

# 3. Affected Environment

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## 3.1 Introduction

This chapter provides a description of the existing social, economic, and environmental settings for the area affected by the three build alternatives and the No Build Alternative. The affected environment is described for each resource of concern in the Boulder City/ U.S. 93 Corridor Study project area. The discussion contains study methodologies, background information, descriptive data, issues, and values that have a bearing on possible impacts and mitigation measures (described in detail in Chapter 4) and on the selection of the preferred alternative.

This EIS was prepared consistent with National Environmental Policy Act of 1969 (NEPA) Council on Environmental Quality (CEQ) regulations (40 CFR 1500. et seq) and the FHWA *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (FHWA Technical Advisory T 6640.8A, October 30, 1987). This guidance lists potentially adverse impacts most commonly encountered by highway projects and directs that these factors should be discussed for each reasonable alternative where a potential for impact exists. Environmental and socioeconomic factors potentially impacted by the proposed project are analyzed in detail in this chapter. Factors that were found to have no potential for project-related impacts and are not discussed in this chapter are as follows:

- Joint Development
- Farmland
- Wild and Scenic Rivers
- Coastal Barriers
- Coastal Zone Impacts

The following additional technical studies were prepared for the Boulder City/ U.S. 93 Corridor Study DEIS, and they are available through NDOT (contact Daryl James at 775/888-7013 for additional information):

- Air Quality
- Noise
- Biological Resources
- Water Quality
- Wetlands
- Floodplains
- Archaeological Resources
- Historic Resources
- Land Use
- Visual Resources
- Economics
- Social Impacts
- Hazardous Waste

The following engineering studies were prepared for the Boulder City/U.S. 93 Corridor Study EIS:

- Preliminary Engineering Report (NDOT, March 2002)
- Traffic Analysis Report (NDOT, August 2001)
- Structure Selection Report (NDOT, August 2001)
- Conceptual Drainage Report (NDOT, September 2001)

## **3.2 Air Quality**

### **3.2.1 Study Methodology**

To evaluate the impacts of the proposed alternatives on ambient air, an approach to evaluate project-related emissions was developed. First, the alternatives were evaluated relative to roadway construction phases. Construction emissions include emissions from heavy equipment, fugitive dust, and emissions from construction vehicles traveling to and from the site. Operational emissions consist mainly of motor vehicles associated with vehicles traveling through the proposed project area.

Once the emitting processes were identified, significance threshold criteria were established to provide a basis for the evaluation. The criteria for project operations were based on the approach recommended by the United States Environmental Protection Agency (EPA) and NDOT, which establishes emission thresholds for determining the impact of a proposed project. The criteria are based on the federal standards that are set to prevent health hazards to the public. An air dispersion modeling analysis was conducted to assess whether the traffic affected by the proposed project would cause an exceedance of an air quality standard (i.e., national ambient air quality standards [NAAQS]).

Because the proposed Boulder City/U.S. 93 Corridor Study qualifies as a major transportation project, and a portion of the project is in the nonattainment area, a carbon monoxide (CO) hot spot analysis was performed at existing and proposed “worst-case” intersections, both within and outside the nonattainment area. Four (4) intersections were analyzed for the project: one at the Railroad Pass/U.S. 95 intersection and one in each of the three build alternative corridors within the attainment area. For this project, the forecast traffic conditions in the design year 2027 were analyzed.

### **3.2.2 Regulatory Standards/Criteria**

#### **Section 176(c) of the CAA**

The Federal Clean Air Act (CAA) (1970), under Section 176(c), provides a framework for ensuring that transportation projects conform to the appropriate state or federal implementation plan for achieving the NAAQS. Before any agency or department of the federal government engages in, supports in any way, provides financial assistance for, licenses, permits, or approves any activity, that agency has an affirmative responsibility to ensure that such actions conform to the applicable implementation plan. Conformity to an air quality implementation plan is defined in the CAA, as amended in 1990, as meaning conformity with the plan’s purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards. Federal actions, including state-administered projects on federal highways and/or using federal

funding, must not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation, or delay timely attainment of any standard or required interim milestone. If the proposed action does not conform to the Statewide Transportation Improvement Program (STIP), it cannot be approved or allowed to proceed. As discussed in Chapter 4, implementation of the preferred alternative will include the employment of emission control measures and monitoring of air quality impacts to assure that construction and operation are in conformance with all applicable county, state, and federal air quality regulations.

### **Transportation Conformity Rule**

EPA promulgated the Transportation Conformity Rule concerning the applicability, procedures, and criteria that transportation agencies must use in analyzing and determining conformity of transportation projects. The Transportation Conformity Rule applies to federal-funded transportation projects in areas that violate one or more of the NAAQS (nonattainment areas). The Transportation Conformity Rule sets forth the requirements for determining conformity, which include applicability of the rule and the methodology to be used to perform the analysis, including air dispersion modeling, if necessary.

### **Current Statewide Implementation Plan**

In 1979, EPA required each state to prepare a Statewide Implementation Plan (SIP), which describes how the state will achieve compliance with the NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state (including the Las Vegas Valley) into compliance with all federal air quality standards. Every change in compliance schedule or plan must be incorporated into the SIP. The CAA Amendments of 1990 established new deadlines for achievement of the NAAQS depending on the severity of nonattainment. The Clark County Respirable Particulate Matter (PM<sub>10</sub>) SIP and the Clark County CO SIP have been submitted to EPA. EPA approved the PM<sub>10</sub> SIP in July, 2004. The EPA proposed approval of the CO SIP in February of 2004 and it was approved in October of 2004. However, most of the project falls outside the Hydrographic Basin 212 (the Las Vegas Valley airshed) and will not be affected by the SIP.

### **3.2.3 Definition of Resource**

Air quality can be described as the concentration of various pollutants in the atmosphere, and it is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality standards in Nevada are enforced by the CAA, which established maximum pollutant levels and requires the preparation of a SIP to outline enforcement and attainment strategies.

Air quality is measured by ambient air concentrations of specific pollutants that have been determined by EPA to be harmful to the health and welfare of the general public. NAAQS have been established for these pollutants, also known as "criteria" pollutants (Table 3-1). The NAAQS are two-tiered: primary – to protect public health; and secondary – to prevent degradation to the environment (e.g., impairing visibility, damaging vegetation and property). The six criteria pollutants are ozone (O<sub>3</sub>), CO, nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), PM<sub>10</sub>, and lead (Pb).

**TABLE 3-1**  
Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Federal <sup>a</sup>	
		Primary <sup>b</sup>	Secondary <sup>b</sup>
Ozone (O <sub>3</sub> )	1-hour	0.12 ppm (235 µg/m <sup>3</sup> ) <sup>c</sup>	0.12 ppm (235 µg/m <sup>3</sup> )
	8-hour (new)	0.08 ppm (157 µg/m <sup>3</sup> )	0.08 ppm (157 µg/m <sup>3</sup> )
Coarse Particulate Matter (PM <sub>10</sub> )	24-hour	150 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
	Annual AM	50 µg/m <sup>3</sup>	50 µg/m <sup>3</sup>
	Annual GM	–	–
Fine Particulate Matter (PM <sub>2.5</sub> )	24-hour (new)	65 µg/m <sup>3</sup>	65 µg/m <sup>3</sup>
	Annual AM (new)	15 µg/m <sup>3</sup>	15 µg/m <sup>3</sup>
Carbon Monoxide (CO)	1-hour	35 ppm (40 mg/m <sup>3</sup> )	–
	8-hour	9 ppm (10 mg/m <sup>3</sup> )	–
Nitrogen Dioxide (NO <sub>2</sub> )	1-hour	–	–
	Annual AM	0.053 ppm (100 mg/m <sup>3</sup> )	0.053 ppm (100 mg/m <sup>3</sup> )
Lead (Pb)	30-day	–	–
	Calendar Quarter	1.5 µg/m <sup>3</sup>	1.5 µg/m <sup>3</sup>
Sulfur Dioxide (SO <sub>2</sub> )	1-hour	–	–
	3-hour	–	0.5 ppm (1,300 µg/m <sup>3</sup> )
	24-hour	0.14 ppm (365 µg/m <sup>3</sup> )	–
	Annual AM	0.03 ppm (80 µg/m <sup>3</sup> )	–

AM – Average Mean

GM – Geometric Mean

ppm – parts per million

mg/m<sup>3</sup> – milligrams per cubic meter

µg/m<sup>3</sup> – micrograms per cubic meter

<sup>a</sup> National standards (other than O<sub>3</sub>, PM<sub>10</sub>, and those based on annual periods) are not to be exceeded more than once per year. The new O<sub>3</sub> standard is based on a 3-year average of the fourth highest 8-hour concentration in each year. For PM, the 24-hour standard is based on 99 percent (PM<sub>10</sub>) or 98 percent (PM<sub>2.5</sub>) of the daily concentrations, averaged over 3 years.

<sup>b</sup> Equivalent units given in parenthesis are based upon reference conditions of 25 degrees Celsius (°C) 77 degrees Fahrenheit (°F) and 760 millimeters (mm) (30 inches) mercury.

<sup>c</sup> EPA promulgated new federal 8-hour O<sub>3</sub> and PM<sub>2.5</sub> standards on July 18, 1997. The federal 1-hour O<sub>3</sub> standard continues to apply in areas that remain in violation of that standard.

The Las Vegas and City of Henderson urban area does not meet air quality standards (nonattainment) for PM<sub>10</sub> and CO. The southern edge of the nonattainment area is located at Railroad Pass. All other areas within Clark County, with the exception of the Las Vegas Valley (Las Vegas, North Las Vegas, and the Henderson urban area), are in attainment with the NAAQS for all criteria pollutants (i.e., PM<sub>10</sub>, CO, SO<sub>2</sub>, NO<sub>2</sub>, O<sub>3</sub>, and Pb); therefore, approximately the first kilometer (0.6 mile) at the west end of the proposed project is located in the nonattainment area.

Boulder City is located within the Eldorado Valley, which is designated as a management area by the Clark County Department of Air Quality and Environmental Management (DAQEM). A management area has more stringent controls than a Prevention of Significant Deterioration (PSD) area. The majority of the project lies within the management area boundaries.

### 3.2.4 Existing Conditions

The Las Vegas Valley is situated on the edge of the Mojave Desert and experiences arid climate typical of the southern Mojave Desert. Due to the “rain shadow” effect of the Sierra Nevada Range and Spring Mountains to the west, moisture associated with storms originating in the Pacific Ocean rarely reaches the Valley. Dry air masses move over the valley, resulting in clear to partly cloudy skies with 85 percent sunshine in an average year. The project area is located in a semiarid region, with a climate characterized by warm, dry summers and cool winters. The temperature ranges from an average daily minimum of 2°C (36 °F) in February, to an average daily maximum of 37 °C (99 °F) in July. The annual precipitation is approximately 10 centimeters (cm) (4 inches) per year.

The project area begins at the border of the Las Vegas Valley and Eldorado Valley to the west. Approximately 20 percent of the project area is located in the Las Vegas Valley, and the other 80 percent is located in the Eldorado Valley. Air quality at a given location is a function of several factors, including the amounts and types of pollutants being emitted, both locally and regionally, and the dispersion rates of pollutants within the region. The major factors affecting pollutant dispersion are wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and the topographic and geographic features of the region.

The closest DAQEM air quality monitoring station operating in the proposed project study area is the Boulder City monitoring station. The station is located at the intersection of U.S. 93 and Industrial Road. The Boulder City monitoring station monitors CO, O<sub>3</sub>, and PM<sub>10</sub>. Table 3-2 presents a summary of the highest pollutant values for CO and PM<sub>10</sub> recorded at this station from 1998 to 2000.

**TABLE 3-2**  
Air Quality Summary, Boulder City Monitoring Station

Pollutant	Averaging Time	Federal Primary Standards	Maximum Concentrations <sup>a</sup>			Number of Days Exceeding Federal Standard <sup>b</sup>		
			1998	1999	2000	1998	1999	2000
CO <sup>c</sup>	1 hour	35 ppm	5.1	6.2	4.7	0	0	0
	8 hours	9 ppm	2.5	2.5	2.3	0	0	0

**TABLE 3-2**  
Air Quality Summary, Boulder City Monitoring Station

Pollutant	Averaging Time	Federal Primary Standards	Maximum Concentrations <sup>a</sup>			Number of Days Exceeding Federal Standard <sup>b</sup>		
			1998	1999	2000	1998	1999	2000
PM <sub>10</sub>	24 hours	150 µg/m <sup>3</sup>	69.0	76.0	188.0	0	0	2
	Annual	50 µg/m <sup>3</sup>	14.3	15.4	19.1	0	0	0

Source: EPA, 2001.

**Notes:**

<sup>a</sup> Concentration units for CO are in ppm; Concentration units for PM<sub>10</sub> are in µg/m<sup>3</sup>.

<sup>b</sup> For annual standards, a value of 1 indicates that the standard has been exceeded.

<sup>c</sup> CO monitoring data for Boulder City is not available on AIRSData. CO data from the Pittman Monitoring Station (located at 1137 North Boulder Highway) was used.

## 3.3 Noise

### 3.3.1 Study Methodology and Regulatory Standards/Criteria

A noise study was performed and a technical report was prepared to meet the requirements of FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772, April 1992). This section summarizes a portion of that technical report and quantifies the existing noise conditions within the project corridor.

All sound levels referred to in this report are stated in dBA, which is a measure of sound pressure as compared to a reference sound pressure. A-weighting de-emphasizes the very low and very high frequencies of sound and approximates the frequency response of the human ear. Table 3-3 shows typical everyday sounds and their corresponding noise levels.

**TABLE 3-3**  
Typical Sounds and Their Corresponding Noise Levels

Noise Level Decibels	Outdoor Noise Levels	Indoor Noise Levels
110	Jet flyover at 300 m (1,000 ft)	Rock band
100	Gas lawn mower at 1 m (3 ft)	Inside subway train (New York City)
90	Diesel truck at 15 m (50 ft)	Food blender at 1 m (3 ft)
85		Garbage disposal at 1 m (3 ft)
80	Noise urban daytime	Shouting at 1 m (3 ft)
70	Gas lawn mower at 30 m (100 ft)	Vacuum cleaner at 1 m (3 ft)
66	FHWA Noise Impact Criteria	NDOT Traffic Noise Policy
65		Normal speech at 1 m (3 ft)
60	Heavy traffic at 90 m (300 ft)	Large business office
50	Quiet urban daytime	Dishwasher in the next room
45	Quiet urban nighttime	Large conference room (background)

**TABLE 3-3**  
Typical Sounds and Their Corresponding Noise Levels

Noise Level Decibels	Outdoor Noise Levels	Indoor Noise Levels
35	Quiet suburban nighttime	Library
30	Quiet rural nighttime	Bedroom at night
20	Rustling leaves	Concert hall (background)
10	Mosquito at 1 m (3 ft)	Broadcast/recording studio (background)

Project-related traffic noise impacts were evaluated by conducting existing traffic and background noise level measurements in the project area and predicting future traffic noise levels from each project alternative using projected peak-hour traffic data, the proposed roadway alignment(s), and the FHWA Traffic Noise Model (TNM) Version 1.1. TNM is the most recent analytical method for traffic noise evaluation and will formally replace the current FHWA Model (STAMINA 2.0) as the preferred method for highway traffic noise prediction (NDOT, August 2001b).

Project-related traffic noise impacts were evaluated against the traffic noise impact criteria established by FHWA and NDOT. The FHWA noise level criterion for noise-sensitive land uses, called Activity Category B sites (e.g., residences, churches, schools, recreation areas, and similar uses), is considered exceeded when the exterior noise level approaches or exceeds 67 dBA. The noise level criterion for extra-sensitive land uses, called Activity Category A sites (i.e., lands where serenity and quiet are of extraordinary significance), is an exterior noise level of 57 dBA. The federal criteria are based on peak-hour traffic noise levels. Federal guidelines use  $L_{eq}$ , which is the average sound level over a set period of time. Table 3-4 shows the FHWA Design Level/Activity Relationship used to determine the noise abatement criterion (NAC) for specific land uses (e.g., residential and commercial).

**TABLE 3-4**  
FHWA and NDOT Design Noise Level/Activity Relationships

Activity Category	Design Noise Levels	Description of Land Use Activity Category
	Hourly $L_{eq}$ (dBA)	
A <sup>1</sup>	57 (Exterior)	Tracts of land for which serenity and quiet are of extraordinary significance and which serve an important public need. The preservation of serenity and quiet is essential if this land is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B <sup>1</sup>	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks that are not included in Category A, and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A and B above.

**TABLE 3-4**  
FHWA and NDOT Design Noise Level/Activity Relationships

<b>Activity Category</b>	<b>Design Noise Levels Hourly <math>L_{eq}</math> (dBA)</b>	<b>Description of Land Use Activity Category</b>
D	–	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

<sup>1</sup> Parks of Categories A and B include all such lands (public or private) that are used as parks, as well as those public lands officially set aside or designated by a governmental agency as parks on the date of public knowledge of the proposed highway project.

Source: FHWA, April 1992.

FHWA and NDOT consider a traffic noise impact to occur if predicted peak-hour traffic noise levels approach or exceed the NAC. NDOT defines “approach” as noise levels within 1 dBA of the NAC; therefore, the noise abatement threshold is 66 dBA for activity Category B and 56 dBA for Activity Category A. In addition to the NAC, NDOT considers a traffic noise impact to occur if predicted levels represent a substantial increase over existing levels. NDOT defines “substantial increase” as a level that exceeds existing ambient sound levels by 15 dBA or more. Mitigation measures are analyzed based on the policies of NDOT.

### 3.3.2 Existing Conditions

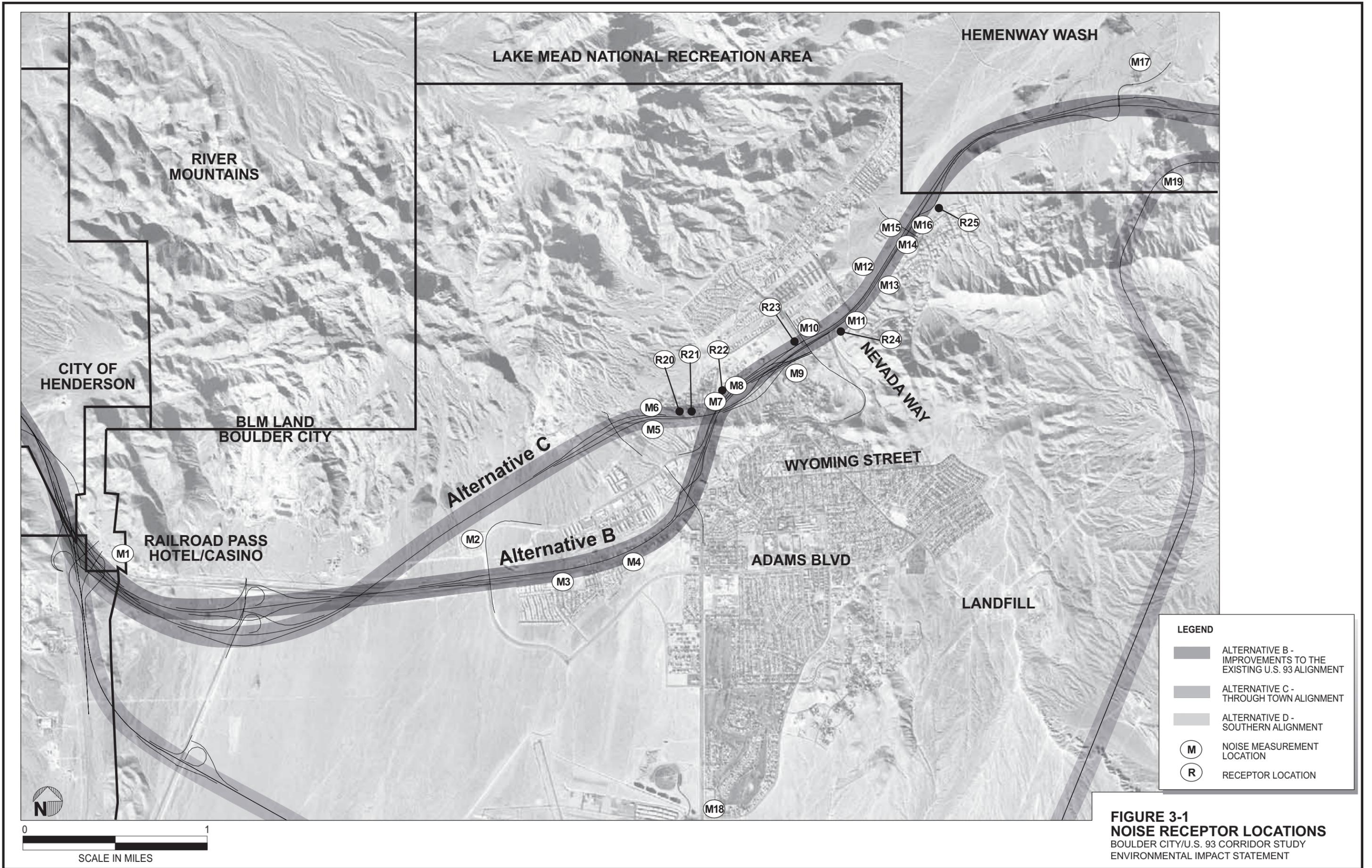
The primary existing environmental noise source contributing to the ambient noise levels within the project area is traffic on U.S. 93. Other sources of environmental noise include traffic on other local roadways and occasional distant aircraft overflights.

Boulder City does not have a development ordinance or a noise compatible development land use plan that requires construction of noise barriers for new developments. The only noise standard the city follows is no construction before 7:00 a.m. or after 7:00 p.m. While there is no restricted airspace, overflights of Boulder City are discouraged.

#### Measured Noise Levels

Existing noise levels in the proposed project area were determined by field measurements at 19 sites in March 2000, March 2001, and November 2001, as well as by modeling existing peak-hour traffic noise levels at an additional 6 locations (NDOT, August 2001b). The noise monitoring locations are shown in Figure 3-1 and are described as follows:

- M1:** This site is located within the Railroad Pass Hotel and Casino parking lot about 30 m (100 ft) from the U.S. 93/95 centerline.
- M2:** Monitor location M2 is on the north side of the Veterans Home building located near the intersection of Industrial Road and Veterans Memorial Drive. This site is about 145 m (475 ft) south of the proposed Alternative C centerline and approximately 460 m (1,500 ft) north of the existing U.S. 93.
- M3:** This site is at the north property line of Gingerwood Mobile Homes near the intersection of Gingerwood Street and Slate Mountain Drive, about 75 m (250 ft) south of the existing U.S. 93 centerline.



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- M4:** This site is in front of the first row of mobile homes in Carusso's Mobile Home Park located at the southwest corner of the intersection of Yucca Street and U.S. 93. The measurement was taken at a distance of about 12 m (40 ft) south of the edge of U.S. 93.
- M5:** This site is at the northwest corner of the Boulder Oaks RV Park, near the end of Pelican Way and at a point closest to the project Alternative C alignment.
- M6:** This site is at the home located at the end of Ridge Road, across from the Boulder Oaks RV Park (Site M5) and on the north side of the proposed Alternative C. This area is relatively distant from the existing U.S. 93 alignment.
- M7:** This site is located at the eastern property line of the home at 103 Forest Lane, just north of Lakeview Drive. The site is about 50 m (165 ft) from the U.S. 93 centerline.
- M8:** This site is within the St. Jude's property at a point slightly northeast of the entryway into St. Jude's Welcome Center. The measurement was taken within the outdoor activity area of the closest structure to U.S. 93, about 60 m (200 ft) from the U.S. 93 centerline.
- M9:** This site is at the top of a hill located just north of the intersection of Claremont Street and Tamarisk Lane. The site is at a distance of about 210 m (700 ft) from U.S. 93.
- M10:** This site is at the property line of a vacant lot within the new condominium complex east of Lake Mountain Drive, along Bay View Drive, facing U.S. 93. The noise monitoring location is about 60 m (200 ft) from the U.S. 93 centerline.
- M11:** This site is within the newly developed single-family residential subdivision east of Nevada Way and south of U.S. 93, at the northern property line of a vacant residential lot on Cats Eye Drive, directly across from Ville Drive. The site is about 60 m (200 ft) south of the highway centerline.
- M12:** This site is located at the south edge of the vacant land between Ville Drive and Pacifica Way. The site is about 30 m (100 ft) north of Hemenway Wash.
- M13:** This site is at the north edge of a vacant lot at the end of Temple Rock Court. The site is about 60 m (200 ft) from the roadway centerline.
- M14:** This monitoring location is at the north edge of a vacant lot at the end of Lava Court. The distance to the roadway centerline is about 60 m (200 ft).
- M15:** This site is near the end of the Laguna Court cul-de-sac, just west of Pacifica Way. The site is located about 60 m (200 ft) north of the existing U.S. 93 centerline.
- M16:** This noise monitoring location is at the northern edge of the vacant lot between 922 Villa Grande Way and 101 Red Rock Road. The site is about 75 m (250 ft) from the U.S. 93 centerline.

- M17:** This site is located near the eastern end of the project, within the parking area of the Hacienda Hotel and Casino at the approximate setback of the buildings, from the existing U.S. 93.
- M18:** This site is located on the walkway north of Georgia Avenue, behind the home located at 1809 Hilton Head Drive. The site is representative of southernmost homes in Boulder City.
- M19:** This site is located in the Eldorado Mountains within the LMNRA near the Alternative D alignment at the point where the proposed highway crosses the LMNRA boundary.

The results of the noise monitoring effort are summarized by data shown in Table 3-5.

**TABLE 3-5**  
Results of Noise Level Measurements (dBA)

Monitoring Site	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	Primary Noise Source(s)
M1	70.8 69.9	47.9 52.8	83.7 80.1	Traffic on U.S. 93
M2	48.6 45.0	40.7 37.4	64.0 57.5	Distant traffic on U.S. 93; local vehicle movements within the parking area
M3	60.5	46.8	76.8	Vehicular traffic on U.S. 93 and Gingerwood Street
M4	63.2 62.9	56.2 49.2	72.1 74.1	Traffic on U.S. 93
M5	42.6 46.8	35.1 34.5	52.9 61.4	Distant traffic on U.S. 93; aircraft overflight; local vehicle pass by
M6	42.4	32.6	51.9	Distant traffic on U.S. 93
M7	62.7 63.9	46.4 48.5	74.4 81.0	Traffic on U.S. 93
M8	58.3 57.5	46.9 44.1	75.9 67.9	Traffic on U.S. 93
M9	54.7 53.2	47.4 43.4	63.0 65.0	Traffic on U.S. 93
M10	62.3 60.9	48.9 47.1	73.0 71.2	Traffic on U.S. 93
M11	62.7 63.4	48.5 50.4	73.0 77.3	Traffic on U.S. 93
M12	63.6 61.9	43.0 46.2	83.1 70.2	Traffic on U.S. 93; aircraft overflight
M13	63.4 62.8	47.0 43.5	78.1 79.2	Traffic on U.S. 93
M14	60.9 60.4	45.5 40.9	72.1 73.2	Traffic on U.S. 93
M15	62.5 61.0	48.2 42.2	73.0 70.9	Traffic on U.S. 93

**TABLE 3-5**  
Results of Noise Level Measurements (dBA)

Monitoring Site	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	Primary Noise Source(s)
M16	63.1	39.8	74.7	Traffic on U.S. 93
	62.9	45.5	72.0	
	62.1	46.3	70.8	
	61.9	47.2	75.6	
M17	66.7	49.3	81.4	Traffic on U.S. 93; local vehicular movements within parking area
M18	53.5	32.5	73.0	Traffic on Georgia Avenue; general aviation aircraft at Boulder City Airport
M19	41.3	33.1	47.4	Aircraft overflights; some animals (U.S. 93 traffic too distant for impact)
	40.8	33.7	46.6	

L<sub>eq</sub> – Equivalent average sound level during the measurement period.

L<sub>max</sub> – Maximum sound level, or the highest sound pressure level in a specific time period.

L<sub>min</sub> – Minimum sound level, or the lowest sound pressure level in a specific time period.

Source: NDOT, August 2001a.

### Calculated Existing Peak-Hour Noise Levels

Existing (1999) peak-hour traffic data were used to predict existing peak-hour traffic noise levels. Calculated existing peak-hour noise levels for the selected monitoring locations along U.S. 93 are listed in Table 3-6. Except along U.S. 93 near the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino, existing traffic noise levels at noise-sensitive locations along U.S. 93 are below the NAC.

**TABLE 3-6**  
Calculated Existing Peak-Hour Traffic Noise Levels on Existing U.S. 93

Monitoring Location	Noise Level (dBA-L <sub>eq</sub> )	Exceeds/Approaches NDOT NAC <sup>1</sup>
M1	70	Yes
M3	61	No
M4	65	No
M7	63	No
M8	59	No
M9	53	No
M10	63	No
M11	62	No
M12	62	No
M13	62	No
M14	62	No
M15	62	No
M16	62	No
M17	66	Yes

<sup>1</sup>The effective NDOT NAC for activity category B lands is a peak-hour L<sub>eq</sub> of 66 dBA.

Source: NDOT, August 2001a.

## 3.4 Biology/Threatened Species

### 3.4.1 Study Methodology

With the exception of the urban-enclosed sections of Alternative B, the entire length of each alignment was walked. The objective was to provide a basis from which to contrast environmental impacts likely to ensue from constructing each different corridor. Thus, the biological resources survey was designed to characterize extant plant and animal communities and associations, and to note presence or potential presence of any protected or otherwise sensitive species along the various routes.

An alignment was first divided into segments of about 1.6 km (1 mile) in length. Depending on the segment being examined, four<sup>1</sup> to six surveyors, paralleling one another at roughly 30-m (100-ft) intervals, examined it by first walking along one side of the staked centerline, then retracing that path along the opposite side of the centerline. Topographic relief affected the overall survey corridor width, which averaged approximately 150 m (500 ft) on either side of the centerline, except in part of Alternative D from the ridge of the western Eldorado Mountains into Gold Strike Canyon where, due to the rugged topography, it averaged about 60 m (200 ft) along each side of the centerline.

For each alternative, records were made of local topography, soils, plant associations, observed wildlife, other indications of wildlife activity, and any unusual physical or biological features. The number of desert tortoise burrows seen along each alternative was recorded.

The survey method used for the study does not constitute standard, desert tortoise-specific survey methodology. The intent during this initial survey was simply to characterize the extent of tortoise presence on the different alternatives. Additional survey of the preferred Alternative D alignment will occur as a component of the Biological Assessment that will be prepared and subject to USFWS review and comment as part of the consultation process under Section 7 of the ESA.

### 3.4.2 Existing Conditions

The project area lies entirely within the greater Mojave Desert biotic region. Changing elevation, aspect, proximity to the Colorado River, and general topography cause marked differences in both terrain and microhabitats encountered along and between the three proposed alternatives.

#### Physical Geography

The western limits of the project study area lie in a natural pass (Railroad Pass) between the River Mountains on the north and a detached block of the McCullough Range on the south. Elevation is about 700 m (2,300 ft) (USGS, 1958). Railroad Pass is the divide between a southeastern arm of the Las Vegas Valley on the west and the northwest corner of the Eldorado Valley on the east. Perched between these two volcanic ranges (Longwell et al., 1965), the Pass consists of largely volcanic fill, which eroded from them.

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<sup>1</sup> Because of the rugged nature of the easternmost 3.2 km (2 miles) of Alternative D (from the ridge overlooking Hemenway Valley to the eastern terminus of the project), only two surveyors examined this section.

Each of the alternative alignments initially follows U.S. 93/95 from Railroad Pass through the upper Eldorado Valley and toward Boulder City. Alternative B remains congruent with its existing corridor along the entire length of the project. Just below Railroad Pass, Alternative C dips south from the present highway at about the site of the Railroad Pass Hotel and Casino. It then passes through a series of low hills en route to crossing U.S. 95, at an elevation of around 670 m (2,200 ft), and then begins a gradual swing northeast back toward U.S. 93. Alternative C proceeds generally northeast across the upper slopes of a bajada (alluvial fan) falling southeast from the River Mountains, eventually reaching a peak elevation of about 790 m (2,600 ft). The alternative then begins to descend the bajada and crosses U.S. 93 near the head of Hemenway Wash. At that point, it converges with the existing U.S. 93 corridor to the eastern terminus of the project area in the Eldorado Mountains.

Alternative D, the preferred alternative, diverges from the U.S. 93/95 corridor at the same point as Alternative C, but it continues south for nearly a mile before turning east to approach and cross U.S. 95. Beyond U.S. 95, it maintains this easterly path across the broad, south-falling alluvial fans of the upper Eldorado Valley until arriving at a point about 3.2 km (2 miles) south of Boulder City. Here the alternative also reaches its lowest elevation, which is about 640 m (2,100 ft). At this point, it turns sharply northeast and reascends the alluvial fans to the point they fall away into the highly dissected breaklands locally making up the west slopes of the Eldorado Mountains. This northeasterly path is maintained for approximately 3.2 km (2 miles), at which point it swings slightly northwest, ascending increasingly steep but still generally south-falling slopes that culminate on a ridge of the Eldorado Mountains roughly parallel to and overlooking Hemenway Valley. Elevation on the ridge is between 760 and 790 m (2,500 and 2,600 ft). From the ridgeline, Alternative D bends sharply east across the now steeply north- and west-falling Eldorado Mountain slopes and traverses north-trending Eldorado Mountain canyons until it finally reconnects with Alternatives B and C at the eastern terminus of the project, at an elevation of around 490 m (1,600 ft).

### Vegetation

Project area vegetation is typically classed as Mojave Desert Scrub (Brown et al., 1980). The Mojave's hallmark creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) comprise the most common species and are common across the project area. Associated plants, however, show notable variety.

**Railroad Pass.** Near Railroad Pass, the combination of elevation, topography, locally increased precipitation, and associated available runoff – all facilitated by the proximity to the adjacent River and McCullough mountain ranges – collectively sustains an extremely rich plant community. Here the most striking addition to the lush creosote/bursage background is a dense proliferation of often large, tall (to over 2 m [6 ft]) staghorn cholla (*Opuntia acanthocarpa*). Abundant silver cholla (*O. echinocarpa*), beavertail (*O. basilaris*), and barrel cactus (*Ferocactus acanthodes*), together with abundant individuals of the diminutive pygmy barrel cactus (*Neolloydia johnsonii*) augment the staghorns' codominance in this region. Fishhook cactus (*Mammillaria tetrancistra*), and even occasional pencil cholla (*Opuntia ramosissima*), are also found here.

Rounding out the shrub community in this vicinity is a mass of encelia (*Encelia virginensis*), indigo bush (*Psoralea fremontii*), range ratany (*Krameria parvifolia*), joint fir (*Ephedra nevadensis*), cheese bush (*Hymenoclea salsola*), flat-topped buckwheat (*Eriogonum fasciculatum*), goldenbush (*Ericameria* sp.), sweetbush (*Bebbia juncea*), paper bag bush (*Salazaria mexicana*), and rabbit brush (*Chrysothamnus nauseosus*). The subshrub community is typified by desert mallow (*Sphaeralcea ambigua*), Mohave aster (*Machaeranthera tortifolia*), desert chicory (*Rafinesquia neomexicana*), pebble pincushion (*Chaenactis fremontii*), little trumpet (*Eriogonum inflatum*), skeleton weed (*E. deflexum*), mustard (*Sisymbrium* sp.), and small-leaved amsonia (*Amsonia brevifolia*). Windmills (*Allionia incarnata*), fiddleneck (*Amsinckia tessellata*), storksbill or filaree (*Erodium cicutarium*), red brome (*Bromus madritensis rubens*), fluff grass (*Erioneuron pulchellum*), and spiny chorizanthe (*Chorizanthe rigida*) comprise the most frequently observed understory plants. Catclaw acacia trees and bushes (*Acacia greggii*) dot the local drainages.

**Alternatives B and C.** Away from areas with higher moisture regimes, the vegetation becomes generally smaller and more widely spaced. As the alignments proceed east from Railroad Pass and away from the nearby mountain slopes, the staghorn cholla quickly becomes less prevalent, although it persists to some degree along the Alternative B and C routes to about the U.S. 93/95 interchange. Farther into the relatively drier environs, silver cholla becomes more commonplace, eventually replacing the staghorn completely, but never approaching its density of occurrence. Catclaw becomes not only less common, but also considerably more shrubby in aspect. Some additional species (e.g., desert cassia or desert senna [*Cassia armata*], range ratany [*Krameria parvifolia*], and desert tobacco [*Nicotiana trigonophylla*]) do become newly apparent in these more easterly sections. Russian thistle (*Salsola tragus*) appears on the highway shoulders and other similarly disturbed areas.

For all practical purposes, there is little difference in the mix of plant species found along Alternatives B and C, although the presently undisturbed portions of Alternative C frequently support denser growth and larger individual plants. Similarly, by virtue of already being largely disturbed, Alternative B shows a greater proliferation of the ruderal Russian thistle.

As the Alternative B and C alignments proceed down Hemenway Valley toward the eastern end of the project, brittlebush (*Encelia farinosa*) and desert four o'clock (*Mirabilis multiflora* var. *pubescens*) become obvious additions to the local shrub assemblage. Various annuals, newly apparent in the early spring, were also obvious here. These include sundrop or yellow cups (*Camissonia brevipes*), brown-eyed primrose (*C. clavaeformis*), Arizona lupine (*Lupinus arizonicus*), desert gold poppy (*Eschscholtzia glyptosperma*), little gold poppy (*E. minutiflora*), and notch-leafed phacelia (*Phacelia crenulata*).

**Alternative D.** As Alternative D falls south and southeast to enter the Eldorado Valley from the McCullough Range foothills, the character of the associated plant community changes to reflect the clearly drier environment. First, the staghorn cholla disappears, returning exclusive dominance of the local plant assembly to the creosote and bursage. Primary associates are what might be expected in this more typical Mojave Desert scrub – joint fir and range ratany. Cheese bush remains relatively common along local drainages, and these “riparian” zones are irregularly amplified with occurrence of paper bag bush, flat-topped buckwheat, desert cassia, scrubby indigo bushes, and even a few stunted acacia trees.

Individual plants are almost universally smaller and better spaced than in the more upslope areas.

Approximately a mile east of U.S. 95, local soils change along the southern alignment from the reasonably firm substrates capped with gravelly, pebbly surfaces (in some areas interspersed with stretches of tightly consolidated desert pavements) that have previously characterized them to sandy, only loosely compacted soil. With the advent of these looser soils, dune primrose (*Oenothera deltoides*) makes its first appearance and quickly becomes commonplace. The stature of locally growing creosote bushes also increases markedly, with individual plants occasionally attaining heights of 2 m (6 ft). As the alignment approaches the Boulder City sewage treatment plant, the sandy texture of the soil increases, becoming almost dune-like. Here, creosote bush and primrose comprise nearly the entirety of the vegetation, and the creosote reaches even greater heights than before. Six-ft-tall plants are common; some even grow to about twice that height (ca. 4 m).

Runoff of treated effluent flowing south from the sewage plant has promoted establishment of a lengthy and wet riparian corridor. The corridor, ranging from about 8 to over 30 m (25 to over 100 ft) wide, consists of a dense, central stand of cattails (*Typha latifolia*) bordered, and occasionally interspersed, with the exotic salt cedar or tamarisk (*Tamarix ramosissima*). Thickets of small, scrubby tamarisk trees also exist beyond the primary wet area, forming intermittent blocks of a tamarisk/creosote community along the borders of the riparian corridor.

East of the riparian corridor, bursage gradually reappears among the creosote bushes until, by the time Buchanan Boulevard is reached, these two species are codominant. Primrose persists in this vicinity but is less prevalent, probably because the local soils have begun to lose their sandy texture and are becoming firmer and regaining a pebbly cap. Not far east of Buchanan Boulevard, classic examples of the Mojave's hallmark creosote/bursage community are again prevalent. In the large, south-falling, concrete-banked drainage channel east of Mead Substation, cheese bush and occasionally tall (4 m [12 ft] or more) acacia trees are again prevalent. Here, several extensive mats of coyote melon (*Cucurbita palmata*) are also found.

East of the wastewater discharge, the creosote bush and bursage are quite stunted; the creosote bush rarely exceeds 1 m (3 ft) in height. A desert pavement of mostly caliche fragments is frequently prevalent here, but some cobbles, and even small boulders, of vesicular volcanics are also found in this vicinity. Caliche strata are plainly exposed in the banks of local washes. Cotton top cactus (*Echinocactus polycephalus*) makes its first appearance in this area and occasional small silver cholla, beavertail, joint fir, paper bag bush, and range ratany begin to reappear within the mix. Thick stands of big galleta (*Pleuraphis rigida*) occur in some of the small, highly braided drainages and, in some of the larger washes cutting this part of the alignment, a few, mostly small, desert willow trees (*Chilopsis linearis*) are established. This same vegetation mosaic is maintained as the alignment begins its northeast pass east of Boulder City. It persists to about the vicinity of the Boulder City Rifle and Pistol Club range, where the alignment enters the headwater slopes of a series of east-falling Eldorado Mountain canyons leading to the Colorado River.

Immediately southwest of the rifle range, at the point the alignment enters the headwater slopes, gypsum (selenite) crystals become apparent in some of the cut banks. Because of the

affinity of the Las Vegas bearpoppy<sup>2</sup> (*Arctomecon californica*) for gypsum-rich soils, this area was examined closely for this plant. No evidence of its presence was noted.

Just north of the Boulder City Rifle and Pistol Club range, local terrain becomes more highly dissected and considerably rockier than anywhere else along this alignment does. A somewhat richer plant assembly is also apparent here as indigo bush, cheese bush, pencil cholla, barrel cactus, pygmy barrel cactus, fishhook cactus, and desert mallow rejoin the mix. Near the small power substation, desert holly (*Atriplex hymenelytra*) makes its initial appearance. Little trumpet again joins the subshrub community, and rock gilia (*Gilia scopulorum*) also first becomes apparent.

North of the substation, the landscape becomes still steeper and even more dissected as the alignment cuts across several drainages in its climb toward the ridge overlooking Hemenway Valley. Rock nettle (*Eucnide urens*) occurs in this section, with encelia and brittlebush also appearing for the first time in this segment. Mostly shrubby, but occasionally moderately large, acacia trees dot the washes, along with numerous flat-topped buckwheat and paper bag bush plants. Creosote bush and bursage, with the usual associates (including joint fir and range ratany), still dominate the plant assemblages beyond the drainage channels. Partly because of the rapid runoff pattern characterizing these uplands, virtually all plants outside the drainage channels are stunted and widely spaced.

Beyond the ridgeline, Alternative D enters the most rugged terrain along its route – a series of often steep-walled, deep, steep-gradient drainages that fall generally northwest toward Hemenway Valley and Lake Mead. Canyon walls frequently approach the vertical; steep talus slopes are commonplace. Drainage bottoms are typically boulder- and debris-filled in their upper reaches, plainly evidencing the high-energy flow events periodically erupting from this region. In this section, just one plant – false fir (*Peucephyllum schottii*) – was found that had not been previously encountered elsewhere along the route.

### **Protected and Sensitive Plant Species**

Inquiry was made of the Nevada Natural Heritage Program, Carson City, Nevada, for records of protected and sensitive species occupying or using the project area. There is record (Miskow, pers. comm.) of a single plant “species of concern”<sup>3</sup> – rosy two-tone beardtongue, aka bicolored penstemon (*Penstemon bicolor roseus*) – possibly occurring along Alternative C in the vicinity of where it crosses Bootleg Canyon Wash, northwest of Boulder City. However, the U.S. Fish and Wildlife Service (USFWS) no longer considers this a “species of concern” in Clark County. No bicolored penstemon was encountered at any point during the surveys.

Records indicate habitat may also be available for the Las Vegas bearpoppy, an NPS Special-Status Species also protected under Nevada state law as critically endangered, and the silverleaf sunray, *Enceliopsis argophylla*, a Nevada NPS Sensitive Species. No evidence of the

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<sup>2</sup> The bearpoppy is listed as a “species of concern” by the U.S. Fish and Wildlife Service’ (USFWS) Nevada office and is protected under Nevada law (Mozingo and Williams, 1980).

<sup>3</sup> The species of concern designation has replaced the Candidate – Category 2 or C-2 designation formerly used by federal agencies to identify species for which information now in possession of USFWS indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

bearpoppy, a species only known to grow in gypsum-rich soils, was noted along any of the proposed alignments.

The sunray does not appear as a species of concern on the most recent USFWS list acquired for this project. Kartesz (1988) considers the plant as “rare” and describes its range as “known only from southern Nevada, from 7 miles east of Henderson, River Mountains, to Echo Bay and Las Vegas Wash, LMNRA, Clark County.” Kartesz notes the sunray’s habitat as “clay and gypsum cliffs to gravelly slopes in our southern deserts” at elevations of 370 to 610 m (1,200 to 2,000 ft). Holland et al. (no date) note the sunray’s occurrence in the LMNRA as being “partial to eroded soils containing gypsum, it is especially noticeable along the North Shore Road from Las Vegas Wash to Overton, and in the Kingman Wash and Bonelli Landing areas.” *E. argophylla*’s record of closest known occurrence to the project area – in the River Mountains separating Henderson and Boulder City – together with its apparent affiliation with gypsum-laced soils, seems to point to a somewhat low likelihood of finding this plant in the project area. None were seen during the surveys.

Miskow (pers. comm.) also notes that Nevada law (NRS 527.060-.120) protects all cacti. Appropriate state and federal agencies (e.g., Nevada Division of Forestry, NPS, and BLM) will determine the guidelines and methodology to be utilized for soil and plant salvage on project site lands occurring under their regulatory jurisdiction.

### **Wildlife**

Numerous terrestrial species presently occupy and/or otherwise use the various proposed alignment corridors. However, lack of suitable aquatic environment precludes any fish presence in the project area.

**Amphibians.** A limited presence of red spotted toads (*Bufo punctatus*) can reasonably be expected across the project area, most particularly within areas where moisture is more abundant or concentrated (along mountain fronts, in major canyons, and in moist urban settings). This highly desert-adapted species occurs throughout the Mojave Desert region (Stebbins, 1985). The somewhat less desert-adapted woodhouse toad (*B. woodhousei*) might also be expected within canyons and around wet urban environments. Both species probably occupy the riparian corridor associated with the Boulder City Sewage Treatment Plant drain. Pacific treefrogs (*Pseudacris regilla*) might also be found along this riparian corridor.

The relict leopard frog (*Rana onca*) is known to occur east of the proposed project site in Black Canyon below Hoover Dam. This species is known to occur in desert riparian habitat along permanent streams, springs, tributaries, and other water impoundments in elevations up to 750 m (2,500 ft). Primarily nocturnal in nature, this species utilizes grassy banks and water for cover. This species could potentially occur in the northeastern segment of Alternative D.

**Reptiles.** An abundance of reptile species occupies the project area. The federally listed desert tortoise (*Gopherus agassizii*) maintains a typically patchy distribution, but it is nearly ubiquitous along the various corridors. Because of the special status of this species, its presence is discussed in greater detail.

Southern Clark County is home to at least 16 lizard species, many of which occupy the project area. These include side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert spiny lizard (*Sceloporus magister*), long-tailed brush lizard (*Urosaurus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus obesus*), long-nosed leopard lizard (*Gambelia wislizenii*), desert collared lizard (*Crotaphytus insularis*), banded gecko (*Coleonyx variegatus*), and gila monster (*Heloderma suspectum*). Two of these – the chuckwalla and gila monster – are of special status and are discussed in detail.

Eighteen snake species occur locally and, as with the lizards, several can be found in the project area. These include western blind snake (*Leptotyphlops humilis*), ground snake (*Sonora semiannulata*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*), red racer (*Masticophis flagellum*), patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis melanoleucus*), glossy snake (*Arizona elegans*), long-nosed snake (*Rhinocheilus lecontei*), king snake (*Lampropeltis getulus*), night snake (*Hypsiglena torquata*), lyre snake (*Trimorphodon biscutatus*), sidewinder or horned rattlesnake (*Crotalus cerastes*), Mojave rattlesnake (*C. scutulatus*), and speckled rattlesnake (*C. mitchellii*).

**Birds.** An extensive variety of avian species occupies or regularly migrates through the project vicinity. Some typical nesting species of local, open desert environs are black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), horned lark (*Eremophila alpestris*), greater road runner (*Geococcyx californianus*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), phainopepla (*Phainopepla nitens*), verdin (*Auriparus flaviceps*), northern mockingbird (*Mimus polyglottos*), loggerhead shrike (*Lanius ludovicianus*), mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), killdeer (*Charadrius vociferus*), and burrowing owl (*Athene cunicularia*). Domestic pigeons (*Columba livia*) and the exotic house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*) also nest locally.

In the more rugged upland and canyon locales, rock wren (*Salpinctes obsoletus*), raven (*Corvus corax*), barn owl (*Tyto alba*), great-horned owl (*Bubo virginianus*), western screech owl (*Otus kennicottii*), peregrine falcon (*Falco peregrinus*), prairie falcon (*F. mexicanus*), American kestrel (*F. sparverius*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and turkey vulture (*Cathartes aura*) can also be considered as likely, locally nesting species.

Virtually all migrant species using western flyways may potentially pass through this area during the spring and fall migrations.

**Mammals.** Several carnivores occupy the various habitats through which the proposed alignments pass. Bobcat (*Lynx rufus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxidea taxus*), ring-tailed cat (*Bassariscus astutus*), striped skunk (*Mephitis mephitis*), and spotted skunk (*Spilogale putorius*) might reasonably be encountered in suitable habitats along the various corridors. Mountain lion (*Felis concolor*) is a possible occupant of the Eldorado Mountain uplands through which Alternative D passes.

| Desert bighorn sheep (*Ovis canadensis nelsoni*) are common in the River Mountains rising north and northwest of the various alignments. The sheep is somewhat less common but still present in the McCullough Range just south of Railroad Pass. Bighorn density is comparatively high in portions of the northern Eldorado Mountains.

At least 20 bat species (Table 3-7) have been reported in Clark County (O'Farrell and Rahn, 2000). Eleven of these are considered species of concern by USFWS and are discussed in detail.

**TABLE 3-7**  
Bat Species Recorded in Clark County, Nevada

Common Name	Scientific Name	Primary Associations
California leaf-nosed <sup>1</sup>	<i>Macrotis californicus</i>	Caves and mines
Mexican long-tongued	<i>Choeronycteris mexicana</i>	Riparian/desert canyons
California myotis	<i>Myotis californicus</i>	Crevices, caves, and mines
Small-footed myotis <sup>1</sup>	<i>Myotis ciliolabrum</i>	Habitats above 1,830 m (6,000 ft) <sup>2</sup>
Long-eared myotis <sup>1</sup>	<i>Myotis evotis</i>	Conifer forests <sup>2</sup>
Fringed myotis <sup>1</sup>	<i>Myotis thysanodes</i>	Crevices, caves, and mines
Long-legged myotis <sup>1</sup>	<i>Myotis volans</i>	Mid to high elevations <sup>2</sup>
Yuma myotis <sup>1</sup>	<i>Myotis yumanensis</i>	Crevices, caves, and mines
Western red	<i>Lasiurus blossevillii</i>	Riparian and wooded areas <sup>2</sup>
Hoary	<i>Lasiurus cinereus</i>	Forested habitats <sup>2</sup>
Silver-haired	<i>Lasionycteris noctivigans</i>	Forested habitats <sup>2</sup>
Western pipistrelle	<i>Pipistrellus hesperus</i>	Crevices, caves, and mines
Big brown	<i>Eptesicus fuscus</i>	Caves and mines
Townsend's big-eared <sup>1</sup>	<i>Corynorhinus townsendii</i>	Caves and mines
Spotted <sup>1</sup>	<i>Euderma maculatum</i>	Cliff faces
Allen's big-eared <sup>1</sup>	<i>Idionycteris phyllotis</i>	Trees, caves, and mines
Pallid	<i>Antrozous pallidus</i>	Crevices, caves, and mines
Brazilian free-tailed	<i>Tadarida brasiliensis</i>	Cliff faces, caves, and mines
Big free-tailed <sup>1</sup>	<i>Nyctinomops macrotis</i>	Canyonlands
Western mastiff <sup>1</sup>	<i>Eumops perotis</i>	Crevices and cliff faces

<sup>1</sup> USFWS species of concern.

<sup>2</sup> Habitat preferences indicate species unlikely to be encountered during this project.

A variety of other mammals also inhabits the general project area. Typical species include black-tailed jackrabbit (*Lepus californicus*), desert cottontail rabbit (*Sylvilagus audubonii*), desert wood rat (*Neotoma lepida*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Citellus tereticaudus*), pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* sp.), various cricetid mice (*Onychomys* sp., *Reithrodontomys megalotis*, *Peromyscus* sp.), and pocket mice (*Perognathus* sp.).

### Protected and Sensitive Animal Species

**Desert Tortoise.** The desert tortoise, a federally listed threatened species, is protected under both federal and Nevada law. The desert tortoise, as well as several other species, both plant

and animal, are afforded further protection and conservation by the Clark County Multi-Species Habitat Conservation Plan (MSHCP). The MSHCP is intended to maximize prospects for long-term protection for habitats located throughout Clark County, as well as the numerous plant and animal species that inhabit those areas. The Paiute-Eldorado Valley Desert Tortoise Conservation Area, located about 29 km (18 miles) south of the southernmost Alternative D alignment, was one of the areas established for this purpose.

Tortoises have a nearly continuous presence (Figure 3-2) along all three alignments; however, tortoise sign<sup>4</sup> is generally less prevalent along the already disturbed Alternative B corridor and those portions of Alternative C that are essentially congruent with Alternative B. Although in the western segment of the Alternative C corridor – from the Railroad Pass area to where the alignment crosses U.S. 93 – tortoise sign on the south side of the existing U.S. 93/95 and U.S. 93 highways is reasonably dense. Subsequently, along Alternative C, tortoise sign is patchy but persists in densities ranging from light to moderate as the corridor skirts the base of the River Mountains en route to rejoining Alternative B near the head of Hemenway Valley. Tortoise sign is sparse along the Alternative B and C corridors from the head of the valley to about the Hacienda Hotel and Casino, and it essentially disappears as the corridor enters the canyon lands leading to the Colorado River.

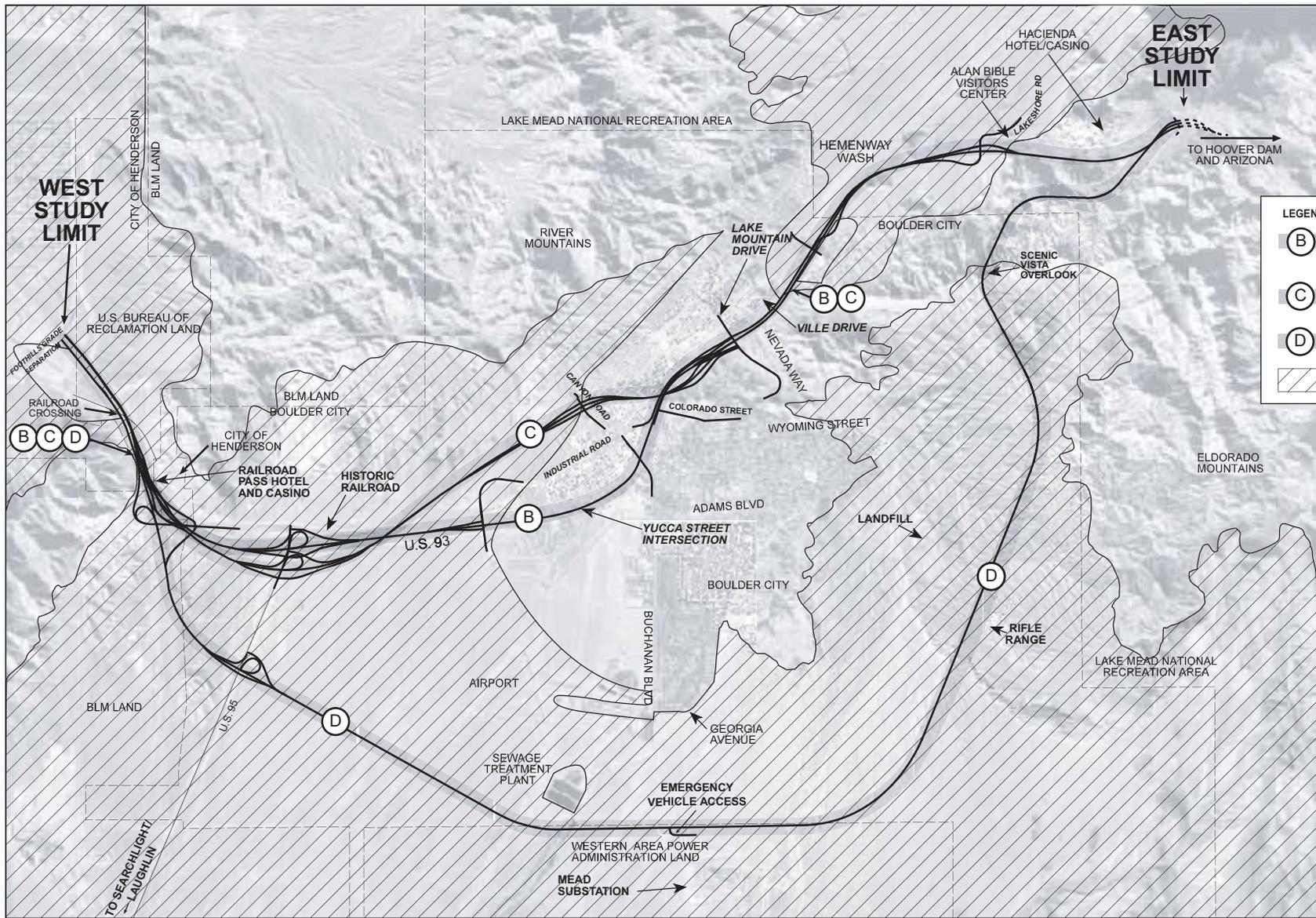
Along Alternative D, tortoise sign is moderately dense from the Railroad Pass area south to U.S. 95, but it gradually thins east of the highway as soils become sandy, more loosely consolidated, and less able to support tortoise burrows. In the highly sandy soils in the vicinity of the sewage treatment plant, tortoise sign is completely absent. Evidence of tortoise reappears east of Buchanan Boulevard as more consolidated soils again become the norm. As Alternative D begins its northern swing toward the Boulder City Rifle and Pistol Club range, tortoise sign varies from light to moderate depending upon the immediately local terrain and habitat. Between the rifle range and small power substation to the north, tortoise sign is typically low; however, occasional clusters of three to five tortoise burrows in close proximity to one another can be found on some of the benches separating local drainages in this area.

The highly dissected terrain between the substation and the ridge overlooking Hemenway Valley appears to support a relatively low tortoise population. Similarly, in the mountainous section northeast of the ridge, tortoise density is low. Most burrows occurring in this area have been constructed on the stable, low-angle slopes found between the major canyons.

**Gila Monsters.** Gila monsters, protected from collection and killing under Nevada law (NRS 501-110), could occur in the project vicinity (Figure 3-3). Encounters with this lizard are more likely in the mountainous areas crossed by the project, but they could happen virtually anywhere along the various routes. Gila monsters are known to occupy the Las Vegas Valley, surrounding uplands, and adjacent areas. They have been found in both the Eldorado and McCullough mountains. A reliable sight record (Hardenbrook, pers. comm.) exists of a gila monster in the central Eldorado Valley just south of the Reclamation compound.

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<sup>4</sup> The element most commonly used to identify tortoise presence is the characteristic burrow of the species. Other signs (i.e., live tortoises, tortoise carcasses, scat, and tracks) are also noted and recorded.



**LEGEND**

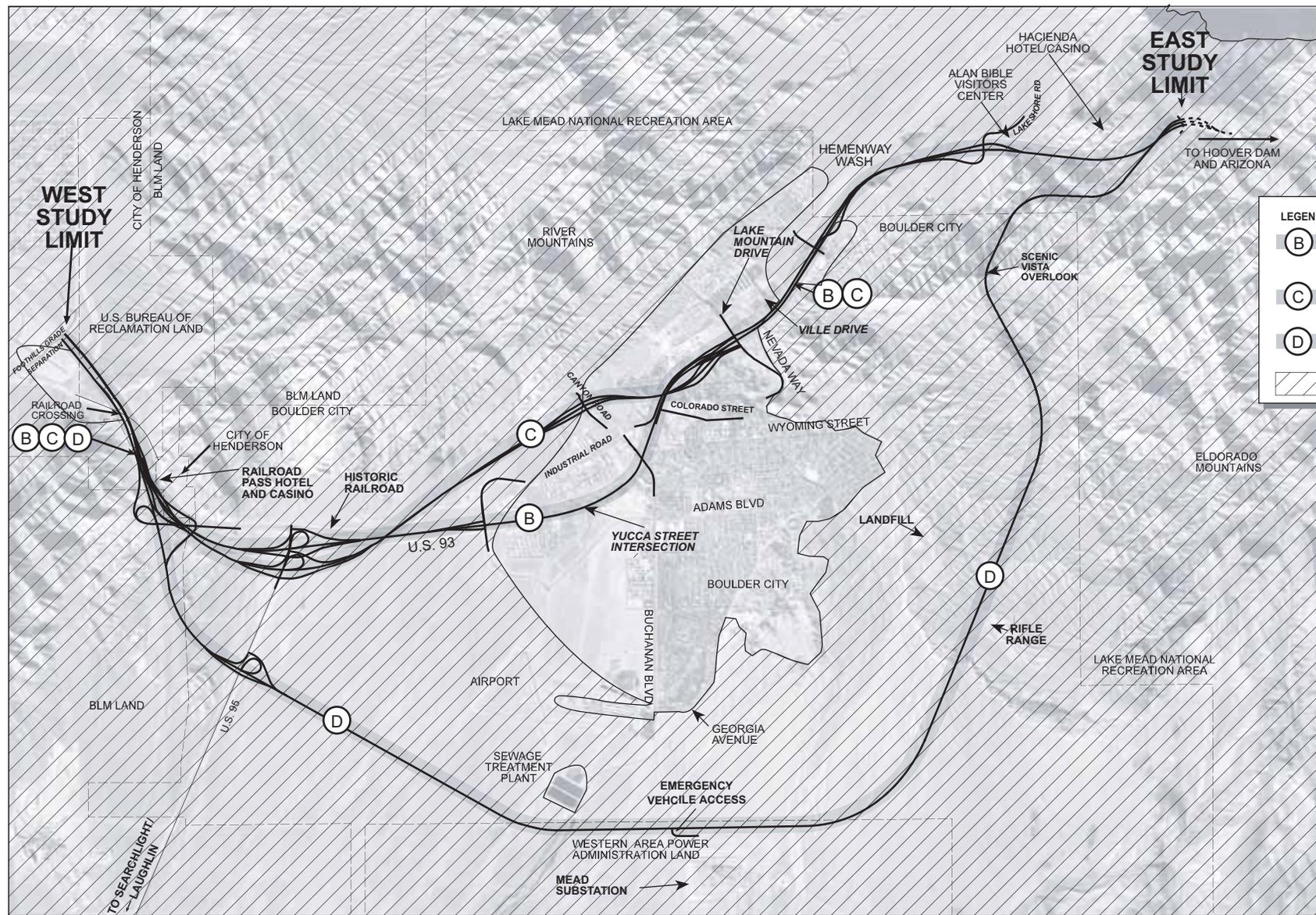
- (B) ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C) ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D) ALTERNATIVE D - SOUTHERN ALIGNMENT
- [Hatched Box] DESERT TORTOISE HABITAT

12/99



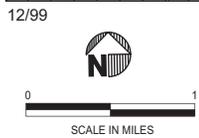
**FIGURE 3-2**  
**DESERT TORTOISE HABITAT IN AREAS**  
**CROSSED BY PROPOSED BOULDER**  
**CITY/U.S. 93 CORRIDOR ALIGNMENTS**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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**LEGEND**

- (B)** ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C)** ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D)** ALTERNATIVE D - SOUTHERN ALIGNMENT
- GILA MONSTER HABITAT



**FIGURE 3-3**  
**GILA MONSTER HABITAT IN AREAS**  
**CROSSED BY PROPOSED BOULDER**  
**CITY/U.S. 93 CORRIDOR ALIGNMENTS**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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**Chuckwalla.** Although not formally protected by either federal or state law, the chuckwalla is considered a species of concern by the Nevada Division of Wildlife (NDOW) and a special-status (sensitive) species by the local BLM office (Clemmer et al., 1999). Chuckwallas could be located in the project area where rocky outcrops (including exposed caliche strata) and/or heavily bouldered terrain exist.

**Migratory Birds.** With the exception of domestic pigeons, house sparrows, and European starlings, all birds occupying or using the project vicinity are protected under the Migratory Bird Treaty Act of 1918, as amended (16 United States Code [U.S.C.] §§ 703-712). However, only a few bird species are likely to be of particular concern relative to this project. The southwestern willow flycatcher (*Empidonax traillii extimus*), federally listed as endangered, might be encountered during spring and early summer months in the riparian corridor crossed by Alternative D below the Boulder City sewage treatment plant. The peregrine falcon, which may occur in the mountainous, eastern sections of the project area, is a federal species of concern, as are the burrowing owl and phainopepla. The owl commonly uses abandoned desert tortoise burrows as nesting sites. The phainopepla is likely to be found in association with mature catclaw acacia trees in which it often nests. Berries of the saprophytic desert mistletoe (*Phoradendron californicum*), common in local catclaw trees and shrubs, provide phainopepla an important winter food. As catclaw trees of various sizes occur at several points along the three proposed routes, phainopepla may be encountered.

**Bats.** At least six of the bats considered species of concern by USFWS (see Table 3-7) are reasonable prospects for encounters in the mountainous sections of the various alignments. These bats are particularly likely to be found in the Eldorado Mountains canyon lands, where highly fractured, rocky terrain provides abundant roosting habitat for cave-, mine-, and crevice-roosting species. During the survey of Alternative D, a small concentration of bat droppings was noted in an old adit (horizontal mine shaft) located adjacent to the corridor in the Eldorado Mountains. A similar concentration was noted in a short adit near the Hacienda Hotel and Casino, along the Alternative B and C alignment.

**Bighorn Sheep.** Bighorn sheep are a highly valued<sup>5</sup> big-game animal protected under state law (NRS 501) as administered by NDOW. Potential bighorn sheep range extends throughout the mountainous areas and some alluvial fans through which the various alignments pass<sup>6</sup> (Figure 3-4A). Prior development in the project vicinity has already affected the population dynamics of bighorn in the area to the extent that population and gene flow between isolated mountain ranges, believed to be important to the fitness of the species, is thought to have been much reduced by development in the Twentieth Century (Cummings, NDOW, personal communication). Railroad Pass was formerly an important migration corridor for sheep moving between the River and McCullough mountains, a route

<sup>5</sup> In 2003 there were 10,837 applications for bighorn hunt tags in the State of Nevada ([www.ndow.org/about/license/sales](http://www.ndow.org/about/license/sales)).

<sup>6</sup> BLM estimates, based on NDOW survey data, of 1994 bighorn populations are 257 in the River Mountains and 356 in the Eldorado Mountains (BLM, 1998). NDOW's 1999 estimate of the Eldorado population is 220 adult sheep, most of which are in the northern part of the range. Young-of-the-year (lambs), formerly included in NDOW's population estimates, are not included in the 1999 estimate; thus, direct comparison between it and former estimates cannot be made using these numbers alone (Cummings, pers. comm.).

that is now (and has historically been) impeded by the railroad and the U.S. 93/95 roadway in the pass. Similarly, the Hemenway Valley is identified as an important migration corridor between the River and Eldorado mountains (Cummings, NDOW, personal communication). Extensive residential development in Hemenway Valley as well as the historic U.S. 93 corridor there, are believed to impede bighorn migration between these mountain ranges as well. Bighorn sheep are occasionally killed on U.S. 93, primarily along the upper reaches of Hemenway Wash, and in the rugged lands around and downslope of the Hacienda Hotel and Casino.

Because of the prevalence of ewes and rams in the area from Goldstrike Canyon north to the Eldorado Mountains ridgeline, NDOW considers this and the adjacent section of the Eldorado Mountains a core use area for the species (Cummings, NDOW, personal communication). Recent tracking of bighorn sheep fitted with GPS tracking collars shows their frequent occurrence in the area, and also demonstrates that at least some sheep still move from the River Mountains to the Eldorado Mountains (Figure 3-4B).

Occasional sheep sign was noted during the biological resources survey near Railroad Pass as well as along Alternative C where it skirts the base of the River Mountains. Sheep sign also was noted from the vicinity of the Boulder City Rifle and Pistol Club range, north along the Alternative D alignment. The nearly complete skeleton of an adult ewe was found just above the small power substation. However, more recent tracking data suggests that their presence south of the Eldorado Ridge is infrequent (Figure 3-4B; NDOW, 2004).

Mountain lion, bobcat, gray fox, kit fox, and desert cottontail rabbit, all either known or possible project area residents, are also state-protected species.

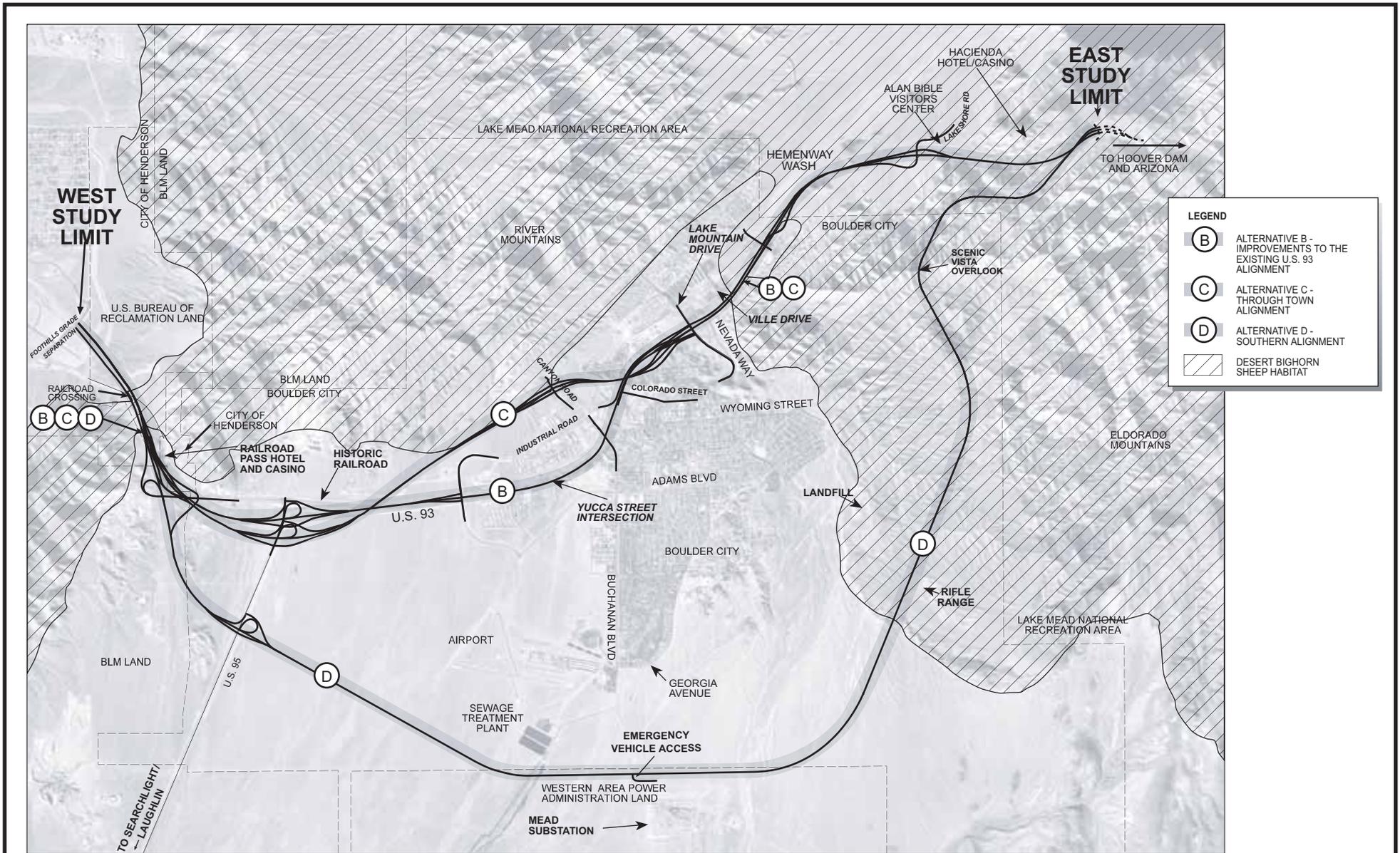
## 3.5 Water Quality

This section describes the environmental setting of the project alternatives from a water quality perspective, including the natural drainage of the area and the locations and characteristics of the desert washes that convey surface water runoff.

### 3.5.1 Project Area Drainage

The annual precipitation in the Las Vegas Valley and throughout the project area averages 10.4 cm (4.1 inches) per year. Runoff from these precipitation events, which are almost entirely in the form of rainfall from infrequent winter storms and summer thunderstorms, is conveyed through desert washes (Figure 3-5).

The River Mountains are located in the northern portion of the project area, and the Eldorado Mountains are in the eastern portion. Much of the precipitation runoff from these mountains is conveyed either into the Colorado River or into Lake Mead via the Hemenway Wash. Lake Mead and the Colorado River are the two primary water resources of concern.



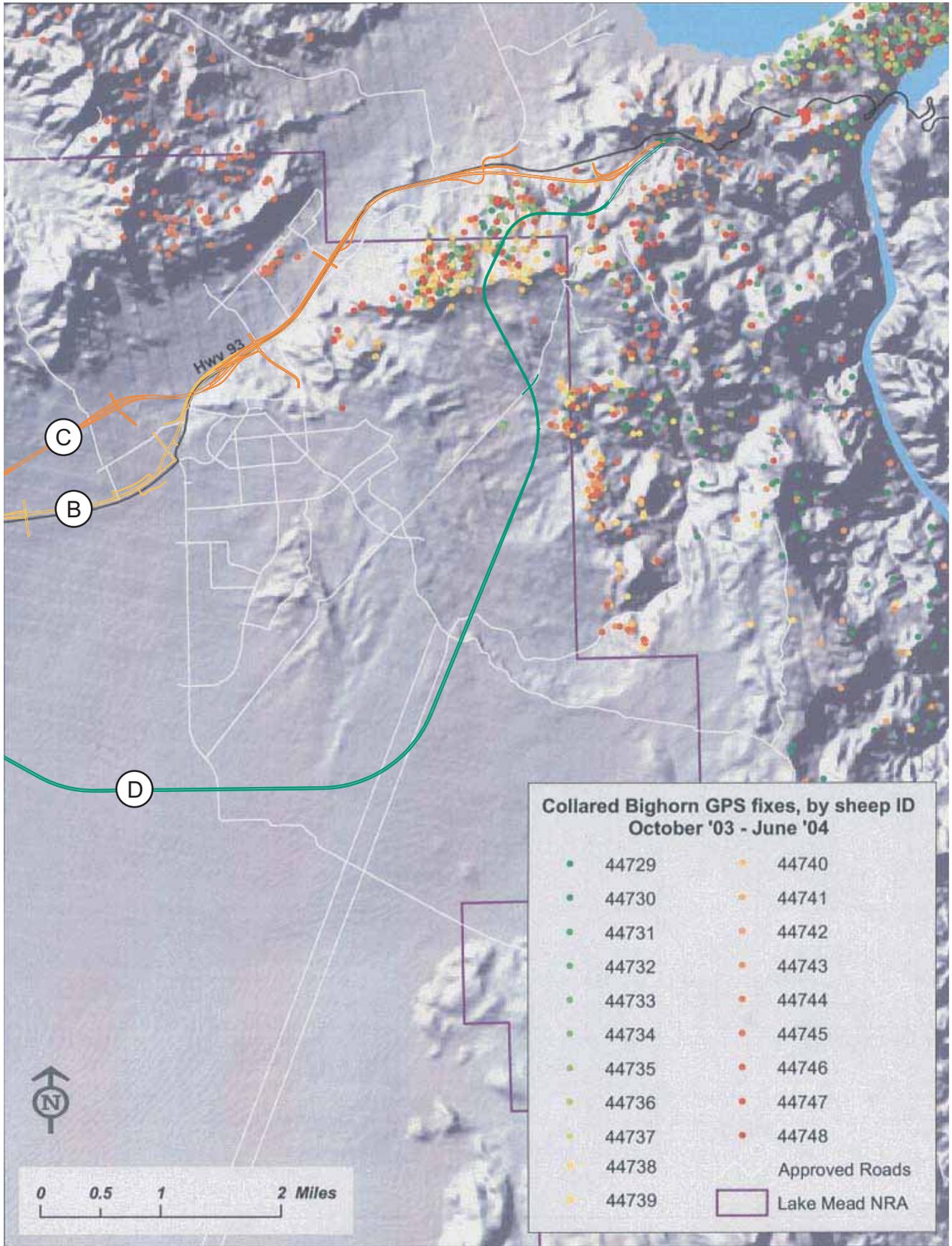
12/99



**FIGURE 3-4A**  
**DESERT BIGHORN SHEEP HABITAT IN**  
**AREAS CROSSED BY PROPOSED**  
**BOULDER CITY/U.S. 93 CORRIDOR**  
**ALIGNMENTS**

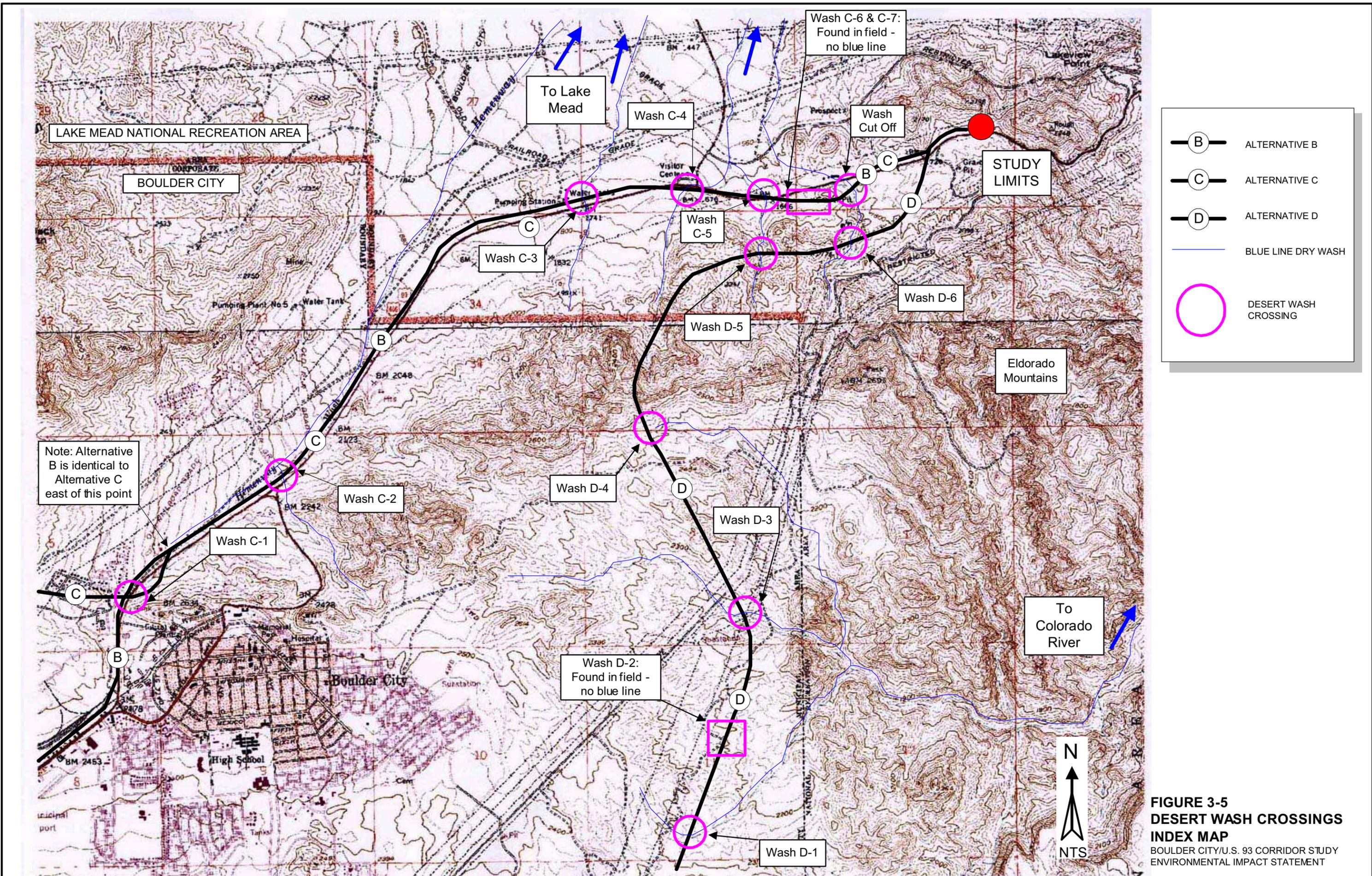
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
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**FIGURE 3-4B**  
**DESERT BIGHORN SHEEP OCCURRENCES**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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**FIGURE 3-5**  
**DESERT WASH CROSSINGS**  
**INDEX MAP**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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The relatively flat alluvial fan area south of existing U.S. 93 and Boulder City contains mostly small desert washes that meander generally south in a braiding fashion and convey stormwater into the Dry Lake Basin, located at the base of the McCullough Range southwest of Boulder City. Two major washes, the Georgia Avenue Wash, located along the south edge of developed Boulder City, and Wash "C," located just east of the Mead Substation, are included in this system. Both washes flow due south out of Boulder City and are channelized within the Boulder City limits. The flow of water in these smaller drainage systems occurs only during infrequent storm events. The waters that drain into the isolated playa evaporate soon after the cessation of storms.

The current quality of water flows through the alluvial fan is assumed to be typical of similar desert washes (i.e., high in suspended solids and variable in dissolved solids). Because of the temporal nature of the water in the playa and its hydrologic isolation of the system from any perennial surface water bodies or groundwater, contamination of these washes will not result in negative impacts to surface water quality.

### 3.5.2 Surface Water Quality Standards

The Nevada Division of Environmental Protection (NDEP) retains statutory authority for water quality through its Bureau of Water Quality Planning (BWQP). The BWQP is responsible for collecting and analyzing water data, developing and assigning standards for surface waters, publishing informal reports, providing water quality education, and implementing programs that address surface water quality.

The BWQP has developed water quality goals for all water bodies in Nevada and, in turn, has assigned beneficial uses for these waters. Some examples of such beneficial uses include recreation, the preservation of aquatic life, drinking water supply, and irrigation. To preserve these beneficial uses at their current level, water quality standards have been developed for each water body in the state of Nevada.

The two navigable water bodies that receive surface drainage from the project area (Lake Mead and the Colorado River) have water quality standards that pertain to specific areas of the lake and river (i.e., Lake Mead near Las Vegas Bay and Colorado River upstream of Hoover Dam). Table 3-8 displays water quality standards for Lake Mead in the project area. The standards have been set to protect the main beneficial uses of the domestic water supply and water contact recreation.

**TABLE 3-8**  
Standards of Water Quality for Lake Mead (NAC 445A.195)  
Applicable to All Project-Area Drainage Outfalls into Lake Mead

Water Quality Parameter	Water Quality Standard for Beneficial Uses	Beneficial Uses
Suspended Solids (mg/L)	≤ 25	Propagation of aquatic life including, without limitation, a warm-water fishery and recreation not involving contact with the water
Turbidity (NTU)	≤ 25	Propagation of aquatic life including, without limitation, a warm-water fishery, recreation involving contact with the water, and recreation not involving contact with the water

**TABLE 3-8**

Standards of Water Quality for Lake Mead (NAC 445A.195)  
Applicable to All Project-Area Drainage Outfalls into Lake Mead

Water Quality Parameter	Water Quality Standard for Beneficial Uses	Beneficial Uses
Color (PCU)	Increase in color $\leq$ 10 PCU above natural conditions	Recreation not involving contact with the water, and municipal or domestic supply, or both
Total Dissolved Solids (mg/L)	$\leq$ 1,000	Municipal or domestic supply, or both, and irrigation
Nitrogen Species (N) (mg/L)	Nitrate $\leq$ 10 Nitrite $\leq$ 1 Ammonia $\leq$ 0.05	Municipal or domestic supply, or both; watering of livestock; propagation of aquatic life including, without limitation, a warm-water fishery; and propagation of wildlife
PH	6.5 – 9.0	Water contact recreation and wildlife propagation (most restrictive), aquatic life, irrigation, stock watering, municipal or domestic supply, and industrial supply

Source: Nevada Administrative Code (NAC), 2001.

mg/L – milligrams per liter

NTU – Nephelometer Turbidity Units

PCU – Platinum-Cobalt Units

Different water quality standards exist for the specific areas of Lake Mead in the vicinity of the Las Vegas Wash confluence and upstream of the Alfred Merritt Smith Water Treatment Facility intake point. Both of these are northwest of the east study limits (approximately 6 and 16 km [4 and 10 miles], respectively). These areas have less stringent requirements for the nitrogen species and total dissolved solids (TDS) water quality parameters (nitrate  $\leq$  90 mg/L, nitrite  $\leq$  5 mg/L, and TDS  $\leq$  3,000 mg/L). This is because the area contains outflow from high nutrient-content marshlands, as well as outflows from three Las Vegas Valley wastewater treatment facilities.

Table 3-9 displays water quality standards for the Colorado River in the project area, at the location where surface runoff from desert wash crossings with the proposed alternatives empties into the water body. Water quality standards specific to this project pertain to the segment of the lower Colorado River that is downstream of Hoover Dam and upstream of the Lake Mohave inlet. Different water quality standards exist all along the Colorado River, depending upon the defined beneficial uses.

### 3.5.3 Surface Water Quality Monitoring

The State of Nevada has a surface water monitoring network for the Colorado River Basin to track fluctuations in water quality parameters and compare readings to existing standards. Recent water quality readings at a monitoring station at Willow Beach (south of the outflow point for the streams shown in Figure 3-5) indicate that for water quality parameters considered sensitive for construction and operation of the build alternatives in this study, all recent data is within established standards, although pH readings have been on the upper end of the standard range for the Colorado River.

**TABLE 3-9**  
Standards of Water Quality for the Colorado River (NAC 445A.193)  
Below Hoover Dam to the Lake Mohave Inlet

Water Quality Parameter	Water Quality Standard for Beneficial Uses	Beneficial Uses
Suspended Solids (mg/L)	≤ 25	Aquatic life (most restrictive)
Turbidity (NTU)	≤ 10	Aquatic life (most restrictive) and municipal or domestic supply
Color (PCU)	Increase in color ≤ 10 PCU above natural conditions	Aquatic life (most restrictive) and municipal or domestic supply
Total Dissolved Solids (mg/L)	723	Municipal or domestic supply (most restrictive), irrigation, and stock watering
Total Phosphates (as P) (mg/L)	≤ 0.05	Aquatic life and water contact for recreation (most restrictive) and noncontact recreation
Nitrogen Species (N) (mg/L)	Nitrate ≤ 10 Nitrite ≤ 0.06 Ammonia ≤ 0.02	Municipal or domestic supply and aquatic life (most restrictive) and stock watering, wildlife propagation, and noncontact recreation
PH	7.0 – 8.3	Water contact recreation and wildlife propagation (most restrictive), aquatic life, irrigation, stock watering, municipal or domestic supply, and industrial supply
Temperature (maximum) (°C)	November-April ≤ 13°C May-June ≤ 17°C July-October ≤ 23°C	Aquatic life (most restrictive) and water contact recreation

Source: Nevada Administrative Code (NAC), 2001.

### 3.5.4 Groundwater Resources

No known groundwater resources are located within the Colorado River or Eldorado Mountains, as the volcanic rocks comprising these mountains are not considered suitable for the formation of significant aquifers. In addition, the lower lying areas within the Boulder City limits and south into the alluvial fan also have no groundwater sources. No known water wells are present within the project area.

## 3.6 Wetlands/Waters of the U.S.

### 3.6.1 Study Methodology

The project team measured and recorded the major drainage areas affected by the project alternatives and delineated the areas of jurisdictional waters of the U.S. that would be potentially impacted by construction. Well defined drainage paths generally exist throughout most of the project area, ranging from small desert washes to large canyons in the surrounding mountains. Therefore, the following standard protocol was used to document crossings of potential waters of the U.S.

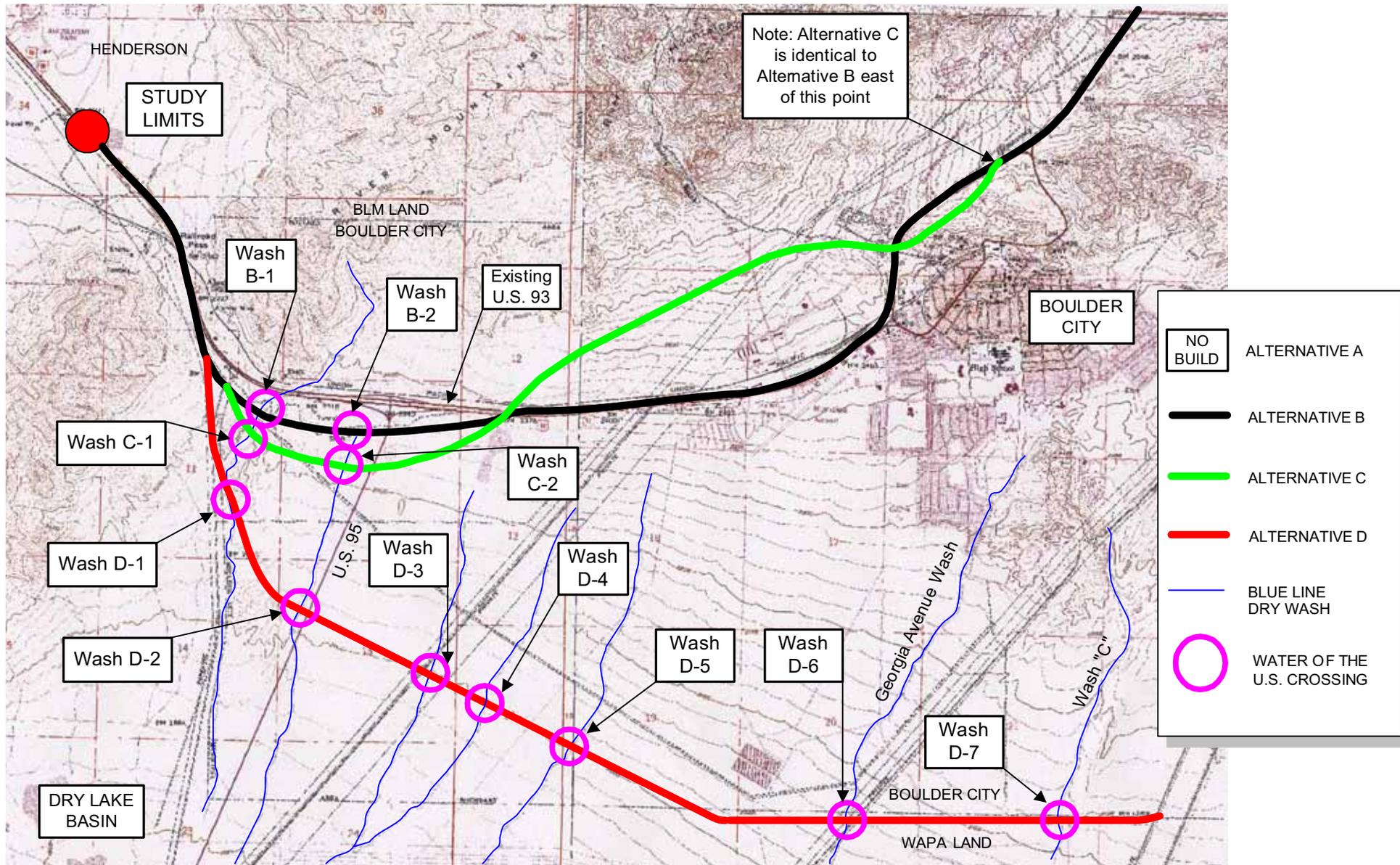
The project build alternatives were drawn on the USGS 7.5 minute quadrangle maps that cover the study area, and potential waters of the U.S. locations were identified as “blue line” streams that convey surface water into either Lake Mead or the Colorado River. Figures 3-6 and 3-7 show the locations of these blue line streams, along with their respective crossings of the three build alternatives.

Figure 3-6 depicts potential jurisdictional waters on the west side of the project area, all of which convey surface runoff to the Dry Lake Basin, south of the project area. Figure 3-7 depicts the potential jurisdictional waters on the east side of the project area, which drain their respective basins to either Lake Mead or the Colorado River. The potential waters of the U.S. are denoted by the terminology “Wash X-Y,” where X is the alpha designation for the build alternative that crosses the wash and Y indicates the wash number, increasing from west to east along a given alternative. Note that Alternatives B and C share a centerline and wash crossing locations for much of the eastern portion of the project area.

Upon completion of this preliminary identification, the project team performed a field delineation of these crossings. Once in the field and in the vicinity of the alignment centerline of the build alternatives, the general locations of the blue line streams on the quadrangle maps were further refined, and accurate levels of impact were measured. In some cases, the actual location of the wash crossing was in a slightly different location than shown on the quadrangle map, mostly due to the meandering nature of the washes and erosional effects. In addition, field verification identified some additional large wash crossings not shown on the quadrangle maps, which were also delineated.

At each of the crossings, a field delineation was made of the location of the ordinary high water mark (OHWM) within the desert wash. The OHWM is defined as the line on the shore established by the fluctuations of water from surface runoff. It is indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (23 CFR 328.3[e]). In the field, all these indicators were collectively or individually utilized to identify and establish the OHWM; however, of all the indicators, shelving of the banks was particularly discernable.

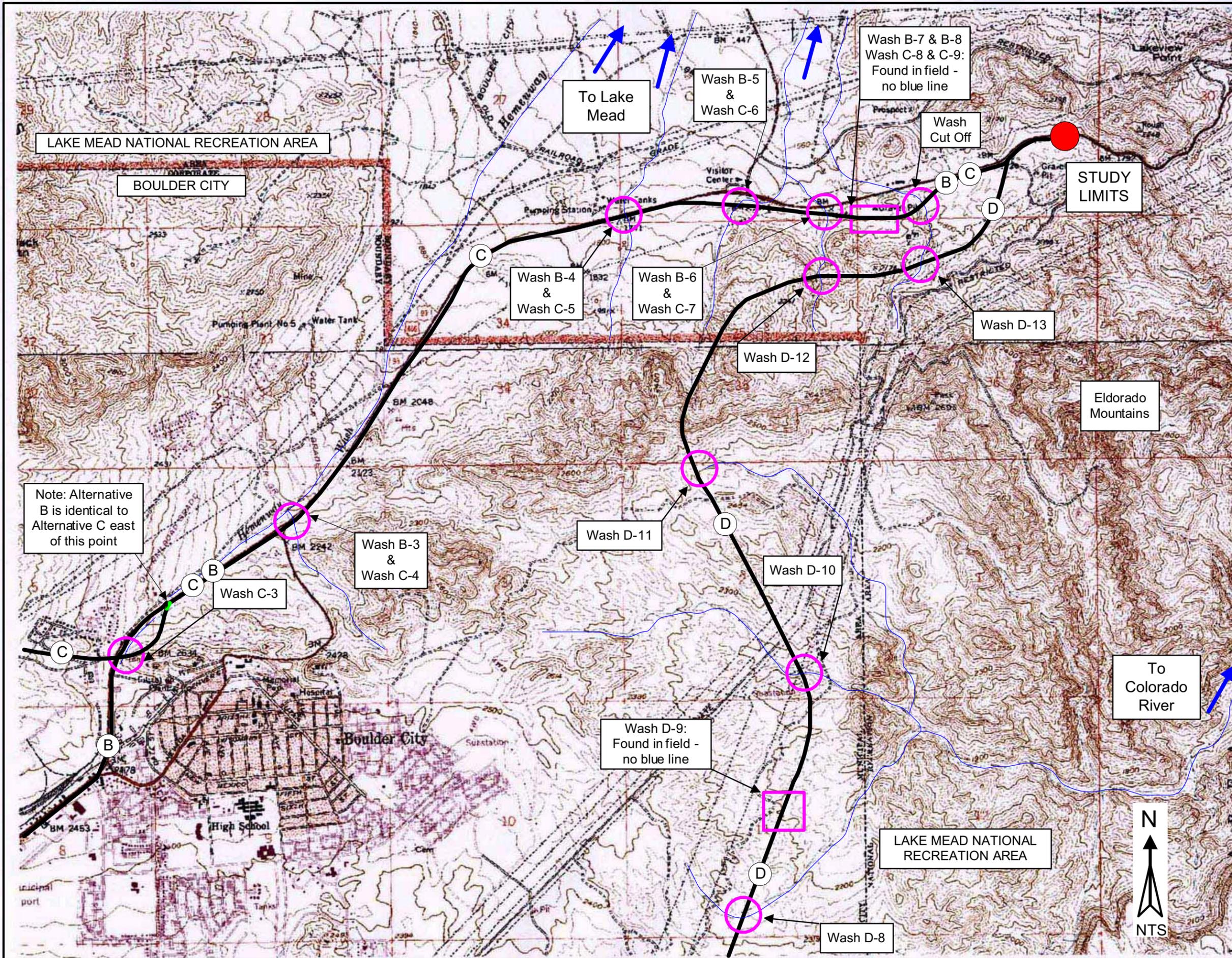
The extent of potential waters of the U.S. at each of the crossings was delineated to the approximate limit of cut and fill, as determined by the engineering drawings of the alternative alignments at the stage of development present in February 2001 (NDOT, January 2001). Field notes were taken at each crossing to account for the dimensions of the washes as determined by the protocol presented above. These dimensions produce an area of impact for each crossing. Along the width of the drainages, information on the plant species in the area was recorded. Photographs were taken to indicate the crossing and the individual alignment centerline locations. Figure 3-8 is a photograph of the approximate affected area of Wash Crossing C-3.



**FIGURE 3-6**  
**WASH CROSSINGS INDEX MAP - ISOLATED WATERS CONVEYING**  
**RUNOFF TO THE DRY LAKE BASIN OF ELDORADO VALLEY**

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 ENVIRONMENTAL IMPACT STATEMENT

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**FIGURE 3-7  
WASH CROSSINGS  
CONVEYING RUNOFF TO  
LAKE MEAD AND THE  
COLORADO RIVER**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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**FIGURE 3-8**  
**WASH CROSSING C-3**  
**(U.S. 93 AT NEVADA WAY)**  
**LOOKING UPSTREAM**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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## 3.6.2 Existing Conditions

### Topography and Soils

Portions of the project area traversed by the build alternatives are extremely rugged. The mountains are steep, generally bare, and deeply incised by ravines and canyons. The elevations range from approximately 500 m (1,600 ft) above sea level near the shores of Lake Mead along Alternatives B and C, to 750 m (2,500 ft) above sea level in the higher points of Alternative D as it passes through the Eldorado Mountains east of Boulder City.

Soils near the ground surface (down to approximately 15 cm [0.5 ft] in depth) are generally classified as very gravelly sandy loam composed of mostly fine soil material. Underlying layers extending down to a depth of 1.5 m (5 ft) contain more very gravelly sandy loam and, in some areas, gypsum-based soil material or bedrock. The bedrock in the area is predominantly very hard volcanic rock, and it exists in both weathered and unweathered forms (Speck, 1985).

The hydrologic (drainage area) soil groups vary throughout the project area, depending on the type of soil in the vicinity of a particular alignment. Most soils underlying the proposed alternatives are listed in the Soil Survey of Las Vegas Valley (Speck, 1985) with a hydrological soil group designation of Group "B," which means that they have a moderate infiltration rate when thoroughly wet. Taking all soils that are contacted by the proposed alternatives into account, the average hydrologic soil group designation is also "B." Permeability of these soils range from 5 to 50 cm (0.2 to 1.6 ft) per hour, with the upper range of permeability generally occurring at depths greater than 3 m (10 ft).

### Hydrology

In flatter portions of the project area south of existing U.S. 93 and Boulder City, the drainage is typified by alluvial fan topography. In this area, smaller meandering washes typically carry runoff out into the open desert (mostly to the dry lake basin to the south of the project area) and not into any navigable waters. The major drainage channels out of the southern portion of Boulder City convey surface water into the dry lake basin – the Georgia Avenue Wash (Wash D-6) and Wash "C" (Figure 3-6).

The project area under study contains several well defined drainage paths, especially in the higher elevations of the Eldorado Mountains east of Boulder City, which take the form of desert washes. Much of the precipitation runoff from the Eldorado Mountains and River Mountains (north of Boulder City) is conveyed into either the Colorado River or through Hemenway Wash into Lake Mead. Some of these washes cut a jagged path through rugged terrain before terminating in these navigable bodies of water (Figure 3-7).

### Vegetation

Throughout the project area, vegetation is sparse and consists primarily of low-growing drought-tolerant shrubs with some grasses. No hydrophytic (water-dependent) vegetation occurs in the desert washes in the vicinity of the proposed alternative alignments. The vegetation-type classification found in the proposed project area is Creosote-Bursage (Brown, 1994).

Dominant plant species observed in the upland areas during the field survey include the following: Creosotebush (*Larrea tridentata*), Brittlebush, (*Encelia farinosa*), burrobush or White bursage (*Ambrosia dumosa*), Beavertail cactus (*Opuntia basilaris*), Silver [=Golden] cholla (*Opuntia echinocarpa*), and Solitary barrel cactus (*Ferocactus acanthodes*). Infrequently, Joshua Trees (*Yucca brevifolia*) are also present. (see Section 3.4 for further details on the flora in the project area.)

The composition of the plant species immediately adjacent to the wash areas is generally similar to the upland vegetation, but with the addition of an occasional Catclaw acacia (*Acacia greggi*). Figure 3-9 depicts a wash crossing along the southern alignment and the typical native vegetation of the project area in the vicinity of the washes.

### 3.6.3 Wetlands

In February 2001, the project area was surveyed in its entirety, including all three build alternatives, to determine the wetland characteristics of the natural setting and the extent of jurisdictional waters that may be impacted by the proposed alternatives. Wetlands are defined in the federal regulations as:

“Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (40 CFR 230.3 and 33 CFR 328).

The Wetlands Delineation Manual (WDM) (USACE, 1987) requires an examination for the presence of indicators of three mandatory diagnostic characteristics. These characteristics (wetland parameters) are as follows:

- Hydrophytic vegetation
- Hydric soils
- Wetland hydrology

Except in limited cases, the WDM requires that a minimum of one positive indicator from each of the three mandatory wetland parameters be present in the project area for the area to be called a wetland under the United States Army Corps of Engineers (USACE) (Section 404) jurisdiction. Based on the field survey and subsequent consultations with the USACE (see Chapter 4), it was determined that no portion of the project area in the vicinity of the three proposed build alternatives contains conclusive evidence of all three wetlands parameters being met. Therefore, it was concluded that no jurisdictional wetlands exist in the project area. As noted above, there is an existing wetlands area created by effluent flowing south from the Boulder City sewage treatment plant. However, even though the treatment wetlands meet the three USACE jurisdictional criteria, the Corps jurisdictional authority is not applicable because the treatment wetland is not self-sustaining (see Section 4.6).



**FIGURE 3-9**  
**NATIVE VEGETATION AT**  
**ALTERNATIVE D WASH CROSSING**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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### 3.6.4 Waters of the United States (WUS)

Some of the washes, natural drainage areas, dry creek beds, and ephemeral channels that would be traversed or affected by the project alternatives may be considered “waters of the U.S.,” according to federal regulations. Waters of the U.S. are defined using the following parameters (33 CFR 328.3; 51 *Federal Register* [FR] 41217):

- Having current or historic use for interstate or foreign commerce
- All interstate waters, including interstate wetlands
- All navigable intrastate waters, such as lakes, rivers and streams
- Waters used to irrigate crops sold through interstate commerce
- Tributaries to any of the aforementioned waters

On January 9, 2001, the U.S. Supreme Court issued a decision in the case of the *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army Corps of Engineers* that reduced the jurisdictional authority of the USACE over isolated waters under Section 404 of the *Clean Water Act* (CWA). The Court concluded that the use of isolated waters by migratory birds as a criterion to determine jurisdictional waters of the U.S. exceeds the authority of USACE under the CWA. The Court further stated that the jurisdiction of USACE is restricted to navigable waters and their tributaries, and wetlands that are adjacent to these.

A WUS is further defined by the states in regulatory information, but general characteristics tend to apply to all definitions. In general, a WUS must have some sort of discernable runoff bed and bank, through which water either continually or periodically flows, and the surface runoff that the stream carries must either directly or eventually drain to a larger receiving water. In the project area, navigable receiving waters (titled waters) to which waters of the U.S. flow include Lake Mead, and the Colorado River immediately downstream of Hoover Dam.

## 3.7 Floodplains

A floodplain is defined as a “lowland adjacent to a river, lake, or ocean” and is categorized by a designation according to the frequency of an expected storm that would lead to a flood large enough to cover an area to a specified elevation (Floodplain Management Association, 1996). This section describes the affected floodplains in the project area.

### 3.7.1 Study Methodology

A floodplain evaluation was performed and a technical report prepared (NDOT, July 2001e) consistent with the guidelines in FHWA Technical Advisory T6640.8A.G.14 (FHWA, 1987).

FEMA Flood Insurance Rate Maps (FIRMs) do not cover all portions of the project area. Instead, detailed floodplain studies were performed to determine the appropriate flood zones for these areas. Figures 3-10 and 3-11 show the resulting flood zone designations.

A detailed study was performed in the project area on the Hemenway Wash channel and its Wash “B” tributary. The main channel runs along the west side of U.S. 93 as it extends in a northeasterly direction out of Boulder City, and Wash “B” runs along Nevada Way. Another

detailed study was performed on Wash “D,” which is a crossing of existing U.S. 93 near Veterans Memorial Drive (see Figure 3-10). Zone AE was designated for these three drainage areas (see below).

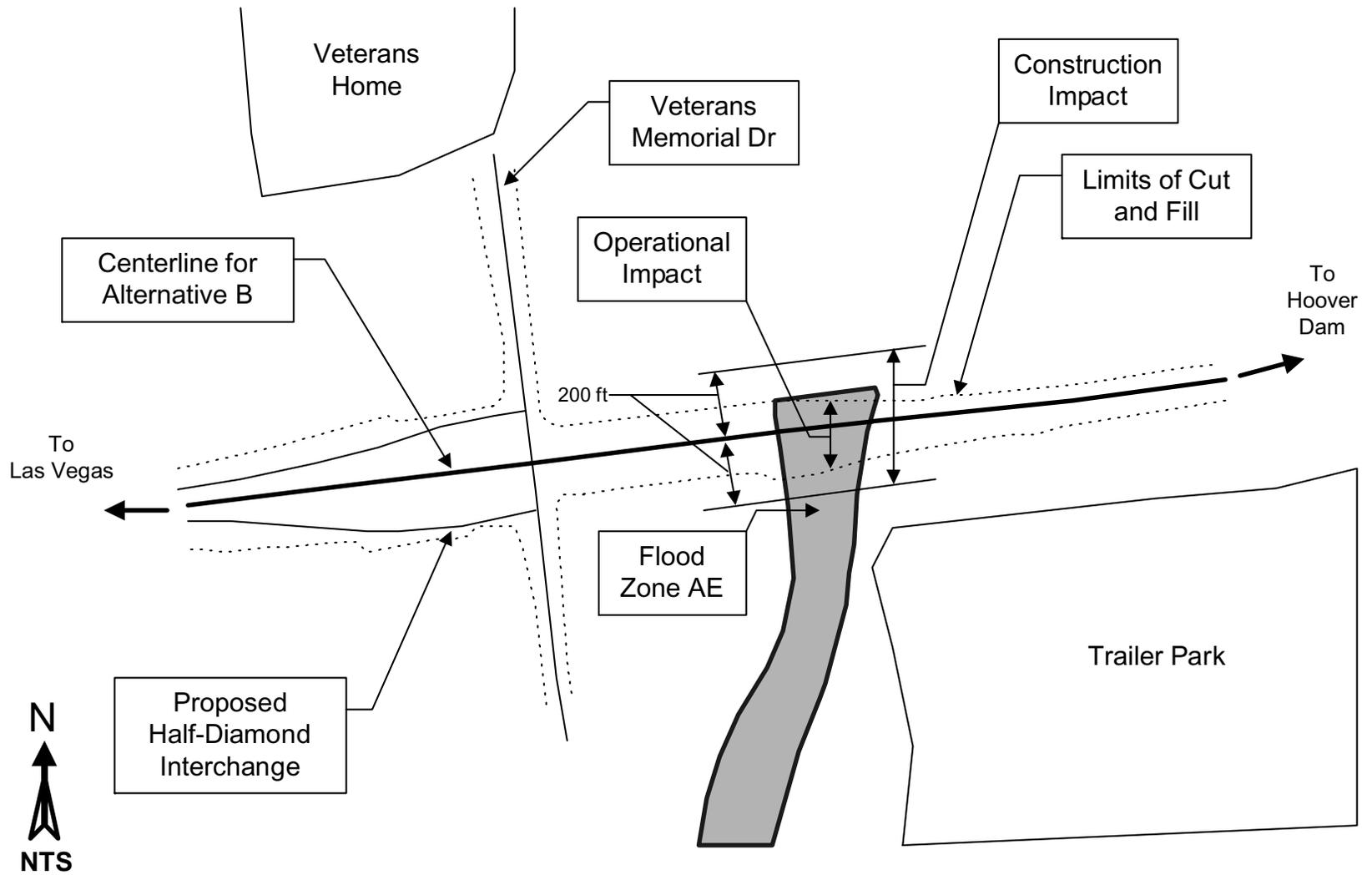
### 3.7.2 Existing Conditions

The detailed study produced a Zone AE for the Hemenway Wash channel and its tributary. The limits of this detailed study are shown in Figure 3-12, a copy of the FIRM, which depicts the floodplain for the Hemenway Wash channel and its Nevada Highway tributary. Base flood elevations range from 700 m (2,300 ft) at the most upstream portion of Zone AE to 600 m (2,000 ft) at the downstream limit of detailed study (National Flood Insurance Program, 1995a, 1995b, and 1995c). The 100-year storm produces approximately 4,000 cubic feet per second (cfs) of runoff along the Hemenway channel, as it is the main receptor of stormwater in the northern portion of the project area.

Figure 3-12 additionally depicts a floodway (darker shading) in the Hemenway Wash outflow area, north of the easternmost Boulder City street (Pacifica Way) when proceeding downgrade through the wash and into the LMNRA. There is no building allowed within this established floodway, and any encroachments into the regulatory floodway will require a remapping of the floodway to account for modified drainage conditions.

Floodplains, regulatory floodways, and their designations are shown in FEMA Flood Insurance Rate Maps (FIRMs). The following flood zones are present within the project study area, and these zones are shown in Figures 3-12 and 3-13, (National Flood Insurance Program, 1995a, 1995b, and 1995c):

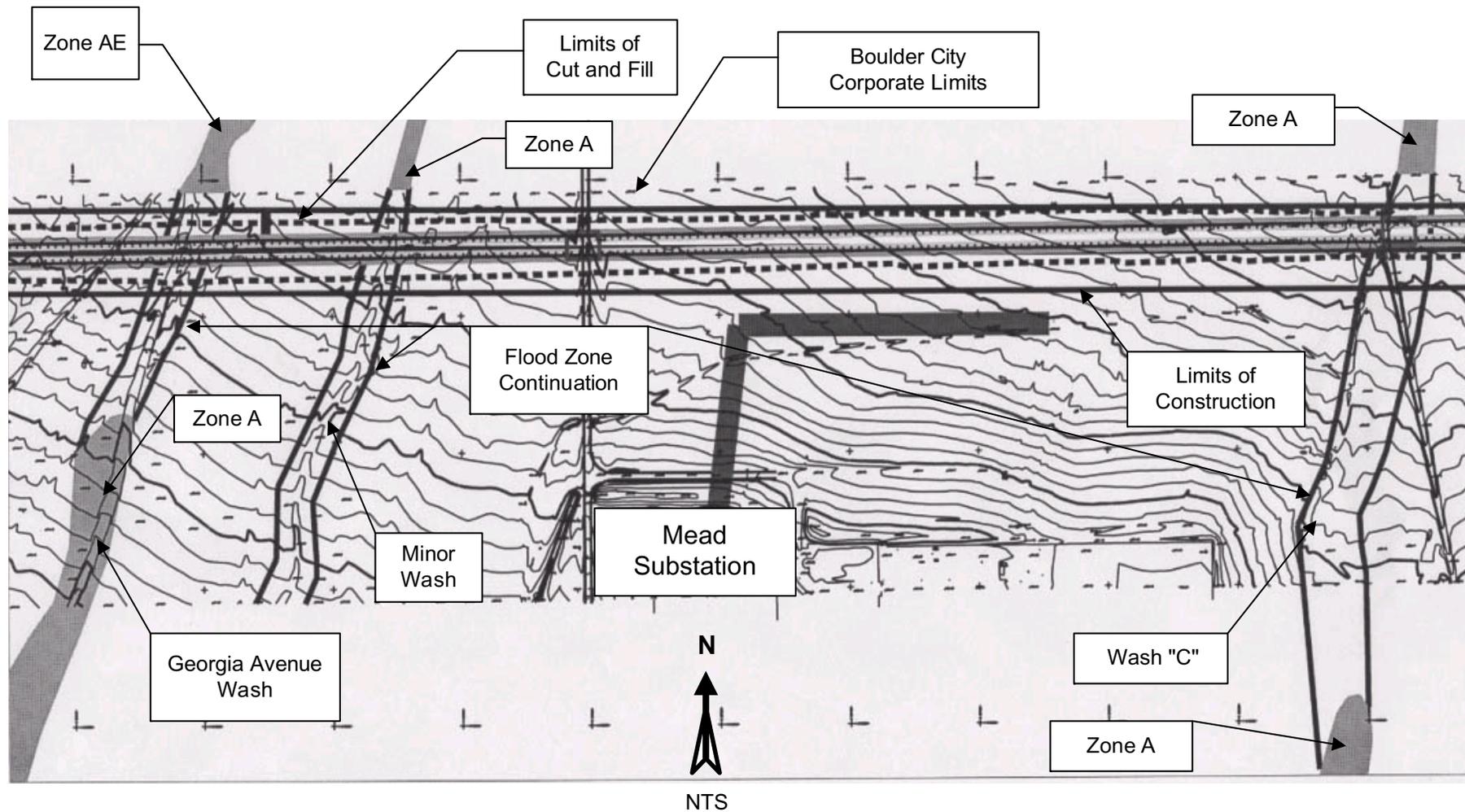
- Zone AE: A special flood hazard area (SFHA) inundated by the 100-year flood, where base flood elevations have been determined. Property located within flood zones designated as “AE” is subject to damage from rising water in storms approaching the 100-year return period.
- Zone A: A special flood hazard area inundated by the 100-year flood, where base flood elevations have not been determined. Property located within flood zones designated as “A” is subject to damage from rising water in storms approaching the 100-year return period.
- Zone X: Areas of inundation only by the 500-year flood; or areas of 100-year flood inundation with average depths of less than 30.5 cm (1 ft) or with drainage areas of less than 2.5 square kilometers (km<sup>2</sup>) (1 square mile); or areas protected by levees from a 100-year flood. Flood zones designated as “X” contain a minimal to moderate risk of flooding.
- Floodway: Areas that have been established by hydrologic and hydraulic modeling of stormwater flows to be designated as an SFHA within the 100-year flood zone, inside which no building construction is permitted. The floodway is determined by narrowing the boundaries of the Zone AE area in the hydraulic model to a width such that the flood depth increases by 30.5 cm (1 ft).



Construction Impact Area = 1.7 acres	Operational Impact Area = 1.2 acres
--------------------------------------	-------------------------------------

**FIGURE 3-10**  
**FLOODPLAIN DELINEATION FOR ALTERNATIVE B -**  
**ZONE AE NEAR VETERANS MEMORIAL DRIVE**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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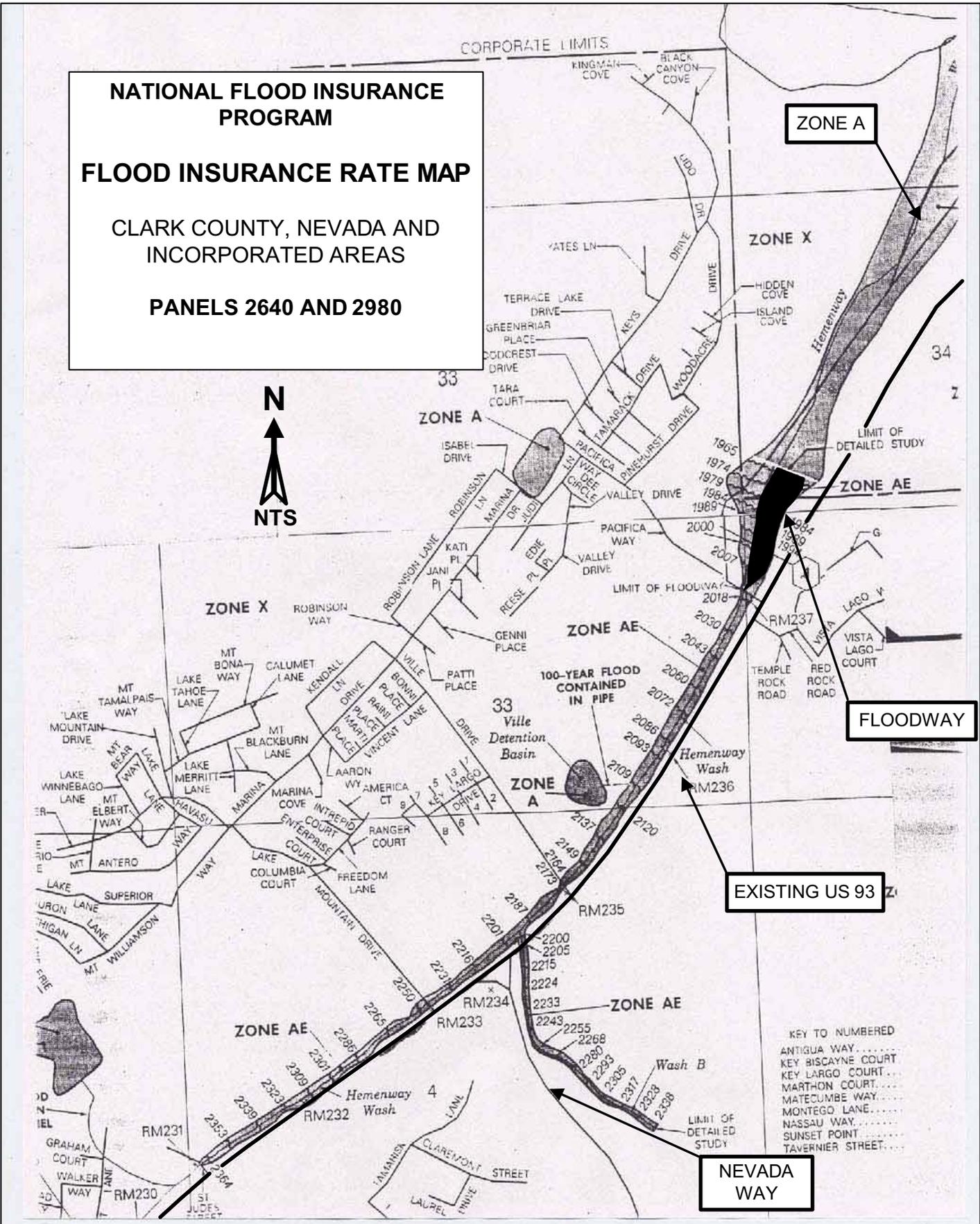


**FIGURE 3-11**  
**FLOODPLAIN DELINEATION FOR ALTERNATIVE D -**  
**ZONES A AND AE APPROXIMATE CONTINUATIONS**

BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

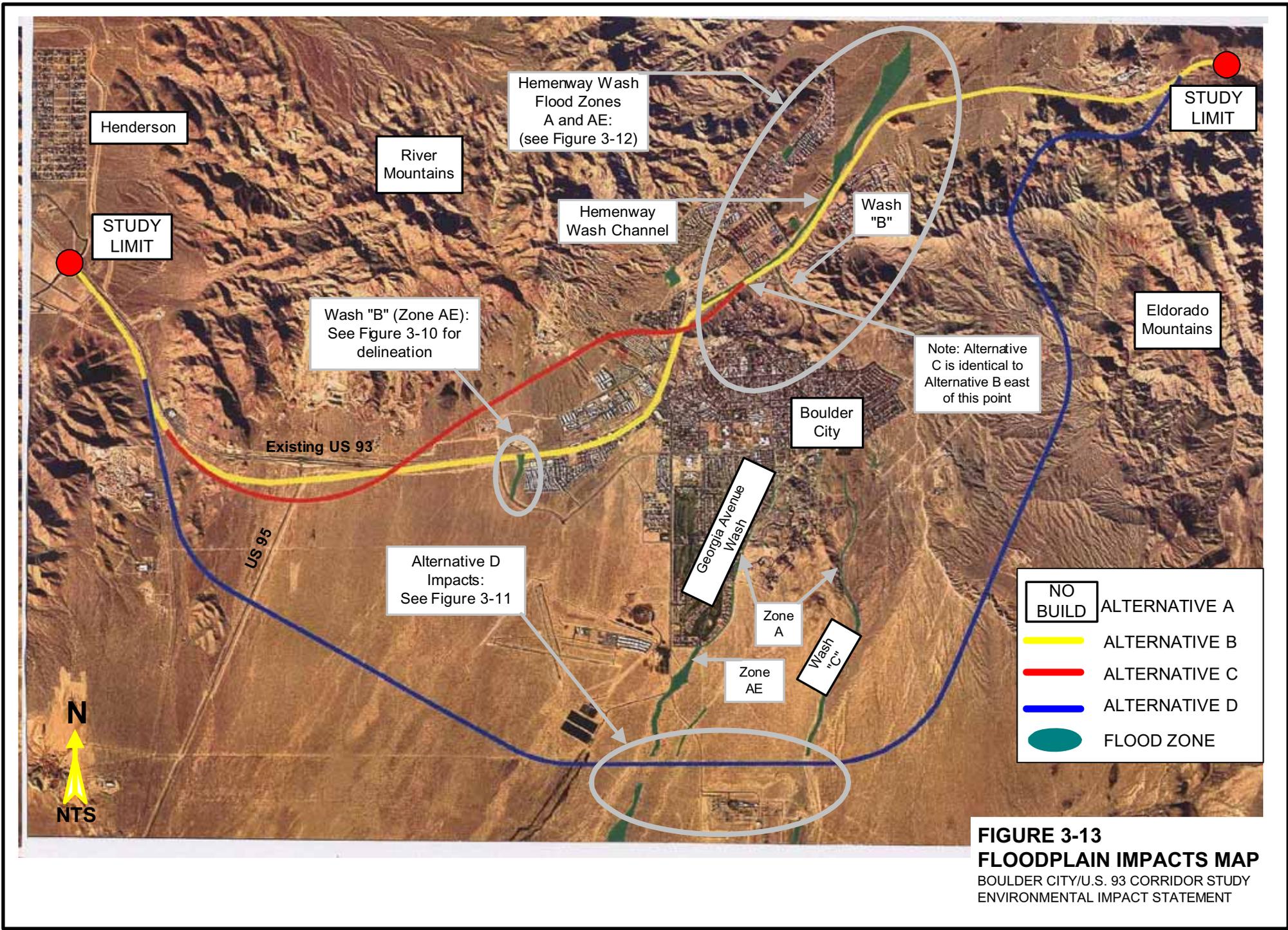
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**NATIONAL FLOOD INSURANCE PROGRAM**  
**FLOOD INSURANCE RATE MAP**  
 CLARK COUNTY, NEVADA AND INCORPORATED AREAS  
 PANELS 2640 AND 2980



**FIGURE 3-12**  
**FLOOD INSURANCE RATE MAP FOR**  
**THE HEMENWAY WASH AREA**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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**FIGURE 3-13**  
**FLOODPLAIN IMPACTS MAP**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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### 3.7.3 Coordination with Public Agencies

The main point of contact at the federal level for floodplain encroachments resulting from the construction of a new roadway is FEMA. FEMA has profiled all communities that have been mapped with flood zones and has provided a community profile for the “City of Las Vegas, Nevada,” including the project area. In this profile, the project area is found to be subject to “disaster risks,” one of which is “severe storms with flooding, high winds, lightning, and tornadoes” (Federal Emergency Management Agency, 2001). This is mostly a potential problem in the summer months when moist, unstable air that travels into the project area from the Gulf of Mexico is forced upward by hot air currents.

## 3.8 Cultural Resources

Important cultural resources are those that are listed in or are eligible for listing in the National Register of Historic Places (NRHP). Such resources are defined as buildings, sites, districts, structures, and objects vital to history, architecture, archaeology, culture, or science. Listed resources, or those resources determined eligible for NRHP listing, are referred to as “historic properties.” The NRHP is the nation’s inventory of historic properties, and NRHP documentation includes a recommendation about whether a resource is eligible for listing in the NRHP according to criteria promulgated by The Secretary of the Interior. The National Historic Preservation Act of 1966 (NHPA) is one of the more important legislative mandates that requires federal agencies to identify historic properties within their jurisdictions and consider the effects on those resources as a consequence of federal “undertakings.” Undertakings are those projects planned and constructed by federal agencies and also include those projects assisted by federal agencies through funding, technical support, or administrative authorizations (licenses, permits, and rights-of-way).

To facilitate their assessment, the cultural resources that were evaluated as part of the Boulder City/U.S. 93 Corridor Study were placed in three broad categories depending on their nature: (1) archaeological resources, (2) historic structures, and (3) Traditional Cultural Properties (TCPs). For cultural resources, the area of potential effect (APE) was determined in consultation with the Nevada State Historic Preservation Office (SHPO). The project APEs for archaeological resources, historic structures, and TCPs include 300-m (1,000-ft)-wide corridors, approximately 150 m (500 ft) each side of centerline of a specified build alternative (B, C, or D), encompassing potential locations of interchanges, construction easements, utility easements, and hydraulic improvements and/or impact areas. For archaeological sites and historic structures, the APE also encompasses the viewshed of these resources (Figure 3-14). For TCPs, the APE also includes the valley that the project is located in (Turner 2001, Pers. Comm.).

Cultural resources inventories were undertaken as one step in the Section 106 process for compliance with the NHPA. As described in detail below, archaeological resources along three proposed alternatives (B, C, and D) were inventoried by qualified staff of the Harry Reid Center for Environmental Studies (HRC), Marjorie Barrick Museum of Natural History, at the University of Nevada, Las Vegas (UNLV). HRC conducted a pedestrian Class III-type survey. The objective of this Class III pedestrian survey is to identify, record, and evaluate cultural materials on the surface within the undertaking’s APE.

Similarly, historic structures were evaluated by architectural historians from the consulting firm of Associated Cultural Resource Experts (ACRE), who conducted a separate historic structures survey. That survey addresses standing structures, historic roads, transmission lines, railroads, and historic districts situated in the project area. The objective was the same as that of the archaeological resources, to maintain compliance with Section 106 of the NHPA. For this investigation, historic structures were considered to be standing buildings, transmission towers, tanks, and similar aboveground-built features. Historic structures were also considered to include railroads and historic roads and highways. Prospect pits, adits, foundations, and other ruins were addressed as archaeological features.

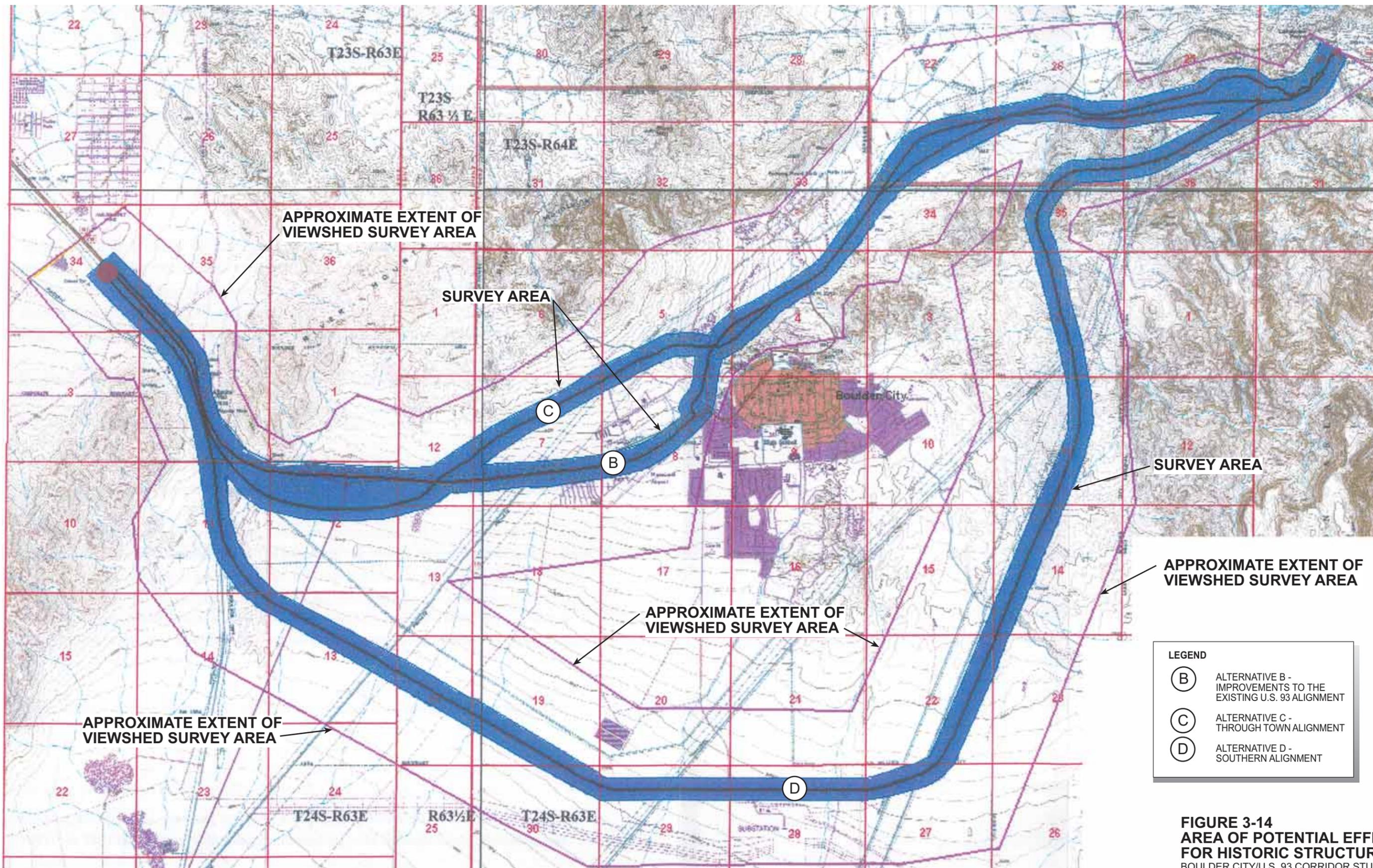
Archaeological and historic surveys were conducted along a staked centerline of each alternative corridor. Structures found within the archaeological survey area were noted on USGS quadrangle maps, and this information was conveyed by the archaeologists from the HRC to the architectural historians from ACRE. The architectural historian subsequently recorded these structures. All such structures were recorded according to Nevada SHPO guidelines for linear resources. To review the full historic survey report, see the *Boulder City/U.S. 93 Corridor Study Historic Structures Survey* (Schweigert and Labrum, 2001).

Consistent with the definition of the APE, all historic structures within the viewsheds of the alternative corridors were inventoried. Similarly, all structures immediately behind any structures to be directly impacted by construction were also evaluated. For this study, structures 40 years old or older were assessed for eligibility for the NRHP. The term "structure" includes resources that may have more than one structure or building, particularly transmission lines that have multiple towers.

Viewsheds in the study area vary according to landforms and the particular topographic locations of historic structures. For example, 10 historic structures on the edge of the Boulder City Historic District are located along the peak of a ridge and are exposed to portions of 2 of the alternative routes. However, other nearby historic structures within the Historic District are downslope and are either topographically shielded from alternative corridors or are too distant to be adversely affected by any of the alternatives.

Reclamation lands near Railroad Pass and situated within Section 2, T23S, R63E, and Section 35, T22S, R63E (USGS Boulder City 7.5' Quadrangle) and the proposed project right-of-way had been previously inventoried. A Memorandum of Agreement (MOA) was signed on January 25, 2002, among FHWA, NDOT, Reclamation, BLM, and SHPO outlining mitigation measures to be completed for the Railroad Pass Squatters' Camp, an eligible site on Reclamation land.

As noted above, a third important type of cultural resource that may be present in the Boulder City area is the TCP. The word "Traditional" in the context of this property type refers to those beliefs, customs, and practices of a living community of people that have been passed down through generations, usually orally or through deeds. The traditional cultural significance of such a property is derived from its importance in historically rooted beliefs, customs, and practices of a community. A good example of a TCP is a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice. Traditional cultural values are often central to the way a community or



APPROXIMATE EXTENT OF VIEWSHED SURVEY AREA

SURVEY AREA

SURVEY AREA

APPROXIMATE EXTENT OF VIEWSHED SURVEY AREA

APPROXIMATE EXTENT OF VIEWSHED SURVEY AREA

APPROXIMATE EXTENT OF VIEWSHED SURVEY AREA

**LEGEND**

- (B) ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C) ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D) ALTERNATIVE D - SOUTHERN ALIGNMENT

**FIGURE 3-14**  
**AREA OF POTENTIAL EFFECTS**  
**FOR HISTORIC STRUCTURES**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

BASED ON ALIGNMENTS IN MAY 2000

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group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self-respect. Properties to which traditional cultural value is ascribed often assume this kind of vital significance, so that any damage to or infringement upon them is perceived to be deeply offensive to, and even destructive to, the group that values them (NPS, 1994).

A TCP can thus be defined as one that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in the history of the community, and (b) are important in maintaining the continuing cultural identity of the community (NPS, 1994).

### 3.8.1 Regulations and Evaluation Criteria

Significant cultural resources are those that are listed in or are eligible for listing in the NRHP. Such resources are defined as buildings, sites, districts, structures, and objects significant to history, architecture, archaeology, culture, or science. Listed resources, or those resources determined eligible for NRHP listing, are often referred to as "historic properties." The NRHP is the nation's inventory of historic properties, and NRHP documentation includes a recommendation about whether a property is significant according to criteria promulgated by The Secretary of the Interior. The NHPA is one of the more important legislative mandates that requires federal agencies to identify historic properties within their jurisdictions and consider the effects on those resources as a consequence of federal "undertakings." Undertakings are those projects planned and constructed by federal agencies and also include those projects assisted by federal agencies through funding, technical support, or administrative authorizations (licenses, permits, and rights-of-way).

The NHPA requires federal agencies to take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP. Further, the federal agency is required to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. The ACHP has promulgated 36 CFR 800 as a set of regulations for federal agencies to follow in fulfilling the historic properties consultation and compliance process. The regulations provide a step-by-step procedure for the entire compliance process, from initial identification of a resource, through its evaluation, and to final treatment (mitigation) measures, if required, for historic properties.

Adverse effects on historic properties could occur if (1) highway and related construction would cause damage, destruction, or removal of sites or structures that are listed on or are eligible for nomination to the NRHP, or (2) if the project would destroy or degrade the setting of registered or eligible structures when the setting is an important element in the significance of the property (see Section 4.9). While it is federal policy to avoid or minimize adverse effects to historic properties when planning, constructing, and/or assisting federal projects, in some cases it is impossible to avoid disturbing or destroying some significant sites or structures if an authorized development is to be implemented. In such instances, it is federal policy to recover the information embodied in those resources through archaeological or historical study before the project begins, realizing the data recovery potential of a cultural resource is a means of mitigating impacts to that resource.

U.S. Department of Interior (DOI) regulation 36 CFR 60.4 outlines the criteria that a site must meet one or more of to be eligible for the NRHP:

*The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and;*

- (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or*
- (b) that are associated with the lives of persons significant in our past; or*
- (c) that embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
- (d) that have yielded, or may be likely to yield, information important in prehistory or history.*

These criteria served as the framework against which the archaeological sites and historic structures were evaluated.

### **3.8.2 Prehistoric Setting**

The following cultural history section is adapted from *A Cultural Resource Investigation of Proposed Routes for the Boulder City/U.S. 93 Corridor Study* (Blair, et al., July 2001).

Three cultural regions, separated by archaeologists based on geography and archaeological evidence, overlap in southern Nevada. These regions generally include different cultural groups: the people of the Great Basin, those from the east along the Colorado Plateau of northern Arizona and adjacent states, and the people from the Lower Colorado River and adjacent western Arizona and eastern California. Warren and Crabtree's (1986) chronology was developed for the southern Great Basin, including the Mojave Desert. Rogers' (1945) chronology defines cultural development along the Lower Colorado River region. Shutler (1961) and Lyneis (1992, 1995) developed chronologies for the Puebloan occupations of southern Nevada.

For additional discussions of southern Nevada's prehistory and history, the reader is referred to the research of Fowler, et al. (1973); Shutler (1961, 1967); E. Warren (1974); Warren and Crabtree (1986); Lyneis (1982); Myhrer, et al. (1990); and Seymour (1997). The separate and sometimes contrasting chronologies suggested by these authors are attributable to the diversity of lifeways in the region, a deficiency of adequately radiocarbon-dated sites, and a lack of temporally diagnostic artifacts at many southern Great Basin sites. For the sake of this prehistoric synthesis, a broader adapted perspective of the chronologies suggested by Blair, et al. (1999); Jennings (1986, fig. 2:115); Warren and Crabtree (1986); and Winslow (1996) is used here. The cultural history can be divided into seven broad temporal units or periods: Paleo-Indian; Early, Middle, and Late Archaic; Protohistoric; Ethnohistoric; and Historic.

## Paleo-Indian

The first people to enter the Great Basin arrived at least 11,500 years ago (Grayson, 1993). The majority of Paleo-Indian sites in the Great Basin are characterized as surface sites commonly found along shores of pluvial lakes or Pleistocene waterways. Key artifact (stone tool) types dating to the Paleo-Indian period (ca. 12,000 to 7,000 before present [BP]) in the southwestern Great Basin are known as “fluted” and “stemmed” projectile points, according point base characteristics. Specific artifact types include: Lake Mojave, Silver Lake, and rare fluted projectile points (Clovis); enigmatic flaked stone “crescents”; small flake engravers; specialized scrapers; leaf-shaped knives; and drills and heavy choppers (Warren and Crabtree, 1986:184). Although Jennings (1986, Fig. 3:117) suggests that the Lake Mojave points should be associated with the Early Archaic, Warren and Crabtree (1986:184) argue that the large game-hunting tradition associated with the Paleo-Indian period lasted much longer. The problem of temporal definition is partly a result of a shortage in datable sites in the southern Great Basin, and partly an issue of definition. Unlike various other Southwest sites, no early Great Basin projectile point types have been found in clear association with the large “megafauna” or big game existing at that time. Warren (1967) has suggested that these early artifact assemblages reflect a widespread generalized hunting tradition, whereas Bedwell (1970, 1973) and Hester (1973) have interpreted the same assemblages to reflect specialized adaptations to “lacustrine” resources around the edges of lakes. J. O. Davis (1978) provides a synthesis: a more generalized hunting and collecting economy existed, in which lakeside sites represent the exploitation of marsh resources.

## Early Archaic

Warren and Crabtree (1986:184-187) view the Early Archaic (ca. 7,000 to 4,000 BP) as a time of major cultural change, and others (Donnan, 1964; Susia, 1964:31; Tuohy, 1974:100-101; and Wallace, 1962) have proposed that environmental conditions also were so adverse (the Altithermal, or middle Holocene period of high temperature) that the southwestern Great Basin was essentially abandoned during the Early Archaic. Warren (1967) maintains that Early Archaic populations were small nomadic groups who continued a widespread generalized hunting lifestyle. Once more, Hester (1973) and Bedwell (1970, 1973) suggest a more specialized adaptation to the pluvial lakes and waterways.

There may be an initial continuation of the stemmed projectile point into this period; however, in the later part of the period, the “Pinto” projectile point is introduced along with leaf-shaped points, knives, domed and elongated “keeled” scrapers, and several forms of flaked scrapers. Warren and Crabtree (1986:187) suggest that environmental change at least in part forced Early Archaic adaptations in the Mojave Desert, as evidenced by the small number of known sites and their seemingly temporary nature. Flat milling slabs (seed grinding stone), along with shallow basin and circular basin milling slabs, have been found at some sites, implying some dependence on seed and nut foods. Lyneis (1982:177) and others contend that true milling stones are rare or missing in Early Archaic assemblages and that seed exploitation was, therefore, not an important subsistence activity. Warren and Crabtree (1986) interpret this period as one of generalized hunting and gathering with the beginnings of a technology for processing hard seeds.

### **Middle Archaic**

The Middle Archaic (ca. 4,000 to 1,500 BP) is best noted for the introduction of new technologies, ritual activities, and increased socioeconomic relationships to outside areas (Warren and Crabtree, 1986:189). Major changes in settlement and subsistence patterns are perceived by Lyneis (1982:177), Rogers (1939:6-10), Wallace (1958:12), and Warren and Crabtree (1986:187-189) in the southwestern Great Basin. These perceptions are based on a tremendous increase in the number and complexity of sites. Lyneis (1982:177) suggests a change in human settlement patterns where less mobile groups are living primarily on valley floors exploiting a wider range of landscape, particularly highland areas. Hunting continues to be the major economic pursuit, with an increase in milling equipment suggesting expanded dependence upon hard seeds.

Projectile point characteristics exhibit stemmed, lance-shaped, and notched varieties. Common projectile point types are called "Elko," "Gatecliff/Gypsum," and "Humboldt." Also, the association of split-twig figurines and extensive rock art sites have been interpreted as an expression of enriched ceremonial lifestyle, and an increase in and elaboration of economic ties with outside areas (e.g., Pippin, 1986:51-52).

### **Late Archaic**

The Late Archaic (ca. 1,500 to 700 BP) for the southwestern Great Basin roughly corresponds to and was greatly influenced by the development of the Anasazi culture of Arizona and New Mexico and the Fremont culture of Utah. Trade routes following the Mojave River are believed to have linked the area to the California coast as well. Lyneis (1982:177) maintains that smaller temporary camps later replaced large camps situated on valley floors during this period. Warren and Crabtree (1986:191), however, proposed a continuity of settlement patterns. Evidence for this continuity has been demonstrated with the discovery of the large Late Archaic village sites around Antelope Valley (McGuire et al., 1981; and Sutton, 1981), in Death Valley (Wallace and Taylor, 1959), and on the Mojave River (Rector et al., 1979). Significant technological changes during this period included the introduction of ceramics and the bow and arrow. Elston (1986:145) argues that these changes in the western Great Basin correspond directly with an increase in plant processing implements, suggesting the adoption of a diverse resource exploitation strategy. Lyneis (1982:177) states that this expansion would also include the exploitation of woodland sites in the surrounding mountains above 1,829 m (6,000 ft).

Fowler and Madsen (1986:175-181), Lyneis et al. (1978:178-179), and Warren and Crabtree (1986:191) present evidence of agricultural societies in the southeastern and eastern periphery of the Great Basin. To the west of Las Vegas, agricultural people, termed the Virgin Branch Anasazi, concentrated along the fertile valleys of the Muddy and lower Virgin Rivers in southeastern Nevada, as well as adjacent portions of Utah and Arizona. Evidence for Virgin Branch Anasazi incursions further west into the heart of the southern Great Basin are relatively common. They may have occupied the Las Vegas Valley at Big Springs (Lyneis et al., 1978:142; Rafferty and Blair, 1984:113-114; Seymour, 1999; and Warren et al. 1978:20) and mined turquoise in the east-central Mojave Desert near Holloran Springs and at the Sullivan Turquoise mines within the project area (Leonard and Drover, 1980:251; Rogers, 1929:12-13; Warren, 1980:81-84; and Blair, 1985:2-4).

Another culture group believed to have periodically visited the Las Vegas and Eldorado Valleys were the Patayan, peoples associated with the emergence of ceramic technology and agriculturally based subsistence strategies along the lower Colorado River. Many of the new traits have been attributed to Hohokam influence from Arizona (McGuire and Schiffer, 1982:216-222). Schroeder (1975), on the other hand, saw this cultural phenomenon as part of the Hakataya tradition that was separate from the Hohokam. According to Schroeder (1975, 1979), the Hakataya inhabited much of western Arizona, the western extent of the Sonoran Desert, the Mojave Desert, and northern Baja California. This cultural development included all of the Yuman-speaking people, as well as some non-Yuman speakers in western Arizona. Schroeder (1975, 1979) characterized their villages as “rock-outlined jacales, gravel or boulder alignments, rock-filled roasting pits, rock-pile shrines, thick dry-lain, low-walled rock or boulder structures, rock-shelters, and bedrock milling stones. . . and crudely decorated pottery.” Rogers (1945) separated those people along the Colorado River and called them the Yuman culture. The term Patayan used in this document is interchangeable with Yuman. The Patayan Tradition has been divided into three phases identified as Patayan I (A.D. 500-1050), Patayan II (A.D. 1050-1500), and Patayan III (A.D. 1500-present). The division of these temporal phases is based on changes in ceramic styles, settlement patterns, and the presence of trade wares. It is assumed now that the Mohave, Quechan, and Cocopa people are the direct descendants of the Lowland Patayan.

Rafferty and Blair (1984), Rafferty (1989), Lyneis (1982:180), and others have proposed that Late Archaic hunter and gatherer groups of the Great Basin coexisted with the Anasazi and Fremont peoples from population centers farther east. These Great Basin peoples became the ethnographically known Southern Paiute and Western Shoshone.

### **Protohistoric**

The Protohistoric Era dates from ca. 700 years BP and continues through the first contact between Native Americans and European people. Time-marker artifacts in the southern Great Basin include “Brown Ware” pottery (Bettinger and Baumhoff, 1982; Madsen, 1975:83; and Thomas and Bettinger, 1976) and “Desert Side-Notched” projectile points (Fowler and Madsen, 1986:181-182; and Warren and Crabtree, 1986:191-192). It is widely thought, but not necessarily conclusively proven, that Numic peoples expanded into the region at this time; and there is pronounced continuity of culture between this archaeological entity and the Paiute and Shoshone of the Historic period. Bettinger and Baumhoff (1982:485) have argued that changes in cultural adaptations during the preceding Late Archaic are directly related to the expansion of Numic-speaking prehistoric groups. They believe that these groups were able to displace the previous inhabitants because of a more efficient adaptive lifeway oriented around the exploitation of diverse arid-lands plant resources. This hypothesis is supported by similarities in artifact types, as well as linguistic theory advanced by Lamb (1958:99). Young and Bettinger (1992:85) propose that a competitive interaction existed between the Numic and pre-Numic groups in the Great Basin. On the other hand, Warren and Crabtree (1986:191-192) have tentatively defined regional developments to correspond with historic boundaries of Numic and Takic language groups. An alternative hypothesis, suggested by Gross (1977), argues that the linguistic ancestors of the Numic were occupying the Great Basin as early as 10,000 years ago.

Contemporary regional Native Americans from the ethnohistoric (European contact) period are known today as the Southern Paiute and the Mohave. It is assumed now that the Mohave, Quechan, and Cocopa peoples are the direct descendants of the Lowland Patayan. Some accounts show that they inhabited the Lower Colorado River region as early as the first part of the 17th century (Kroeber, 1951; and Stone, 1991). Oñate, a Spanish explorer, encountered a tribe he called the Amacavas while crossing the area in 1604 to 1605. While some interpretations of his travels trace his route west through Arizona along the Sacramento River to Topock, others believe that he entered the Colorado River Valley via the Bill Williams River some 100 km (60 miles) to the south.

It was not until 1776 that the next explorer, Spaniard Father Francisco Garcés, traveled to this region. He described natives called the Jamajub living in the Mojave Valley on the Colorado River. Several explorers visited the region during the 1850s and 1860s, and all found the Mohave situated between present-day Parker and Cottonwood Island 25 km (15 miles) north of Davis Dam, now submerged under present-day Lake Mohave. The island was shared with the Chemehuevi, a Southern Paiute group, who came from the north.

To the north of the Mohave peoples, Numic speakers of (first) the Chemehuevi and (then farther north) the Southern Paiute occupied much of what is now southern Nevada and adjacent California and Utah. Groups of Southern Paiute in this region are the Las Vegas, Moapa, and Shivwits groups from west to east. Traditionally, Southern Paiute adaptations to the Mojave Desert included residential focus on areas with permanent water (such as Big Springs in the Las Vegas Valley), as well as high mobility. Subsistence activities included not only horticultural activities in the vicinity of these valley-bottom water sources, but also long-distance forays to gather seasonally available plant resources, as well as hunting activities throughout the valleys and mountains of southern Nevada.

### 3.8.3 Historic Setting

Harsh desert conditions and lack of dependable water sources discouraged settlement in the study region in early historic times, and no known agricultural settlement has ever occurred within the study area. The volcanic origin of landforms in the area offered the possibility of mineral resources, however, and prospecting for gold and other minerals by Euro-Americans began the historic settlement of the Eldorado Valley.

#### Early Twentieth Century Mining

Prior to the arrival of the Mormons to the Las Vegas Valley in the 1850s, Native Americans mined turquoise near Hoover Dam. The area was later mined by Patrick J. Sullivan, who dug numerous prospect holes and sank at least two shafts (Morrissey, 1968:3). Although the turquoise mine near Boulder City was not a prolific contributor to the ensuing Clark County mining industry, turquoise mines in the southern portion of the county (Crescent and Searchlight) have produced perhaps \$30 million in raw material and much more than this in value of finished gems (Morrissey, 1968).

The Sullivan turquoise mines are located in the McClanahan Mining District, also referred to as the Boulder City or Mesabi District. Mineral commodities identified in the district included gold, silver, copper, and aluminum, with discoveries being made in 1906. In the general vicinity of Hemenway Pass, the *Las Vegas Age (LVA)* (9 January 1909:1) reported that

20 claims had been acquired by F.J. Siebert and his associates and were being developed in the Mesaba district. This mining district never would prove to be of any mineral wealth.

According to Vandenburg (1937), the first systematic mining in Clark County began with the discovery of gold and silver deposits in the Eldorado (sometimes referred to as Colorado) mining district around 1857. The district was actively exploited because of its location on the Colorado River. In Clark County between 1908 and 1934, the production of metal came primarily from three districts: gold and silver from Searchlight and Eldorado; and copper, lead, and zinc from Goodsprings. The Searchlight boom lasted through the turn of the century and continued to produce minerals for many years after the boom decreased (Daron, 2001). Other materials, such as manganese, vanadium, molybdenum, cobalt, platinum, and palladium, were mined in commercial quantities by 1910 (Vandenburg, 1937:12).

Of particular concern to the current study is the Alunite Mining District. In the vicinity of Railroad Pass, mineral prospecting and small-scale mining became the principal activity at the turn of the century (Leavitt, 1995; Myhrer, 1995; White, 1996; and Lawrence, 2000). Promising mineral discoveries made between 1870 and about 1906 (Reclamation, 2000) were investigated by Robert Hill in 1908, leading to the organization of the Alunite Mining District, also known as Railroad Pass, and the Vincent District, based on a showing of kaolinite and alunite (Hill, 1908, 1908a; Longwell et al., 1965; and Hewett et al., 1936). It had been previously determined that a relationship existed between alunite and the presence of gold. With the confirmation of alunite in ore samples tested, the location of five shafts were "determined by the structure, pannings, and assays of the outcrops" (Hill, 1908a:1205). The primary claim, known as the Alunite Lode, was located on August 8, 1908, designated Survey No. 3628, certified by the U.S. Surveyor-General for Nevada for Nevada on February 27, 1909, and patented (No. 148449) in August 1910 (Nevada Division of Minerals, nd.).

A force of 25 men was set to work constructing bunkhouses, stables, an office building, and a blacksmith shop, and making road improvements to the area. A contract for the construction of a 60-m (200-ft)-deep vertical shaft was let to Mr. Frederick of Searchlight (LVA, 12 September 1908:1). Two months later it was announced the work was being expanded at four different Alunite Company shaft locations with assays running from \$5 to \$17.77 per ton of ore derived from veins and stringers (LVA, 21 November 1908:1). It was also noted that there was considerable activity in the district by other independent miners working on their properties. Activity in the district decreased in 1909 and resumed on a smaller scale in 1910, focusing primarily on Alunite's No. 1 Shaft (LVA, 29 January 1910:1). After reaching a depth of 220 m (725 ft), the Alunite Mining Company's No. 1 Shaft was closed and ceased activity in 1912 (Averett, 1963).

Several other claims were filed to the west and immediately south of the Alunite Lode. The Red Rose, Crested Butte, Yellow Rose, and the Cream Rose, situated west of the Alunite Lode, were located in 1906, recorded in 1921, and surveyed under Survey No. 4518 in 1929 (Nevada Division of Minerals, n.d.). Adjoining the Alunite claim on the south were the Avis, Sunny South, Grey Eagle No. 1, and Grey Eagle No. 2, located by W. C. Smith in 1928 and surveyed under Survey 4697 in November 1929 (Nevada Division of Minerals, n.d.). In addition, near Railroad Pass and illustrated on the Occupancies in the Vicinity of Railroad Pass April 1932 map (Reclamation, 1932a), is a property inscribed only as the Star and

Star Millsite. An official plat map showing patented claims as of 1933 does not list the Star properties (Reclamation, 1955), and at this time it is thought to have been an unpatented claim.

### **Boulder Canyon Project**

As a consequence of its environment and earlier history, the study area was mostly uninhabited prior to the beginning of the Boulder Canyon Project in 1930. A key element of the project was construction of Hoover Dam in Black Canyon on the Colorado River, at a location about 3 km (2 miles) east of the study area. Construction of the dam was the largest project ever undertaken by the federal government to that time, and it was a monumental engineering and logistical challenge. A series of three railroads were constructed to allow transportation of materials and equipment to the construction site, and highways were constructed from Las Vegas, Nevada, and Kingman, Arizona, to the dam. A 360-km (225-mile), high-voltage transmission line was constructed in 1930 to 1931 from San Bernardino, California, to provide power for construction of the dam. By the time the last hydroelectric generating unit at the dam came on line in 1961, 16 additional high-voltage transmission lines had been built to carry Hoover Dam electricity through or near the study area. A number of these cross the study area.

Construction of Hoover Dam was, among other things, a federal make-work project intended to help fight the effects of the Great Depression. The possibility of obtaining employment brought hundreds of men and their families to the bleak desert beginning in 1930, long before major construction began. Job seekers settled in a number of camps, most notably at Railroad Pass, at the end of the Boulder City Branch Railroad (BCBRR) at Summit, and near the Colorado River at the upper end of Black Canyon. Living conditions in these squatters camps were primitive; most of the camps did not have onsite water sources, and the tents and small frame houses provided little relief from daytime temperatures, sometimes over 120 degrees.

Reclamation recognized a need to establish a federal reservation around Hoover Dam to allow the federal government to maintain legal jurisdiction over the area. By late 1930, Reclamation had also decided to construct a complete new town, Boulder City, to provide living accommodations for dam workers and permanent operators, and to be a central staging area for dam construction activities. The reservation and the government townsite were intended to insulate workers from the temptations of Las Vegas and thereby help ensure efficiency and safety during dam construction. Housing, commercial enterprises, and virtually all other activities were tightly controlled within Boulder City. Gambling and sale of alcohol were forbidden, although sale of low-alcohol beer was allowed beginning in 1934.

By 1934, Boulder City had a population estimated at 6,000 persons, and it was the third largest community in Nevada. The population of the city diminished after the dam was completed in 1936, but the city grew again during World War II when it provided homes for workers at the Basic Magnesium plant in Henderson. The U.S. Bureau of Mines established a metallurgical experiment facility at Boulder City that operated between 1936 and 1984, and the city was also (and is) headquarters for NPS' LMNRA and the Lower Colorado Region of Reclamation. Relatively little residential and commercial development occurred outside the original townsite until 1960, when the city was separated from federal control.

Since 1960, residential development has extended in all directions from the original townsite, and commercial development has extended westward from the original town.

Tourism on a small scale began in the study area by the mid-1920s, but tourism expanded greatly as soon as construction began on Hoover Dam in 1931. The flow of tourists and the paychecks of workers led to the development of entertainment institutions outside and inside the federal reservation. Railroad Pass Casino was established in 1931 on a patented mining claim at Railroad Pass just inside the federal reservation, and it has grown to be a large hotel/casino complex near the west end of the study area. The Hacienda Hotel and Casino was built as the Gold Strike Casino in the 1960s on another patented mining claim near the eastern end of the study area. The casinos, Hoover Dam, and the recreational opportunities at Lake Mead attract millions of visitors to the study area annually.

### 3.8.4 Archaeological Resource Survey

#### Methodology

##### **Record Search**

A literature review and record search was conducted at the Southern Nevada Archaeological Archives located at the HRC. Government Land Office (GLO) plats were reviewed at the BLM, Las Vegas Field Office, for the presence of historic roads or other important features. Other information concerning the project was obtained at the LMNRA and the Dickenson Library, Special Collections, at UNLV.

In all, 68 cultural resource projects have been conducted within a 1.6-km (1-mile) area of the three build alternatives (Blair, et al., July 2001). Twenty-eight of the studies are associated with utility rights-of-way, and 12 projects are concerned with the construction and maintenance of roadways. The municipality of Boulder City initiated six community development projects, and there were three flood control projects conducted in the area. Other NPS LMNRA-related projects account for many of the remaining studies.

##### **Archaeological Research Expectations**

Prehistoric research questions and issues include chronology, subsistence, settlement, technology, cultural boundaries, the definition of ethnic groups, and interregional interactions and trade. Historic archaeological research domains encompass Euro-American settlement, mining, Hoover Dam and associated construction activities, leisure and recreation, and transportation. Additional regional research domains for both historic and prehistoric archaeological resources are found in *An Archaeological Element for the Nevada Preservation Plan* (Lyneis, 1982) and the *Nevada Comprehensive Preservation Plan* (White et al., 1991) and have influenced the study expectations as well. Together with the literature review and archival record search, expectations were formulated as to the types and frequencies of cultural resources likely to be encountered within the project boundaries and the APE.

**Prehistoric Resources.** Research issues important to the Boulder City/U.S. 93 Corridor Study include chronology, subsistence, settlement, technology, cultural affinity and boundaries, and interregional interactions and exchange. It was expected that similar types and frequencies of prehistoric resources as those previously recorded, such as lithic scatters and isolates, rock alignments and rockshelters, would be identified within the boundaries of the study corridor. Because the general area is known to have been occupied prehistorically and

historically by both the Southern Paiute and the Patayan people (Blair and Lawrence, 2000), their cultural sites may be included in the resources identified in the archaeological survey.

**Historic Resources.** Based on previous studies in the surrounding area, historic sites identified within the project APE were expected to be affiliated with early 20th century mining, the construction of Hoover Dam, transportation, and gaming. The literature suggests the surrounding landscape between the Las Vegas Valley, Eldorado Valley, and Black Canyon has been heavily modified due to mining activities and the construction of Hoover Dam. Historic maps reviewed in conjunction with the project also indicate that the area has been cut by roads, communication and power transmission lines, and railroad grades. As a result, the types of historic period cultural resources that were both expected and encountered in previously unsurveyed, undisturbed lands include roads, railroad grades and appurtenances, mining-related features, habitation locales, trash scatters, and isolated artifacts.

### ***Archaeological Survey***

In order to comply with federal mandates to inventory all cultural resources for the proposed project, the 300-m (1,000-ft)-wide APE was completely surveyed. Prior to the survey, the APE was field-staked along the approximate centerline of each alternative alignment. Survey, field recording, and project reporting procedures were applied on previously unsurveyed parcels according to protocols developed for cultural resource studies by the Nevada BLM (BLM, 1989) and Nevada SHPO (SHPO, 1994). These field investigations were conducted by qualified HRC cultural resource personnel walking in transects spaced no wider than 30 m (100 ft) apart across the project area. Archaeological sites were recorded using the Intermountain Archaeological Computer System (IMACS) format, and they were evaluated for NRHP eligibility. NRHP evaluations were supported by the placement of low-impact trowel probes in each appropriate cultural resource site location to determine depth, the extent of diagnostic materials, existence of features, and other significance standards set forth in the NRHP criteria (36 CFR 60.4) for reporting and evaluating archaeological sites. Isolated artifacts were recorded in the field, plotted on a USGS 7.5' map, and then listed within the report in tabular format. Specific research questions that guided the field investigations were drawn from regional contexts and previous cultural resource studies in the area. Artifacts were not collected.

HRC acquired the suitable permits required by the appropriate agencies to conduct cultural resource studies. All cultural research project personnel met the Secretary of the Interior's Professional Qualification Standards.

Additionally, permit stipulations on NPS lands were strictly followed throughout the survey area, including the provision issued to give equal treatment to historic and prehistoric sites. Other project-specific guidelines for conducting cultural resource surveys in Nevada were issued by NDOT. Field investigations were conducted along each 300-m-wide (1,000-ft-wide) corridor (150 m [500 ft] on each side of the project centerline). Slopes above 30 percent were not surveyed because of the danger to the crewmembers in these steep areas; however, a thorough scanning with field binoculars was conducted to determine the likelihood of cultural materials. When suspicious-appearing areas were seen that may have contained cultural features or artifacts, every effort was made to reach those places so that they could be properly recorded and evaluated.

Representative prehistoric and historic artifacts observed during field investigations were used to estimate the relative age and determine site function for the purpose of site interpretation and NRHP evaluations. Projectile points identified during the project were categorized utilizing the methods outlined by Thomas (1981). Cultural material of the late 19th and the first half of the 20th century passed through various stages of change and improvement, all of which left distinctive technological fingerprints that can provide the archaeologists with a relative age of the artifact and/or site. Particular trademarks or definable maker's marks can also be used to assess relative age of historic artifacts. For this project, Lehner (1988) and Kovel and Kovel (1953, 1986) were used to identify ceramic trademarks. Toulouse (1971) was consulted regarding glass bottle marker's marks. Rock (1981, 1987) was referenced for tin can diagnostics, while a chronological chart produced by Simonis (n.d.) offers a dating scheme used for evaporated milk cans. Florence (1995, 1997) and the National Depression Glass Association (2001) contributed to the analysis of depression glass. The *IMACS User's Guide* (1992) also renders useful information regarding both prehistoric and historic artifacts and was used during this project.

Of the 60 previously recorded sites listed within a 0.8 km (0.5 mile) radius of the project area (see below), 16 were reinvestigated. Ten of these sites situated within the project APE were revisited and updated by HRC archaeologists. Five are historic structure sites. The remaining previously recorded significant site, called the Railroad Pass Squatters' Camp (26CK1169/3024/5413), is situated on lands managed by Reclamation, which were not surveyed by HRC. The January 25, 2002, MOA among Reclamation, NDOT, BLM, and SHPO specifies the mitigation measures to be completed for this site.

### **Affected Archaeological Resources**

Standard format for the reporting of archaeological and historic resources inventories to the SHPO calls for the differentiation between resources that have been recorded by previous inventories and those that are newly recorded. That format was followed in the resource inventories for this study, and it is preserved in the following sections.

#### ***Previously Recorded Sites***

The record search determined that 60 cultural resource sites have been previously recorded within 0.8 km (0.5 mile) of the study area. These sites are listed in Table 3-10, except for four historic structures (26CK3917, 26CK4046, 26CK5260, and 26CK5414) that are listed in Table 3-13.

Nineteen sites are prehistoric and are composed of three rock circles, four rockshelters, seven lithic scatters, one trail and clearing, and four isolated lithic (human-modified stone) artifacts. One site is both prehistoric and historic, where petroglyphs are represented as clearly being Native American and others are depicted from the historic era. Historic sites are more numerous in the corridor alternatives and represent 41 of the total 60 cultural locations. The majority of the historic features and materials are associated in one way or another with area mining or the construction of Hoover Dam. The squatters' camps were constructed to house people hopeful of acquiring jobs at the dam site. In addition to structures necessary for the operations and maintenance at Hoover Dam, ancillary facilities include railroads, roadways, and their appurtenances. Other sites are remnants of the mining activities, such as Alunite near Railroad Pass and the Sullivan turquoise mines situated by the dam.

**TABLE 3-10**  
Previously Recorded Cultural Resource Sites within 0.5 Mile of the Corridor Study Alternatives

Site Number(s)	Site Type	Report/Study	NRHP Eligibility and Criteria	Alternative Route
26CK23/6291	Turquoise Mine	J.P. Harrington, 1929a and 1929b	Unevaluated	B, C, D
26CK2170	Prehistoric Rock Circles	LAME 79/LAME 80F	Unevaluated	B, C
26CK2171	Clearing with Trail	LAME 79C/LAME 80F	Unevaluated	B, C
26CK2364	Prehistoric Rockshelter	HRC 1-2-11	Eligible d	B, C
26CK2368	Rock Circle	HRC 1-2-11	Not Eligible	B, C
26CK2369	Historic Habitation	HRC 1-2-11/2-8-8	Eligible d	B, C, D
26CK2370	Historic Sullivan Cabin	HRC 1-2-11	Eligible d <sup>2</sup>	B, C
26CK2371	Historic Prospect Campsite	HRC 1-2-11	Eligible d <sup>2</sup>	B, C
26CK2372	Historic Prospect Pit	HRC 1-2-11	Eligible d <sup>2</sup>	B, C
26CK3024/1169/5413	Historic Squatter's Camp	HRC 2-8-15	Eligible a and d	B, C, D
26CK3440	Prehistoric Rockshelter	Personal Letter	Unevaluated	D
26CK3441	Prehistoric and Historic Petroglyphs	Personal Letter	Unevaluated	D
26CK3443	Prehistoric Isolated Metate	HRC 4-5-2	Not Eligible	D
26CK3851	Prehistoric Ceramic Isolate	BLM 5-1739	Not Eligible	D
26CK3916	Hoover Dam Historic District	Middleton, 1979	Eligible	B, C
26CK3917	Boulder City Historic District	Woodward et al., 1983	Listed on NRHP	B, C
26CK4044	Prehistoric Lithic Isolate	NDOT 044-81C	Not Eligible	B, C
26CK4045	Prehistoric Lithic Scatter	NDOT 044-81C	Not Eligible	B, C
26CK4647	Prehistoric Lithic Scatter	BLM 5-2127	Not Eligible	D
26CK4648	Prehistoric Lithic Scatter	BLM 5-2127	Not Eligible	D
26CK4649	Prehistoric Lithic Scatter	BLM 5-2127	Not Eligible	D
26CK4650	Prehistoric Lithic Scatter	BLM 5-2127	Not Eligible	D
26CK4651	Prehistoric Lithic Isolate	BLM 5-2127	Not Eligible	D
26CK4652	Prehistoric Lithic Scatter	BLM 5-2127	Not Eligible	D
26CK4695	Historic Prospector's Camp	BR46/LC-NV-92-2	Eligible d	B, C, D
26CK4696	Historic Bridge	BR46	Unevaluated	B, C, D
26CK4697	Historic Retaining Wall	BR46	Unevaluated	B, C, D
26CK4698	Historic Rock Cairn and Rock Circle	BR46/LC-NV-92-2	Eligible d	D
26CK4751	Historic U.S. Government Railroad	LC-NV-92-2/ Schweigert, 1999	Eligible a and c	B, C, D
26CK4762	Historic Stone Dam	BR46	Eligible a and d <sup>1</sup>	D

**TABLE 3-10**  
Previously Recorded Cultural Resource Sites within 0.5 Mile of the Corridor Study Alternatives

Site Number(s)	Site Type	Report/Study	NRHP Eligibility and Criteria	Alternative Route
26CK4763	Historic Wooden Feature	BR46	Eligible a and d <sup>1</sup>	B, C, D
26CK4766	Scenic Overlook Stone Wall	BR46	Eligible a and d <sup>1</sup>	B, C, D
26CK5161	Historic Glass Scatter	BLM 5-2267	Not Eligible	B, C, D
26CK5162	Historic Debris Scatter	BLM 5-2267	Not Eligible	B, C, D
26CK5256	Historic Mine	BLM 5-2306 HRC 2-8-8	Eligible d	B, C, D
26CK5257	Historic Trash Dump	BLM 5-2306	Not Eligible	B, C, D
26CK5258	Historic Mine Activity Area	BLM 5-2306	Eligible d	B, C, D
26CK5259	Historic Debris Scatter	BLM 5-2306	Not Eligible	B, C, D
26CK5261	Historic Debris Scatter	BLM 5-2306	Not Eligible	B, C, D
26CK5389	Historic Mine and Camp Alunite	IMACS	Unevaluated	B, C, D
26CK5411	Prehistoric Lithic Scatter	HRC 2-9-1	Not Eligible	B, C, D
26CK5412	Prehistoric Rockshelter	HRC 2-9-1	Eligible d	B, C, D
26CK5413 <sup>3</sup>	East Camp Squatter, Camp	HRC 2-9-1	Eligible a and d	B, C, D
26CK5420	Historic Features	HRC 2-8-5	Not Eligible	B, C
26CK5425	Historic Hemenway Wash Road	HRC 2-8-8	Not Eligible	B, C
26CK5472	Historic Water Detention Dam	HRC 2-8-10	Not Eligible	B, C, D
26CK5473	Historic Mine Shaft	HRC 2-8-10	Not Eligible	B, C, D
26CK5474	Historic Debris	HRC 2-8-10	Not Eligible	B, C, D
26CK5475	Prehistoric Rockshelter	HRC 2-8-10	Eligible d	B, C, D
26CK5476	Historic Mine Adit	HRC 2-8-10	Not Eligible	B, C
26CK5477	Historic Mine Adit	HRC 2-8-10	Not Eligible	B, C
26CK5478	Historic Rockshelter	HRC 2-8-10	Not Eligible	B, C
26CK5479A-D	Historic Squatter's Camp	HRC 2-8-10	Eligible a and d	B, C
26CK5787	Historic Stone and Concrete Structure	Schweigert, 1999	Not Eligible	B, C, D
26CK5788	Historic Bureau of Reclamation Warehouse	Schweigert, 1999	Not Eligible	B, C, D
26CK5789	Historic Lower Tunnel Access Road and Gate	Schweigert, 1999	Eligible a and d	B, C, D

<sup>1</sup> Sites recommended eligible as part of the Hoover Dam District.

<sup>2</sup> Sites recommended eligible as part of the Sullivan Mine District.

<sup>3</sup> This site is also listed as part of Site 26CK3024/1169.

Source: Blair, et al., July 2001.

Four previously recorded NRHP-eligible archaeological resources were determined to be located within the APE. These sites are briefly described as follows:

**Squatters' Camp (26CK1169/3024/5413).** Remains of the Railroad Pass Squatters' Camp (White, 1995, 1996a) have been identified as archaeological sites 26CK1169, 26CK3024, and 26CK5413. The camp consisted of loosely organized tent locations, wooden buildings (some with concrete floors and rock foundations), and a school building, much of which is depicted on a 1932 Reclamation map (Reclamation, 1932). Initial start of the camp may have occurred during a general strike of dam construction workers in August 1931. A radical labor union, Industrial Workers of the World, established two camps referred to as Texas Acres and Oklahoma City (Dunar and McBride, 1993).

Based on scanty archival evidence and archaeological features, it can be surmised that the collective camp, scattered on both sides of U.S. 93/95, consisted of several clustered habitation areas. Commenting on the camp's content, Leo Dunbar stated, "I imagine a thousand people camped . . . on the flats there" (Dunar and McBride, 1993:23). Archivaly, not much is known of the families who inhabited the area, but there were enough to have required the building of a school with its own teacher (White, 1995). Local newspaper accounts reveal the problems associated with the numerous purveyors of alcohol, bootleggers, troublemakers, and police efforts to control such activities at the camp.

**Camp Alunite (26CK5389).** Site 26CK5389 has been identified as the location of the historic mining settlement known as Camp Alunite. The site covers an area of approximately 230 m (750 ft) by 90 m (300 ft) on land owned by Boulder City. The Alunite Mining Co., based in New York City, began work in the vicinity of Railroad Pass in the summer of 1908 with the excavation of a 61-m-deep (200-ft-deep) shaft contracted to E. B. Fredericks of Searchlight, Nevada. The company employed 25 men, constructing bunk houses, stables, an office, and a blacksmith shop at the camp, as well as working to improve the road from Las Vegas to the pass (LVA, 12 September 1908:1). Geologist Robert T. Hill performed an extensive surface survey of the area in an effort to locate rich veins through scientific means. The camp met with early success, unearthing valuable ore and attracting prospectors and speculators. However, the boomtown never materialized. By November 1909, active work had ceased at Alunite. Mining at Alunite stopped and restarted a number of times, but by 1917 the mine was completely inactive (LVA, 13 January 1917).

Camp Alunite, archaeological site 26CK5389, is located on a low alluvial fan ridge and rock outcrop bordered by drainage channels on the east and west. The site consists of 30 identifiable features and 3 trash concentrations, including 11 tent pads, a suspected dugout, 9 prospect pits and a trench, 2 historic roads, 3 linear rock alignments, and a footpath. Evidence suggests that much of the surface of the site was intentionally cleared of desert pavement gravel and rocks moved by occupants of the camp resulting in an accumulation of gravel dumped along the periphery of the site and larger rocks used to form linear rock alignments. Artifact collectors have disturbed this site.

**Mine Shaft (26CK5473).** Archaeologist William White, Harry Reid Center for Environmental Studies, first recorded the Alunite Mine Shaft #1 on November 3, 1997. It covers an area measuring approximately 6 m (20 ft) by 9 m (30 ft) and is situated on privately owned property. The site consists of "a fenced shaft and a concrete motor mount for the shaft hoist. Located on the northeast side of a volcanic rock outcrop, an extensive waste rock tailings

pile extends to the north, east, and south of the shaft opening; a segment of the BCBRR (26CK5414) cuts through the northeast edge of the rock and tailings pile. The shaft has been fenced with an inner and outer protective fence. A concrete hoist motor mount is 6.7 m (22 ft) southeast of the shaft and measures 1 m (3 ft) wide, 2.5 m (9 ft) long, and 0.5 m (18 inches) deep where exposed. Nine ¾-inch-diameter bolts protrude from the top of the concrete motor mount. Wire nails of various sizes and fragments of windowpane glass were the only artifacts observed, as well as two pieces of milled lumber imbedded into the level surface of the tailings pile. The mine shaft dates from the turn of the century and is associated with the formation of the Alunite Mining District.”

In July 1999, the site was updated by archaeologists Pamela Lawrence and Heather Cain, HRC. They found the site in the same condition as reported by White (1997). On August 21, 2000, Reclamation requested that 26CK5473 be determined eligible under Criterion A, and the Nevada SHPO concurred.

**Grey Eagle Mine (26CK5256).** Site 26CK5256 is located south of the Railroad Pass Hotel and Casino, on property owned by Boulder City. It is a previously recorded circa 1930 mining camp, approximately 20 m (65 ft) by 40 m (130 ft) in size, consisting of at least 2 tent pads, a structure pad, a concentrated and broad scattering of debris, a footpath, privy pits, a segment of dirt road, a fenced mine shaft with waste rock piles, and graded areas. The mine is thought to have been worked by a Mr. Worthington for its suspected gold content and was part of the Grey Eagle Claim filed in 1929.

#### ***Newly Recorded Sites***

As a result of the Boulder City/U.S. 93 Corridor Study archaeological survey, 24 new cultural resource sites were recorded within the project APE (Blair et al., July 2001). Table 3-11 provides summary information on all these sites. Five sites were prehistoric and composed of two lithic scatters, one rockshelter complex, one pot drop, and one rock circle. Nineteen sites were historic, consisting of nine variously described debris concentrations; eight site locations were related to the mining industry; one site was the remains of an individual habitation; and one site was the townsite referred to as McKeeversville (see below).

Twenty isolated artifacts were also recorded during the Boulder City/U.S. 93 Corridor Study archaeological survey. They have been plotted on maps, and no further documentation was required. Isolated artifacts are not eligible to the NRHP.

**TABLE 3-11**  
Newly Recorded Archaeological Sites within the APE of the Corridor Study Alternatives

<b>Permanent Site No.</b>	<b>Temporary Site No.</b>	<b>Site Description</b>	<b>Management or Ownership</b>	<b>Build Alternative</b>	<b>Eligibility</b>
26CK6266	HRC 2	Prehistoric lithic scatter	Boulder City	D	Not Eligible
26CK6268	HRC 4	Prehistoric ceramic concentration	WAPA	D	Not Eligible
26CK6269	HRC 6	Prehistoric rock ring	Boulder City	D	Not Eligible
26CK6270	HRC 7	Prehistoric lithic reduction site	Boulder City	D	Eligible (d)
26CK6271	HRC 9	Historic trash dump	Boulder City	C	Not Eligible

**TABLE 3-11**  
Newly Recorded Archaeological Sites within the APE of the Corridor Study Alternatives

Permanent Site No.	Temporary Site No.	Site Description	Management or Ownership	Build Alternative	Eligibility
26CK6272	HRC 10	Historic trash dump	Boulder City	C	Not Eligible
26CK6273	HRC 11	Historic trash dump	Boulder City	C	Not Eligible
26CK6274	HRC 12	Historic McKeeversville Townsite	Boulder City	C	Eligible (a & d)
26CK6275	HRC 13	Historic mine claims corner with artifacts	Boulder City	C	Not Eligible
26CK6276	HRC 14	Historic debris scatter	Boulder City	C	Not Eligible
26CK6277	HRC 15A	Historic mining camp	Boulder City	D	Eligible (d)
26CK6278	HRC 16/17	Historic mining locality	NPS	C	Unevaluated
26CK6279	HRC 18	Historic trash and debris	NPS	C	Not Eligible
26CK6280	HRC 15B	Historic mining site, rock cairns	Boulder City	D	Unevaluated
26CK6281	HRC 20	Historic prospects and footpath	NPS	C	Unevaluated
26CK6282	HRC 21	Historic habitation	NPS	C	Eligible (a & d)
26CK6283	HRC 22	Historic trash scatter	NPS	B	Not Eligible
26CK6284	HRC 24	Historic trash scatter	NPS	B	Not Eligible
26CK6285	HRC 25	Historic trash concentration	Boulder City	C	Not Eligible
26CK6286	HRC 26	Prehistoric rock shelters	NPS	B	Eligible (d)
26CK6287	HRC 27	Historic trash concentration	NPS	C	Not Eligible
26CK6288	HRC 28	Historic mining shaft and adit	Boulder City	B	Unevaluated
26CK6289	HRC 29	Historic collapsed adit and debris	Boulder City	C	Unevaluated
26CK6290	HRC 30	Historic adit, 2 prospects	NPS	B	Not Eligible

Source: Blair, et al., July 2001.

From field investigations and apparent research values based on surface indications (and trowel probes), 5 of the 24 newly discovered sites described below were recommended as being significant and eligible for inclusion in the NRHP.

**Prehistoric Lithic Reduction Site (26CK6270).** Site 26CK6270 is a prehistoric lithic reduction site, characterized by the presence of numerous cores and waste flakes. The presence of two unmodified chert nodules, half buried, could possibly identify this site as a tool-stone source as well. Encompassing an area 300 m (1,000 ft) by 150 m (500 ft), the site sits atop a long east-west-oriented ridge in the vicinity of the Boulder City Rifle and Pistol Club range. A surface sample of the area was conducted by walking close (1 m [3 ft]) transects across a portion of the site recording all artifacts observed. A 25-by-25-by-10-cm (9.8-by-9.8-by-3.9-inch) trowel probe was placed near a cluster of five core reduction flakes. An additional

core reduction flake was found 3 cm (1 inch) below the surface. Frequent traffic indications (both foot, all-terrain vehicle [ATV], and truck) likely account for some of the artifacts being forced below the surface. Boulder City owns the property.

**McKeeversville Townsite (26CK6274).** Site 26CK6274 is a portion of the historic community known as McKeeversville. It measures approximately 200 m (650 ft) by 375 m (1,250 ft) and is now situated on property owned by Boulder City. In the midst of the Great Depression, desperate families willingly traveled across the country in search of employment. The proposed Hoover Dam, to be built in Boulder Canyon, promised to employ thousands of men. As word spread about the project, family after family descended upon the sleepy desert town of Las Vegas. The small city of 5,000 tripled in size almost overnight, swelling with men, along with their wives and children, hoping to find jobs on a project that had not yet begun. Families not employed by the government or Six Companies, who still wanted to live near Boulder City and the dam, stayed in McKeeversville, which persisted as a worker settlement for the duration of the Project (Dunar and McBride, 1993:70).

After the completion of Hoover Dam, the coming of war in 1941 and the opening of the magnesium plant in Henderson brought new life. Housing shortages in Las Vegas and the City of Henderson brought factory workers to Boulder City, and McKeeversville once again became the site of temporary occupation, home to roughly 60 families. After the war, Boulder City began reorganizing for self-government, and in 1959 the municipality of Boulder City was incorporated. The next year, Boulder City officially separated from the federal government (Stevens, 1988:262). Many families, however, still lived in the vicinity of McKeeversville on land that they had been leasing from the U.S. government, which became part of the municipality of Boulder City. Core components of neighborhood homes today can still be identified as original McKeeversville and Lakeview Addition structures.

Site 26CK6274 consists of 18 identified features and historic and modern debris spread across an area comprised of low alluvial terraces heavily bisected by numerous northwest-to southeast-trending drainage channels.

**Historic Mining Camp (26CK6277).** Site 26CK6277 is situated on the lower southern flank and toe of a north/south-trending linear hill, at the northern end of the McCullough Range. The site covers an area of approximately 150 m (500 ft) (north-south) by 90 m (300 ft) (east-west) and is located on property owned by Boulder City. It consists of 13 identifiable features and a scattering of historic and modern debris. Six of the features are associated with domestic habitation, while seven are related to mining exploring and extracting activities from two separate, parallel veins of mineralized rock material. Modern trash has been dumped on a portion of the site. By focusing on specific associated artifacts, the mining site can be dated to the 1940s.

**Historic Habitation (26CK6282).** Site 26CK6282 consists of five identifiable features and a scattering of historic refuse located on a north-facing hill slope adjacent to and above the old U.S. 93 alignment now situated on NPS property. The approximately 45-m (150-ft) by 18-m (60-ft) area site is a small, isolated squatters' camp. It was probably occupied prior to, or during Hoover Dam construction, and was situated on a patented mining claim property.

Several time-sensitive trademarks and artifacts were noted at this site, providing support for a squatters' camp associated with Hoover Dam construction.

**Prehistoric Rockshelters (26CK6286).** Site 26CK6286 is a cluster of six shallow west-facing rockshelters situated in a rocky outcrop overlooking the head of Hemenway Wash. Together, they occupy an area measuring approximately 70 m (225 ft) by 90 m (300 ft). The site is situated on NPS property, and it appears to have been frequently visited by transients and tourists. Each shelter was assigned a letter designation for recording. All of the shelters are estimated as having a minimum of 30 cm (11 inches) soil deposition, and they are likely to contain subsurface artifacts and features, such as living floors and hearths. Small hand trowel excavations were made to determine possible presence of archaeological materials in the soil of the shelter floors. Artifacts noted in some of the shelters consisted of a large groundstone specimen, a single chert core reduction flake, chert pressure flakes, a turquoise nodule, and modern materials and debris.

### 3.8.5 Historic Structures Survey

The Boulder City area has been the site of a substantial amount of activity, relative to many areas in the Mojave Desert, during historic times as a result chiefly of the siting and construction of Hoover Dam, as well as widespread mining activities. Because this resulted in the presence of many historic structures within the APE of the build alternatives, it was appropriate for the purpose of this study to survey for and record historic structures as an individual class of cultural resource.

#### Methodology

Historic structures were identified through documentary research and field survey. The alternative corridors are located in a major transportation and transmission corridor, and a number of previous cultural resources investigations have addressed historic structures in the area to various extent. A files and records search was conducted by HRC, including identification of all historic and prehistoric resources previously recorded within one mile of the three study corridors. This information was augmented by further file searches done for previous investigations within visual survey areas.

Previously recorded historic structures within the APE study areas are presented in Table 3-12 below. These properties were recorded during nine previous investigations of portions of the study area. Previously recorded historic structures are discussed at length in the following sections of this report.

**TABLE 3-12**  
Previously Recorded Historic Structures in APE Survey Areas

Site Number	Description
26CK3917	Boulder City Historic District (includes individual structures within the APE, itemized in Table 3-13)
26CK4046	U.S. Construction Railroad
26CK4046b 26CK4046c	Six Companies, Inc. Railroad (SCIRR), main line and spur
26CK4956 <sup>1</sup>	Southern Sierras Transmission Line

**TABLE 3-12**  
Previously Recorded Historic Structures in APE Survey Areas

Site Number	Description
26CK5180 <sup>1</sup>	18 Transmission Lines
26CK5260	Hemenway Wash Road
26CK5383 <sup>1</sup>	Lakeshore Road
26CK5414	BCBRR
26CK6233 <sup>1</sup>	Boulder City Pump Plant No. 2

<sup>1</sup> Not represented in results of files search at UNLV.

Source: ACRE, July 2001.

Additional documentary research was conducted in UNLV and Boulder City libraries, records of the Boulder City Engineering Department, the Reclamation Regional Photographic Center in Boulder City, and the Denver Public Library. The project architectural historian, as a result of previous and ongoing cultural resources investigations, had generated substantial historical information concerning the Boulder City area (Schweigert, 2000 and 2001).

Prior to field investigations, site forms and other information concerning known historic structures were compiled, and locations of known historic structures were entered on appropriate USGS topographic quadrangle maps. The centerlines of the three build alternative corridors were also drawn on the quadrangle maps, and these maps were then used as field reference documents. Locations of subsequently recorded historic structures were also entered on the quadrangle maps. Field recording included notation of the nature, materials, and condition of structures. All historic structures within the APE were photographed with black-and-white 35-mm film. Within the 300-m-wide (1,000-ft-wide) survey corridors, structures less than 40 years old were photographed with either 35-mm black-and-white film or with a digital camera. General viewsheds of alternative corridors were also digitally photographed.

### Historic Structures within the APE

The historic structures survey resulted in the recordation of 78 structures (Table 3-13). In total, the APE of the three alternatives was found to contain 71 historic structures built more than 40 years ago (Table 3-13). The APE also includes 6 recorded structures that are less than 40 years old that may be directly affected by construction within Alternative B. An additional structure was recorded because it initially appeared to be of some age, but it was subsequently found to have been built in 1990. In a letter dated November 21, 2002, the SHPO concurred that 26 historic structures or groups of structures are eligible for the NRHP (one having previously been listed on the NRHP).

**TABLE 3-13**  
Recorded Structures within Build Alternatives APE

Site Number	Name	Type of Resource	Recommended NRHP Eligible	Rationale	Alternative
26CK3917	Boulder City Historic District	Historic district	Yes	Listed on NR	B, C
26CK4046	U.S. Construction Railroad	Railroad grade	Yes	Part listed on NR	B, C
26CK4046b, c	Six Companies, Inc. Railroad	Railroad grade	Yes	Part listed on NR	B, C
26CK4956	Southern Sierras Transmission Line	Electrical transmission line	No	Lacks integrity in study area	B, C, D
26CK5260	Hemenway Wash Road	Road	No	Lacks significance	B, C, D
26CK5383	Lakeshore Road	Highway	No	Lacks integrity in study area	B, C
26CK5414	BCBRR	Railroad	Yes	Determined eligible	B, C, D
26CK6193	100 Forrest Lane	Residence	No	Lacks integrity	B, C
26CK6194	101 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6195	101 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6196	102 Forrest Lane	Residence	No	Lacks integrity	B, C
26CK6197	103A Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6198	103B Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6199	106 Forrest Lane	Residence	No	Lacks integrity	B, C
26CK6200	107 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6201	108 Forrest Lane	Residence	No	Lacks integrity	B, C
26CK6202	12 Valley View Lane	Residence	Yes	Associated with McKeeverville	B, C
26CK6203	13 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6204	14 Valley View Lane	Residence	Yes	Associated with McKeeverville	B, C
26CK6205	17 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6206	200 Donner Way	Residence	Yes	Associated with McKeeverville	B, C
26CK6207	201 Donner Way	Residence	No	Lacks integrity	B, C

**TABLE 3-13**  
Recorded Structures within Build Alternatives APE

Site Number	Name	Type of Resource	Recommended NRHP Eligible	Rationale	Alternative
26CK6208	202 Donner Way	Residence	No	Lacks integrity	B, C
26CK6209	202 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6210	204 Lakeview Drive	Residence	No	Lacks age (1990)	B, C
26CK6211	205 Donner Way	Residence	Yes	Associated with McKeeversville	B, C
26CK6212	206 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6213	300 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6214	302 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6215	303 Lakeview Drive	Residence	Yes	Associated with McKeeversville	B, C
26CK6216	305 Lakeview Drive	Residence	Yes	Associated with McKeeversville	B, C
26CK6217	306 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6218	11 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6219	307 Lakeview Drive	Residence	No	Lacks integrity	B, C
26CK6220	307 Ridge Road	Residence	Yes	Associated with McKeeversville	B, C
26CK6221	205 Lakeview Drive	Residence	Yes	Associated with McKeeversville	B, C
26CK6222	1100 Nevada Way	Commercial building	No	Lacks significance	B
26CK6223	1104 Nevada Way	Commercial building	No	Lacks significance, age	B
26CK6224	1108 Nevada Way	Commercial building	No	Lacks significance	B
26CK6225	1112 Nevada Way	Commercial building	No	Lacks significance, age	B
26CK6226	1200 Nevada Way	Commercial building	No	Lacks significance, age	B
26CK6227	1212 Nevada Way	Commercial building	No	Lacks significance, age	B
26CK6228	1300 Nevada Way	Commercial building	No	Lacks significance	B
26CK6229	1304 Nevada Way	Warehouse	No	Lacks significance	B
26CK6230	1310 Nevada Way	Commercial building	No	Lacks significance	B
26CK6231	1500 Nevada Way	Commercial building	No	Lacks significance	B

**TABLE 3-13**  
Recorded Structures within Build Alternatives APE

Site Number	Name	Type of Resource	Recommended NRHP Eligible	Rationale	Alternative
26CK6232	Bootleg Wash Road	Road	No	Lacks integrity	B, C
26CK6233	Boulder City Pumping Station No. 2	Utilities facility	Yes	Determined Eligible	B, C
26CK6234	Dam Construction Road	Road	No	Lacks significance	B, C
26CK6235	Old Airport Terminal	Building	No	Lacks integrity	B
26CK6236	Old Lakeshore Road	Abandoned road	Yes	Other segments determined eligible	B, C
26CK6237	Los Angeles Bureau of Power and Light (LABPL) Transmission Line 2	Electrical transmission line	Yes	Determined eligible	B, C, D
26CK6238	LABPL Transmission Line 1	Electrical transmission line	Yes	Determined eligible	B, C, D
26CK6239	Reservation Boundary Road	Road	No	Lacks significance	D
26CK6240	Metropolitan Water District Line 1	Electrical transmission line	Yes	Determined eligible	B, C, D
26CK6241	Metropolitan Water District Line 2	Electrical transmission line	No	Lacks significance and age	B, C, D
26CK6242	LABPL Transmission Line 3	Electrical transmission line	Yes	Determined eligible	B, C, D
26CK6243	Alunite-Eldorado Valley Road	Road	No	Lacks significance	D
26CK6244	Old Airport Hangar	Hangar	Yes	Rare example of architectural style	B
26CK6245	Old Highway 93	Road	Yes	Associated with Hoover Dam and Civilian Conservation Corps (CCC)	B, C
26CK6246	Old Highway 95	Road	Yes	Importance in regional commerce	B, C, D
26CK6247	Old Lake Highway	Road	No	Lacks integrity	B, C
26CK6248	LMNRA Maintenance Warehouse	Government building	Yes	Associated with Hoover Dam	B, C

**TABLE 3-13**  
Recorded Structures within Build Alternatives APE

Site Number	Name	Type of Resource	Recommended NRHP Eligible	Rationale	Alternative
26CK6249	Southern California Edison Company (SCE) North Transmission Line	Electrical transmission line	Yes	Associated with Hoover Dam	B, C, D
26CK6250	SCE South Transmission Line	Electrical transmission line	Yes	Associated with Hoover Dam	B, C, D
26CK6251	Hoover- Basic South Transmission Line	Electrical transmission line	Yes	Associated with Hoover Dam and Basic Magnesium	B, C, D
26CK6252	Joint Telephone Line and Construction Road	Telephone line and road	No	Lacks significance	D
26CK6253	Boulder City Tap to Boulder City No. 2 Substation Transmission Line	Electrical transmission line	No	Lacks significance	D
26CK6254	Railroad Pass Hotel and Casino	Hotel and casino	No	Lacks integrity	B, C, D
26CK6255	Basic Tap/Boulder City Tap Substation	Electrical substation	No	Lacks significance	D
26CK6256	Southern Sierras Road	Road	No	Lacks integrity	D
26CK6257	1306 Nevada Way	Commercial building	No	Lacks significance	B
26CK6258	1208 Nevada Way	Commercial building	No	Lacks significance, age	B
26CK6259	200 Lakeview Drive	Residence	Yes	Associated with McKeeverville	B, C
26CD6447	Boulder City Rifle and Pistol Club Range	Shooting range	No	Lacks significance/ lacks integrity	D
26CK6448	Alan Bible Visitors Center	Government building	No	Lacks age, significance	B, C
26CK6449	Boulder City Tap Telephone Line	Telephone line	No	Lacks significance	D
26CK6450	Davis-Hoover Transmission Line	Electrical transmission line	No	Lacks significance	D

### 3.8.6 Agency Consultation

On August 8, 2001, FHWA initiated consultation with the Nevada SHPO to identify the historic and archaeological properties located within the APE of the three build alternatives and to gain concurrence on the NRHP eligibility of those affected properties (see Appendix A). The above findings and recommendations for NRHP eligibility and ineligibility (Tables 3-11 and 3-13) were fully documented by FHWA in their determinations of eligibility to the SHPO. The SHPO responded on September 14, 2001, concurring with FHWA on some of the eligibility determinations and requesting additional information on other historic and archaeological properties. Subsequently, in a letter dated November 21, 2002, the SHPO provided concurrence with the remainder of the recommendations.

FHWA and SHPO have prepared a Programmatic Agreement (PA), which is executed and, as such, finalizes FHWA responsibilities under the NRHP. See Appendix E for a copy of the Executive PA. The PA stipulates cultural resources management responsibilities within the APE of Alternative D, the preferred alternative, including agency responsibilities for the following:

- Any final determinations of eligibility for identified cultural resources
- Assessments of impacts from implementation of the preferred alternative
- Consultation to develop mitigation measures
- Implementation of mitigation measures

As noted above, Reclamation lands within Section 2, T23S, R63E and Section 35, T22S, R63E have been previously inventoried. An MOA was signed on January 25, 2002, among FHWA, NDOT, Reclamation, BLM, and SHPO outlining mitigation measures to be completed for the Railroad Pass Squatters' Camp, an eligible site on Reclamation land.

### 3.8.7 Native American Consultations

During the initial stages of project development, HRC assembled a plan for Native American Consultation (Blair and Lawrence, 2000). Based on that plan, FHWA initiated formal Government-to-Government consultation with Native American groups with an affinity to the Eldorado Valley. FHWA started the consultation process by sending letters to representatives of seven tribes or groups on June 19, 2001, informing them of the project and the results to date of cultural resource studies, and requesting their response relative to any concerns about cultural resources, traditional religious or cultural properties, or about the overall project (see Appendix A). The groups contacted were:

- Las Vegas Paiute Tribe
- Pahrump Paiute Tribe
- Moapa Business Council (Moapa Paiute)
- Chemehuevi Indian Tribe
- AhaMaKav Cultural Society of the Chemehuevi
- Colorado Indian Tribes
- Fort Mojave Indian Tribes

As a result, four tribes/groups had no response to FHWA's request for consultation, and three requested additional work and/or information. The results of the consultation were summarized in the *Native American Consultation Report* submitted to SHPO on August 8,

2001. After review, FHWA determined that these requests will be addressed prior to implementation of the preferred alternative and subsequent to a final determination of effects from that implementation on historic properties. SHPO has completed its review of prehistoric survey documentation and historic documentation. Consultations with SHPO and other agencies, as appropriate under the NHPA, will be ongoing through completion of the Section 106 compliance process. Consultations with appropriate Native American groups are ongoing.

## **3.9 Land Use**

### **3.9.1 Study Methodology**

Methods utilized for land use analysis included field surveys of the existing and proposed alignments conducted in January and March 2001. These were supplemented by meetings and telephone interviews with local planning staff to determine the cohesiveness of neighborhoods and current development trends, and to compare existing conditions with local and regional government plans and policies on land use and growth. A geographic information system (GIS) was developed to quantify information such as acreage and linear distance, and provide a context for understanding the spatial relationship among the proposed project alternatives and existing and planned land uses (NDOT, November 2001). Documentation of the existing conditions and potential impacts also included a review of current plans and policies relevant to the proposed project, and a review of recent project public meeting information to identify specific citizen concerns expressed about the proposed project.

The development standards of locally affected jurisdictions were also evaluated, including the zoning ordinances and land use plans of Boulder City, the City of Henderson, and Clark County.

### **3.9.2 Existing Land Uses**

The relationship of the proposed project alternatives to existing land uses is depicted in Figure 3-15. The affected environment consists of those land uses described below.

#### **Boulder City and Vicinity**

Boulder City was incorporated in 1958 when the federal government passed the Boulder City Act. The majority of land in Boulder City is undeveloped open space, with developed land uses concentrated in approximately 13 km<sup>2</sup> (5 square miles). These developed land uses are primarily residential, with commercial/retail uses concentrated in the northwest portion of the city. In 1995, an additional 518 km<sup>2</sup> (200 square miles) were added to the city south of the original city limits. This area is referred to as the Eldorado Valley Transfer Area and consists predominantly of open space. In addition, major utility corridors have been developed through Boulder City and the surrounding area (see Section 6.4.1).

### **Existing U.S. 93 Alignment and Vicinity (Alternative B)**

Beginning at the western terminus of the project limits, U.S. 93 runs through predominantly open space within Clark County and the City of Henderson (Figure 3-15). Major landowners include Reclamation and BLM. The Boulder City Branch Railroad tracks cross at grade with U.S. 93 southeast of the western terminus and continue parallel to the north side of the alignment. Immediately west of the Boulder City limits in the City of Henderson, U.S. 93 runs south of the Railroad Pass Hotel and Casino. A quarry and processing facility is located southwest of the casino. It is not yet known if this particular quarry site would be used during construction. Due to the close proximity of several quarry sites to the project area, the aggregate resources from a number of these sites would likely be used if a build alternative is recommended.

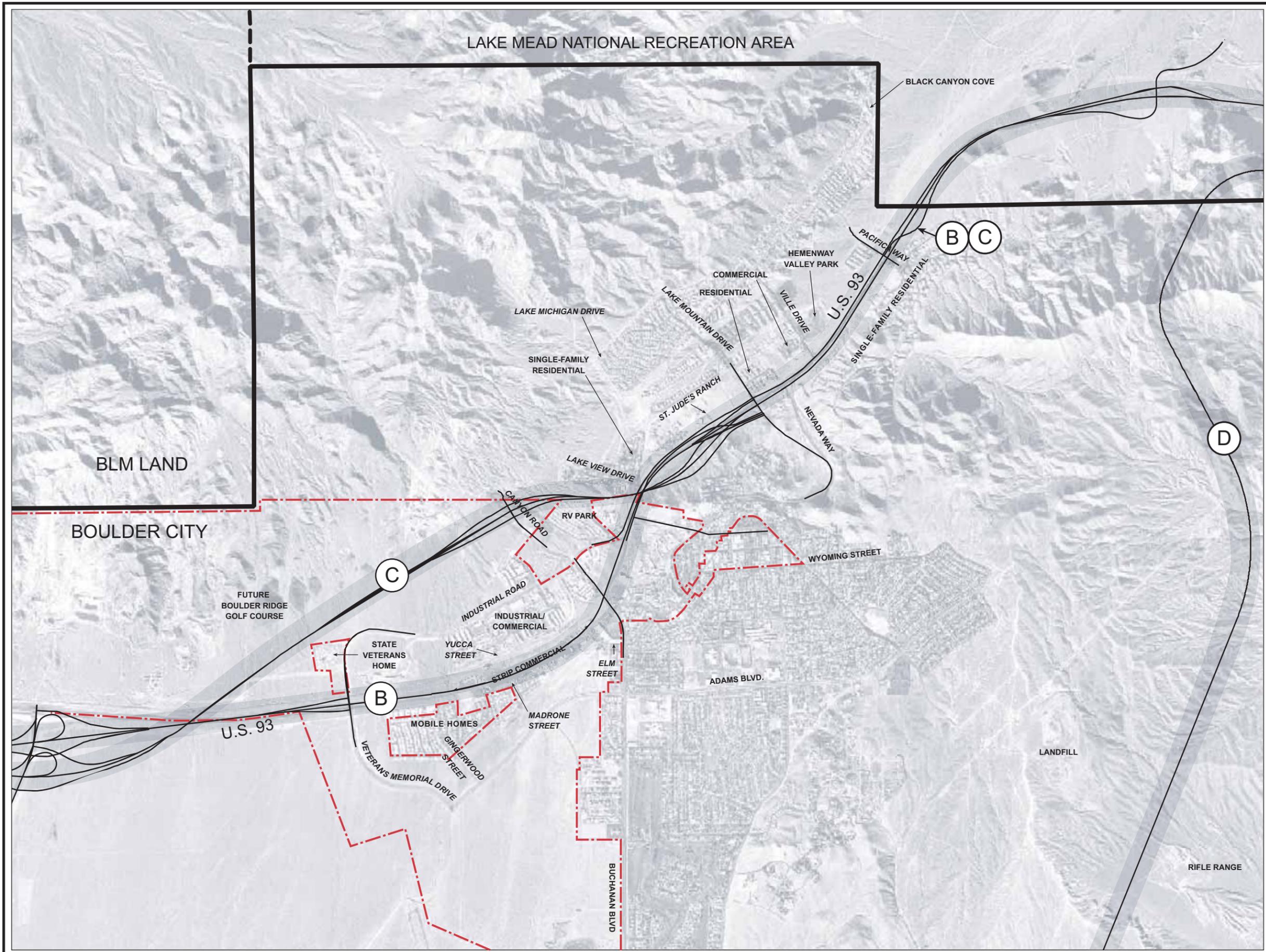
Immediately east of the hotel and casino, U.S. 93 enters the Boulder City limits and intersects with U.S. 95. Undeveloped open space surrounds this portion of the alignment. The River Mountains are located to the north, with relatively flat undeveloped areas south of U.S. 93.

Developed lands within central Boulder City begin east of the U.S. 93/95 interchange at Veterans Memorial Drive. Land uses near the interchange include the State Veterans Home, a nursing home facility currently under construction, and a mix of commercial uses and mobile homes located south of the alignment.

A mix of retail, commercial, and industrial land uses front both sides of U.S. 93 from Yucca Street to Colorado Street, with occasional areas of vacant land. An RV development is located off Industrial Road northwest of the intersection with U.S. 93, and a maintenance equipment yard for the LMNRA is located at the northeast intersection of Industrial Road and U.S. 93.

East of Colorado Street and west of Nevada Way, a channelized portion of Hemenway Wash and the associated River Mountains Loop Trail bicycle/hiking path parallels U.S. 93 to the north, with open space and hilly terrain to the south. Between Colorado Street and the eastern city limits, land uses along U.S. 93 are mostly residential. A school, church, and a children's home are located along the north side of U.S. 93 at St. Jude Street. A hotel, restaurant, and gas/retail facility are located at the northwest intersection with Ville Drive. The 10-acre Hemenway Park is located north of the alignment and east of Ville Drive. The area immediately north of U.S. 93 between Ville Drive and Pacifica Way is mostly undeveloped.

The Boulder City limits end to the east of Pacifica Way, with U.S. 93 continuing through primarily open space and recreation land within NPS land in the LMNRA. The Alan Bible Visitors Center for the LMNRA is located along the north side of U.S. 93, and includes a trailhead to the River Mountains Loop Trail. The alignment turns south of existing U.S. 93 at the Hacienda Hotel and Casino. The eastern terminus of the project is east of the hotel.



LAKE MEAD NATIONAL RECREATION AREA

**LEGEND**

- (A) EXISTING U.S. 93 (NO BUILD ALTERNATIVE)
- (B) ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C) ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D) ALTERNATIVE D - SOUTHERN ALIGNMENT
- REDEVELOPMENT BOUNDARY

0 1

SCALE IN MILES

**FIGURE 3-15**  
**RELATIONSHIP OF EXISTING**  
**LAND USES TO PROJECT**  
**ALTERNATIVES**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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### **Through-Town Alignment and Vicinity (Alternative C)**

Alternative C is located south of and parallel to the existing U.S. 93 alignment. Similar to Alternative B, this alignment traverses predominantly undeveloped open space west of the Boulder City limits near the Railroad Pass Hotel and Casino.

At the Boulder City limits, the alignment turns south of the existing U.S. 93 alignment, intersecting with U.S. 95 south of the existing interchange. From U.S. 95, Alternative C turns northward across U.S. 93 and toward the lower elevations of the River Mountains, and bisects the proposed Boulder Ridge public golf course development area. This portion of the alignment contains primarily open space and undeveloped lands. However, the State Veterans Home is located directly south of the alignment, west of Veterans Memorial Drive.

Alternative C continues parallel to and north of existing U.S. 93, passing north of the Boulder City central business district. The proposed alignment turns southeast toward the existing alignment north of the Buchanan Boulevard/U.S. 93 intersection. Adjacent land uses along this segment include a high-density RV community, the LMNRA maintenance yard, and a medium-density residential development located off Lakeview Drive. The alignment crosses over existing U.S. 93 west of the intersection with Lakeview Drive, continuing directly south of and parallel to the existing alignment and merging with U.S. 93 at the intersection with Lake Mountain Drive. Land uses located along this portion of the alignment include primarily undeveloped hilly terrain south of the existing U.S. 93 alignment. East of Lake Mountain Drive, land uses are identical to those described under Alternative B.

### **Southern Alignment and Vicinity (Alternative D)**

Alternative D, the preferred alternative, generally follows existing U.S. 93 until just west of the existing hotel and casino, where the alignment turns southward and intersects with U.S. 95 south of the existing U.S. 93/95 interchange. The alignment continues through several miles of open space, around the southernmost portion of developed land uses in central Boulder City. Along the southernmost section, the alignment passes directly south of a municipal sewage treatment facility and the Boulder City Municipal Airport. Further east, the alignment passes north of the Mead Substation, a facility employed chiefly to route electrical power to regional transmission lines. At this location, a ramp for emergency vehicle access only would be constructed and connected to Buchanan Boulevard.

East of the Mead Substation, the alignment turns sharply northeast through the lower elevations and ridges of the Eldorado Mountains. Land uses in the nearby vicinity include a landfill facility west of the alignment, the Boulder City Rifle and Pistol Club rifle range located directly east of the alignment, a NPS-designated Wilderness Suitability Area approximately 0.8 km (0.5 mile) east within the LMNRA, and a high-voltage transmission line corridor located parallel to the southeast portion of the alignment. In addition, several service roads/recreational trails are crossed that are used as equestrian trails and for access to the LMNRA.

Alternative D continues north and east through open space/recreation land in the LMNRA, immediately south of the existing U.S. 93 alignment. Alternative D connects to the Hoover Dam Bypass's Nevada interchange located directly east of the Hacienda Hotel and Casino.

### 3.9.3 Land Use Planning

Development within the project area is guided primarily by the land use plans, policies, and regulations adopted by Boulder City. In addition, portions of the project area are under the jurisdiction of Clark County, the City of Henderson, or one of four federal agencies: Reclamation, BLM, NPS, and WAPA. Relevant plans, policies, and regulations of these jurisdictions are described below.

#### Boulder City

**Boulder City Master Plan.** At the time of publication of the DEIS, The Boulder City Master Plan, adopted in 1991, was in the process of being updated. The new Master Plan, or Comprehensive Plan, was adopted by the City Council on December 9, 2003. The Master Plan's Vision Statement is as follows:

"The community of Boulder City is committed to preserving our status as a small town, with small town charm, historic heritage, and unique identity, while proactively addressing our needs and enhancing our quality of life."

The Guiding Principles of the Master Plan are the highest level statements of land use policy for the Boulder City Planning Area. Those relevant to the proposed project are outlined below:

- Identify and Protect Existing Historic Structures: Seek to preserve and enhance historic buildings and resources. Historic preservation efforts should be encouraged.
- Preserve and Enhance Natural Resources: The air, water, and lands of the community should be managed in a manner that should protect the environment.
- Promote a Strong Community Identity: Continue to enhance its community image and identity by maintaining the distinct character and identity that sets it apart from other communities in the region, including its historic heritage, extensive park and recreational facilities, and small-town atmosphere.
- Sustainable Growth Management Program: Strive for a balanced mix of land uses that achieves fiscal health and community livability. Non-residential uses should be designed and located to minimize negative land use impacts on residential areas.
- A Balanced Multi-Modal Transportation System: Strive for a balanced transportation system that provides safe and efficient facilities for pedestrians, bicycles, and automobiles. Current and future mobility needs should be addressed through appropriate land use decisions.
- Active Community Involvement and Regional Coordination – Continue to foster coordination with other communities, organizations, and agencies in the region, and ensure and promote opportunities for public participation in the community planning process.
- A System of Connected Parks and Trails: Increased emphasis should be placed on enhancing connections between neighborhoods, parks and other public gathering places.

**Growth Management.** The Land Use Map (Figure 3-16), adopted by the Boulder City Council in December 2003, guides new development in Boulder City, along with Boulder City's redevelopment agency. The existing U.S. 93 corridor, and therefore Alternative A (the no-build alternative) and Alternative B (improvements to the existing alignment), are primarily adjacent to land identified with Future Land Use Codes for Open Land (OL) and Parks and Recreation (PR) generally west of Veterans Memorial Drive. To the east of Veterans Memorial Drive, Commercial (COM), Public/Quasi Public (PUB), Manufacturing (MAN) and Medium-Density Residential (MDR) uses are planned for land along the alignment (Figure 3-16).

For Alternative C west of the proposed interchange at Canyon Road, the alignment crosses land designated primarily Open Land, Parks and Recreation (that of the Boulder Ridge Golf Course), and Public/Quasi Public (Figure 3-16). To the east of the proposed interchange at Canyon Road, Public/Quasi Public and Medium-Density Residential uses predominate, with lesser areas designated as Manufacturing and Parks and Recreation.

Designated land use within Boulder City adjacent to Alternative D is chiefly Open Land with Public/Quasi Public zoned land in the vicinity of the waste water treatment plant to the south of the City, and the municipal landfill to the east (Figure 3-16). Alternative D crosses publicly owned land managed by WAPA in the south, while all alternatives pass through BLM managed lands in the west, and NPS managed lands in the east.

Boulder City has established areas for potential redevelopment. Relative to the proposed project alternatives, established redevelopment areas generally include those lands north of the current U.S. 93 alignment between the city limits to the west and Buchanan Boulevard to the east. In addition, the redevelopment boundary includes the area south of U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard. Existing residential uses and the State Veterans Home project are excluded from the redevelopment zone. Hence, the majority of Alternatives B and C falls within the redevelopment boundary west of Buchanan Boulevard. Boulder City's redevelopment goals for this zone are to stimulate new investment, stabilize the tax base, and maintain the viability of existing businesses.

**Boulder City Zoning Ordinance.** New development in Boulder City must conform to ordinances within the Boulder City Municipal Code. Chapter 41 of Title 11 was adopted in response to a 1979 citizen growth control initiative and places limits on new residential and hotel development. A separate ordinance requires the vote of Boulder City residents whenever 1 acre or more of land is to be sold for development. This ordinance would not apply to the proposed project concerning any land acquired by NDOT for highway right-of-way.

### **Clark County**

The existing alignment is adjacent to designated land uses in Clark County that include Light Industrial, Low Density Residential (three to six dwelling units per acre), Suburban Residential (two dwelling units per acre), and Highway Commercial. County property associated with the existing alignment is zoned Highway Commercial. All other property is administered by various jurisdictions that require coordination with, and permits issued by, the County in order to develop their lands. The Clark County Current Planning office

recently issued two Use Permits for the installation of new power lines. No other development or land use changes for this area have been recorded with this office as of March 13, 2001.

### **City of Henderson**

The existing U.S. 93 alignment is located adjacent to areas designated by the City of Henderson as Tourist Commercial, Commercial, High-Density Residential, and Low-Density Residential. The alignment is located within the River Mountain and Mission Hills planning area neighborhoods, which are planned for development within the next 10 years. The City of Henderson has presented to the state legislature a plan for a new state college along U.S. 93. At the request of the City of Henderson, to ensure future interchange access to the college, the foothills grade separation should be preserved; this would be a separate project subject to its own NEPA document (see Chapter 6).

### **Reclamation**

U.S. 93 currently traverses the southern portion of Reclamation land located within the City of Henderson limits. The proposed project would run through this area just south of the existing alignment and cross the historic BCBRR at Railroad Pass. No other land uses would be affected by the proposed project, as the surrounding area is undeveloped open space.

### **BLM**

There is a small portion of BLM land south of the Railroad Pass Hotel and Casino. This land includes a gravel quarry and the old U.S. 95 roadbed.

### **LMNRA**

The proposed project alternatives are located within the Boulder Basin Zone of the LMNRA General Management Plan (GMP). The land adjacent to the existing U.S. 93 corridor is located in the Natural Environment subzone of the Proposed Action Management Zoning. Within this subzone, there is an emphasis on conservation of natural resources and provision of environmentally compatible recreational activities. This subzone contains lands possessing natural values and is not open to domestic livestock grazing.

## **3.9.4 Agriculture**

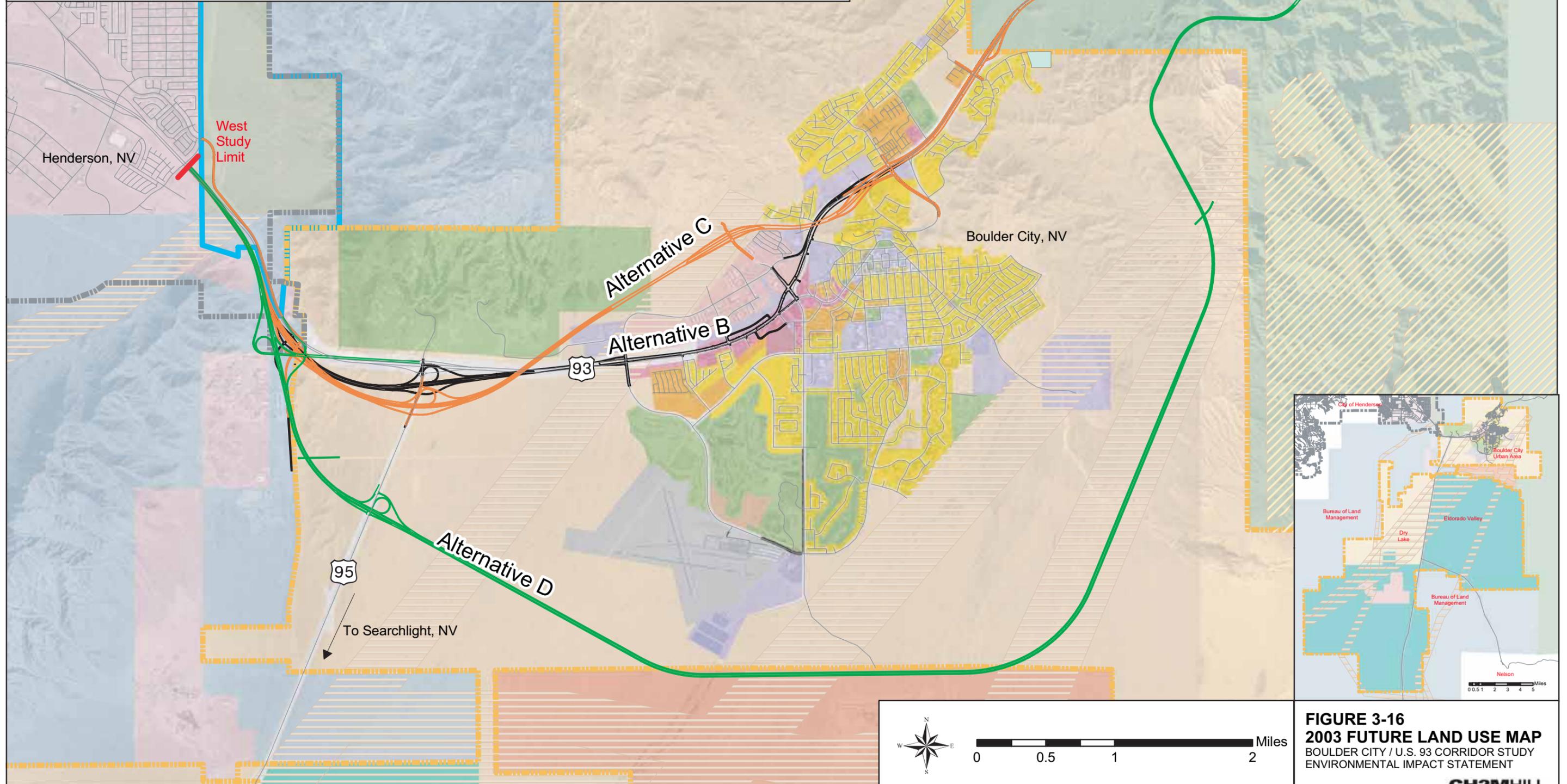
As a result of a substantial decrease in the amount of open farmland, Congress passed the Farmland Protection Policy Act (PL 97-98; 7 U.S.C. 4201 et seq.). The purpose of the Act is to minimize the unnecessary and irreversible conversion of farmland to nonagricultural uses by federal programs/actions. The Act specifies three categories of farmlands: prime farmland, unique farmland, and additional farmland of statewide or local importance.

No agricultural land uses occur within the project area, and no areas are designated for future agricultural development.

**Legend**

- |                                   |                                      |                             |  |
|-----------------------------------|--------------------------------------|-----------------------------|--|
| — Alternative B                   | <b>Future Land Use Designation**</b> | Commercial                  | Open Lands                                       |
| — Alternative C                   | Airport Related Commercial           | Low Density Residential     | Open Lands (Multi-Species Conservation Easement) |
| — Alternative D                   | Airport                              | Manufacturing               | Private Land                                     |
| — Boulder City Boundary           | Bureau of Land Management            | Medium Density Residential  | Park/Recreation                                  |
| — City of Henderson Boundary      | Bureau of Reclamation                | Mixed-Use Commercial/Office | Public/Quasi-Public                              |
| — Bureau of Reclamation Boundary  | Central Business District            | National Park Service       | Right of Way                                     |
| — Black Canyon Wilderness Area    |                                      |                             | Western Area Power Administration                |
| — Approximate Powerline Easements |                                      |                             |  |
| — Streets                         |                                      |                             |  |

\*Source 2003 Boulder City Master Plan



**FIGURE 3-16**  
**2003 FUTURE LAND USE MAP**  
 BOULDER CITY / U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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## 3.10 Visual Resources

### 3.10.1 Study Methodology

This visual resources assessment is a multistep process, including:

- Defining baseline visual resources by:
  - Determining the visual environment of the alternative alignments
  - Characterizing the visual resources of that environment
  - Identifying viewer groups, viewpoints, exposures, sensitivities, and responses to those resources
- Determining the degree of visual impact by:
  - Identifying the change in visual resources that would be introduced by the alternatives
  - Assessing the compatibility of those changes with the landscape
  - Describing the potential viewer response to the change
- Developing mitigation for identified adverse impacts on visual resources

### 3.10.2 Regulatory Standards/Criteria

Several agencies have jurisdiction over activities that occur on lands under their jurisdiction along the Alternative B, C, and D alignments. These agencies and their visual resource guidelines and policies are presented below.

#### Federal

**FHWA.** FHWA held a 5-day training course in the late 1970s that led to the development of a guide entitled *Visual Impact Assessment for Highway Projects*. The guide does not constitute a standard, specification, or regulation, but rather it is intended to help those who prepare or review visual impact discussions in environmental assessments for highway projects. The guide discusses an approach to identifying the potential importance of visual effects and then assessing the nature of these effects (FHWA, 1981). This visual resource analysis follows the approach suggested in FHWA's guide.

#### BLM

**Resource Management Plan.** The *Las Vegas District Resource Management Plan/Final Environmental Impact Statement* (RMP/EIS) provides management guidance for approximately 3.3 million acres of public land administered by BLM. The following objective applies to visual resources of the lands that the build alternatives would cross:

- **Objective VS-1:** Limit future impacts on the visual and aesthetic character of public lands

In support of that objective, BLM has included several management directions regarding designating land to appropriate classes and to continue to refine the Visual Resource

Management (VRM) inventory (BLM, 1998). According to Map #2-9 in the RMP/EIS, the BLM land in the project area is designated Management Class IV.

**VRM Program.** BLM is committed to managing visual resources on an equal basis with all other resources as it puts public land to productive use. BLM has developed a VRM Program to manage the quality of the visual environment and to reduce the visual impact of development activities. As part of the VRM Program, lands within its jurisdiction are inventoried and given relative visual ratings. When development is proposed, the degree of contrast between the proposed activity and the existing landscape is measured.

Management Classes describe the different degrees of modification allowed to the basic elements of the landscape. Management Class I is the most restrictive, and Management Class V is the least restrictive. Management Class IV (the designation of BLM land in the project area) indicates that “any contrast attracts attention and is a dominant feature of the landscape in terms of scale, but it should repeat the form, line, color, and texture of the characteristic landscape.”

Since its inception in 1975, the BLM’s VRM Program has helped set standards for transmission line location, timber harvesting, recreation development, range management, mining activities, and highway placement (BLM, 1980).

**NPS.** NPS prepared a GMP and EIS (1986) to guide park management activities for 25 years (through 2011) for the LMNRA. The LMNRA encompasses Lake Mead, Lake Mohave, and both federal and nonfederal land.

The primary recreation season is from March through October, with 75 percent of visitation occurring during that period. Peak use occurs on Memorial Day, 4<sup>th</sup> of July, and Labor Day holidays. One of the areas that receives a majority of visits is the Lakeshore Road area (Boulder Beach and Las Vegas Wash). Recreation visits to the LMNRA in 1983 were reported at 6,128,254, with Lake Mead being the primary destination (NPS, 1986); visits in 1999 were reported at 9,351,237 (NPS, 1999). Viewing scenery is the second highest activity participated in by park visitors (93 percent) (NPS, 1986). Today, the LMNRA is the third most visited park in the country (Holland, pers. comm.).

The FEIS indicates that:

“Preserving the high visual qualities of the area is integral to preserving the high quality of the recreation experience. This is one reason why NPS is so concerned about surface ground disturbance from mineral, oil, and gas leasing; illegal off-road vehicle (ORV) use; and uncontrolled expansion of developed areas.”

The EIS identifies significant natural features of the LMNRA as being areas that are unique, provide critical habitat, or provide aesthetic or recreational value. Examples of outstanding resources are warm springs, unique geologic formations and plant communities, scenic vistas, desert bighorn lambing grounds, and coves that are popular for their sandy beaches or scenic beauty. The EIS also acknowledges that the views provided by these natural features must be protected and has identified these views on its Significant Natural Features map (NPS, 1986). No significant natural features or views are identified along

Alternatives B, C, or D in the GMP and EIS. The Lake Mead GMP identifies a Wilderness Suitability Area approximately 0.8 km (0.5 mile) east of the northward-trending portion of Alternative D.

## Local

### Boulder City

**Master Plan.** The 1991 Boulder City Master Plan, prepared by the Boulder City Community Development Department, is the policy plan and contains goals that identify overall community values and provide guidance for development within the City.

The Master Plan is applicable to Alternatives B, C, and D, the majority of which are aligned through the City. The following goals are applicable to the visual resources analysis:

- **Goal 2:** Consider the historic, cultural, aesthetic, and visual relationships in the planning of the community.
  - **Objective 2.1:** Support and promote efforts to improve the appearance and image of the community.
- **Goal 5:** Develop and maintain balanced road and circulation systems that will provide for the safe and efficient movement of people and goods to, from, and within the community and area.
  - **Objective 5.4:** Integrate the major street plan in accordance with the goals of this Plan to enhance environmental and aesthetic values.

Five areas in the City are considered to be developable. Approximately 78 percent of the developable land are designated for mixed uses including Interim Study, General Commercial, RV, Government Flood Control, Government Park-Recreation. The remainder of the developable land is designated for residential land uses (Boulder City, 1991).

**Zoning Code.** The Boulder City Zoning Ordinance (2001) lists zoning designations throughout the City and allowable uses within those designations. Land along the alignments within the City and outside the City but within its jurisdiction, respectively, is zoned Interim Study (S), General Commercial (C2) (Boulder City, 1987a), and Mobile Estate (ME), Mobile Home Park (MP), Commercial Manufacturing (CM), Single-Family Residential (R1), Government Municipal (GM), Government Park-Recreation (GP), and Neighborhood Commercial (C1) (Boulder City, 1987b). The City's Zoning Ordinance provides specifications that are applicable to visual resources and aesthetics including landscaping, fences, walls, and building heights for the various zoning districts.

There are no development codes listed in the City's Zoning Ordinance that are applicable to the visual resources or aesthetics of freeway improvements.

**Scenic Route.** Nevada Way, east of Buchanan Boulevard, is posted as a Historic District Scenic Route. This City-designated route includes the Boulder City Historic District that is listed on the NRHP (Mimi Garat Rodden, pers. comm.).

### 3.10.3 Public Concerns

Public meetings were held regarding the proposed action on January 26 and April 26, 2000. Several questions and concerns expressed at those meetings are either directly or indirectly related to visual resources, as follows:

- Can the lighting at the Railroad Pass Hotel and Casino and marquee sign be reduced? At night it is difficult to adjust to those lights when driving to Boulder City through the Railroad Pass area.
- Constructing a road that bypasses town will reduce drive-by business.
- Will there be a tree buffer along the realigned highway?
- Concerns regarding the proximity of the roadway to residences.

In addition, a meeting was held on August 7, 2001, at the Railroad Pass Hotel and Casino with hotel/casino management personnel to discuss their concerns with the build alternatives. The primary concern that the property owners expressed at that meeting was the change in the drivers' decision point and visibility of both the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino from the proposed U.S. 93. All three build alternatives are parallel to existing U.S. 93/95 to accommodate AASHTO design standards. Additionally, access to the adjacent hotel properties is maintained via U.S. 93.

The Visual Resources section (Section 4.10) of this report addresses these questions as well as other potential impacts on visual resources.

### 3.10.4 Existing Conditions

#### Visual Environment

**Regional Landscape.** To assess the visual effects of a proposed action, the relationship between the immediate visual environment of the proposed action and the visual environment of the geographic region must be understood.

The proposed action would be located at the border of the Las Vegas Valley (edge of Mojave Desert) and Eldorado Valley, within the Eldorado and Hemenway valleys, with the vast majority being located in the Eldorado Valley. The project area is characterized by an east-west mountain range (the River Mountains) to the north of Alternative C and the Eldorado Mountains near the eastern terminus of Alternatives B, C, and D.

To the east of the project area is the LMNRA, in which spectacular views of the mountains and lake are offered. There are significant natural features in the LMNRA, including warm springs, unique geologic formations and plant communities, scenic vistas, desert bighorn lambing grounds, and scenic coves. In the area south of the three build alternatives and south of Boulder City is an alluvial fan that has smaller meandering washes that carry runoff out into the open desert area of the Dry Lake Basin. The Dry Lake Basin (playa) is a relatively flat open area that is typical of a desert landscape and has low-lying sparse vegetation. Transmission line corridors cross the area.

**Project Area Landscape.** The project area lies within the Mojave Desert ecosystem. The changing elevation, aspect, and topography cause marked differences in terrain along and between the three build alternatives. That, combined with the various vegetation and soil types and land uses along the alternatives, results in a variety of landscapes in the project area. Soils in the project area exhibit a pink, tan, and brownish-gray hue. Certain areas are sandy, while others are gravelly or rocky.

Elevations in the project area vary from 700 m (2,300 ft) at Railroad Pass near the western terminus; 670 m (2,200 ft) near the U.S. 93/95 interchange; 790 m (2,600 ft) where Alternative C is aligned north of existing U.S. 93; 640 m (2,100 ft) about 3 km (2 miles) south of Boulder City; 750 to 790 m (2,500 to 2,600 ft) on the ridge of the Eldorado Mountains; and about 500 m (1,600 ft) at the eastern terminus of the project area.

The visual appearance of the landscape depends on its underlying landform and its land cover. The landforms in the project area consist of mountains (River Mountains toward the west and the Eldorado Mountains toward the east), the passes through the mountains, and the valley between them where most of the human-made development exists.

The land cover of an area includes the water bodies (lakes or rivers), vegetation, and human-made development within the area. No lakes or rivers would be crossed by the three build alternatives. Minimal human-made development exists along the preferred alternative (Alternative D), consisting of the two hotel/casinos at the project termini and the Mead Substation and associated transmission line corridors that would be crossed.

Alternative B exhibits the most human-made development of the three build alternatives, with residential, commercial, and light industrial uses, as well as some undeveloped land. Alternative C follows Alternative B for the majority of its length, so it exhibits a similar level of human-made development. However, Alternative C also crosses undeveloped open space land to the north of Alternative B for approximately 4 km (2.5 miles).

Creosote bush and white bursage are common vegetation across the project area, but plants along the three build alternatives demonstrate the variety in terrain (and therefore, landscape). For example, near the western terminus of the project, the elevation, topography, and locally higher levels of precipitation result in a rich plant community (all three alternatives). Away from the higher precipitation, the vegetation becomes smaller and more widely spaced. Along Alternative B, the disturbed areas result in more ruderal (weedy) vegetation. The vegetation mix along Alternative C is similar to that found for Alternative B; however, the undisturbed area of Alternative C supports more dense vegetation and larger individual plants.

Vegetation along the southernmost portion of Alternative D reflects a drier environment, with smaller and wide-spaced vegetation. Alternative D also passes a riparian corridor, caused by runoff from the sewage treatment plant. The riparian vegetation adds much variety to the local landscape; away from the riparian corridor, the desert landscape reappears. North of the Boulder City Rifle and Pistol Club range, the landscape becomes steeper as the alignment cuts across drainages. Near the eastern end of Alternative D is the most rugged terrain along the alignment—a series of steep-walled and deep drainages. This presents a rugged landscape.

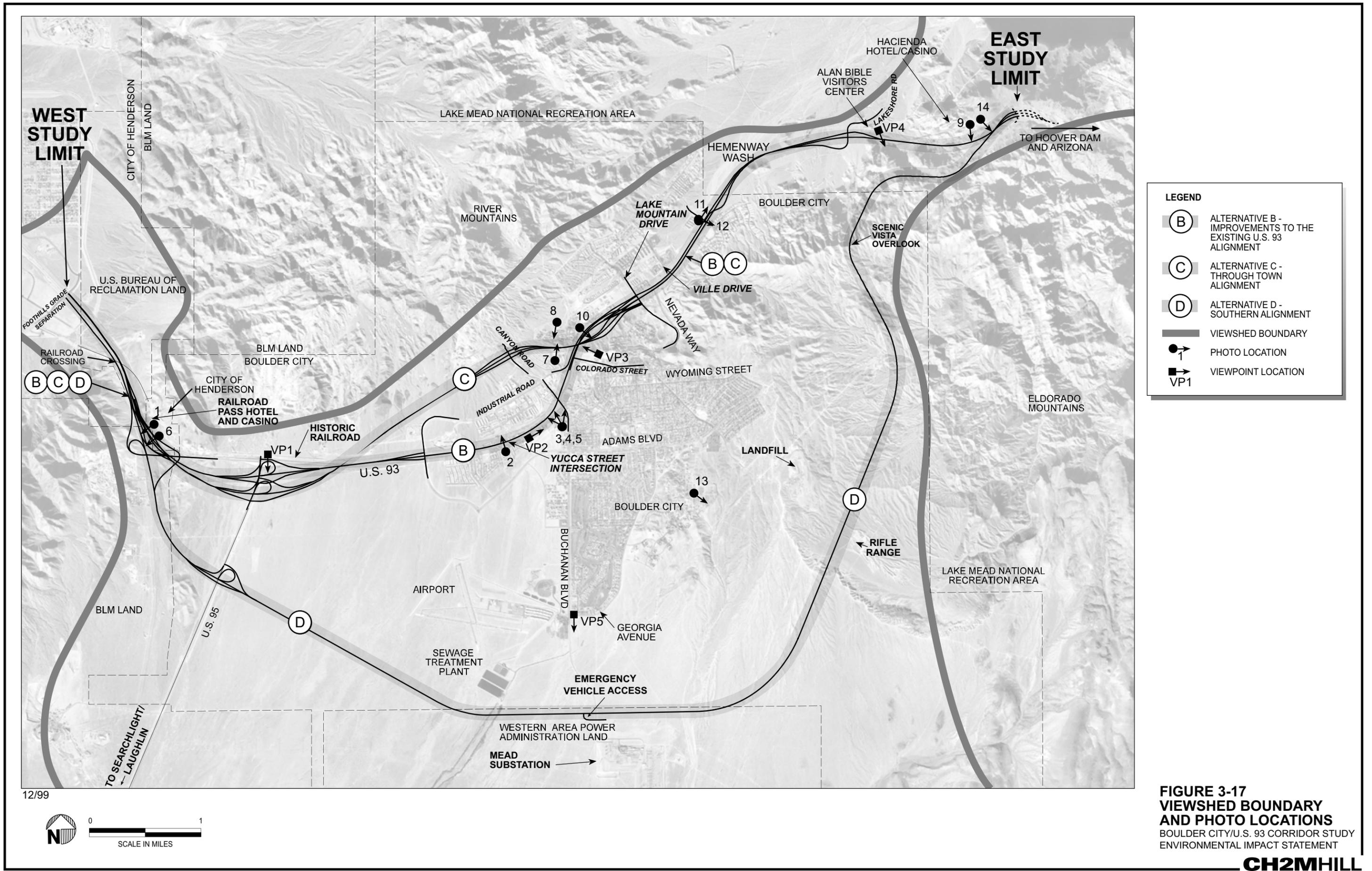
**Project Viewshed.** The visual environment of the project area was determined by mapping the project viewshed (Figure 3-17). The viewshed is the surface area that is visible from a given viewpoint or series of viewpoints. It is also the area from which that viewpoint or series of viewpoints may be seen. The viewshed aids in identifying the views that could be affected by the proposed action.

One viewshed, termed the “potential viewshed,” which encompasses all three build alternatives, was mapped. The potential viewshed is based solely on topography (landform). The potential viewshed is a conservative approach because it does not take into account land use activities such as buildings or existing vegetation that may obscure a view; thus, it overstates project visibility. Visibility is also overstated because some of the areas within the viewshed and along the viewshed boundary are inaccessible to the general public. As shown in Figure 3-17, there are some hills near the eastern end of the alignments that may limit visibility within the viewshed; however, they were included in the viewshed so that the entire lengths of all of the build alternatives would be contained.

**Visual Resources.** The visual resources of a landscape are the stimuli upon which the actual visual experience is based; therefore, the existing resources of the visual environment of the project area are inventoried and analyzed. The inventory categories are landforms, types of water bodies, vegetation communities, land use, and the types of development present.

As discussed above, the visual resources of the project area landscape are a mixture of natural physical landscape elements (mountains, valleys, and lake) and the human-made elements (hotel/casinos; residential, commercial, and industrial development; transmission lines and towers; roads; and highways [U.S. 93 and U.S. 95]). Vegetation is not readily visible in the project area from views at a great distance; foreground views reveal primarily vegetation typical of a desert landscape in the undeveloped areas. The land use of the project area is a mixture of residential, commercial, and industrial uses; utility and transportation corridors; recreation lands; and undeveloped open space. To the east of the project area is Lake Mead, within a mountainous natural landscape element. The lake, its beaches and shores, and its vista points and unique natural features comprise an area that exhibits high visual interest. To the south of the project area is the alluvial fan and Dry Lake Basin, a flat area typical of desert landscapes.

**Visual Character.** Our visual understanding of the environment is based on the visual character of objects in the environment and the relationships between those objects. Two attributes comprise visual character: pattern elements and pattern character. Pattern elements include the form, line, color, and texture of an object. The form is the visual mass, bulk, or shape of the object. The line is introduced by the edges of objects or parts of objects. The color of an object is its reflective brightness (light or dark) and its hue (red, blue, or yellow). Texture is the surface coarseness of the object. Awareness of these pattern elements attenuates with distance.



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**FIGURE 3-17**  
**VIEWSHED BOUNDARY**  
**AND PHOTO LOCATIONS**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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The visual contrast of an environment can be traced to its pattern character components: dominance, scale, diversity, and continuity. Elements in a landscape may be visually dominant because of position, extent, or contrast of basic pattern elements. Scale is the size relationship between a landscape element and its surroundings. Visual diversity is the number, variety, and intermixing of visual pattern elements. Continuity is the uninterrupted flow of pattern elements of a landscape and the maintenance of the visual relationship between connected or related landscape components.

The primary forms in the study area are the mountains and the human-made development in Boulder City. South of the city, the primary forms are the many transmission towers, alluvial fan, and Dry Lake Basin. The highways, roadways, and transmission lines in the project area provide the variety of angled, vertical, and horizontal lines. To the east of the study area, the primary forms are the mountains and the lake.

The variety in colors is demonstrated by the pink, tan, and brownish-gray rock formations and soils; the colors of the human-made development in the commercial district along Alternative B and part of Alternative C; and the brightness provided by the reflection of the sun off that development. Colors east of the proposed action area (Lake Mead area) are vivid, exhibiting varying shades of blues, reds, pinks, light browns, and grays. The rock formations, topography, and vegetation along the alignments exhibit the texture of the area.

No one feature in the project area is considered dominant. Codominant features at opposite ends of the study area are the two hotels/casinos. Human-made development in Boulder City is typical of an urban environment. South of the City, the dominant visual features are the transmission line corridors and Dry Lake Basin. East of the study area, the lake is the dominant feature.

Visual diversity is provided in the area by the mixture of the natural and human-made environment; the variety of form, line, color, and texture provided by the ground surface relief; and vegetation. Continuity is demonstrated by the inter-relatedness of the forms in the landscape (the mountains and undeveloped area, the concentrated city development in the valley, and the transmission line development south of the city). It is also exhibited by the strong lines provided by the natural and human-made structures in the area; the combination of colors; and the textures afforded by the natural environment.

**Visual Quality.** Aesthetics includes not only the character of the visual experience (pattern elements and pattern character) but also its quality. The enjoyment or interpretation of a landscape is subjective, yet there is public agreement that the visual resources of certain landscapes have high visual quality. For example, high visual quality is recognized in both natural landscapes (such as the Grand Canyon) and urban landscapes (such as the San Francisco skyline). Therefore, the character of a landscape and its components may vary greatly, and both landscapes may be considered exceptional. A project in an area with high visual quality does not always have an adverse effect on the visual quality of that landscape.

Three criteria have been used to evaluate the visual quality of the study area: vividness, intactness, and unity. None of these by itself is equivalent to visual quality; all three must be high to indicate quality. Vividness is the memorability of contrasting landscape components as they combine in striking and distinctive visual patterns. Intactness is the visual integrity

of the natural and human-made landscape and the degree to which the landscape is free from visual encroachment. Unity is the visual harmony of the landscape (compatibility of landscape elements) when considered as a whole.

Vividness of the study area includes an assessment of the landforms, land cover, and human-made development of the area. The vividness rating of the study area is considered low to moderate. The landforms of the area contribute to the memorability of the view; however, the mountains are only present toward the two ends of the project alignments. In addition, no water bodies are present within the study area. The human-made development in the area contributes to the vividness of the view by the contrast it provides against the natural landscape (the hotels/casinos on the outlying areas and the urban development); however, the human-made landscape is not considered striking or distinctive. Lake Mead, to the east of the study area, is considered to have high visual quality. The lake and its surrounding mountains receive a high vividness rating, and views of the lake from several vantage points in Hemenway Valley and near the eastern terminus of the study area are considered high quality views.

Intactness of the proposed action area is demonstrated by the concentration of development within the City boundaries and is considered moderate. Scattered development away from the City center would cause encroachment on the undeveloped area and compromise visual integrity. Intactness of the LMNRA is considered high because of the high degree of inter-relatedness of the natural landscape (mountains) with the lake.

Unity of the landscape is shown by the mixture of natural elements and human-made alterations. There is a connection between the natural landscape (mountains, lake, and valley) and the human-made facilities (urban development, roadways, and transmission lines). Overall, the landscape elements within the study area exhibit moderate visual unity. Unity of the LMNRA is considered high because of the high degree of compatibility of the lake with the mountain landscape.

The overall visual quality of the corridor study area, when considered in context with the LMNRA to the east and the views of the lake afforded from several locations within Hemenway Valley, is considered moderate to high.

### **Viewer Characteristics**

**Viewer Groups, Exposure, and Sensitivity.** The quality of the visual experience depends on the visual resources and the viewer response to those resources. When characterizing viewers, the following must be considered: the type of viewer group; the viewer exposure (their location, number of people in group, and duration and frequency of their view); and viewer sensitivity (viewer activity, awareness, and values). For all three build alternatives, the viewer groups can be classified as three types:

- Residents: living in single- and multi-family residences, mobile homes, trailers, and RV parks

- Tourists: traveling to the Railroad Pass Hotel and Casino, Alan Bible Visitors Center, LMNRA, and the Hacienda Hotel and Casino
- Drivers and passengers: traveling in vehicles through and within Boulder City

Photos demonstrating the views and visual quality afforded to the various types of viewers (receptors) were taken in August 2001. The locations where these photos were taken and the direction that the camera was focused are shown in Figure 3-17. These photos and their associated viewers and view locations are listed below:

- Photo 1: Tourist view from Railroad Pass Hotel and Casino – Alternative B (Figure 3-18)
- Photo 2: Resident view from Boulder Oaks RV Park residence – Alternative B (Figure 3-18)
- Photos 3, 4, and 5: Tourist and resident view from fast-food restaurant toward buildings to be removed – Alternative B (Figure 3-19)
- Photo 6: Tourist view from Railroad Pass Hotel and Casino – Alternative C (Figure 3-20)
- Photo 7: Resident view from Boulder Oaks RV Park residence – Alternative C (Figure 3-21)
- Photo 8: Resident view from Ridge Road residence – Alternative C (Figure 3-21)
- Photo 9: Tourist view from Hacienda Hotel and Casino – Alternatives B and C (Figure 3-22)
- Photo 10: Resident view from Forest Lane residence – Alternatives B and C (Figure 3-23)
- Photos 11 and 12: Resident view from Laguna Lane residence – Alternatives B and C (Figure 3-24)
- Photo 13: Resident view from San Felipe Drive residence – Alternative D (Figure 3-25)
- Photo 14: Tourist view from Hacienda Hotel and Casino – Alternative D (Figure 3-26)

**Residents' Existing Views.** Residents are considered to be a sensitive viewer group because of the long-term nature of the proposed action and the sensitivity with which people regard their places of residence. Also considered are that residents have frequent opportunities to experience the views from their homes, and view duration can be fleeting or lengthy (lasting hours). Residents at their single-family, multi-family, mobile home, trailer, and RV residences along Alternatives B, C, and D have views of varying landscapes and quality.

For example, the quality of the view toward existing U.S. 93 from residences within the Boulder Oaks RV Park (Figure 3-18, Photo 1) is considered low. At the other end of the view quality spectrum is the high quality view of Lake Mead currently afforded the residences on Laguna Lane (Figure 3-24, Photos 11 and 12).

**Tourists' Existing Views.** Tourists are considered to be a sensitive viewer group because they generally value and are more aware of the aesthetic quality of their surroundings than commuters or people at work. This is because their focus is usually on their surroundings while they are touring or relaxing. In addition, the recreation activity they are engaging in is usually enhanced by their surroundings.

Tourist views from the parking lot of the Railroad pass Hotel and Casino are shown in Figure 3-18, Photo 1, and Figure 3-20, Photo 6. Tourist views from the parking lot of the Hacienda Hotel and Casino are shown in Figure 3-22, Photo 9, and Figure 3-26, Photo 14. Tourist views from the Alan Bible Visitors Center, also depicting a simulated view of Alternative D, are shown in Figure 4-10.

**Drivers' and Passengers' Existing Views.** Drivers are considered to have lower sensitivity than residents and tourists do because views from the roadway are fleeting and short-term, are obstructed by the vehicle, and drivers' attention is primarily concentrated on maneuvering the roadway. Although passengers have a longer view opportunity than drivers, they are also considered to have low sensitivity due to view obstructions caused by the vehicle, which shortens their view. It is acknowledged that scenic driving for pleasure is a valid recreational activity and the sensitivity of such viewers should not be ignored. However, because of the short view time, the distraction that would occur from traveling in heavy traffic, and the obstructed views within vehicles, these travelers (drivers and passengers) are not considered highly sensitive viewers.

Speeds at the western terminus of the project are 88 km/h (55 mph), decreasing to 56 km/h (35 mph) when traveling through the Boulder City commercial district. Although speeds are relatively low, existing traffic levels (from 31,200 and 32,000 ADT between Buchanan Boulevard and the U.S. 93/95 intersection [NDOT, August 2001a]) require the driver's full attention rather than allowing scenic viewing. At posted speeds, travel time from one end of the alignment to the other end for either Alternative B or C is estimated at approximately 14 minutes; for Alternative D, travel time is estimated at approximately 16 minutes. View time from the vehicle for any of the build alternatives is considered short to moderate, and views of any particular landscape element are considered to be short.

The viewshed from within vehicles sitting higher off the ground, such as commercial trucks, is greater than from passenger vehicles, but it is still of relatively short duration and is also partially obstructed by the vehicle itself.

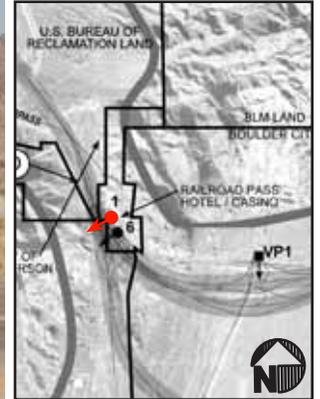


Photo 1: View of existing U.S. 93 looking southwest from the Railroad Pass Hotel and Casino parking lot. This view shows the approximate location where Alternative B crosses U.S.93 and the Hotel/Casino. It also shows the landscape through which Alternative B would be aligned. Currently, this is only an entrance to the Hotel/Casino from U.S. 93.



Photo 2: View of U.S. 93 from the Boulder City Trailer Park, just east of Yucca Street, looking northwest. As shown in the photo, the trailer park is at a lower elevation than the roadway. U.S. 93 would be widened in this area as part of Alternative B. As part of the widening, the vegetation shown in the photo would likely be removed. An 8-foot-high noise barrier would be installed to reduce traffic noise. The removal of the vegetation and the addition of the noise barrier would eliminate views of U.S. 93 from approximately 15 residences.

**FIGURE 3-18**  
**ALTERNATIVE B: PHOTOS 1 AND 2**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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Photo 3: View of a building that may be removed due to realignment of U.S. 93 closer to the building as part of Alternative B.

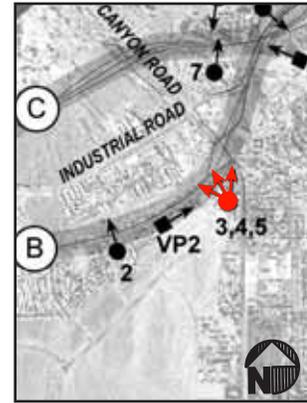


Photo 4: View of a building that may be removed due to realignment of U.S. 93 as part of Alternative B.

Photo 5: View of a building that may be removed (the smaller building to the right side of the tree) due to realignment of U.S. 93 as part of Alternative B.

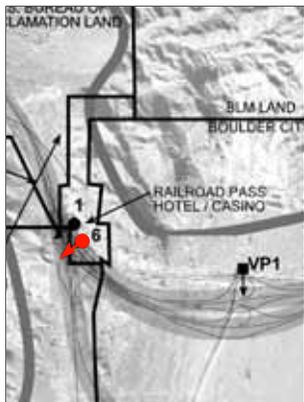


**FIGURE 3-19**  
**ALTERNATIVE B: PHOTOS 3, 4, AND 5**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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Photo 6: View of existing U.S. 93 looking southwest from the Railroad Pass Hotel and Casino parking lot. This view shows the approximate location where Alternative C accesses U.S. 93 and the Hotel/Casino. It also shows the landscape through which Alternative C would be aligned. Currently, this is not an entrance or exit to the Hotel/Casino. This view is similar to that shown in Photo 1; however, this access would be southeast of that shown in Photo 1.



**FIGURE 3-20**  
**ALTERNATIVE C: PHOTO 6**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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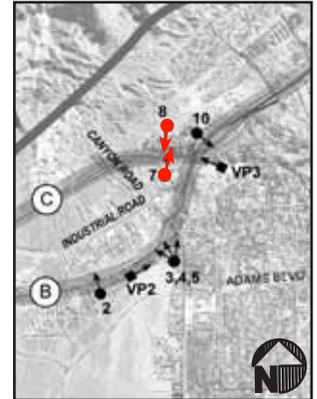


Photo 7: View showing where Alternative C would be aligned looking northeast from the RV residence located at 113 Pelican Way. This residence is within the Boulder Oaks RV Park. The alignment would be elevated and would be located in the undeveloped area between the cinder block wall and the residences in the distance. The residence at the far left in the photo is the residence where Photo 8 was taken. As part of Alternative C, a 10-foot-high noise barrier would be installed to reduce traffic noise. The new elevated roadway and the noise barrier would change the residential and River Mountains view from approximately 25 residences.

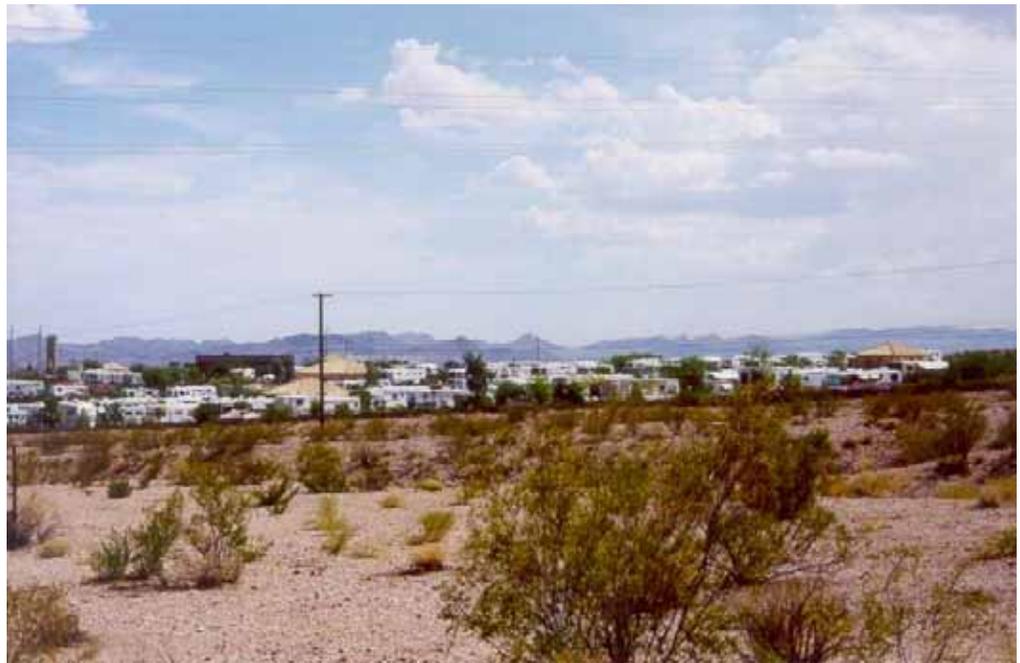


Photo 8: View showing where Alternative C would be aligned looking south from the back yard of a residence located at the dead-end of Ridge Road. The alignment would be located in the undeveloped area shown in the foreground. The RVs shown in the distance are located within the Boulder Oaks RV Park. As part of Alternative C, a 10- to 14-foot-high noise barrier would be installed to reduce traffic noise. This barrier, along with the elevated roadway, would change the view from approximately 20 to 25 residences.

**FIGURE 3-21**  
**ALTERNATIVE C: PHOTOS 7 AND 8**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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Photo 9: View showing the approximate location where Alternatives B and C access U.S. 93 and the Hacienda Hotel and Casino from the east. It also shows the landscape through which Alternatives B and C would be aligned. The access would be aligned approximately through the left side of the photo between the two trucks and would turn left, cutting behind the hill. Access to and from the Hotel/Casino from the west would remain unchanged (from existing U.S. 93). Alternatives B and C would change the view of the mountains from the Hotel/Casino.



**FIGURE 3-22**  
**ALTERNATIVES B AND C: PHOTO 9**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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Photo 10: View of existing U.S. 93 looking southeast from the residence located at 101 Forest Lane. The vehicle shown in the photo is traveling southwest on U.S. 93. Alternative B would result in U.S. 93 being aligned further away from the residences on Forest Lane than it is currently and would require a cut into the hill shown in the photo. Alternative C would move U.S. 93 closer to the Forest Lane residences than it is currently when looking south and would move U.S. 93 away from the Forest Lane residences when looking southeast and east. Alternative C would also require a cut into the hill. Residences atop the hills (see photo) have a view of U.S. 93 and would continue to have a view of either Alternative B or C. With either Alternative B or C, a 14-foot-high noise barrier would be installed to reduce traffic noise. The noise barrier would change the view from the back yards of approximately 6 residences if Alternative B is selected and would change the view from approximately 15 to 20 residences if Alternative C is selected.



**FIGURE 3-23**  
**ALTERNATIVES B AND C: PHOTO 10**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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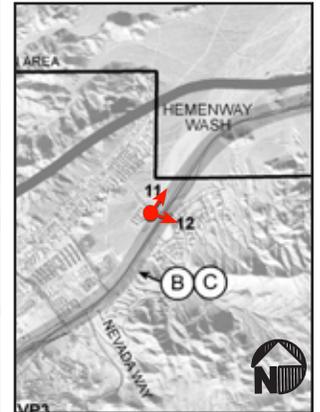


Photo 11: View of Lake Mead from the back yard of the residence located at 100 Laguna Lane looking northeast. The edge of Pacifica Way is seen in the photo as the dark area just below the fencing because Pacifica Way is at a lower elevation than the residences on Laguna Lane. Pacifica Way is an existing two-lane roadway and would be four lanes with either Alternative B or C. Pacifica Way would also be elevated over U.S. 93 to nearly the same elevation as this residence as part of either Alternative B or C. The view of the lake from the back yards of up to five residences on the north side of Laguna Lane would be obstructed when Pacifica Way is elevated as part of either alternative.



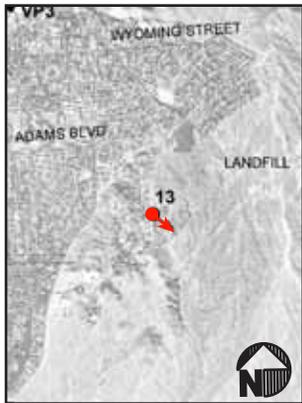
Photo 12: View of existing U.S. 93 from the back yard of the residence located at 100 Laguna Lane looking east. A vehicle is shown on U.S. 93. The dark area just below the fencing is Pacifica Way. With either Alternative B or C, Pacifica Way would be elevated over U.S. 93, eliminating much of the view from this location.

**FIGURE 3-24**  
**ALTERNATIVES B AND C: PHOTOS 11 AND 12**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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Photo 13: View from residential lot that is “for sale” on San Felipe Drive looking southeast toward Alternative D, which would be located approximately 2.4 km (1.5 miles) away. The Boulder City Horsemen’s Association is seen in the foreground, and transmission lines and mountains are seen in the distance. This view is representative of the view afforded to many residences on this hill. This lot is currently undeveloped, but it is planned to be single-family residential. This is the view from the back yard of the future residence. This lot is located across the street from 1426 San Felipe Drive, approximately 0.1 mile south of Cherokee Court.



**FIGURE 3-25**  
**ALTERNATIVE D: PHOTO 13**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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Photo 14: View of Alternative D from approximately 520 feet east of the main entrance to the Hacienda Hotel and Casino looking southeast. This photo shows the approximate location where the new U.S. 93 interchange would be located. It also shows the landscape through which the Alternative D interchange would be aligned.



**FIGURE 3-26**  
**ALTERNATIVE D: PHOTO 14**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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## 3.11 Economic Conditions

### 3.11.1 Study Methodology

A number of methods and sources were used to document the existing economic conditions of Boulder City and to estimate the potential impacts of the different corridor improvement alternatives. These included the following:

An extensive nationwide literature search into numerous studies analyzing the effects of highway bypasses on similar small cities provided comparative data. The literature search included a recent study of the potential impacts of a southern bypass on the Boulder City economy (Borden and Fletcher, 2000).

- The results of an origin and destination study conducted for this project indicated the reasons for travel to, from, and through Boulder City.
- The results of mail-in and telephone surveys, and in-person interviews with local businesses, which yielded information about local businesses' opinions about how various project alternatives might impact their business and the overall climate for business in the city.
- Field surveys and analysis of maps developed for the project documented current accessibility along U.S. 93 and indicated how the proposed alignments might impact existing businesses and the potential for future development.
- Information databases from Dunn & Bradstreet and Prime Prospects Business Directories were combined with business survey results and Internet and published telephone directories to develop a database of businesses in Boulder City. The database was used to estimate employment and sales.
- Demographic, economic, and fiscal statistics were collected from Boulder City and various county, state, and federal agencies. Interviews were held with Boulder City government officials to gain perspective on how the U.S. 93 corridor alternatives might affect city government finances and operations.

### 3.11.2 Existing Conditions

A discussion of project area demographic characteristics, business and economic conditions, and the Boulder City fiscal environment follows.

#### Demographic Characteristics

Table 3-14 displays the population of Boulder City, Clark County, and the State of Nevada. According to the 2000 Census, the population of Boulder City is 14,966, representing an increase of 2,399 persons from 1990. In 2000, the populations of Clark County and the State of Nevada were approximately 1.4 million and 2.0 million, respectively.

**TABLE 3-14**  
Population by Area

Area	Population		Population Change	
	2000	1990	Number	Average Annual Growth 1990-2000
Boulder City	14,966	12,567	2,399	1.8%
Clark County	1,375,765	741,459	634,306	6.4%
State of Nevada	1,998,257	1,201,833	796,424	5.2%

Source: U.S. Census Bureau, 2000.

Boulder City's population has not experienced the rapid growth of Clark County and the State of Nevada due primarily to local growth controls. From 1990 to 2000, Boulder City averaged an annual growth rate of approximately 1.8 percent. Clark County and the State of Nevada, by comparison, experienced average annual growth rates of 6.4 percent and 5.2 percent, respectively. Clark County's rapid growth over the last decade can be attributed largely to growth in the gaming industry and related businesses in and around the Las Vegas Valley.

### Housing Units

Table 3-15 displays the estimated number of housing units for Boulder City and Clark County. In July 2000, the total number of housing units in Boulder City was estimated at 6,304, or 1.1 percent of the Clark County total. Over 61 percent of the housing units in Boulder City were detached single-family units. Secured mobile homes accounted for over 19 percent of the total housing units. In comparison with the rest of Clark County, the Boulder City housing stock includes relatively fewer multi-family units and relatively more mobile home units.

**TABLE 3-15**  
Housing Units

Housing Type	Boulder City	Clark County	Boulder City as Percentage of Clark County
Single-Family, Detached	3,862	286,378	1.3%
Single-Family Attached	834	64,850	1.3%
Secured Mobile Home	1,220	35,375	3.4%
Multi-Family Units	388	171,942	0.2%
Total Housing Units	6,304	558,545	1.1%

Source: Clark County Assessor, 2001.

### Business and Economic Conditions

The regional economy of Clark County is the driving economic force for the State of Nevada. The hotel/gaming, retail, and service sectors are the dominant industries in Clark County and the State of Nevada and are geared towards serving more than 30 million visitors to Las Vegas each year. The rapid population growth in Nevada has been fueled

by the employment opportunities created by the completion of five major hotel/casino establishments the last couple of years in Las Vegas. Many new jobs have also been created in retail and restaurant establishments to serve the growing visitor and resident population.

In 1999, Clark County accounted for nearly 68 percent of all jobs in Nevada and dominated the hotel, gaming, and recreation sector with approximately 77 percent of all jobs in these industries in the State of Nevada. The retail sales activity in Clark County represented approximately 76 percent of the entire State of Nevada's taxable retail sales from June 1999 to June 2000.

The number of businesses and employment data, organized by industrial classification, for Boulder City are presented in Table 3-16. As shown, the Services sector is the largest in Boulder City, providing an estimated 1,860 jobs, or about 37 percent of all jobs in Boulder City. The strength of this sector in Boulder City is consistent with the trend towards a service economy experienced throughout Clark County and the U.S. The next two largest sectors are the Retail Trade and Public Administration industries, accounting for approximately 917 and 844 jobs, respectively.

**TABLE 3-16**  
Boulder City Business Profile

SIC Code	Industrial Classification (SIC Description)	Businesses		Employment	
		Number	Percent of Total	Number	Percent of Total
01-09	Agriculture, Forestry, and Fishing	11	1.4	36	0.7
10-14	Mining	4	0.5	10	0.2
15-19	Construction	91	11.2	350	6.9
20-39	Manufacturing	49	6.0	368	7.3
40-49	Transportation and Public Utilities	38	4.7	245	4.8
50-51	Wholesale Trade	36	4.4	174	3.4
52-59	Retail Trade	156	19.2	917	18.1
60-69	Finance, Insurance, and Real Estate	77	9.5	255	5.0
70-89	Services	331	40.7	1,860	36.8
90-99	Public Administration	20	2.5	844	16.7
	Total	813	100.0	5,057	100.0

Sources: Dunn & Bradstreet, 1999; Prime Prospects, 1999.

Table 3-17 presents a comparison of employment estimates by industry for Boulder City, Clark County, and the State of Nevada. Boulder City businesses account for approximately 0.9 percent of all the jobs in Clark County and 0.6 percent of all of the jobs in the State of Nevada. The Public Administration sector is more concentrated in Boulder City than Clark County or the State of Nevada. Approximately 16.7 percent of the jobs in Boulder City are in the Government sector, while Clark County and the State of Nevada report 10.1 percent and 11.7 percent, respectively. The relatively high concentration of public

sector employees results from Boulder City's historic position as the location for federal government administration of Hoover Dam operations, recreation opportunities in the LMNRA, and various Reclamation activities.

**TABLE 3-17**  
Employment by Sector for Boulder City, Clark County, and the State of Nevada

Industrial Classification (SIC Description)	Boulder City		Clark County		State of Nevada	
	Employment	Percent of Total	Employment	Percent of Total	Employment	Percent of Total
Mining	10	0.2	678	0.1	11,923	1.2
Construction	350	6.9	66,273	10.1	88,688	9.2
Manufacturing	368	7.3	19,906	3.0	42,406	4.4
Transportation and Public Utilities	245	4.8	35,931	5.5	51,421	5.3
Wholesale Trade	174	3.4	21,165	3.2	37,356	3.9
Retail Trade	917	18.1	115,148	17.5	164,311	17.0
FIRE <sup>1</sup>	255	5.0	32,120	4.9	44,151	4.6
Services <sup>2</sup>	1,896	37.5	298,786	45.5	412,100	42.7
Public Administration	844	16.7	66,132	10.1	112,785	11.7
<b>TOTAL<sup>3</sup></b>	<b>5,057</b>	<b>100.0</b>	<b>656,139</b>	<b>100.0</b>	<b>965,141</b>	<b>100.0</b>

Sources: Dunn & Bradstreet, 1999; Prime Prospects, 1999. State of Nevada Department of Employment, Training, and Rehabilitation, 2001.

Notes:

<sup>1</sup> Finance, Insurance, and Real Estate.

<sup>2</sup> Includes agricultural services and firms not elsewhere classified.

<sup>3</sup> Total may not equal summation of industry totals because of rounding.

### Boulder City Fiscal Environment

Revenue sources for Boulder City's General Fund 2001 Budget are shown in Table 3-18. The 2001 budget forecasts revenues of approximately \$14.2 million. The largest source of revenue for Boulder City is sales and use taxes, which are expected to contribute approximately \$6.2 million to the general fund. Other major sources of revenue include fees from the Boulder City golf course, lease payments, and property taxes.

**TABLE 3-18**  
Boulder City Revenue Sources

Revenue Source	Budget 2001	Percent of Total
Property Taxes	\$954,749	6.7
Licenses and Permits	\$510,420	3.6
Consolidated Sales/Use Tax	\$6,209,280	43.6
Fuel Taxes	\$122,000	0.9
Boulder City Municipal Golf Course	\$1,700,000	11.9

**TABLE 3-18**  
Boulder City Revenue Sources

Revenue Source	Budget 2001	Percent of Total
Additional Golf Course Fees	\$212,300	1.5
Other Charges for Services	\$600,000	4.2
Fines and Fees	\$470,000	3.3
Interest on Investments	\$375,000	2.6
Lease Payments	\$1,442,240	10.1
Miscellaneous	\$206,825	1.5
Transfers In	\$1,424,800	10.0
<b>TOTAL REVENUES</b>	<b>\$14,227,614</b>	<b>100.0</b>

Source: Boulder City Finance Department, 2001.

## 3.12 Social Context

### 3.12.1 Study Methodology

The assessment of the social context of the proposed project included a review of U.S. Census data and other available demographic information relating to Boulder City and the surrounding region. The analysis is also based on input provided by local citizens at a series of outreach events hosted by NDOT in January and February 2001, in which the project alternatives were presented and feedback was solicited from the attendees. In addition, field visits were conducted in January and March 2001 to determine the relation of the existing and proposed alignments to existing neighborhoods and other community facilities or municipal services. This analysis is also based on the results of concurrent studies addressing land use, economics, transportation, noise, aesthetics, and other potential impacts that could result in secondary social impacts.

### 3.12.2 Existing Conditions

As the only U.S. highway that provides a continuous route between the Mexican and Canadian Borders, U.S. 93 has become an important corridor for national and international commercial traffic. U.S. 93 also provides regional access to major tourist destinations such as Las Vegas, Hoover Dam, and Lake Mead. Because U.S. 93 also serves as a major east-west arterial for Boulder City, local residents must compete with regional through traffic for use of the roadway. A high crash rate along the alignment can be partially attributed to the conflict between local and nonlocal traffic. In addition, the central location of U.S. 93 within Boulder City tends to create a barrier effect that divides the far northern portion of the city from the southern portion.

Those areas and neighborhoods anticipated to be directly affected by one or more of the project alternatives are noted in Figure 3-27. This figure focuses in on the affected neighborhoods, business areas, and community facilities within 0.5 km (0.25 mile) of the project alignments in Boulder City.

## Regional Characteristics

The proposed project alternatives are located within Clark County, Nevada, one of the fastest-growing counties in the U.S. As shown in Figure 3-28, the population of Clark County grew from 770,280 to 1,425,723 persons between 1990 and 2000. This represents an 85 percent population increase over an 11-year time period. During that same time period, the population of Nevada increased by 67 percent. Recently released Census data estimates the 2000 Clark County population to be 1,375,765, which is 69 percent of the statewide total of 1,998,257. The increased volume of traffic on U.S. 93 is partially attributable to the dramatic increase in the population of the surrounding region.

Demographic characteristics of Clark County, in relation to statewide totals, are provided in Table 3-19. The minority population comprises nearly 30 percent of the 2000 population total for Clark County, which is marginally higher than the statewide proportion of approximately 25 percent. The Hispanic population, which includes persons of all races, is 22 percent of the County total and 20 percent of the statewide total.

**TABLE 3-19**  
State and County Minority Populations

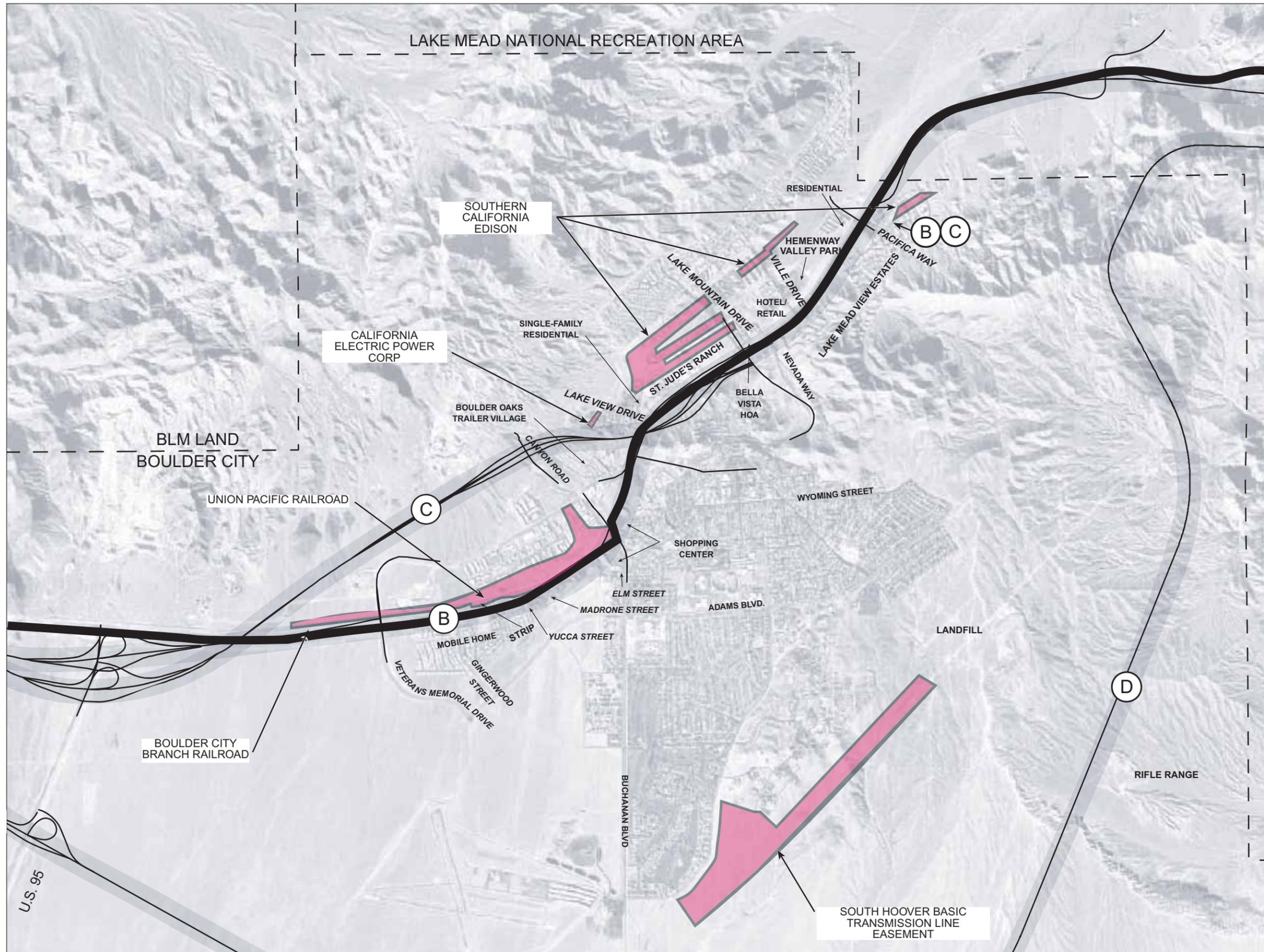
Race	Clark County		State of Nevada	
	Persons	Percent of Total	Persons	Percent of Total
<b>Total Population</b>	<b>1,375,765</b>	<b>100</b>	<b>1,998,257</b>	<b>100</b>
White	984,796	71.6	1,501,886	75.2
Black or African American	124,885	9.1	135,477	6.8
American Indian and Alaska Native	10,895	0.8	26,420	1.3
Asian	72,547	5.3	90,266	4.5
Native Hawaiian and other Pacific Islander	6,412	0.5	8,426	0.4
Some other race	118,465	8.6	159,354	8.0
Two or more races	57,765	4.2	76,428	3.8
<b>Hispanic or Latino (any race)</b>	<b>302,143</b>	<b>22.0</b>	<b>393,970</b>	<b>19.7</b>

Source: U.S. Census Bureau, 2001a

According to the U.S. Department of Commerce, estimated per capita income in Clark County during 1997 was \$26,612. This income level is close to the statewide per capita estimate of \$26,514 (U.S. Department of Commerce, 2001).

## Boulder City

The area known as Boulder City was originally established to house workers during construction of Hoover Dam. During the early to mid 1930s, over 1,500 permanent and temporary buildings accommodated over 4,000 workers. Boulder City was incorporated in 1958 when the federal government passed the Boulder City Act, which created an independent municipal government. Consistent with the legal history while under federal jurisdiction, gaming is illegal per the Boulder City Charter.



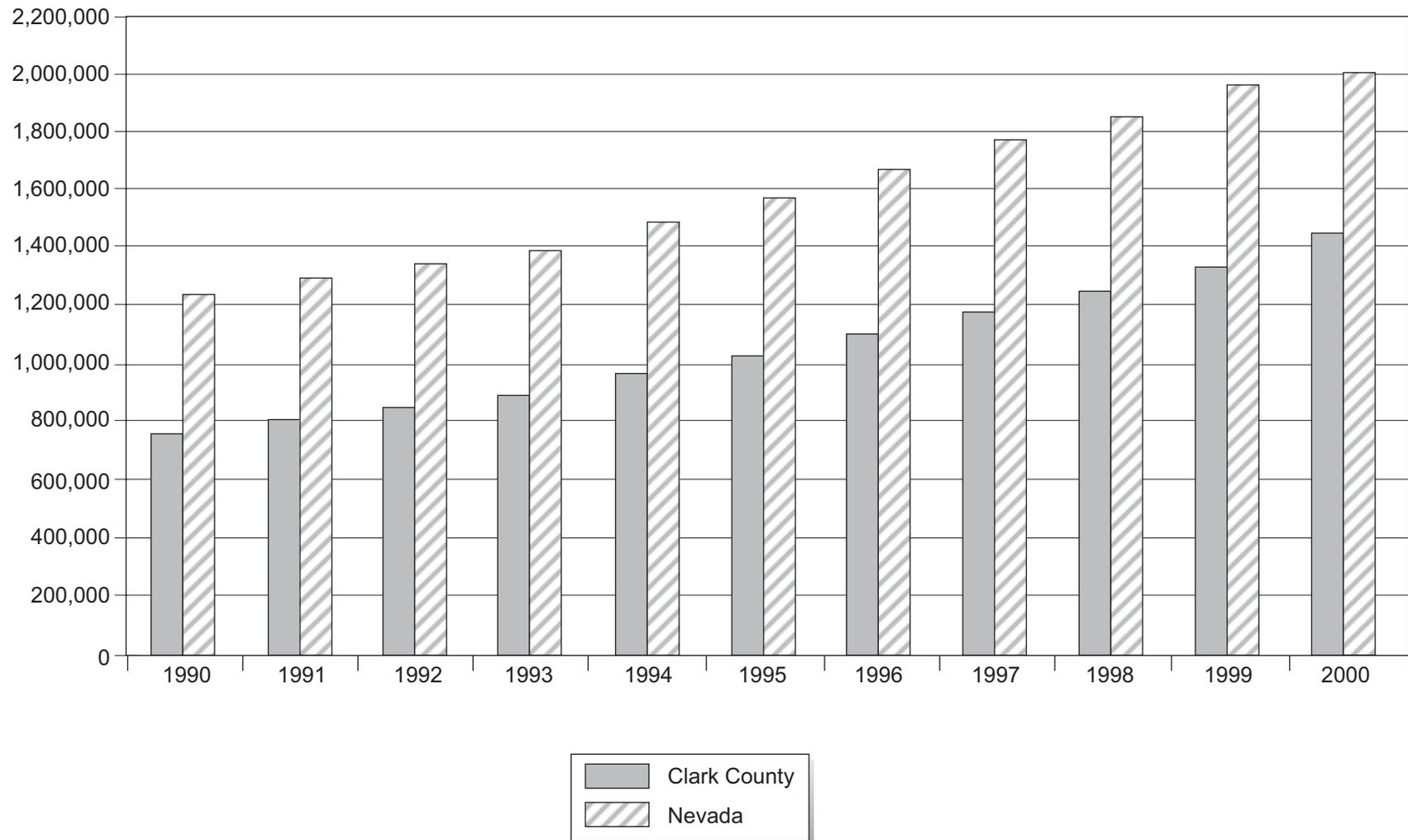
**LEGEND**

- (B) ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C) ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D) ALTERNATIVE D - SOUTHERN ALIGNMENT
- BOULDER CITY UTILITY CORRIDORS
- EXISTING U.S. 93



**FIGURE 3-27**  
**AFFECTED NEIGHBORHOODS**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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SOURCE: NEVADA STATE DEMOGRAPHER, 2001

**FIGURE 3-28**  
**POPULATION ESTIMATES FOR**  
**CLARK COUNTY AND NEVADA**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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The original city limits established in 1958 encompassed an area of approximately 85 km<sup>2</sup> (33 square miles). The developed portion of Boulder City is concentrated almost exclusively in the north-central portion of these limits, within an area of approximately 13 km<sup>2</sup> (5 square miles). In 1995, another 518 km<sup>2</sup> (200 square miles) were acquired by Boulder City and added south of the original city limits. This area is referred to as the Eldorado Valley Transfer Area and is primarily undeveloped open space.

The citizens of Boulder City are active in local political issues, and numerous citizen initiatives have been passed relating to the type, rate, and character of future development in Boulder City. In 1979, an initiative was passed that instituted a controlled-growth ordinance. This ordinance limits the number of new residential units to 120 per year, and the number of new hotel rooms to 35 per year. Since the initiative passed and the ordinance was implemented, population growth has been less than three percent per year. In June 1999, a referendum was placed on the ballot relating specifically to the possible realignment of U.S. 93. Approximately 61 percent of voters approved of an alternate alignment that would be located south of the airport, at least 1.2 km (0.75 mile) from any existing residence in Boulder City. Currently, as part of Boulder City's Strategic Plan, the community is developing the city's image as "Clean and Green" by landscaping various parts of the city and addressing and setting standards for neighborhood maintenance.

### **Census Data**

As of March 2001, the smallest geographic area for which 2000 population and racial/ethnic data is available is the census tract. Detailed demographic information at the block level relating to population, race/ethnic group, age, and income is anticipated to be available in late 2001 and early 2002. Therefore, general population characteristics are derived from 2000 data, with more specific demographic characteristics and neighborhood information based on 1990 census data.

Figure 3-29 provides a breakdown of the Boulder City population by age cohort. As indicated in the figure, more of Boulder City's citizens are between the ages of 5 to 24 than any other age range. However, the percentage of the population in this group is only slightly higher than the 25 to 44 age group. Senior residents age 60 and above represent about one-third of the total population in Boulder City, with the peak senior age group being age 65 and above.

2000 Census data listing the ethnic and racial distribution for Boulder City was published in March 2001 (U.S. Census Bureau, 2001b). The ethnic and racial distribution is provided in Table 3-20. Since 1990, the population of Boulder City has grown by 19 percent to 14,966. The 2000 minority population represents just over five percent of the total, with no individual race category greater than one percent of the total. The Hispanic population, which includes persons of any race, comprises approximately four percent of the total.

**TABLE 3-20**  
2000 Boulder City Race and Minority Profile

Race	Persons	Percentage of Total
Total Population	14,966	100.0
White	14,149	94.5
Black or African American	107	0.7
American Indian and Alaska Native	108	0.7
Asian	107	0.7
Native Hawaiian and other Pacific Islander	24	0.2
Some other race	190	1.3
Two or more races	281	1.9
Hispanic or Latino (any race)	650	4.3

Source: U.S. Census Bureau, 2001b

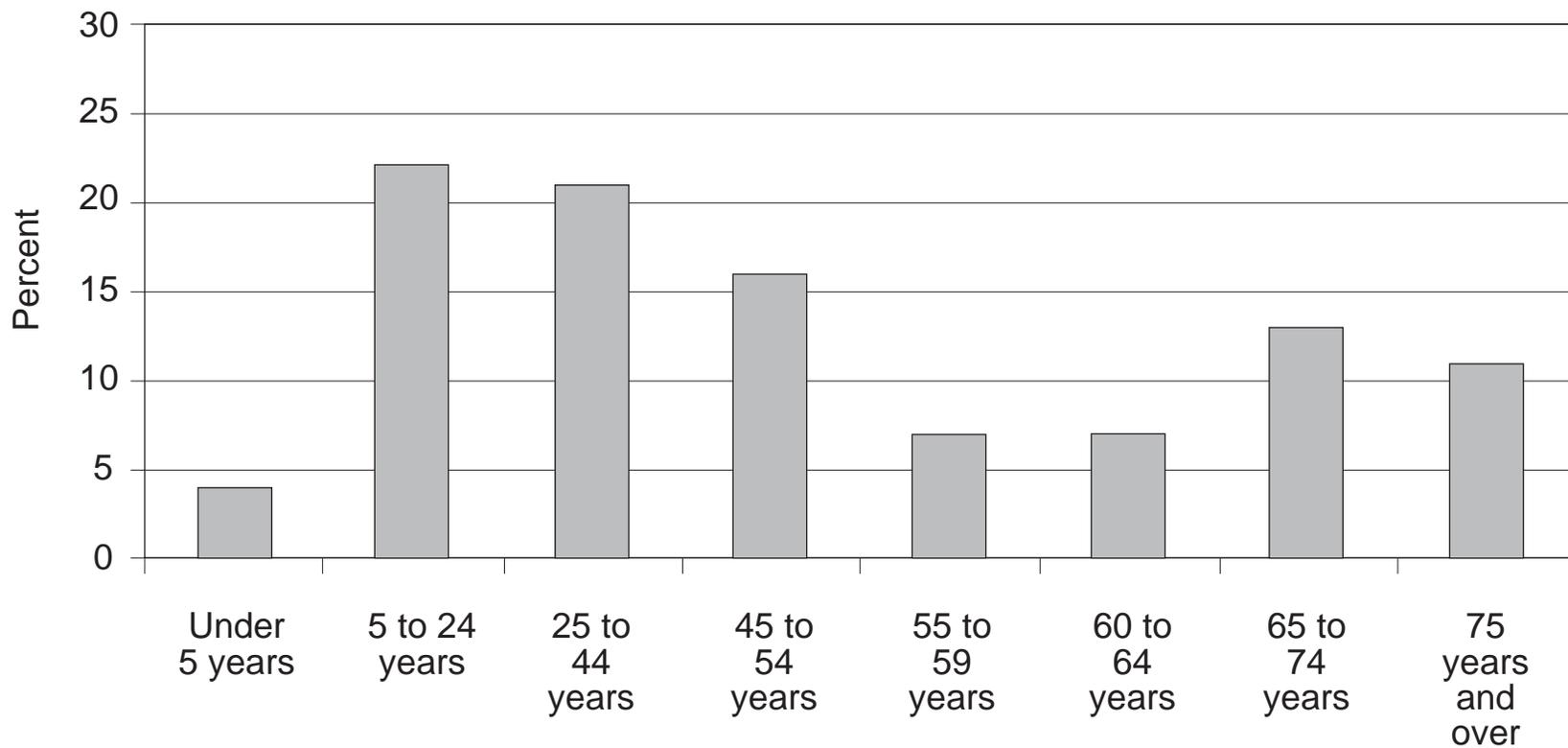
Income data from the 1990 Census indicated that per capita income for Boulder City was \$17,254. Approximately 94 percent of all families in Boulder City were above the poverty level.

### Alternative B

Beginning at the western project limits, Alternative B traverses primarily vacant lands, with the exception of the hotel and casino development located west of the Boulder City limits. Within Boulder City, a residential neighborhood south of U.S. 93 extends for approximately 1.2 km (0.75 mile), beginning just east of Veterans Memorial Drive. The several hundred mobile home units within this neighborhood are located a minimum of 30 m (100 ft) south of the existing U.S. 93 alignment, with the exception of a row of homes between Yucca Street and Madrone Street. Block-level Census data from 1990 indicates that close to half of the population in this neighborhood is age 65 or over.

Between Veterans Memorial Drive and Buchanan Boulevard, a business district consisting of commercial and retail strip development is located directly adjacent to U.S. 93. These businesses serve a mix of local residents and customers driving through Boulder City. Several of these establishments can be classified as small businesses, with annual revenues estimated at less than \$500,000 per year (Dunn & Bradstreet, 1999). Large retail shopping centers are located at the northeast and southwest quadrants of the intersection of Buchanan Boulevard and U.S. 93, each of which includes a major grocery retailer.

East of Buchanan Boulevard, U.S. 93 runs south of two distinct residential areas. The first is a development located off of Industrial Road, known as the Boulder Oaks RV Park. This development includes over 200 occupied RVs. Immediately northeast of the Boulder Oaks RV Park is an established residential neighborhood located off of Lakeview Drive. This area contains fewer than 100 detached single-family homes. A review of 1990 block-level Census data indicated that approximately 98 percent of the population in these areas is classified as White, with less than 2 percent Hispanic, and approximately one-third age 65 or over.



**FIGURE 3-29**  
**BOULDER CITY POPULATION**  
**DISTRIBUTION 2000 CENSUS**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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East of Lakeview Drive, U.S. 93 enters the Hemenway Wash area. The area north of the alignment is characterized primarily by newer residential development, including primarily single-family detached homes with some multi-family development. In addition, the St. Jude's Ranch for Children is located directly north of the alignment. This property includes a school, church, and residences. The neighborhood represented by the Bella Vista Homeowners Association is located east of St. Jude's at Lake Mountain Drive and includes a mix of single-family and multi-family developments.

South of U.S. 93, the Lake Mead View Estates extends for approximately 1.5 km (1 mile) east of Nevada Way. Several lots within this residential subdivision are located directly adjacent to U.S. 93. North of this area, a hotel, retail development, and the Hemenway Park are located off Ville Drive. The easternmost residential area along the alignment occurs north of U.S. 93 at Pacifica Way and includes approximately 50 residential units.

The area of Boulder City traversed by Alternative B has been affected by past improvements made to U.S. 93. In the late 1970s, traffic growth and demand exceeded the capacity of the highway, which at that time ran through the heart of the historic commercial district and is now known as Nevada Way. In order to remedy its capacity constraints, U.S. 93 was widened from two to four lanes. Several years later, in 1982, an Environmental Assessment was completed, and the construction of a truck bypass was approved. The truck bypass, which is part of the current alignment through Hemenway Wash, was constructed to remove truck traffic from the heart of the downtown commercial district.

### **Alternative C**

Alternative C traverses primarily vacant land from the western terminus to the proposed interchange at the future extension of Canyon Road, with the exception of the hotel and casino development near the western terminus. No residential neighborhoods, business districts, or community facilities are within 0.5 km (0.25 mile) of this segment of the alignment, and none are planned to be developed within this area prior to construction of the proposed project.

East of the proposed interchange with Canyon Road, Alternative C would traverse a vacant strip of land located directly between two residential areas, the Boulder Oaks RV Park and the residential neighborhood located off Lakeview Drive, which are described under Alternative B. East of Lakeview Drive, the alignment merges with existing U.S. 93. Potentially affected areas along U.S. 93 from this point to the eastern terminus are described in Alternative B.

### **Alternative D**

Alternative D, the preferred alternative, is located approximately 1.2 km (0.8 mile) from any neighborhood or business district within Boulder City. Outside of Boulder City, this alignment traverses predominantly vacant federal land, with the exception of the hotel and casino development near the eastern and western project limits.

## 3.13 Environmental Justice

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February 11, 1994), requires federal agencies to make the achievement of environmental justice part of their mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The EO further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participating in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin.

This environmental justice analysis examines the extent to which readily identifiable groups of minority or low-income populations occur in or immediately adjacent to the various alternatives for the proposed project. What is considered here is whether or not the nearby populations have historically received a disproportionate share of projects and land uses that have had an adverse effect on the surrounding environment; and/or would receive a disproportionate and high level of adverse environmental impacts as a result of the proposed project.

### 3.13.1 Study Methodology

Implementing EO 12898 requires determining if high and adverse impacts would fall disproportionately in minority or low-income populations. In general, the process to integrate environmental justice into the NEPA process involves the following steps:

- Determine if minority/low-income populations exist within the impact zone
- Determine if there are adverse effects
- Determine if adverse effects fall disproportionately on minority or low-income populations
- If there are adverse effects, avoid, mitigate, or explain the impact and demonstrate that there is no feasible, practicable alternative

The assessment of environmental justice impacts resulting from the proposed project included a review of U.S. Census data and other available demographic information relating to Boulder City and the surrounding region. The analysis is also based on input provided by local citizens at a series of outreach events hosted by NDOT in January and February 2001. This analysis is also based on a field review of the location for the project alternatives and on the results of concurrent studies addressing land use, economics, transportation, noise, aesthetics, and other potential impacts that could contribute to environmental justice impacts.

### 3.13.2 Regulatory Standards/Criteria

Pursuant to Section 101 of EO 12898, a project would have an adverse effect on environmental justice if it has a "disproportionately high and adverse human health or environmental effect" on "minority and low-income populations." The Presidential Memorandum that accompanied EO 12898 states that a NEPA document should

include analysis of “effects in minority communities and low-income communities” (Subsection 5-5c). Neither the EO nor the Presidential Memorandum specifically defines the terms “disproportionately high and adverse human health and environmental effects,” “minority,” “low-income,” or “populations/communities;” and there is no single definition of what constitutes low-income or minority population or community. The CEQ and other agencies have issued guidance on complying with the EO, including recommended definitions. Specifically, FHWA Order 6640.23 on Environmental Justice establishes policies and procedures to use in complying with EO 12898. The definitions used in this analysis are discussed below.

### **Disproportionately High and Adverse Human Health and Environmental Effects**

For the purposes of this analysis, a determination of disproportionate and high adverse human health and environmental effects is based on the frequency of impact. If the potential impact occurred in a minority or low-income population/community with a greater frequency than the population/community with which it is being compared, the impact would be considered to be disproportionate and, therefore, adverse.

### **Low-Income and Minority Populations and Communities**

EPA defines a low-income population/community as, “a jurisdiction (i.e., census tract) having an aggregated mean income level for a family of four that corresponds to the state’s standard for average low-income level” (EPA, 1994). The income qualifications for receiving public assistance from programs such as Aid to Families with Dependent Children (AFDC), food stamps, and Medicaid could also be considered to define a low-income population group. The Department of Housing and Urban Development (HUD) has standards that identify a low-income household as one with a family income of 80 percent or less of the county median. For the purposes of this document, a low-income household is defined as one with a family income of 80 percent or less of the Clark County median.

According to the White House Office of Environmental Justice, a “minority” means individuals classified by Office of Management and Budget Directive No. 15 as Black/African American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other nonwhite persons. The White House Office indicates that for a population to be classified as minority, the minority composition should either exceed 50 percent of, or be meaningfully greater than, the minority population percentage in the general population or other unit of geographic analysis. Further, the appropriate unit of geographic analysis may be a governing body’s jurisdiction, a neighborhood, a census tract, or other similar unit. This analysis uses block groups as the geographic analytical unit because ethnic/racial composition data are readily available from the 2000 Census.

### **Effects on Low-Income and Minority Populations and Communities**

In the absence of specific federal guidance or criteria, the following adverse effect criterion has been developed:

The project would have a disproportionately high, adverse health impact to minority and low-income populations if such an impact occurs with greater frequency for these populations than for the general population as a whole.

### 3.13.3 Existing Conditions

The highest concentration of people along the project corridor is located in Boulder City, Nevada. No one currently lives outside the city limits along U.S. 93.

#### Minority Populations

According to the 2000 Census of Population and Housing, the population of Boulder City is 14,966, representing an increase of 2,399 persons from 1990. This represents an annual growth rate of 1.9 percent. By comparison, Clark County and the State of Nevada experienced average annual growth rates of 8.5 percent and 6.6 percent, respectively. The small growth rate for Boulder City is due primarily to local growth controls. In contrast, Clark County's rapid growth over the last decade can be attributed largely to growth in the gaming industry and related businesses in and around the City of Las Vegas. Table 3-21 displays the populations of the State of Nevada, Clark County, Boulder City, and census tracts within the proposed project area.

**TABLE 3-21**  
Population by Area

Area	Population		Population Change	
	2000	1990	Number	Average Annual Growth 1990-2000 (%)
State of Nevada	1,998,257	1,201,833	796,424	6.6
Clark County	1,375,765	741,459	634,306	8.5
Boulder City	14,966	12,567	2,399	1.9
Tract 55.01	4,365	2,604	1,761	6.7
Tract 55.02	4,091	3,773	318	0.8

Source: U.S. Census Bureau, 2000

Population characteristics for the various racial and ethnic categories for Boulder City, Clark County, and the State of Nevada are presented in Table 3-22. According to the 2000 Census data, approximately 95 percent of the population of Boulder City are white. Persons of two or more races and other races account for 1.9 percent and 1.3 percent of the population, respectively. Approximately 4.3 percent of the population of Boulder City are persons of Hispanic or Latino origin, who may be of any race.

The populations of Clark County and the State of Nevada as a whole are more diverse than the population of Boulder City. The populations of the County and State are 71.6 percent and 75.2 percent white, respectively, compared to 94.5 percent for Boulder City. There are larger populations of African American and Asian persons in the County and the State when compared to Boulder City. The County and the State also have a higher percentage of persons of Hispanic or Latino origin than Boulder City.

**TABLE 3-22**  
2000 Ethnic/Racial Distribution for Project Area

Race	Boulder City		Clark County		State of Nevada	
	Persons	Percent of Total	Persons	Percent of Total	Persons	Percent of Total
<b>Total Population</b>	<b>14,966</b>	<b>100.0</b>	<b>1,375,765</b>	<b>100.0</b>	<b>1,998,257</b>	<b>100.0</b>
White	14,149	94.5	984,796	71.6	1,501,886	75.2
Black or African American	107	0.7	124,885	9.1	135,477	6.8
American Indian and Alaska Native	108	0.7	10,895	0.8	26,420	1.3
Asian	107	0.7	72,547	5.3	90,266	4.5
Native Hawaiian and other Pacific Islander	24	0.2	6,412	0.5	8,426	0.4
Some other race	190	1.3	118,465	8.6	159,354	8.0
Two or more races	281	1.9	57,765	4.2	76,428	3.8
Hispanic or Latino (any race)	650	4.3	302,143	22.0	393,970	19.7

Source: U.S. Census Bureau, 2000

The ethnic/racial distribution of the two census tracts of Boulder City is shown in Table 3-23. The location of these census tracts and block groups (see below) in relation to the project area is depicted in Figure 3-30. The racial/ethnic character of each census tract is similar to the other, as well as to that of Boulder City (shown above in Table 3-22). The percentage of whites in census tracts 55.01 and 55.02 are 95.5 and 94.5 percent, respectively. Similarly, the percentage of whites in Boulder City is 94.5 percent. As with the white population, the percentage of the Black/African American population does not vary significantly between the two census tracts. Tract 55.01 is made up of 1.1 percent Black or African American, and tract 55.02 is made up of 0.5 percent.

**TABLE 3-23**  
2000 Ethnic/Racial Distribution for Project Area Census Tracts

Race	Tract 55.01		Tract 55.02	
	Persons	Percent of Total	Persons	Percent of Total
<b>Total Population</b>	<b>4,365</b>	<b>100.0</b>	<b>4,091</b>	<b>100.0</b>
White	4,167	95.5	3,864	94.5
Black or African American	46	1.1	20	0.5
American Indian and Alaska Native	29	0.7	32	0.8
Asian	29	0.7	35	0.9
Native Hawaiian and other Pacific Islander	8	0.2	6	0.1
Some other race	38	0.9	60	1.5
Two or more races	48	1.1	74	1.8
Hispanic or Latino (any race)	138	3.2	170	4.2

Source: U.S. Census Bureau, 2000

As shown in Table 3-24, the population within each census tract is subdivided into five smaller units called block groups. Table 3-24 contains block group level data from the 1990 Census, as 2000 Census block level data is currently unavailable. However, the ethnic/racial character for the census tracts did not vary significantly from 1990 to 2000. For example, in 1990 the population in census tract 55.01 was 95 percent white, 0.6 percent Black, and 3 percent Hispanic or Latino; while the percentages for the same tract in 2000 were 95.5 percent white, 1.1 percent Black, and 3.2 percent Hispanic or Latino. Therefore, it is assumed that the block group data for 2000 will be similar to that of 1990.

**TABLE 3-24**  
1990 Ethnic/Racial Distribution for Project Area Block Groups

<b>Census Tract and Block Group</b>	<b>White (%)</b>	<b>Black (%)</b>	<b>American Indian (%)</b>	<b>Asian and Pacific Islander (%)</b>	<b>Other Race (%)</b>	<b>Hispanic Origin (%)</b>
Census Tract 55.01	95	0.6	0.4	1	0	3
Block Group 1	95	1	0.3	1.3	0	2.4
Block Group 2	95.3	0	0.6	0.8	0	3.3
Census Tract 55.02	95	0.4	0.8	0.7	0.05	3
Block Group 1	95	0.4	0.7	0.7	0.06	3.3
Block Group 5	95	0.2	1	1	0	2.7

Source: U.S. Census Bureau, 2001b

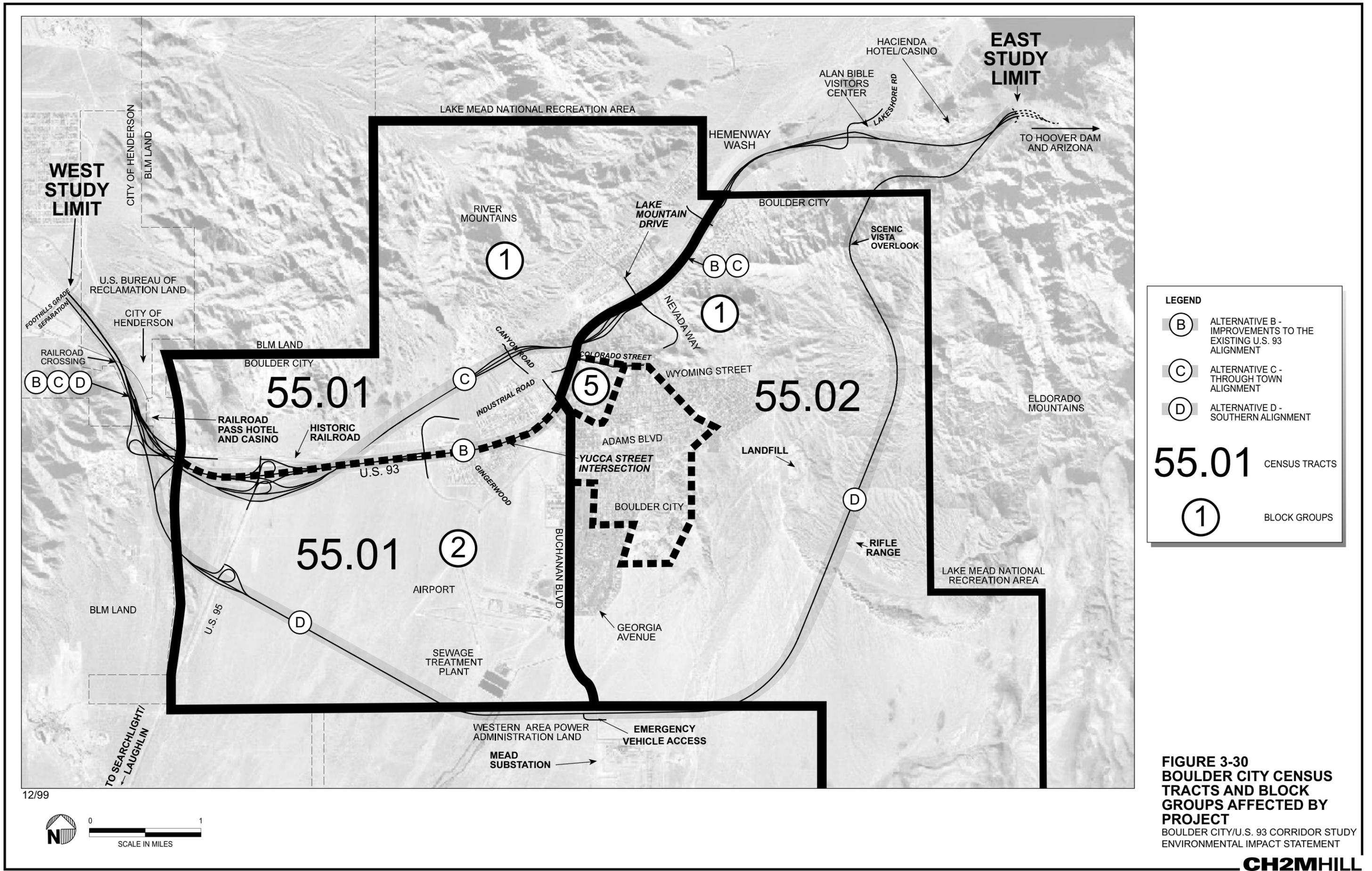
### Low-Income Populations

HUD defines a low-income population as having a family income of 80 percent or less of the county median. Table 3-25 lists the median family income of each geographic area relevant to the proposed project, from state to block group. It also compares the median incomes for Boulder City, census tracts 55.01 and 55.02, as well as their respective block groups, to that of Clark County. This comparison is displayed in the form of a percentage, which can be used to determine if a geographic area is low income, as defined by HUD. Please note that the data in Table 3-25 contains data from the 1990 Census, as 2000 Census block level data are currently unavailable. However, because the ethnic/racial character for the census tracts did not vary significantly from 1990 to 2000, it is assumed that income and poverty data would similarly not vary significantly.

**TABLE 3-25**  
1989 Median Family Income

<b>Geographic Area</b>	<b>Median Family Income</b>	<b>Percentage of County Median</b>
Clark County	\$35,172	–
Boulder City	\$40,414	115
Census Tract 55.01	\$31,989	91
Block Group 1	\$46,094	131
Block Group 2	\$25,530	73
Census Tract 55.02	\$47,642	135
Block Group 1	\$51,808	147
Block Group 5	\$29,833	85

Source: U.S. Census Bureau, 2001b



**FIGURE 3-30**  
**BOULDER CITY CENSUS TRACTS AND BLOCK GROUPS AFFECTED BY PROJECT**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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In 1989, the most recent year for which income data are available, the median family income for Clark County was \$35,172. The median family income for census tracts 55.01 and 55.02 was \$31,989 and \$47,642, respectively. In comparison, census tract 55.01 was 91 percent of the county median family income, and census tract 55.02 was 135 percent of the county median. Both census tracts were well above the 80 percent threshold determined by HUD as the indicator of a low-income household. Of the block groups within the project area, one was considered low income using the HUD definition.

Block group 2 within census tract 55.01 was 73 percent of the county median family income in 1989. At that time, roughly 67 percent of the population in this area was over the age of 55. A sample of this population demonstrated that 90 percent of this age group grossed less than the county median for that particular year. Of this sample, 70 percent collected Social Security Income (SSI), and 40 percent lived off of their retirement income.

Therefore, this block group meets the criteria for being considered low income, according to HUD.

## 3.14 Bicycles/Pedestrians

Current or planned pedestrian and bicycle facilities or indications of use in Boulder City, Nevada, and the surrounding area must be identified, pursuant to FHWA Technical Advisory 6640.8A. This section discusses the current and anticipated use of these facilities in the Boulder City/U.S. 93 Corridor project area.

### 3.14.1 Study Methodology

The process to examine pedestrian and bicycle impacts was completed as follows:

- Collect information regarding existing and planned pedestrian and bicycle facilities from the local, state, and federal agencies
- Identify specific citizen concerns
- Consider traffic patterns and the projected traffic volumes for each of the alternatives
- Conduct a site investigation to document existing facilities within the identified alternative alignments and locate land uses or community activities that would contribute to the use or nonuse of such facilities
- Consider the relationship between bus transit routes and stops, and pedestrian and bicycle needs

### 3.14.2 Regulatory Requirements and Planning Objectives

The following regulatory standards and criteria are relevant to the analysis of impacts to bicycle/pedestrian resources:

- Title 23 of the U.S.C. requires that a reasonable alternative route(s) be identified if an alternative severs a major existing nonmotorized transportation traffic route (23 U.S.C. 109[n]).

- FHWA N5040.38 *Design of Pedestrian Overpass and Underpass to Accommodate the Handicapped* requires the design of pedestrian grade-separated crossings to accommodate accessibility for the physically handicapped and bicycle traffic, where warranted.
- The Nevada Revised Statutes state that all bicycles are to be legally operated on all Nevada roads with the exception of limited-access corridors (typically freeways).

Furthermore, the 1991 Boulder City Master Plan contains several goals and objectives reinforcing the importance of pedestrian, bicycle, and alternate modes of transportation for the city. Goal 5 of the Master Plan is entitled *Transportation Element* and states that the city shall "...develop and maintain balanced road and circulation systems that will provide for the safe and efficient movement of people and goods to, from, and within the community and area." The following objectives are listed for the completion of this goal:

- Objective 5.1.2: Support the completion of the extension of the East-West Expressway
- Objective 5.1.3: Support transit planning that would link Boulder City to the existing and planned transit system in the Las Vegas Valley
- Objective 5.5: Encourage the development of alternative modes of transportation
- Objective 5.5.1: Promote the establishment of a bicycle route throughout the community, where feasible

### **3.14.3 Recreational Trail System**

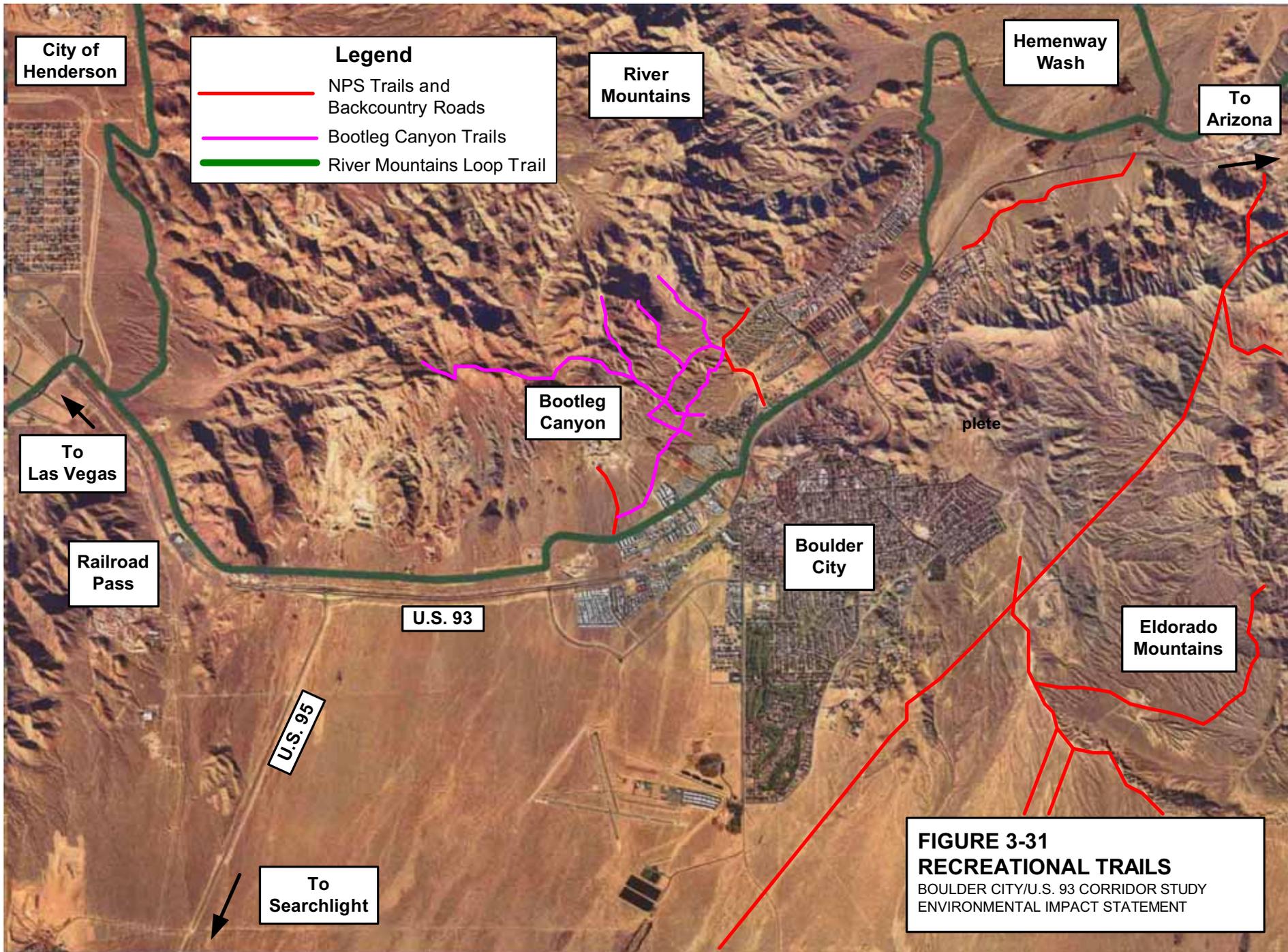
The project area contains multiple recreational trails and established NPS backcountry roads that could potentially be impacted by the build alternatives in this study. Those trails are described in the following sections.

#### **River Mountains Loop Trail**

The River Mountains Loop Trail is a partially complete, approximately 50-km (30-mile) multiuse path that has been designed to encircle the River Mountains, LMNRA, Boulder City, and City of Henderson (Figure 3-31). Once completed in 2004, the trail will serve as a link for these communities, as well as linking these communities to nearby recreational facilities. Upon completion, this trail will provide a continuous pedestrian and bicycle path within the project area (i.e., from the western to eastern study limits) and help alleviate the current pedestrian/bicycle access problems within portions of the project area.

#### **NPS Backcountry Roads and Trails**

NPS has designated a number of gravel roads in the project area as approved backcountry roads of LMNRA (Figure 3-31). These roads and trails are in continuous usage for such recreational activities as hiking, equestrian activities, and four-wheel vehicle use. As such, NPS places a high priority on maintaining access to these roads and trails, especially the Gold Strike Canyon trailhead, which is near the eastern study limits of the project.



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## Mountain Bike Trails

The Bootleg Canyon Trails is a large and well used mountain bike trail system north of Boulder City within the River Mountains (see [www.bootlegcanyon.com](http://www.bootlegcanyon.com)). The detention basin located at the base of the River Mountains near the end of Canyon Road is also the location of a yearly motorbike race. Due to the high level of usage on these trails, maintaining access to these trails is critical.

### 3.14.4 Bicycle and Pedestrian Facilities

Boulder City was established in the 1930s to support the construction of Hoover Dam by Reclamation. Evidence in historical records shows that bicycle and pedestrian facilities in both residential and commercial areas of Boulder City were part of the original construction plan, and some are still present today. Existing pedestrian and bicycle routes are located along arterial roadways throughout the Boulder City community, linking neighborhoods with major destinations within the city (Figure 3-32). Future facilities, also shown in Figure 3-32, are planned in order to connect neighborhoods and to promote linkage in anticipation of development. Figure 3-32 represents the current and approved bicycle and pedestrian facilities as shown in the RTC RTP. The RTP has subsequently been incorporated into a statewide bicycle plan. Some new landscape-lined pedestrian and bicycle paths will be located off existing streets to encourage the use of these safer facilities. The following sections provide a brief detail of bicycle and pedestrian facilities in segments along existing U.S. 93 within the project area.

#### Western Study Limits to Railroad Pass Hotel and Casino

From the Foothills grade separation at the western study limits to the Railroad Pass Hotel and Casino, pedestrians and bicyclists currently must use the shoulder of U.S. 93 for travel. Along this stretch of roadway the shoulder on both sides is approximately 3 m (10 ft) wide, but it contains 0.5-m-wide (2-ft-wide) rumble strips, which bicyclists do not like to travel on. The placement of these strips essentially narrows the width of the shoulder along which bicyclists can travel.

Access to Railroad Pass Hotel and Casino for pedestrians and bicyclists traveling east is difficult, as eastbound vehicular traffic along U.S. 93 does not stop at the Railroad Pass Hotel and Casino traffic signal, and left-turn traffic from the hotel periodically enters the eastbound flow. Because of the continuous eastbound movement, pedestrians and bicyclists wishing to access the hotel from eastbound U.S. 93 must jaywalk across the intersection.

The future River Mountains Loop Trail, discussed above in Section 3.14.3, is partially completed within this portion of the project limits. Upon completion, this trail will not only provide a path from Foothills Road to the area immediately behind the Railroad Pass Hotel and Casino, but it will also help to alleviate the existing problematic conditions for pedestrians and bicyclists in the area.

#### Railroad Pass Hotel and Casino to Veterans Memorial Drive

From the Railroad Pass Hotel and Casino to Veterans Memorial Drive, there is no dedicated pedestrian or bicycle facility. Instead, pedestrians and bicyclists must use the shoulder of U.S. 93 for travel. Additional challenges for bicycles and pedestrians along this portion of U.S. 93 include:

- Vehicular traffic typically moves at freeway speeds along U.S. 93 from the Railroad Pass Hotel and Casino to Veterans Memorial Drive;
- The lack of traffic signals along this segment of roadway;
- Rumble strips along the shoulder in this segment, which decrease the travel width for bicyclists to only a few feet; and
- The only point of entry or exit to U.S. 93 is through the U.S. 93/95 interchange.

A pedestrian and bicycle path has been proposed that would connect the Railroad Pass Hotel and Casino area and Veterans Memorial Drive to the River Mountains Loop Trail. The construction of this section of the trail has been funded with a Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) grant, and construction of this segment of the loop trail is set to begin in 2001 upon completion of the Southern Nevada Water Authority (SNWA) water line installation parallel to this segment of the trail.

### **Veterans Memorial Drive to Buchanan Boulevard**

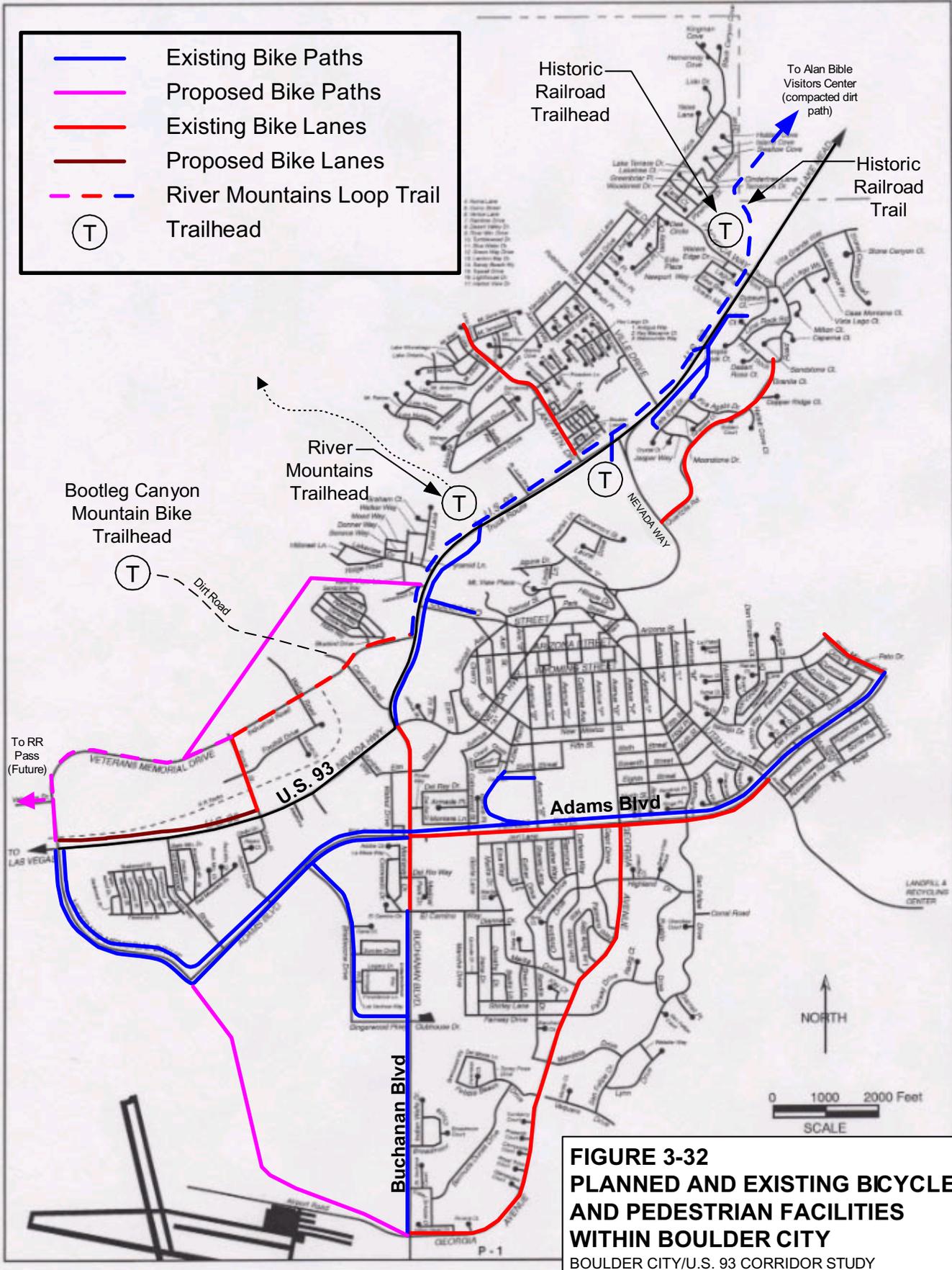
The signalized intersection at U.S. 93 and Veterans Memorial Drive is essentially the western edge of the Boulder City commercial corridor. Along this commercial segment of roadway, sidewalks have been constructed on the south side of U.S. 93 from approximately 600 m (2,000 ft) east of Veterans Memorial Drive (Gingerwood Street) and on the north side of U.S. 93 from approximately 800 m (2,600 ft) east of Veterans Memorial Drive. These sidewalks extend on both sides of the road to Buchanan Boulevard.

Bicycle access is proposed along U.S. 93 from Veterans Memorial Drive to Yucca Street (Figure 3-32), which would connect to an existing bicycle lane system that extends north along Yucca Street, then east-west on Veterans Memorial Drive and Industrial Road, connecting to Hemenway Valley. The construction of this proposed bicycle lane would produce a continuous bicycle lane from the Veterans Memorial Drive intersection with U.S. 93 to the Industrial Road/U.S. 93 intersection, allowing for better bicycle circulation in Boulder City. The Adams Boulevard Bike Paths are currently in place in the southern portion of the same area (Figure 3-32), which allows for increased circulation within that area of Boulder City.

An alternate path will be available for pedestrians and bicyclists upon completion of this portion of the River Mountains Loop Trail. The trail will produce an additional link from the Veterans Memorial Drive/U.S. 93 intersection to Hemenway Valley. Boulder City has submitted an application for TEA-21 funds to relocate this segment of the trail to the north, providing for a safer and more scenic trail.

There are no formal crossings between the neighborhoods and businesses along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard, except at the Buchanan Boulevard/U.S. 93 intersection. This lack of crossings has resulted in pedestrians attempting to cross the often-congested highway when there is a gap in the traffic. This situation has led to 2 pedestrian fatalities in the last 10 years.

- Existing Bike Paths
- Proposed Bike Paths
- Existing Bike Lanes
- Proposed Bike Lanes
- River Mountains Loop Trail
- T Trailhead



**FIGURE 3-32**  
**PLANNED AND EXISTING BICYCLE**  
**AND PEDESTRIAN FACILITIES**  
**WITHIN BOULDER CITY**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

Source: "Summary of Bike Travelways" City of Boulder City. June 1999.

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### **Buchanan Boulevard to Industrial Road**

There is a pedestrian sidewalk on the east side of U.S. 93 between Buchanan Boulevard and Industrial Road. The west side of the road, however, has no sidewalk and only a few feet of shoulder for bicyclists. This limits pedestrian and bicycle access to the Albertson's shopping center on the east side of U.S. 93 at Buchanan Boulevard. As a result, residents of the Boulder Oaks RV Park (located on the west side of U.S. 93 north of Industrial Road) who walk to the shopping center are forced to either jaywalk across U.S. 93 at Industrial Road to use the sidewalk, or walk along the U.S. 93 shoulder to the Buchanan Boulevard intersection with U.S. 93 where the crosswalk is located. Without mitigation, increased traffic on U.S. 93 will make this pedestrian access point more difficult.

### **Industrial Road to River Mountains Trailhead**

The sidewalk on the east side of U.S. 93 continues up to a multiuse crossing of the existing highway at the River Mountains Trailhead. Surfaces vary between asphalt and concrete to provide pedestrian access to Colorado Street. North of Colorado Street, the sidewalk also serves as a drainage channel, which conveys stormwater to the multiuse crossing. This pedestrian tunnel also conveys surface runoff underneath the highway and into the Hemenway Wash channel, which is also a multiuse drainage facility and pedestrian/bicycle path (part of the River Mountains Loop Trail).

North of Industrial Road on the west side of U.S. 93, there is a 3-m-wide (10-ft) paved, 2-lane pedestrian and bicycle facility located a distance away from the road, which is part of the River Mountains Loop Trail. The facility ends at the River Mountains Trailhead, merging with the concrete-channel dual-use crossing.

### **River Mountains Trailhead to Pacifica Way**

The River Mountains Loop Trail dual-use concrete channel connects neighborhoods along U.S. 93 in this segment. The trail surfaces vary between dirt, gravel, and concrete as it runs parallel to and set back from the highway. From the crossing at the River Mountains Trailhead through the remainder of the descent down Hemenway Wash, there is no sidewalk on the right side of U.S. 93; however, there are dual-use crossings similar to the tunnel found at the River Mountains Trailhead where pedestrians and bicyclists can cross under U.S. 93 and gain access to the River Mountains Loop Trail.

### **Pacifica Way to Eastern Study Limits**

Pacifica Way essentially represents the end of the Boulder City limits along existing U.S. 93. The River Mountains Loop Trail continues past the city boundary as a dual-use drainage facility (Hemenway channel) and pedestrian/bicycle path a few hundred meters north of Pacifica Way, then abruptly ends in a small detention basin. However, on the other side of this basin, the loop trail continues in the form of a compacted dirt path, leading to the Alan Bible Visitors Center (Figure 3-31).

Approaching the Alan Bible Visitors Center, the River Mountains Loop Trail meets up with the Historic Railroad Trail, which passes behind both the visitors' center and the Hacienda Hotel and Casino to the eastern study limits. In 1996, NPS, Reclamation, and

Boulder City applied for and received an Intermodal Surface Transportation Efficiency Act (ISTEA) grant for the extension of the Historic Railroad Trail to Hoover Dam. Further information on the NPS backcountry road and trail system is provided in Section 3.14.3.

### **3.14.5 Mass Transit System**

The existing RTC Citizens Area Transit (CAT) bus mass transit system is an important component of the pedestrian/bicycle system because many users of the CAT system walk or bicycle to the nearest bus stop (Figure 3-33). CAT Bus Stop 116, located east of Veterans Memorial Drive on U.S. 93, is proximate to a large mobile home community on the south side of U.S. 93 between Veterans Memorial Drive and Yucca Street. For this analysis, Bus Stop 116 is the only stop of concern within the project area. For those disabled and elderly residents who are unable to use the bus stop, CAT Paratransit Services provides public transportation to eligible residents of Boulder City.

The bus stop for the westbound bus is located on the north side of U.S. 93, and access to that stop is difficult, as no crossing facilities exist near the stop. In addition, there is no sidewalk access to or from the stop, which forces pedestrians to use the shoulder of westbound U.S. 93, and the bench at the stop is not set away from the road but is located in the shoulder of westbound U.S. 93. Furthermore, the bus stop is not well lit, which can be a concern at night. NDOT statistics indicate that 2 pedestrian fatalities have occurred in this area in the last 10 years, which is partially attributed to these poor existing conditions.

RTC is seeking a site to construct a transit transfer terminal near the Boulder Highway and U.S. 93 interchange (west of the project limits), possibly in the City of Henderson. This facility is intended to provide a local and regional pedestrian and bicycle interface with the transit services. Linkage to recreational trails is also a consideration for RTC in the selection of the site. Because the site has not been selected and the intent is to interconnect bicycle and pedestrian facilities using existing trails, the west end of the study area is important in the evaluation of the alternatives.

## **3.15 Hazardous Waste**

### **3.15.1 Study Methodology**

The methodology used in the hazardous waste/material study generally follows the protocol described in FHWA Technical Advisory T 6640.8A for a baseline hazardous waste assessment. A baseline hazardous waste/material survey identifies the location of known or suspected sites potentially affecting development of alternative transportation corridors. If known or suspected waste sites are identified, the locations are mapped by their relationship to the alternatives under consideration. If a known or suspected waste site is affected by an alternative, information about the site; the potential involvement, impacts, and public health concerns of the affected alternative(s); and the potential mitigation measures to eliminate or minimize impacts or public health concerns are evaluated.

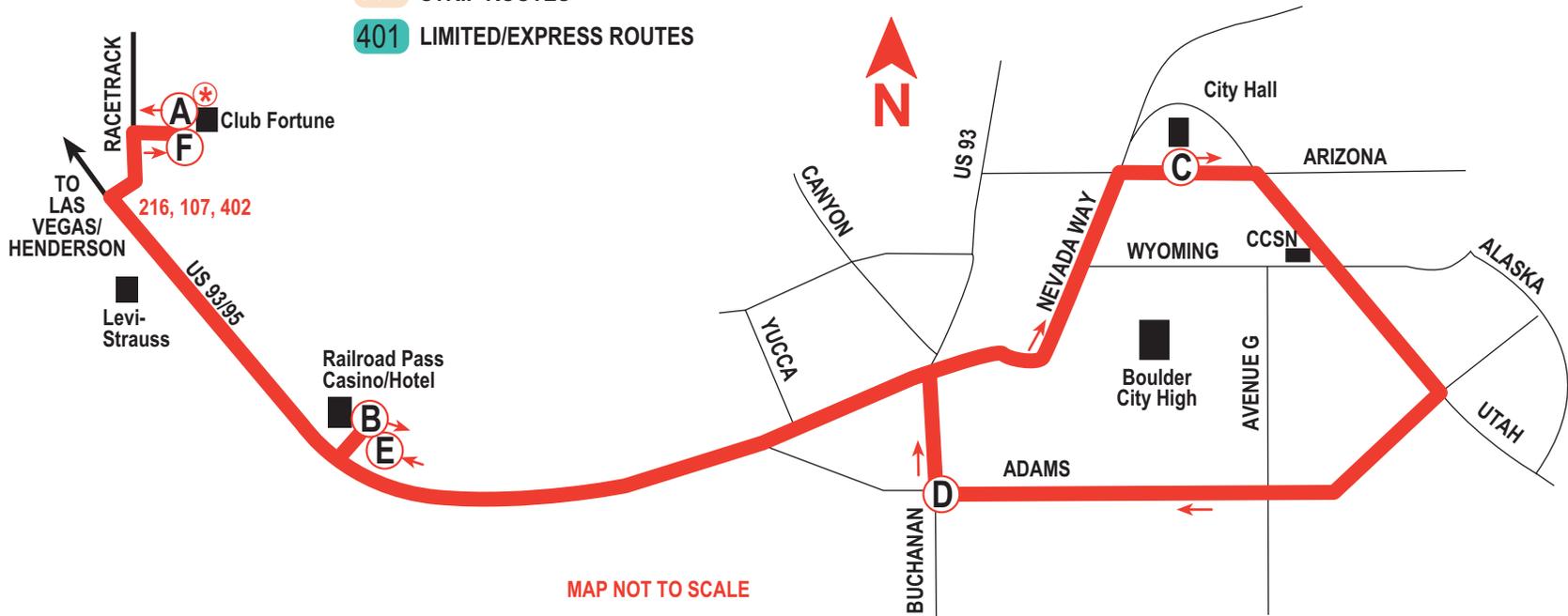
# Boulder City



**CAT**<sup>®</sup>

CITIZENS AREA TRANSIT  
A Service of the Regional Transportation Commission of Clark County, Nevada

- 101 NORTH/SOUTHBOUND
- 201 EAST/WESTBOUND
- 301 STRIP ROUTES
- 401 LIMITED/EXPRESS ROUTES



**FIGURE 3-33**  
**BOULDER CITY BUS ROUTES**  
BOULDER CITY/U.S. 93 CORRIDOR STUDY  
ENVIRONMENTAL IMPACT STATEMENT

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An initial set of known and suspected hazardous waste/material sites was identified through an electronic records search using a database of environmental records maintained by federal, state, and local sources. The results of the Vista Information Solutions (Vista) database search was reported in the "Preliminary Environmental Report for the Boulder City U.S. 93 Corridor Study," prepared by CH2M HILL in April 2000 (NDOT, 2000). That report included the analysis of a corridor (the "Northern Alternative") that is not specifically discussed in this report because it was screened out as a reasonable alternative (see Chapter 2, Section 2.4.1).

To further investigate which sites would be potentially affected by the development of the alternatives, regulatory agency files were reviewed and the findings summarized. The Vista database search reported two sets of sites for each corridor: mapped sites (sites with locations that were plotted in Vista electronic maps) and unmapped sites (sites that appeared to meet the search criteria but could not be mapped). Regulatory agency files were requested for: 1) all mapped sites, and 2) all unmapped sites that listed Boulder City in the address. In this step, the sites identified as part of the "Northern Alternative" were included in the files review to ensure that sites potentially impacted by the project alternatives were not missed. Agency files were requested and reviewed at the NDEP offices in Las Vegas and Carson City, and at the Clark County DAQEM office in Las Vegas. Section 3.15.3 summarizes the information for each site in the context of existing conditions along the corridor alternatives.

Historic aerial photographs of the Boulder City area were reviewed from the collection at the Nevada Bureau of Mining and Geology. Photographs were available for three time periods: 1954, 1976, and 1984. The photographs were reviewed to identify evidence of development in the vicinity of the corridors and to look for readily apparent indications of potential hazardous waste concerns such as large disposal pits or ponds.

Following the review of agency records and historical aerial photographs, the readily accessible portions of the corridor alternatives and the individual hazardous waste/material sites were located and observed through a windshield reconnaissance on March 26, 2001. Locations of sites were confirmed against existing information, and the general condition of the sites was observed and documented (NDOT, July 2001b).

### 3.15.2 Regulatory Standards/Criteria

Hazardous wastes are regulated by the federal government through the Resource Conservation and Recovery Act of 1976 (RCRA) and amendments, and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and amendments, as well as implementing federal regulations in Title 40 of the CFR. In addition, Nevada regulates hazardous materials and wastes through sections of the Nevada Revised Statutes and Nevada Administrative Code, Chapter 459.

In addition to hazardous wastes, the public has expressed a concern related to potential impacts from possible future transportation of radioactive wastes through the project area in the event the Yucca Mountain High-Level Radioactive Waste Repository is

built and operated. While nuclear waste does not fall under the definition of “hazardous wastes,” the issue is disclosed in this section of the EIS. Nuclear waste is managed under the Nuclear Waste Policy Act of 1982 (as amended). Management of these wastes falls under the Department of Energy (DOE), Office of Civilian Radioactive Waste Management. This waste is generated at 72 commercial and 5 DOE facilities located across the U.S. An FEIS for the Yucca Mountain Repository was published in February 2002. According to a DOE project timeline published on the project web site (<http://yucca-web2.ymp.gov/timeline/index.htm>), construction is planned to occur from 2006 through 2009, with operations commencing in 2009. Truck transportation routes proposed for high-level nuclear waste destined for Yucca Mountain currently include I-15 and I-40, but neither U.S. 93 nor U.S. 95 is proposed as a route (<http://www.state.nv.us/nucwaste/maps2002/roadrail/index.htm>).

### **3.15.3 Existing Conditions**

Sites with known or suspected hazardous waste or material contamination were identified and evaluated to assess potential project impacts. Any such sites that are known or suspected to be contaminated with hazardous wastes because of historical use, storage, or release of hazardous materials at the site were assessed. Locations of these sites with potential environmental concerns are shown in Figures 3-34 and 3-35.

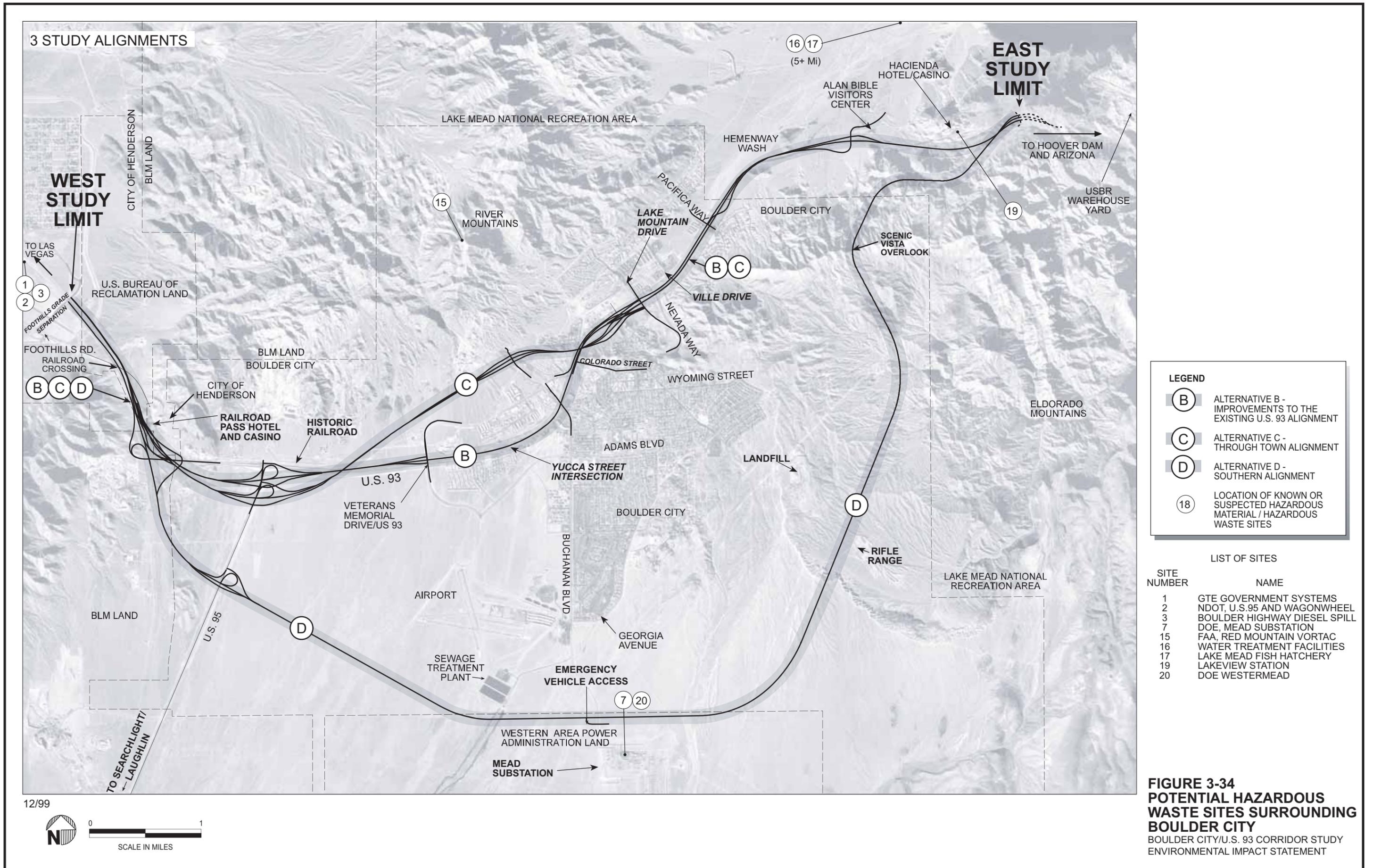
No groundwater resources are located in the River Mountains or the Eldorado Mountains, as volcanic rocks comprising these mountains are not considered suitable for the formation of significant aquifers. In addition, the low-lying area within the Boulder City limits and south into the alluvial fan also has no groundwater resources. Because of these conditions, soil contamination at sites in this area would not encounter groundwater. Therefore, groundwater would not be impacted from soil contamination, and migration of contamination through groundwater would not occur.

#### **Alternative A – No Build Alternative**

By definition, Alternative A would leave existing conditions as they are, so no known or suspected hazardous waste/material sites were identified for this alternative.

#### **Alternative B – Improvements to the Existing U.S. 93 Alignment**

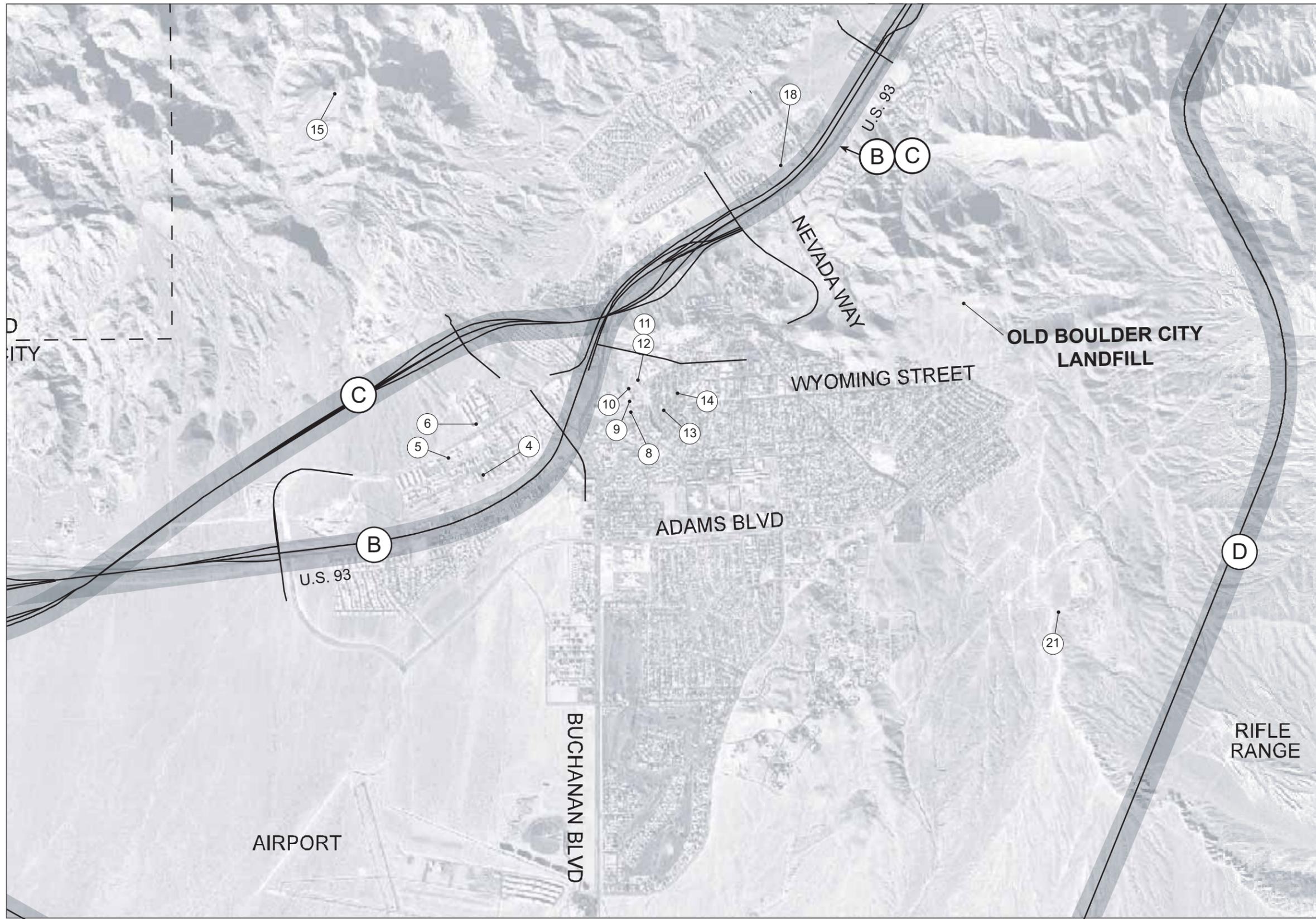
Twenty-two known or suspected hazardous waste/material sites were identified through a Vista database search as being in the vicinity of Alternative B. The listing of sites is based on the results of two Vista database queries that together cover the alignment and vicinity of Alternative B. The list includes sites that were mapped by Vista, as well as unmapped sites that listed Boulder City as the address. A review of historical aerial photographs from Boulder City showed the general pattern of development for this area from 1954 to 1984. No additional suspected hazardous waste/material sites were identified in the historical aerial photographs for Alternative B.



12/99



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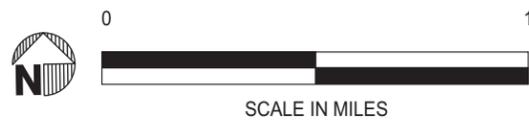


**LEGEND**

- (B)** ALTERNATIVE B - IMPROVEMENTS TO THE EXISTING U.S. 93 ALIGNMENT
- (C)** ALTERNATIVE C - THROUGH TOWN ALIGNMENT
- (D)** ALTERNATIVE D - SOUTHERN ALIGNMENT
- (18)** LOCATION OF KNOWN OR SUSPECTED HAZARDOUS MATERIAL / HAZARDOUS WASTE SITES

**LIST OF SITES**

SITE NUMBER	NAME
4	GOUDIE INDUSTRIAL PLAZA
5	VELTMAN PROPERTY
6	LADWP
8	RECLAMATION
9	BOULDER CITY TRANSFORMER SITE
10	RECLAMATION
11	BOULDER CITY MAINTENANCE YARD
12	PUBLIC WORKS DEPARTMENT YARD
13	LADWP
14	CENTRAL TELEPHONE COMPANY
18	FIRST STOP/LAST STOP
21	CURRENT BOULDER CITY LANDFILL



**FIGURE 3-35**  
**POTENTIAL HAZARDOUS WASTE SITES WITHIN BOULDER CITY**  
 BOULDER CITY/U.S. 93 CORRIDOR STUDY  
 ENVIRONMENTAL IMPACT STATEMENT

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The 22 known or suspected hazardous waste/material sites associated with Alternative B are identified as follows (see Figures 3-34 and 3-35):

- GTE Government Systems, 301 Conestoga Way, Henderson (Site number 1, Figure 3-34)
- NDOT, U.S. 95 and Wagonwheel (Site number 2, Figure 3-34)
- Boulder Highway Diesel Spill (Site number 3, Figure 3-34)
- Goudie Industrial Plaza, 1581 Foothill Drive, Boulder City (Site number 4, Figure 3-35)
- Veltman Property, 1553 and 1559 Industrial Road, Boulder City (Site number 5, Figure 3-35)
- Los Angeles Department of Water and Power (LADWP), 690 Wells Road, Boulder City (Site number 6, Figure 3-35)
- Reclamation, 500 Date Street, Boulder City (Site number 8, Figure 3-35)
- Boulder City Transformer Site, 500 Date Street, Boulder City (Site number 9, Figure 3-35)
- Reclamation, 400 Railroad Avenue, Boulder City (Site number 10, Figure 3-35)
- Boulder City Maintenance Yard, 500 Railroad Avenue, Boulder City (Site number 11, Figure 3-35)
- Public Works Department Yard, 500 Railroad Avenue, Boulder City (Site number 12, Figure 3-35)
- LADWP, 600 Nevada Highway, Boulder City (Site number 13, Figure 3-35)
- Central Telephone Company, 503 Ash Street, Boulder City (Site number 14, Figure 3-35)
- Federal Aviation Administration (FAA), Red Mountain VORTAC (aviation radio navigation aid) (Site number 15, Figure 3-34)
- Water Treatment Facilities, 243 Lakeshore Road (Site number 16, Figure 3-34)
- Lake Mead Fish Hatchery, 245 Lakeshore Road (Site number 17, Figure 3-34)
- D. H. Blatner Sons, Lakeshore Road
- First Stop/Last Stop, 100 Ville Drive, Boulder City (Site number 18, Figure 3-35)
- Lakeview Station, U.S. 93 (Site number 19, Figure 3-34)
- Lowe North Construction, Nelson Road
- Service Station, 3715 South Industrial
- Omega Recycling, Nevada and California

**GTE Government Systems, 301 Conestoga Way (Site Number 1).** This site is located approximately 1 km (0.6 mile) west of the intersection of Boulder Highway and U.S. 93, which is over 1 km (0.6 mile) west of the western end of the corridor. In March 1993, two underground storage tanks (USTs) were removed and disposed of. No soil contamination was reported. No spill or release records were observed in the agency file.

**NDOT, U.S. 95 and Wagonwheel (Site Number 2).** The site is located approximately 0.8 km (0.5 mile) west of the U.S. 93 overpass at Foothills Road in Henderson. A spill of 70 gallons of diesel fuel was reported on July 3, 1995. A response contractor removed and disposed of 4.9 tons of contaminated soil from the site. An April 9, 1996, NDEP letter references this soil removal action and indicates a concern that no confirmation soil sample was collected from the excavation after the soil was removed; however, this letter does not require any further action at the site. No subsequent records were observed in the agency file, and the file was marked "closed."

**Boulder Highway Diesel Spill (Site Number 3).** The site location is listed in the Vista database entry as Boulder Highway and Wagonwheel Drive, which is approximately 0.8 km (0.5 mile) west of the U.S. 93 overpass at Foothills Road in Henderson. This site was reported in the Vista database search, but no agency file could be located at NDEP or DAQEM. The Vista database entry indicated that this was a confirmed site, and the pollutant was total petroleum hydrocarbon (TPH) and/or diesel. The database indicated that the case was closed on September 8, 1994.

**Goudie Industrial Plaza, 1581 Foothill Drive (Site Number 4).** This site is located approximately 300 m (1,000 ft) north of U.S. 93. One UST was removed from this site, and there was no soil contamination reported. On March 15, 1996, DAQEM issued a No Further Action (NFA) closure letter for this site.

**Veltman Property, 1553 and 1559 Industrial Road (Site Number 5).** This site is located approximately 0.4 km (0.25 mile) north of U.S. 93. The site included a former aboveground storage tank (AST) and an alleged dumping area. The site was assessed, and 31 tons of soil were excavated from the former AST area. Residual soil contamination was reported as TPH (diesel) from 10 to 530 milligrams per kilogram (mg/kg) at the AST area. Trenches were dug and soil was sampled at the alleged dumping area. Trichloroethylene (TCE) was reported at up to 0.018 mg/kg, and perchloroethylene (PCE) was reported at 0.0029 mg/kg. The assessment report recommended no further action at the site. On May 20, 1997, NDEP issued an NFA closure letter for this site.

**LADWP, 690 Wells Road (Site Number 6).** This site is located approximately 250 m (800 ft) north of U.S. 93. Two USTs were reported in service. Tightness test results from June 2000 indicate that all equipment passed. No spill or release records were observed in the agency file.

**Reclamation, 500 Date Street (Site Number 8).** This site is located approximately 250 m (800 ft) east of the U.S. 93 Truck Route (east of the Buchanan Boulevard intersection). Twelve tons of hydrocarbon-contaminated soil was excavated, treated, and disposed of in a municipal landfill. The agency file did not contain records with further details on the source of contamination or quantification of contamination. On April 5, 1993, DAQEM issued an NFA closure letter for this site.

**Boulder City Transformer Site, 500 Date Street (Site Number 9).** This site is located approximately 250 m (800 ft) east of the U.S. 93 Truck Route. In September 1995, a cleanup contractor responded to a 500-gallon spill of mineral oil. The mineral oil was reported to contain less than 25 ppm of polychlorinated biphenyls (PCBs). Approximately 186 tons of contaminated soil were removed from the site. Residual soil contamination was below detection limits except for one sample reported as TPH at 750 mg/kg. On January 25, 1996, NDEP issued an NFA closure letter for this site.

**Reclamation, 400 Railroad Avenue (Site Number 10).** This site is located approximately 200 m (650 ft) east of the U.S. 93 Truck Route. One UST was removed in August 1981. A site investigation found that approximately 100 cubic yards of soil were impacted with up to 480 mg/kg of TPH (gasoline). The site was used as a parking lot. The site owner recommended no further action in a Reclamation letter dated June 3, 1995. On June 5, 1996, DAQEM issued an NFA closure letter for this site. In another case at this same site, two USTs were removed in February 1991. Soil contamination was reported as TPH (diesel) up to 16,000 mg/kg. Additional excavation and soil sampling were performed in 1992, with residual soil contamination reported as TPH up to 1,140 mg/kg at 6 m (20 ft) below ground surface (bgs). The site owner recommended no further action in a Reclamation letter dated November 19, 1992, citing low risks for exposure, migration, or contamination of groundwater. An NFA letter for this case was not observed in the agency file. However, an agency staff note in the file requested that a letter be prepared that would say, "...DAQEM agrees with your conclusion and will require no further action at this time."

**Boulder City Maintenance Yard, 500 Railroad Avenue (Site Number 11).** This site is located approximately 300 m (1,000 ft) east of the U.S. 93 Truck Route. A spill was reported in January 1999, indicating that a UST had failed the tightness test, and approximately 150 to 200 gallons of gasoline were released. One UST was removed in March 1999, and soil contamination associated with the UST was reported as TPH (gasoline) up to 525 mg/kg. A consultant letter dated May 10, 1999 recommended no further action. On May 26, 1999, NDEP issued an NFA closure letter for this site.

**Public Works Department Yard, 500 Railroad Avenue (Site Number 12).** This site is located approximately 300 m (1,000 ft) east of the U.S. 93 Truck Route. In response to a complaint of asphalt and diesel disposal, a site assessment was performed in May and July 1991. Soil contamination was reported in three areas, with TPH reported up to 12,000 mg/kg (at 0.3 m [1 ft] bgs). The August 1991 consultant report recommended no further action. On October 30, 1991, NDEP denied the request and requested a plan for corrective action. On November 18, 1991, a second review of the no further action proposal was requested, and two alternative cleanup options were provided. On January 10, 1992, NDEP issued an NFA closure letter for this site. The agency file contained no records of any further investigation or cleanup at this site.

**LADWP, 600 Nevada Way (Site Number 13).** This site is located approximately 500 m (1,600 ft) east of the U.S. 93 Truck Route. Two USTs were removed, and 2 cubic yards of contaminated soil were removed and disposed of. Residual soil contamination was below detection limits. On April 8, 1991, DAQEM issued an NFA closure letter for this site.

**Central Telephone Company, 503 Ash Street (Site Number 14).** This site is located approximately 600 m (2,000 ft) east of the U.S. 93 Truck Route. One UST was removed in July 1996. Soil contamination was reported as TPH, up to 3,800 mg/kg. Seventy-six tons of soil were removed, and residual soil contamination in the excavation was reported as below detection limits. The excavation was backfilled, and a new AST was installed at this location. On September 26, 1996, NDEP issued an NFA closure letter on this site.

**FAA, Red Mountain VORTAC (Site Number 15).** This site is located approximately 2 km (1.25 miles) northwest of U.S. 93, at the top of a mountain. The site houses a radio transmitter that acts as a navigation aid to aircraft. One UST was removed in 1990, and 3 cubic yards of contaminated soil were removed and disposed of. Residual contamination was not documented in the file. On December 28, 1990, DAQEM issued an NFA closure letter for this site.

**Water Treatment Facilities, 243 Lakeshore Road (Site Number 16).** This site is located over 8 km (5 miles) north of U.S. 93, on Lakeshore Road. Records in the agency file identify this site variously as: Las Vegas Water District, Southern Nevada Water System, and Alfred Merritt Smith Water Treatment. One UST was removed in January 1997, and TPH contamination in soil was reported up to 220 mg/kg. On April 9, 1997, NDEP issued an NFA closure letter. This site reportedly contains 12 registered USTs, of which 3 are out of service. Agency file records indicate that the USTs passed an April 2000 tightness test. There were no records observed regarding the remaining USTs and no additional records regarding releases. The site reportedly contains one registered AST, which is in service. No agency records were observed on this AST.

**Lake Mead Fish Hatchery, 245 Lakeshore Road (Site Number 17).** This site is located almost 10 km (6 miles) north of U.S. 93, on Lakeshore Road. The site contained two USTs, both of which are out of service. One UST was removed in January 1995. At that time, TPH contamination in soil was reported at 880 mg/kg. Soil was removed (the quantity of soil removed was not observed in the agency file), and the residual contamination was reported as 100 mg/kg TPH. Subsurface soil samples were collected from a soil boring at the site of the contamination, but no subsurface contamination was detected. On January 2, 1996, DAQEM issued an NFA closure letter for this UST site. The remaining UST was removed in July 1997. No soil contamination was reported in association with this UST removal. On September 9, 1997, DAQEM issued an NFA closure letter for this UST removal. No other spill or release records were observed in the agency file.

**D. H. Blatner Sons, Lakeshore Road.** The specific location of this site on Lakeshore Road could not be determined from agency files or corridor reconnaissance. A spill of 10 to 20 gallons of diesel fuel was reported in October 1998. An NDEP letter dated October 21, 1998, stated that the spill was contained and cleaned up, and that no further action was required. Because the agency file reflected such a small-size spill and a rapid resolution, no further effort was made to more precisely locate the site.

**First Stop/Last Stop, 100 Ville Drive (Site Number 18).** This site is located approximately 60 m (200 ft) north of the U.S. 93 truck route at Ville Drive. Reconnaissance on March 26, 2001, indicated that this site is an operating Mobil gasoline station. Four USTs are reported to be in service. Results from a January 12, 2001, tightness test reported that all USTs passed. No spill or release records were observed in the agency file.

**Lakeview Station, U.S. 93 (Site Number 19).** This site is located at the eastern end of the study area on U.S. 93, approximately half way between Hoover Dam and Boulder City. Agency files refer to the Gold Strike Inn and Casino at this site. The facility is now called Hacienda Hotel and Casino. Soil contamination was initially reported in May 1995 up to 7,628 mg/kg TPH (diesel). The consultant report recommended no further action. However, this request was denied in a DAQEM letter dated May 17, 1995. The case was subsequently transferred to NDEP, who also denied the recommendation for no further action. A workplan for additional investigation was approved in September 1996, but the work reportedly was allowed to be postponed until the UST was removed. One UST was removed in December 1996, and soil contamination remaining in the excavation was reported at up to 1,949 mg/kg TPH. The January 1997 consultant report recommended that no further action was necessary. On April 24, 1997, NDEP issued an NFA closure letter for the site.

**Lowe North Construction, Nelson Road.** The Vista database indicated that this site is located 25 km (16 miles) east on Nelson Road. However, no road with this name was found in maps of the Boulder City area. No further description of the site location is contained in agency files. On December 1, 1994, a response contractor was called in for a 25-gallon spill of diesel fuel. Forty tons of soil were excavated, and the excavation was sampled for residual soil contamination. An additional 81 tons of soil were removed later in December 1994. Residual soil contamination was reported as below detection limits. The agency file did not contain an NFA letter, but the file was marked "Closed," and the cleanup report in the file was date-stamped (presumably the date received by NDEP) on January 6, 1995. This date agrees with the "case closed" date listed in the Vista database entry.

**Service Station, 3715 South Industrial.** The Vista database mapped this site in Boulder City but provided an address listing the city as Las Vegas. Reconnaissance on March 26, 2001, along Industrial Road in Boulder City did not locate this range of street addresses, nor a facility that might fit the description of this site. Therefore, it appears that this site is not located in Boulder City.

**Omega Recycling, Nevada and California.** This site was listed in the Vista database with an address of Boulder City, Nevada 89005. The entry indicated that this is a "confirmed site" but provided no other details. There was no file on this site at either NDEP or DAQEM. No listing in business or telephone directories was found for Omega Recycling in Nevada.

### **Alternative C – Through Town Alignment**

The Alternative C corridor generally coincides with Alternative B on the eastern half (east of Buchanan Boulevard). On the western half, the two alternatives cross back and forth and are separated by no more than 1 km (0.6 mile). The Vista database queries covered the vicinity of both alternatives. For the purpose of this analysis, the 22 known or suspected hazardous waste/material sites identified for Alternative B were also evaluated for Alternative C. A review of historical aerial photographs showed the general pattern of development for this area from 1954 to 1984. No additional suspected hazardous waste/material sites were identified in the historical aerial photographs for Alternative C.

Although the existing conditions for these known and suspected hazardous waste/material sites are not repeated here for Alternative C, the environmental impacts are discussed separately for Alternative B and Alternative C in Section 4.15.

### **Alternative D – Southern Alignment (Preferred Alternative)**

Ten known or suspected hazardous waste/material sites were reported in the Vista database in the vicinity of Alternative D. Several of these sites were also reported in Alternative B and Alternative C and are listed here but are described above. A review of historical aerial photographs showed the general pattern of development for this area from 1954 to 1984.

The 10 sites associated with Alternative D are identified below and are shown in Figures 3-34 and 3-35.

- Public Works Department Yard, 500 Railroad Avenue, Boulder City (Site number 12, Figure 3-35)
- Department of Energy (DOE), Mead Substation (Site number 7, Figure 3-34)
- DOE Westermead, Buchanan Boulevard (Site number 20, Figure 3-34)
- Boulder City Landfill (Site number 21, Figure 3-35)
- FAA, Red Mountain VORTAC (Site number 15, Figure 3-34)
- Water Treatment Facilities, 243 Lakeshore Road (Site number 16, Figure 3-34)
- Lake Mead Fish Hatchery, 245 Lakeshore Road (Site number 17, Figure 3-34)
- D. H. Blatner Sons, Lakeshore Road
- Lakeview Station, U.S. 93 (Site number 19, Figure 3-34)
- Lowe North Construction, Nelson Road

**Public Works Department Yard, 500 Railroad Avenue (Site Number 12).** This site is described above under Alternative B.

**DOE, Mead Substation (Site Number 7) and DOE Westermead, Buchanan Boulevard (Site Number 20).** The location of DOE Westermead along Buchanan Boulevard was not specified in the agency file. No other DOE facility was observed on Buchanan Boulevard during the March 26, 2001 reconnaissance, so this database entry may refer to the Mead Substation at the foot of Buchanan Boulevard. One UST was removed, and the soil was sampled in 1994. Trace (less than 20 mg/kg) TPH was reported in several soil samples. The soil was used as backfill for the site. On May 11, 1994, DAQEM issued an NFA closure letter for this site.

**Boulder City Landfill (Site Number 21).** This landfill is located approximately 5 km (3 miles) southeast of U.S. 93, at the end of Utah Street. This Class I municipal landfill is permitted and occupied 10 acres in 1997. It can occupy up to 100 acres. A request in April 1997 for a waiver from groundwater monitoring requirements was approved by DAQEM on July 25, 1997. No spills, releases, or other environmental issues of concern were observed in inspection reports contained in the DAQEM file through February 2000.

**FAA, Red Mountain VORTAC (Site Number 15).** This site is described above under Alternative B.

**Water Treatment Facilities, 243 Lakeshore Road (Site Number 16).** This site is described above under Alternative B.

**Lake Mead Fish Hatchery, 245 Lakeshore Road (Site Number 17).** This site is described above under Alternative B.

**D. H. Blatner Sons, Lakeshore Road.** This site is described above under Alternative B.

**Lakeview Station, U.S. 93 (Site Number 19).** This site is described above under Alternative B.

**Low North Construction, Nelson Road.** This site is described above under Alternative B.

One additional suspected hazardous waste/material site was identified in the historical aerial photographs and from discussions with local residents, the Old Boulder City Landfill, approximately 0.4 km (0.25 mi) north of the eastern terminus of Wyoming Street (Figure 3-35).

## 3.16 Energy Use

### 3.16.1 Study Methodology

Both direct and indirect use of energy would be affected by the construction and operation of the proposed project. Energy usage during operation of the proposed project would primarily occur through the use of fuel by vehicles using the roadway.

In order to evaluate the direct energy consumption associated with the operation of the project alternatives, the traffic analysis (NDOT, August 2001a) prepared for this project was consulted for the following information: the total daily VMT; total peak-hour VMT; total peak-hour vehicle-hours traveled; traffic delay time; and the average peak-hour travel speed for each alternative. Using that data, the following information was calculated:

- Fuel consumption rate (at normal operating speeds), which was determined by multiplying the total daily VMT by the estimated fuel consumption rate at idle (0.58 gallons per hour at idle)
- Total peak-hour fuel consumption, estimated by adding the calculated fuel consumption rate at normal operating speeds to the calculated fuel consumption at idle
- Idle time, calculated by multiplying the traffic delay time by the number of vehicles
- Total gallons consumed, calculated by converting the calculated idle time to hours, which was then multiplied by the 0.58 gallons per hour factor

Knowing the total gallons consumed by vehicles for each alternative provides a method of comparing each Build Alternative to the No Build Alternative.

### **3.16.2 Existing Conditions**

As described in the traffic analysis, current traffic demand along U.S. 93 is reaching available capacity (NDOT, August 2001a). Constraints along the roadway that are worsening the problem include traffic signals and access points through Boulder City, and steep grades in the Hemenway Valley. While increasing, existing energy consumption is still far below future demands, and it is easily being met by resources available in the Boulder City area.