by CDPHE, is required for dewatering of construction areas, if necessary. The following activities would require the acquisition of a 402 Permit:

  - Construction dewatering operations associated with activities such as utility excavation, bridge pier installation, foundation or trench digging, or other subsurface activities.
  - If discharge is expected to occur from a point source discharge from mechanical wastewater treatment plants, vehicle washing, or industrial discharges.

- **Section 401 Water Quality Certification.** A Section 401 Water Quality Certification is required in conjunction with an Individual 404 Permit (dredge and fill permit) for any transportation construction project or maintenance activity where work occurs below ordinary high-water line or adjacent to wetlands. As part of the 401 Certification, CDOT notifies downstream water users when impacts to nearby receiving waters may occur during construction, e.g., when blasting occurs near receiving streams. As part of construction, CDOT (or its contractors) will monitor turbidity in any of the affected streams. The 401 Certification must be obtained from the Water Quality Control Division of the CDPHE. If a 404 Nationwide or General permit has not been issued, a 401 Certification is not required.

- **Senate Bill 40 Certification.** A SB 40 Certification will be required by the Colorado Division of Wildlife for stream crossings or adjacent streambanks to

avoid adverse effects to waterways and adjacent riparian vegetation. In these areas, trees and shrubs must be replaced at a 1:1 basis (trees) and square foot basis (shrubs).

- **Fugitive Dust Permit.** A Fugitive Dust Permit will be required if more than 25 acres of land will be impacted and/or project construction will last longer than six months.
- **State Access Permit.** A State Access Permit is required for all requests for new or modified access to SH 7. Any existing accesses adversely affected by the proposed action will be notified of the proposed changes.
- **Construction Access Permits.** Construction Access Permits will be required for temporary access needs outside the construction project limits.
- **Floodplain Permits.** A Floodplain Development Permit from Boulder County may be required. This will be obtained during final design.
- **Other Local Permits.** Additional permits, such as building, utility or survey permits may be required to support project construction requirements.

3.26 Summary of Mitigation

A summary of mitigation measures and commitments for the Preferred Alternative is provided in **Table 3-28** on the following pages.

Table 3-28
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Land Use	Mitigation for the change in land use will be through compensation to the landowner during the right-of-way acquisition process. The right-of-way mitigation is discussed in Section 3.5.	
Social Conditions(including Environmental Justice)	Social: Good communication with emergency service providers, the community, and residents with regard to road delays, access, and special construction activities is recommended during the construction phase. This may be accomplished by radio and public announcements, newspaper notices, on-site signage, and the use of the City's Web site. Environmental Justice: Every effort was made to avoid or minimize potential impacts to low-income and/or minority populations in the study area. This included eliminating the auxiliary/queue jump lane in order to narrow the width of the roadway in front of the mobile home park. Because of these efforts, no disproportionate impacts to low-income or minority populations are anticipated, and therefore, no mitigation measures are required. All property acquisition will follow the procedures outlined in the CDOT Right of Way Manual. CDOT follows the Federal Uniform Relocation and Real Property Acquisition Act of 1970 (Public Law 91-646), as amended in 1987 (Public Law 100-17), 1991 (Public Law 102-240) and 1997 (Public Law 105-117). The purpose of the act is "To provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally assisted programs."	
Economic Conditions	Good communication with the community, business owners, and residents with regard to road delays, access, and special construction activities is recommended during the construction phase. This may be accomplished by radio and public announcements, newspaper notices, on-site signage, and through the CDOT's Web site. Mitigation for relocation impacts is addressed in Section 3.5, Right-of-Way.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Right-of-Way	All property acquisition will follow the procedures outlined in the CDOT Right of Way Manual. CDOT follows the Federal Uniform Relocation and Real Property Acquisition Act of 1970 (Public Law 91-646), as amended in 1987 (Public Law 100-17), 1991 (Public Law 102-240) and 1997 (Public Law 105-117). The purpose of the act is "To provide for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by Federal and federally assisted programs and to establish uniform and equitable land acquisition policies for Federal and federally assisted programs." For permanent right-of-way acquisitions, under CDOT right-of-way policy, owners will be compensated in a fair and equitable manner. Depending on the estimated value of the property, monetary compensation is determined through independent and impartial appraisals by qualified professionals (over $5,000) or by value finding (under $5,000). For permanent slope easements acquisitions, similarly to right-of-way acquisitions, owners will be compensated in a fair and equitable manner through the use of appraisals (over $5,000) or by value finding (under $5,000). For permanent slope easements, owners are compensated for the property but retain limited usage in ways that do not cause negative impacts to the roadway. For properties requiring relocation, the relocation benefits provided to those displaced are determined by eligibility guidelines based on federal regulations. For eligible businesses, this includes reimbursement of actual reasonable and necessary moving and related expenses and certain re-establishment costs, or a fixed payment in lieu of all other possible relocation benefits. For eligible residences, this includes reimbursement of moving and related expenses, a replacement housing benefit for owners, or a rental supplement for renters. The rental supplement payment may also be used towards the down payment for the purchase of a replacement dwelling to encourage renters to become property owners. The replacement housing benefit and rental supplement benefit have certain monetary limitations; however, these limitations can be exceeded in certain circumstances.	
Transportation	Because there are no adverse impacts, mitigation is not necessary.	
Noise	Once a noise impact is determined to result from the proposed improvements, a reasonableness and feasibility analysis must be conducted to determine if mitigation is warranted at these locations. Mitigation should consider all possible noise abatement measures for reasonableness and feasibility. These include providing noise barriers or walls, earth berms, creating buffer zones of undeveloped land, planting vegetation, traffic management, installing noise insulation on buildings and relocating the highway.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Noise (continued)	According to CDOT guidelines, the "feasibility and reasonableness" of mitigation needs to be considered for all locations that are projected to experience noise impacts. The feasibility analysis of mitigation considers such factors as the effectiveness of a barrier to achieve a 5-dB(A) reduction in predicted future noise levels, construction, engineering, maintenance or other design issues. Mitigation measures are considered feasible if they can achieve a noise reduction of 5 dB(A) for at least one receiver. They should not create any safety or unacceptable maintenance problems. Noise mitigation is considered reasonable if it meets certain criteria, such as the cost per receiver per decibel of noise reduction and type of land use protected. For example, business districts typically do not receive noise mitigation, as noise barriers would block the view of businesses from motorists. Relocating the highway, creating buffer zones, constructing earth berms and planting vegetation are not feasible in this situation because these abatement measures require large amounts of land to achieve the necessary noise reductions. The surrounding land use in the study area prohibits acquiring the space needed for these abatement measures. Traffic management, such as limiting truck traffic on the highway, is not feasible because of the status of SH 7 as a major highway and the commercial and light industrial uses along the highway. Because of the high cost, installing noise insulation on buildings is usually reserved for public buildings such as schools or hospitals. For these reasons, noise barriers seem to be the most appropriate noise abatement measure for this project. Noise mitigation models were run to test the reasonableness and feasibility of noise walls. Note that a unit noise wall cost of $30.00 per square foot was used in all of the calculations, according to current CDOT guidelines. Noise abatement structures were analyzed for three impacted areas according to CDOT guidelines. Mitigation Barrier	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Noise (continued)	Mitigation Barrier at SW10 A noise barrier was analyzed for Site SW10, which consists of two residences located at 6160 and 6180 Arapahoe Road. Noise mitigation at this site is not recommended because the resultant cost-benefit was unreasonable according to CDOT and FHWA guidelines. The feasible and reasonable analyses are detailed in Appendix B of the SH 7 *Noise Analysis Technical Memorandum,* which is located in Appendix E of this document.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Noise (continued)	An effective noise reduction of 5.7 decibels could be achieved at this location by constructing a continuous six-foot noise wall that is 310 feet long. The noise wall would require relocation of the two residential driveway accesses. Any gaps in the wall would decrease the effectiveness of the noise abatement, making the wall infeasible. The wall is shown in Figure 3-11, illustrating the gaps created by intervening driveway access points. Construction of a continuous wall should not create safety hazards for vehicles or pedestrians along SH 7. The cost of a continuous wall of these dimensions would be approximately $55,800. Using the CDOT criterion for cost benefit in determining the reasonableness of noise abatement discussed in the paragraphs above, the cost benefit of this noise wall would be approximately $4,895 per receiver per decibel noise reduction. CDOT considers any amount over $4,000 not reasonable. Noise mitigation at this location is not recommended because, although relocating the two accesses would make this wall feasible, the extraordinary cost/benefit ratio would make the wall unreasonable.	
Air Quality	Motor vehicle emissions in the study area would not result in any exceedance of the NAAQS; therefore, no direct project air quality mitigation is necessary. During construction, dust emissions should be minimized by including techniques to control fugitive dust.	
Wetlands	The Preferred Alternative design includes avoidance and minimization of impacts to most study area wetlands. Impacts to wetlands will be avoided and minimized as much as practical during the final design process. The design shall comply with the policy of Executive Order 11990 regarding impacts to wetlands. The following specific BMPs from the *Erosion Control and Storm Water Quality Guide*, CDOT, 2002, will be required during construction to reduce the potential for wetlands to be indirectly affected by sedimentation from accelerated erosion or by hazardous materials (e.g., fuel, equipment lubricants): • All disturbed areas will be revegetated with native grass and forb species. Seed, mulch and mulch tackifier will be applied in phases throughout construction. • Where permanent seeding operations are not feasible because of seasonal constraints (e.g., summer and winter months), disturbed areas will have mulch and mulch tackifier applied to prevent erosion. • Erosion control blankets will be used on 3:1 or steeper, newly seeded slopes to control erosion and to promote the establishment of vegetation. Slopes should be roughened at all times. • Temporary erosion control blankets will have flexible natural fibers.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Wetlands (continued)	• Erosion bales, erosion logs, silt fence or other sediment control device will be used as sediment barriers and filters adjacent to wetlands, surface waterways and at inlets where appropriate. • To minimize the loss of sand from the road surface during winter sanding operations, sediment catch basins will be included during construction and put in place permanently with continual maintenance. • Where appropriate, slope drains will be used to convey concentrated runoff from top to bottom of the disturbed slopes. Slope and cross-drain outlets will be constructed to trap sediment. • Storm drain inlet protection will be used where appropriate to trap sediment before it enters the cross-drain. • Check dams will be used where appropriate to slow the velocity of water through roadside ditches and in swales. Additionally, the following BMPs to minimize additional wetland impacts during construction will be employed: • All wetland areas and water bodies not impacted by the project will be protected from unnecessary encroachment by temporary fencing and will be seeded in phases throughout construction. Sediment control such as silt fence or erosion logs will also be used where needed to protect the area from sediment. Siltation control devices (e.g., fences) will be placed on the down-gradient side of construction areas to prevent soil from entering wetland areas. • No staging of construction equipment, equipment refueling or storage of construction supplies will be allowed within 50 feet of a wetland or any water-related area. • Standard erosion/sediment control measures will be observed and an erosion control plan will be developed prior to and for inclusion in the construction bid plans. All bare fill or cut slopes adjacent to streams or intermittent drainages will be stabilized as soon as practicable. • No fertilizers, hydrofertilizers, or hydromulching will be allowed anywhere on the project. • Work areas will be limited as much as possible to minimize construction impacts to wetlands	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Wetlands (cont'd.)	Wetlands, as well as their associated functions permanently impacted by the Preferred Alternative will be mitigated at a 1:1 ratio by purchase of credits at one of the three wetland mitigation banks within the primary service area. Wetland impacts will be reduced as much as possible during final design. Replaced wetland functions and values are anticipated to include bank stabilization, sediment/toxin retention, nutrient removal/transformation, food chain support, wildlife habitat, and visual quality. Wetland areas temporarily impacted by construction activities will be restored as soon as possible following completion of the activity.	
Vegetation and Noxious Weeds	All CDOT revegetation BMPs and guidelines will be followed to ensure adequate revegetation of the study area. All disturbed areas will be seeded in phases throughout construction. Although specific BMPs to be used will not be determined until final design, mitigation measures are anticipated to include: • Minimize the amount of disturbance of grading to 10 feet beyond the toe of slope. Project will follow CDOT standard specifications for amount of time that disturbed areas are allowed to be non-vegetated. • Avoid existing trees, shrubs and vegetation, to the maximum extent possible, especially wetlands and riparian plant communities. Coordinate with CDOT landscape architect prior to construction to determine which vegetation will be protected during construction. • Salvage weed free topsoil for use in seeding. • Implement temporary and permanent erosion control measures to limit erosion and soil loss. Erosion control blankets will be used on steep, newly seeded slopes to control erosion and to promote the establishment of vegetation. Slopes should be roughened at all times. • All disturbed areas will be revegetated with native grass and forb species. Seed, mulch and mulch tackifier will be applied in phases throughout construction. • Develop acceptable revegetation plan with the CDOT Landscape Architect, City of Boulder, and Boulder County. • A Senate Bill 40 (SB 40) Certification will be required by the Colorado Division of Wildlife for stream crossings or adjacent streambanks to avoid adverse effects to waterways and adjacent riparian vegetation. In these areas, trees and shrubs must be replaced at a 1:1 basis (trees) and square foot basis (shrubs).	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Vegetation and Noxious Weeds (continued)	Since soil disturbance with accompanying invasion by noxious weed species can be associated with highway construction, an Integrated Weed Management Plan will be incorporated into the project design and implemented during construction. Specific BMPs will be required during construction to reduce the potential for introduction and spread of noxious weed species, such as: • Mapping will be included in the construction documents along with appropriate control methods for noxious weeds. • Highway right-of-way areas will periodically be inspected by the City of Boulder or its consultants during construction and during post-construction weed monitoring for invasion of noxious weeds. • Weed management measures will include removal of heavily infested topsoil, herbicide treatment of lightly infested topsoil, limiting disturbance areas, phased seeding with native species throughout the project, monitoring during and after construction, other herbicide and/or mechanical treatments. • Use of herbicides will include selection of appropriate herbicides and timing of herbicide spraying, and use of a backpack sprayer in and adjacent to sensitive areas such as wetlands and riparian areas. • Certified weed-free hay and/or mulch will be used in all revegetated areas. • No fertilizers will be allowed on the project site. • Supplemental weed control measures may be added during design and construction planning. Preventative Control Measures for project design and construction may include: • Native Plants: Use of native species in revegetation sites. • Weed Free Forage Act: Materials used for the project will be inspected and regulated under the Weed Free Forage Act, Title 35, Article 27.5, CRS. • Topsoil Management: When salvaging topsoil from on-site construction locations, the potential for spread of noxious weeds will be considered. Importing topsoil onto the project site will not be allowed. • Equipment Management: Equipment will remain on designated roadways and stay out of weed-infested areas until the areas are treated. All equipment will be cleaned of all soil and vegetative plant parts prior to arriving on the project site.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Wildlife and Aquatic Resources	• Disturbance to native plant communities will be minimized. • Tree removal will be minimized. • Erosion control techniques, such as silt fence or erosion logs, will be used to protect surrounding areas from construction related erosion. • Noxious weeds will be spot sprayed. In locations where spot application is not practical a wildlife biologist will inspect the area prior to spraying to ensure crucial habitat is not impacted. • Temporary erosion control blankets will have flexible natural fibers. • Follow requirements of the Colorado Department of Transportation, outlined in the note below: Note: The Migratory Bird Treaty Act (MBTA) protects all migratory birds, nests and eggs except English sparrow, European starling, and rock dove and resident game birds. For projects that could potentially result in the killing, taking, harassing, or harming of these birds, the following conditions must be adhered to: Tree Trimming/Removal Tree trimming and/or removal activities shall be completed before birds begin to nest or after the young have fledged. In Colorado most nesting and rearing activities occur between April 1st and August 31st. However, since some birds nest as early as February a nesting bird survey must be conducted by a biologist before any tree trimming or removal activities begin. Bridge/Box Culvert Work Bridge or box culvert work that may disturb nesting birds must be completed before birds begin to nest or after the young have fledged. No bridge or box culvert work may take place between April 1st and August 31st. If work activities are planned between these dates, nests must be removed (before nesting begins) and appropriate measures taken to assure no new nests are constructed. Failure to remove and keep nests from becoming established could postpone construction of the project.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Wildlife and Aquatic Resources (continued)	Clearing/Grubbing Activities Clearing and grubbing of vegetation that may disturb ground nesting birds must be completed before birds begin to nest or after the young have fledged. If work activities are planned between April 1st and August 31st, vegetation must be removed and/or trimmed to a height of six (6) inches or less prior to April 1st. Once vegetation has been removed and/or trimmed, appropriate measures (i.e. repeated mowing/trimming) must be implemented to ensure vegetation does not grow more than six (6) inches. Failure to maintain vegetation height of six (6) inches or less could provide habitat suitable for nesting birds that could postpone construction of the project. Birds of Prey For birds or prey that could potentially nest near the project site, please refer to the Colorado Divisions of Wildlife's "Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors" guidelines, available at Colorado Division of Wildlife district offices. • Work activities, including the movement and placement of vehicles, shall not disturb black-tailed prairie dog colonies. If any sites are encountered, CDOT Region 4 Environmental Unit shall be notified so that all applicable clearances and permits may be obtained, including following CDOT prairie dog policy. • Although no Burrowing owls were observed in or near the study area, they are a state threatened species and are protected under MBTA. No human encroachment or disturbance within 75 yards of a nest site shall occur from April 1 to July 31. If project activities are scheduled to take place between March 1 and October 31, a burrowing owl survey must be completed before construction activities begin. If owls are identified on or adjacent to the project, CDOT Region 4 Environmental Unit shall be notified immediately.	
Threatened, Endangered or Sensitive Species	Mitigation is not necessary since there will be no impacts.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Water Resources and Water Quality	For the high groundwater in the proximity of the railroad overpass, the design will accommodate this groundwater and direct it to the storm drainage system. This project commits to following CDOT's Erosion Control and Stormwater Quality Guide, sections 107.25 & 208 of the specifications for the Standard Specifications for Road and Bridge Construction and the Stormwater Management Plan. CDOT follows The Municipal Separate Storm Sewer System (MS4) requirements for water quality. These requirements will be followed on this project by the process outlined in Appendix I of the CDOT Drainage Design Manual. A Stormwater Management Plan (SWMP) will be completed during final design. It will address specific methods of reducing pollutants in stormwater runoff during construction. Stormwater BMPs for a site during construction would consist of five major elements: • Implementation of BMPs for erosion control. These include, but are not limited to, phased seeding with mulch and tackifier, the use of erosion control blankets, the use of embankment protectors, the use of berm diversions or check dams, and outlet protection for storm sewer pipes. • Implementation of BMPs for sediment control. These include, but are not limited to, erosion bales or logs, silt fence, storm drain inlet and outlet protection, sediment traps, concrete washout and saw water containment basins, and stabilized construction entrances. • Implementation of BMPs for materials handling and spill prevention. These include, but are not limited to, stockpile management, material management, material use, and spill prevention and control. • Implementation of BMPs for waste management. These include, but are not limited to, concrete, hazardous, and contaminated waste management to ensure that solid or liquid wastes are not carried off the site by stormwater. • Implementation of BMPs for pollution prevention. These include treatment during dewatering and paving operations. It also includes the use of street sweeping and temporary waterway crossings.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Water Resources and Water Quality (continued)	Permanent BMPs will be designed to protect stormwater quality and reduce pollutant discharges after construction is complete. The permanent BMPs are developed with the intention of mitigating the potential impacts typical of a roadway corridor. These can include petroleum or other vehicle fluids, hazardous spills, sand or other snow melting chemicals, and litter. General BMPs for this project will include the vegetation of all disturbed areas with erosion control blankets on slopes 3:1 or steeper. In addition to maintaining BMPs installed on the project, maintenance activities after construction will include consistent roadway sweeping and removal of sediment from storm inlets and basins. The EA evaluated a wide range of Best Management Practices (BMPs) for the use on SH7. The following outlines the process for choosing the appropriate BMPs that should be incorporated for the project. During final design, a determination will be made of exact methods and locations of stormwater management during construction and will be outlined in the SWMP.	
Wild and Scenic Rivers	No mitigation is necessary.	
Floodplains	Since the improvements within the floodplain would not cause a rise in the floodplain, no mitigation measures are required for floodplains. A floodplain development permit from Boulder County would be required since work is taking place in the floodplain. This permit would be obtained during the final design of the project.	
Geology	The final design stages of the project will include a detailed geotechnical and pavement design to provide structural integrity of the roadway for the geological conditions. Bridge foundations, retaining walls and culvert structures will be designed based on specific geologic conditions. Deep foundations will be considered based upon the presence of potentially swelling or collapsible soils. Some locations east of Legion Park where sandstone and alluvial sands are present may allow structures founded on spread footings. The improvements will be designed to meet the seismic requirements for the area. Therefore, seismic events typical of the region will not affect the project.	
Historic Preservation	Agreement among the SHPO, ACHP, FHWA, and the Certified Local Government, represented by the Boulder Landmarks Preservation Board, has been reached through the Section 106 process of the National Historic Preservation Act on measures to minimize harm. Those measures are incorporated into the alternatives designs. A Memorandum of Agreement has been prepared and will be signed prior to the Final Decision Document. No mitigation for paleontological resources has been recommended for the alternatives. However, if these resources are uncovered during construction, the CDOT Paleontologist will be notified immediately.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Hazardous Waste	During construction, CDOT utilizes its Environmental Health and Safety Management Specification (250 Specification) on projects to address issues related to the transportation, handling, monitoring, and disposal of any hazardous or solid waste materials encountered during construction, including contaminated soils, lead-based paint, and other toxic substances. If deemed necessary, a materials management plan would be prepared regarding the removal and disposal of contaminated soils. A Health and Safety Plan would also be developed to protect workers during construction. During final design when right-of-way and access requirements are further developed, CDOT will obtain the status of any suspect sites in the study area and will take the necessary precautions during future construction activities. When contaminated properties are encountered, either during or prior to construction, CDOT coordinates with the affected property owners through the right-of-way process, as well as with the appropriate state, local and federal authorities. Prior to a construction project, CDOT ascertains the status of adjacent properties and updates all available information at that time. Construction contractors are required to comply with Section 250, Environmental Health and Safety Management (CDOT Standard Specifications), when applicable, during construction. Specific mitigation is unknown at this time, but will be incorporated into final design plans when more detailed design information becomes available. At the Historic Gas Station, further testing of soils and groundwater on site and off site may be necessary. At the time of final design, the necessary right-of-way acquisition and relocation processes would be initiated in accordance with the CDOT right-of-way manual, FHWA, and other federal guidance procedures involving acquisition and relocation. CDOT procedures concerning hazardous waste issues would also be followed to determine necessary project mitigation requirements.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Open Space/Recreation	The land where the eastern leg of the access into Legion Park is removed will be revegetated with native plant seed mixtures. No other mitigation measures are necessary for any of the parks or recreation facilities. The following BMPs will mitigate the build alternatives impacts: • Minimize the amount of disturbance of grading to 10 feet beyond the toe of slope. Project will follow CDOT standard specifications for amount of time that disturbed areas are allowed to be non-vegetated. • Develop and implement a noxious weed management plan. This will be completed during final design. • Salvage weed free topsoil for use in seeding. • Implement temporary and permanent erosion control measures to limit erosion and soil loss. • Reseed all disturbed locations except rock cuts with native plant seed mixtures. • Develop acceptable revegetation plan with the CDOT Landscape Architect, City of Boulder, and Boulder County. Removed trees and shrubs in the Boulder Creek riparian zone will be replaced on a 1:1 basis as required by SB 40.	
Visual Quality	Visual mitigation measures could include: • Choose wall colors and textures that will fit into the landscape visually and aesthetically by complimenting the surrounding area to reduce visual impact to the community. • Revegetation of disturbed areas in a manner that is consistent with adjacent landscape features. Use native and indigenous species for revegetation. • Where feasible, slope modifications will be completed in a manner that maintains or accentuates foreground views. Techniques could include creating pockets for native vegetation, undulating finished grades, and application of erosion control measures.	
Farmland	The total points on the Farmland Conversion Rating form (AD-1006) for impacts are less than 260. Therefore, under the provisions of 7 CFR 658.4(c), no mitigation is required by the NRCS. Any crops that are damaged during construction will be compensated by CDOT.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Energy/Utilities	All utility locations will be identified and field verified prior to construction. Exposed utilities will be protected during construction activities. If utility service must be interrupted, temporary service will be provided as needed and maintained during the disruption. It is expected that some of the utilities will be in conflict with the proposed improvements and require reset and/or relocation work to a new permanent location. Impacted utility owners will be contacted during the early stages of the design process to closely coordinate this work and design. An effort will be made to minimize impacting the existing ditches and drainage structures through efficient design and coordination with the owners. The exact location of personal wells and septic systems adjacent to the proposed action will be determined during the design process and noted on the plans, if applicable. Protection and/or relocation of the wells and septic systems might be needed and will be mitigated during the right-of-way acquisition process. Coordination with the affected residents, CDOT, Boulder County, and the City of Boulder will be necessary to minimize conflicts. Adequate public notice will be given for proposed work activities. Coordination with impacted residents will be maintained throughout the construction process. If it is determined that the improvements will impact the existing system, the owner will be notified in advance of roadway work for coordination efforts to protect or relocate the system. Design modifications, such as retaining wall installations instead of embankment or excavation roadway slopes, may be preferred.	
Construction	Air Quality To mitigate impacts to air quality during construction, water as a dust palliative will be used. Stockpile areas can be stabilized through covering or the application of water. Haul trucks should be covered during transport. Finally, to reduce emissions, the contractor can be encouraged to retrofit equipment to reduce pollution, to use clean burning fuels and to properly maintain construction equipment. Noise To limit noise impacts to residents, it is recommended that the construction activities be limited to daytime work hours. Also, the contractor shall be encouraged to phase as much of the noise inducing activities together to help limit the duration of higher noise levels. Finally, the contractor shall be required to use mufflers or noise blankets on equipment and quiet generators.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Construction (continued)	Water Quality Impacts to stormwater quality can be mitigated during construction. This project commits to following CDOT's Erosion Control and Stormwater Quality Guide and sections 107.25 and 208 of the Standard Specifications for Road and Bridge Construction. An erosion control plan will be developed during final design and followed during construction. Inspections of erosion control and water quality devices should occur during construction. The following are stormwater quality methods to be implemented during construction: • Implementation of BMPs for erosion control. These include but are not limited to seeding, the use of erosion control blankets, the use of embankment protectors, and outlet protection for storm sewer pipes. • Implementation of BMPs for sediment control. These include but are not limited to erosion bales, silt fence, storm drain inlet protection, sediment traps, and stabilized construction entrances. • Implementation of BMPs for materials handling and spill prevention. These include but are not limited to stockpile management, material management, material use, and spill prevention and control. • Implementation of BMPs for waste management. These include but are not limited to concrete, hazardous, and contaminated waste management. • Implementation of BMPs for pollution prevention. These include treatment during dewatering and paving operations. It also includes the use of street sweeping and temporary waterway crossings. Visual Visual impacts will be minimized during construction by limiting stockpiles and equipment storage to designated areas. Any traffic control devices can be removed promptly after use. Section 4(f) Mitigation for temporary impacts to the Legion Park 4(f) property will include seeding with a native seed mix approved by Boulder County.	

continued

Table 3-28 (cont'd.)
Summary of Mitigation and Commitments for the Preferred Alternative

Category	Mitigation Measures and Commitments	Date Completed
Construction (continued)	Sustainability Sustainable practices incorporated into the project planning, construction, and maintenance can minimize resource impacts. As part of its environmental ethic and policy, CDOT encourages its staff, consultants, and contractors to identify and utilize opportunities and methods to reduce the impact of projects and programs on environmental resources through innovative programs and by providing flexibility in project planning and construction for the use of sustainable processes and materials. This may include such concepts as: natural resource conservation, waste minimization, materials reuse, minimal use of native virgin materials, conservation and efficient use of water and energy, air pollution prevention, preference for "green" purchasing including recycled, minimally processed and packaged items, and preference for locally-available resources. CDOT encourages the identification and incorporation of proven alternative materials that are as long or longer-lasting, and which require the same or less amount of maintenance, as long as such materials do not impact CDOT's ability to meet its primary obligations for providing a safe and efficient transportation system.	
Cumulative	The following measures could reduce the proposed action's portion of the cumulative impacts to the resources of concern: • Prior to construction, an NPDES Permit would be obtained from the CDPHE, in accordance with Section 402 of the Clean Water Act. Under the NPDES permit stipulations, BMPs would be detailed in the project plans for implementation in the field. • Use of Stormwater BMPs during construction. These are detailed in Section 3.13.5, Water Resources Mitigation, and would comply with local ordnances. • All CDOT revegetation BMPs and guidelines will be followed to ensure adequate revegetation of the study area. These are detailed in Section 3.10.3, Vegetation and Noxious Weed Mitigation. • Adherence to the conditions outlined by CDOT ensure compliance with the Migratory bird Treaty Act. These provisions are detailed in Section 3.11.4, Wildlife and Aquatic Resources Mitigation. • Implementation of BMPs from the *Erosion Control and Storm Water Quality Guide*, CDOT, 2002 will reduce the potential for impacts to wetlands and riparian areas. These are detailed in Section 3.9.4, Wetland Impact Minimization and Mitigation Measures.	

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