FHWA-NV-EIS-00-02-F

Boulder City/U.S. 93 Corridor Study

Final Environmental Impact Statement and Section 4(f) Evaluation

Volume I

April 2005

Boulder City US 93 Corridor Study

BOULDER CITY / U.S. 93 CORRIDOR STUDY FINAL ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F) EVALUATION

Submitted pursuant to 42 U.S.C. 4332 (2) (c), 16 U.S.C. 470 (f), 49 U.S.C. 303, and Section 404(b)(1) of 33 U.S.C. 1344 by the U.S. Department of Transportation, Federal Highway Administration; Nevada Department of Transportation; and these cooperating Agencies:

- U.S. Bureau of Reclamation
- National Park Service
- Western Area Power Administration
- Clark County Department of Public Works
- Bureau of Land Management
- Regional Transportation Commission of Southern Nevada
- City of Boulder City
- City of Henderson

3/21/05

Date of Approval

Susan Klekar

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Date of Approval

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Abstract

This Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation documents potential environmental impacts associated with the Boulder City/U.S. 93 Corridor Study. The study limits are between a western boundary on U.S. 95 in the City of Henderson, where the present freeway ends, and an eastern boundary on U.S. 93 approximately 4.7 miles east of downtown Boulder City. The eastern boundary is coincident with the planned western end of the Hoover Dam Bypass project being developed by the Federal Highway Administration, Central Federal Lands Highway Division, on behalf of the Nevada and Arizona Departments of Transportation. The study covers a total distance of approximately 10.4 miles on the present route of U.S. 93. The project is in Clark County, Nevada, and lies on lands under both local municipal and federal jurisdiction. Within the study corridor, U.S. 93 varies from a four-lane divided roadway to a two-lane roadway with numerous business driveways and cross streets. The highway project under consideration would provide overall transportation improvements in the corridor to reduce traffic congestion and crashes and improve regional mobility while maintaining or improving local circulation and access within Boulder City. This FEIS addresses the social, environmental, and economic impacts associated with three Build Alternatives and a No Build Alternative. All three Build Alternatives use public recreation land and historic sites protected under Section 4(f) of the U.S. Department of Transportation Act of 1966. Subsequent to these analyses, and following a public review period on the Draft Environmental Impact Statement, Alternative D was selected as the preferred alternative.

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Preface

This Final Environmental Impact Statement (FEIS) consists of the text of the Draft EIS (DEIS) with revisions and additions based on supplemental research, and on public and agency comments and consultations. Substantive revisions to the DEIS are marked in this FEIS by a vertical line in the outside margin next to the revised or added text. The FEIS includes a new Volume II, which describes the DEIS notification and public hearing process, summarizes and reproduces all comments received on the DEIS, and provides responses to comments on the DEIS. This FEIS is also available for review on the Boulder City/U.S. 93 Corridor Study Project web site at:

http://bouldercitystudy.com

The Federal Highway Administration (FHWA) is the lead agency, and the Nevada Department of Transportation (NDOT) is serving as the sponsoring agency for the Boulder City/U.S. 93 Corridor Study. Cooperating agencies consist of the National Park Service (NPS), U.S. Bureau of Reclamation (Reclamation), Western Area Power Administration (WAPA), Regional Transportation Commission of Southern Nevada (RTC), Bureau of Land Management (BLM), the cities of Boulder City and Henderson, and Clark County Department of Public Works. The corridor study is a vital element in RTC's Regional Transportation Plan (RTP) and Transportation Improvement Program and NDOT's Statewide Transportation Improvement Program.

On the basis of various environmental studies and comments received on the DEIS, the southern bypass alignment, Alternative D, with the proposed mitigation measures incorporated herein, has been identified as the preferred alternative. The preferred alternative was identified on the basis of meeting the project's Purpose and Need (Chapter 1), minimizing traffic and noise impacts within Boulder City, associated minimization of safety impacts, and engineering and operational advantages. The preferred alternative was also identified after weighing the environmental impacts that would result from implementation of the individual alternatives, including the no-action alternative. Sections of the EIS that have been substantively rewritten or supplemented in response to public and agency input include: Chapter 2 – Selection of Alternatives for Detailed Analysis, and Identification of the Preferred Alternative; Chapter 3 – Biology/Threatened Species, Cultural Resources, Waters of the U.S., Land Use, and Hazardous Materials; Chapter 4 – Biology/Threatened Species, Cultural Resources, Waters of the U.S., Land Use, and Hazardous Materials; Chapter 6 – Mitigation Measures for Cumulative Impacts; Chapter 7 – Section 4(f) Evaluation (Identification of Section 4(f) Uses, Impacts, and Means to Minimizing Harm); Chapter 8 – Public Hearing for the DEIS; Volume I, Appendix A - Correspondence on Impacts Assessments and Selection of The Preferred Alternative; and Volume II, Comments On the DEIS and Responses to Comments. The Executive Summary has also been supplemented to reflect these changes. In addition to Volumes I and II, supplemental technical studies are part of the administrative record and are referenced in this FEIS.

The Boulder City/U.S. 93 Corridor Study FEIS will be used by FHWA to decide on the various discretionary actions required to implement the project. FHWA's decisions will be identified in a Record of Decision (ROD). Statements on the FEIS will be accepted by FHWA and considered in the decision on this proposed action. The FEIS is being distributed for a minimum 30-day review period.

Acronyms

AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACRE	Associated Cultural Resource Experts
ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
ADT	average daily traffic
AFDC	Aid to Families with Dependent Children
AM	average mean
APE	area of potential effects
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATV	all-terrain vehicle
BA	Biological Assessment
BCBRR	Boulder City Branch Railroad
BDCU	Boulder Dam Credit Union
BFE	base flood elevation
bgs	below ground surface
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BP	before present
BWQP	Bureau of Water Quality Planning
°C	degrees Celsius
CAA	Clean Air Act
CANAMEX	Canada-to-Mexico corridor
CAT	Citizens Area Transit
CCC	Civilian Conservation Corps
CCDCP	Clark County Desert Conservation Program
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
cm	centimeters
CO	carbon monoxide
CWA	Clean Water Act
CWG	Community Working Group
DAQM	Department of Air Quality Management
dBA	decibel A-weighted
DEIS	Draft Environmental Impact Statement
DMHNSR	Division of Museums and History of Nevada State Railroad

DOE	Department of Energy
DOI	United States Department of Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRMs	Flood Insurance Rate Maps
FR	Federal Register
ft	foot
GIS	geographic information system
GLO	Government Land Office
GM	geometric mean
GMP	General Management Plan
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HCP	Habitat Conservation Plan
HDNHL	Hoover Dam National Historic Landmark
HRC	Harry Reid Center for Environmental Studies
HUD	Department of Housing and Urban Development
I-10	Interstate 10
I-15	Interstate 15
I-215	Interstate 215
I-40	Interstate 40
I-515	Interstate 515
ID	identification
IMACS	Intermountain Archaeological Computer System
IP	Individual Permit
ISTEA	Intermodal Surface Transportation Efficiency Act
km	kilometer
km^2	square kilometers
km/h	kilometers per hour
kV	kilovolt
LABPL	Los Angeles Bureau of Power and Light
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LEDPA	least environmentally damaging practicable alternative
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_{min}	minimum sound level
LMNRA	Lake Mead National Recreation Area
LOMR	Letter of Map Revision

LOP	Letter of Permission
LOS	level of service
m	meters
m^2	square meters
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
$\mu g/m^3$	micrograms per cubic meter
mm	millimeters
MOA	Memorandum of Agreement
MP	milepost
mpg	miles per gallon
mph	miles per hour
MSHCP	Multi-Species Habitat Conservation Plan
MUTCD	Manual on Uniform Traffic Control Devices
MVM	million vehicle miles
MW	megawatt
MWD	Metropolitan Water District of Southern California
NA	Northern Alternative
N/A	not applicable
NAAQS	national ambient air quality standards
NAC	Nevada Administrative Code; noise abatement criterion
NAFTA	North American Free Trade Agreement
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act of 1969
NFA	No Further Action
NHP	Nevada Highway Patrol
NHPA	National Historic Preservation Act of 1966
NHS	National Highway System
NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_X	nitrogen oxide
NPC	Nevada Power Company
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRA	National Rifle Association
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
NSCH	Nevada State College at Henderson
NTU	Nephelometer Turbidity Units
NWP	Nationwide Permit
O_3	ozone
O&D	Origin and Destination
OHWM	ordinary high water mark

ORV	off-road vehicle
PA	Programmatic Agreement
Pb	lead
PCBs	polychlorinated biphenyls
PCE	perchloroethylene
PCU	Platinum-Cobalt Units
PM_{10}	respirable particulate matter
PMT	project management team
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act of 1976
Reclamation	United States Bureau of Reclamation
RMLT	River Mountains Loop Trail
RMP/EIS	Resource Management Plan/Final Environmental Impact Statement
ROD	Record of Decision
RTC	Regional Transportation Commission of Southern Nevada
RTP	Regional Transportation Plan
RVs	recreational vehicles
SA	Southern Alternative
SCE	Southern California Edison Company
SCIRR	Six Companies, Inc. Railroad
SFHA	special flood hazard area
SHPO	State Historic Preservation Office
SIP	Statewide Implementation Plan
SNWA	Southern Nevada Water Authority
SO_2	sulfur dioxide
SO_X	sulfur oxide
SR	State Route
SSI	Social Security Income
SSPC	Southern Sierras Power Company
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TA	Through-Town Alternative
TCE	trichloroethylene
TCP	Traditional Cultural Property
TDS	total dissolved solids
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Plan
TNM	Traffic Noise Model
TPH	total petroleum hydrocarbon
TSM	transportation systems management
UNLV	University of Nevada, Las Vegas
UPRR	Union Pacific Railroad
U.S.	United States
U.S. 93	United States Highway 93
U.S. 95	United States Highway 95

USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCRR	United States Construction Railroad
U.S. DOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USTs	underground storage tanks
V/C	volume/capacity
Vista	Vista Information Solutions
VMT	vehicle miles traveled
VRM	Visual Resource Management
WAPA	Western Area Power Administration
WDM	Wetlands Delineation Manual

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Executive Summary

Introduction

This proposed project involves traffic improvements to United States Highway 93 (U.S. 93) in the Boulder City, Nevada, area. The proposed project limits are between a western boundary at the end of Interstate 515 (I-515) on U.S. 93/95 in Henderson near the Foothills grade separation approximately 1.6 kilometers (km) (1 mile) north of the Railroad Pass Hotel and Casino, and an eastern boundary on U.S. 93, approximately 7.5 km (4.7 miles) east of downtown Boulder City. The eastern boundary is coincident with the western end of the U.S. 93 Hoover Dam Bypass project. The Boulder City/U.S. 93 Corridor Study covers a total distance of approximately 16.7 km (10.4 miles) on U.S. 93 (Figure 1-1).

U.S. 93 is a major regional commercial corridor for interstate and international commerce and is the single route through Boulder City, functioning as a major urban arterial. It is a direct north-south link between Phoenix and Las Vegas, which are two of the fastest-growing areas in the United States (U.S.); and carries 32,000 vehicles per day (average annual daily traffic [AADT]) of east-west traffic from Interstate 40 (I-40) to Las Vegas and Interstate 15 (I-15). U.S. 93, in combination with I-19 (Nogales to Tucson) and I-10 (Tucson to Phoenix), create a continuous Canada-to-Mexico (CANAMEX) corridor. In Nevada, U.S. 93/U.S. Highway 95 (U.S. 95) is a four-lane divided facility from Las Vegas to the west study limits. Within the study corridor, U.S. 93 varies from a four-lane divided roadway to a two-lane roadway with numerous business driveways and cross streets.

The Federal Highway Administration (FHWA), in cooperation with the Nevada Department of Transportation (NDOT) and the Project Management Team (PMT), which includes the City of Boulder City, the City of Henderson, Bureau of Reclamation (Reclamation), the Regional Transportation Commission of Southern Nevada (RTC), Clark County Department of Public Works, National Park Service (NPS), Western Area Power Administration (WAPA), and Bureau of Land Management (BLM), is studying the Boulder City/U.S. 93 corridor and has prepared this Environmental Impact Statement (EIS) for a proposed project to improve this transportation corridor, located in Clark County, Nevada. The highway project would provide overall transportation improvements to reduce traffic congestion and crashes and enhance regional mobility, while maintaining or improving local circulation and access within Boulder City. This could be accomplished by either-widening and upgrading existing U.S. 93, or by realigning U.S. 93 as a new highway north or a new highway south of the present highway.

Scoping and Public Involvement

Following publication of a Notice of Intent (NOI), which appeared in the *Federal Register* on February 2, 2000, FHWA and NDOT initiated the NEPA process and began the scoping for the proposed project. An agency scoping meeting was held on February 22, 2000, in Las Vegas. Attendees were given an overview of the proposed project and asked to present their agency's concerns, special requirements, and information pertinent to the corridor study. Agencies were also encouraged to prepare written responses to FHWA. Subsequent interviews with other community members and meetings with interested members of the public, the Boulder City Chamber of Commerce, members of the Boulder City and City of Henderson City Councils, and other organizations also occurred during this scoping period.

FHWA and NDOT completed and approved the Draft Environmental Impact Statement (DEIS) for public review on March 4, 2002. The DEIS was circulated to the public on March 15, 2002, with publication of the Notice of Availability in the *Federal Register*. A public hearing to formally introduce the Boulder City/U.S. 93 Corridor Study DEIS was held on April 4, 2002, at the Boulder City Parks and Recreation Center in Boulder City, with 278 in attendance. Written comments, plus court reporter transcripts of oral comments received at the hearing, are included in Volume II of this final EIS (FEIS). The entire DEIS was also accessible on the project web site. The initial 45-day public comment period was extended by 12 days, and the public comment period closed on May 10, 2002 (see Volume II for a full description of the DEIS public input process, the comments received, and the responses to comments).

Public outreach and agency consultations have been ongoing and have taken numerous forms, depending on the circumstances. The public outreach process will continue through completion and approval of the Record of Decision (ROD) by FHWA. Statements on the FEIS will be accepted by FHWA and considered in the decision on this proposed action. The FEIS is being distributed for a minimum 30-day review and comment period.

The following is a list of some of the public outreach activities and processes undertaken for this corridor study through the various stages of the project:

- Public Meetings/Open House Forums
- Public and Agency Chartering Meeting
- Presentations at City Council and County Commission Meetings
- Presentations to Stakeholder Groups
- Boulder City Cable Television Programs
- Community Working Group Meetings
- Project Web Page
- Project Newsletters
- Project E-Mail Box
- Project Hot-line

The Project Web Page can be accessed at http://www.bouldercitystudy.com.

Summary of Alternatives Considered

Corridor alternatives were developed based on the problems and potential solutions identified by the residents of Boulder City and the City of Henderson at two public meetings in January and April 2000 in Boulder City, as well as an agency scoping meeting and monthly PMT meetings. A combination of public involvement input, engineering, and environmental baseline analysis efforts was used to identify 35 alignment segments, totaling over 640 km (400 miles). These initial alignments were described by segment so that different logical segment combinations yielded over 40 potential build alternatives. These alternatives were then screened with the goal of identifying routes that addressed the issues developed through the NEPA scoping process, as well as avoided or minimized a large proportion of potential environmental impacts. The screening included a comparative evaluation of social, environmental, and engineering considerations raised during the initial scoping process. This process reduced the number of reasonable and feasible alternatives to 16.

The remaining 16 alternative corridors were grouped into three categories. The alternatives aligned through the River Mountains were designated as the Northern Alternative (NA). The alternatives aligned through the developed areas of Boulder City were designated as Through-Town Alternatives (TAs); these included both a transportation systems management (TSM) alternative and a U.S. 93 improved alternative that provides grade separations at key intersections and an overall widening of the roadway. The alternatives aligned south of the Boulder City Airport and wastewater treatment facility were designated as the Southern Alternatives (SA).

Preliminary horizontal and vertical alignments for each of the corridor alternatives were prepared, based on minimizing cuts and fills along the roadway. The alignments conformed to the corridor topography, existing drainage patterns, local traffic circulation, and utilized American Association of State Highway and Transportation Officials (AASHTO) design guidelines. The PMT developed a set of 30 criteria against which to evaluate these 16 alignments. These criteria addressed accessibility, operations, safety/design, environmental impacts, socioeconomic impacts, and implementation.

Description of Proposed Alternatives

Based on a comprehensive review of the evaluation results, the PMT eliminated all but four alternatives (three build plus a "no-build" alternative) from further consideration during several workshop meetings of the PMT in June and July 2000. After eliminating corridor alternatives based on the criteria screening, the PMT concurred upon the following four alternatives (Figure ES-1) from the 16 evaluated as the most reasonable and feasible to carry into detailed evaluation in the EIS:

- Alternative A – No Build
- Alternative B – Existing U.S. 93 Expressway (with arterial and freeway segments)
- Alternative C – Through-Town Freeway Alignment
- Alternative D – Southern Freeway Alignment

The four alternatives subjected to detailed study (including the No Build Alternative) were developed to a comparable level of detail in the DEIS to analyze their comparative merits and impacts. The identification of a preferred alternative was not made until the impacts of the alternatives, along with comments on the DEIS and from the public hearings, were fully evaluated.

Alternative A (No Build)

This alternative assumes that no geometric improvements are made to the present-day roadway network within the study limits, except for expansion of U.S. 93 to a three-lane roadway section with a new westbound lane between the Hoover Dam Bypass tie-in and Lakeshore Road. All intersections are assumed to remain unsignalized except for the signalized intersections at Railroad Pass, Veterans Memorial Drive, and Buchanan Boulevard.

Alternative B

This build alternative is proposed as a freeway and arterial improvement combination that includes a general widening of U.S. 93 and other roadway improvements within the study limits (Figure ES-2). The goal of the alternative is to make improvements to the present 17.7 km (11 miles) of roadway, mostly within the U.S. 93 corridor. The proposed improvements consist primarily of a new four-lane divided freeway beginning from the Foothills grade separation, crossing under the Boulder City Branch Railroad, and continuing just south of the existing highway to a new diamond interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues to just east of a half-diamond interchange at Veterans Memorial Drive. The U.S. 93/95 interchange would be replaced by a new, higher-capacity interchange. A six-lane principal urban arterial would extend from east of the new half-diamond interchange at Veterans Memorial Drive to Colorado Street, with a new traffic signal at an improved Buchanan Boulevard/U.S. 93 intersection. There would be a four-lane median barrier divided freeway through Hemenway Valley to the eastern project limit, with existing U.S. 93 converted to a frontage road and interchanges at Lake Mountain Drive, Pacifica Way, and Lakeshore Road. The freeway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange.

The total estimated cost of this alternative is $220 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration, and contingencies.

Alternative C

Alternative C would be a new through-town freeway connecting the western and eastern study limits of the project (Figure ES-3). It would consist of a continuous four-lane, controlled-access freeway parallel to existing U.S. 93. Alternative C would be a divided freeway from the Foothills grade separation to the west end of Hemenway Valley, and from there it would be a barrier-median freeway to the eastern project limit. The alignment begins at the Foothills grade separation, crosses under the existing railroad, and continues just south of the existing highway to a new interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues to the east to approximately 0.8-km (0.5-mile) south of the U.S. 93/95 interchange. The existing U.S. 93/95 interchange would be replaced by a new, higher-capacity interchange. After the alignment turns north, crossing underneath U.S. 93, it runs parallel to and north of Industrial Road along the transmission line corridor. A new interchange would be provided at Canyon Road. This alternative meets existing U.S. 93 at the west end of Hemenway Wash and, from there, generally follows the Alternative B alignment in the Hemenway Valley area with interchanges at Lake Mountain Drive, Pacifica Way, and Lakeshore Road. The freeway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange.

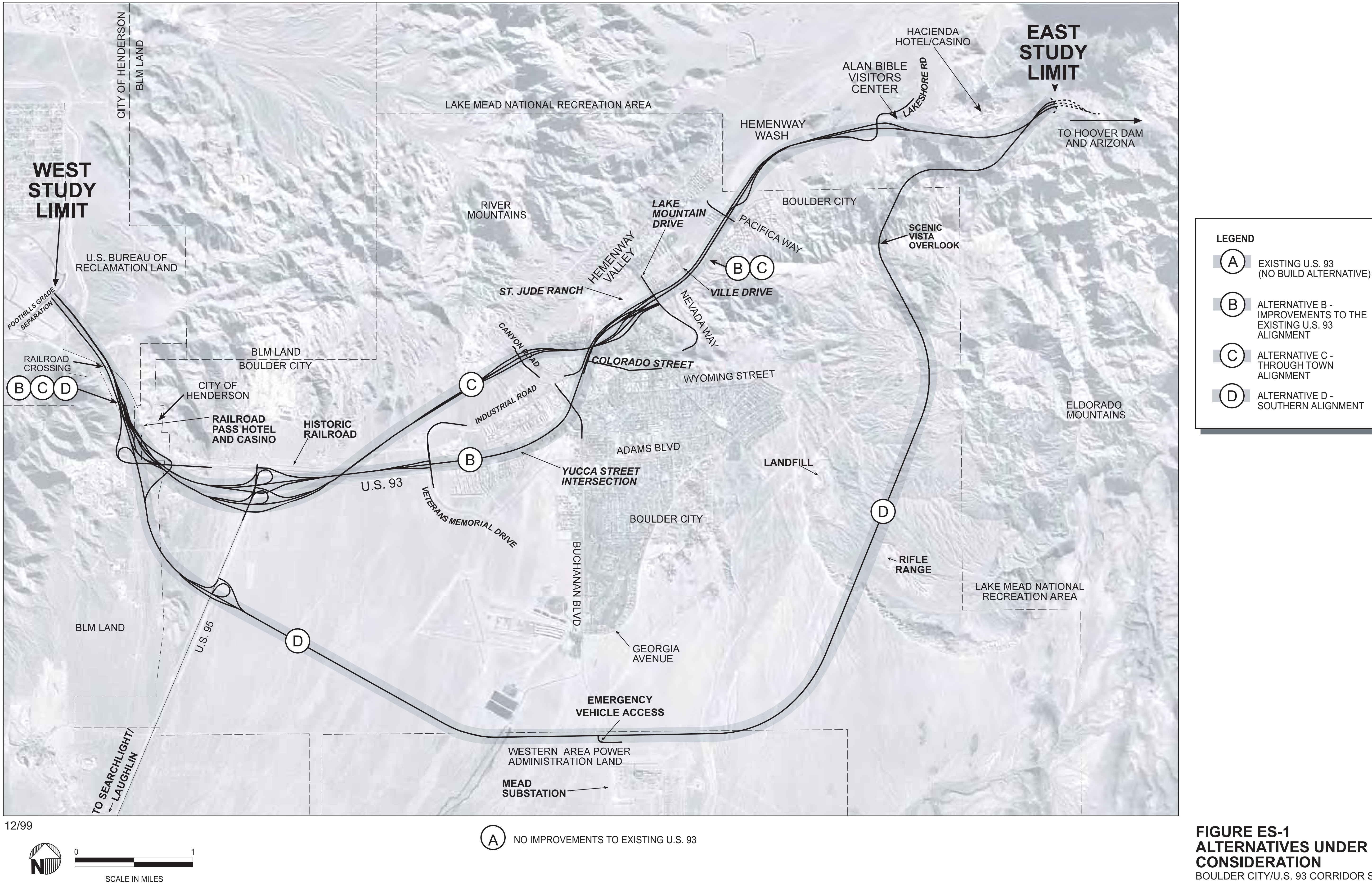

FIGURE ES-1
ALTERNATIVES UNDER CONSIDERATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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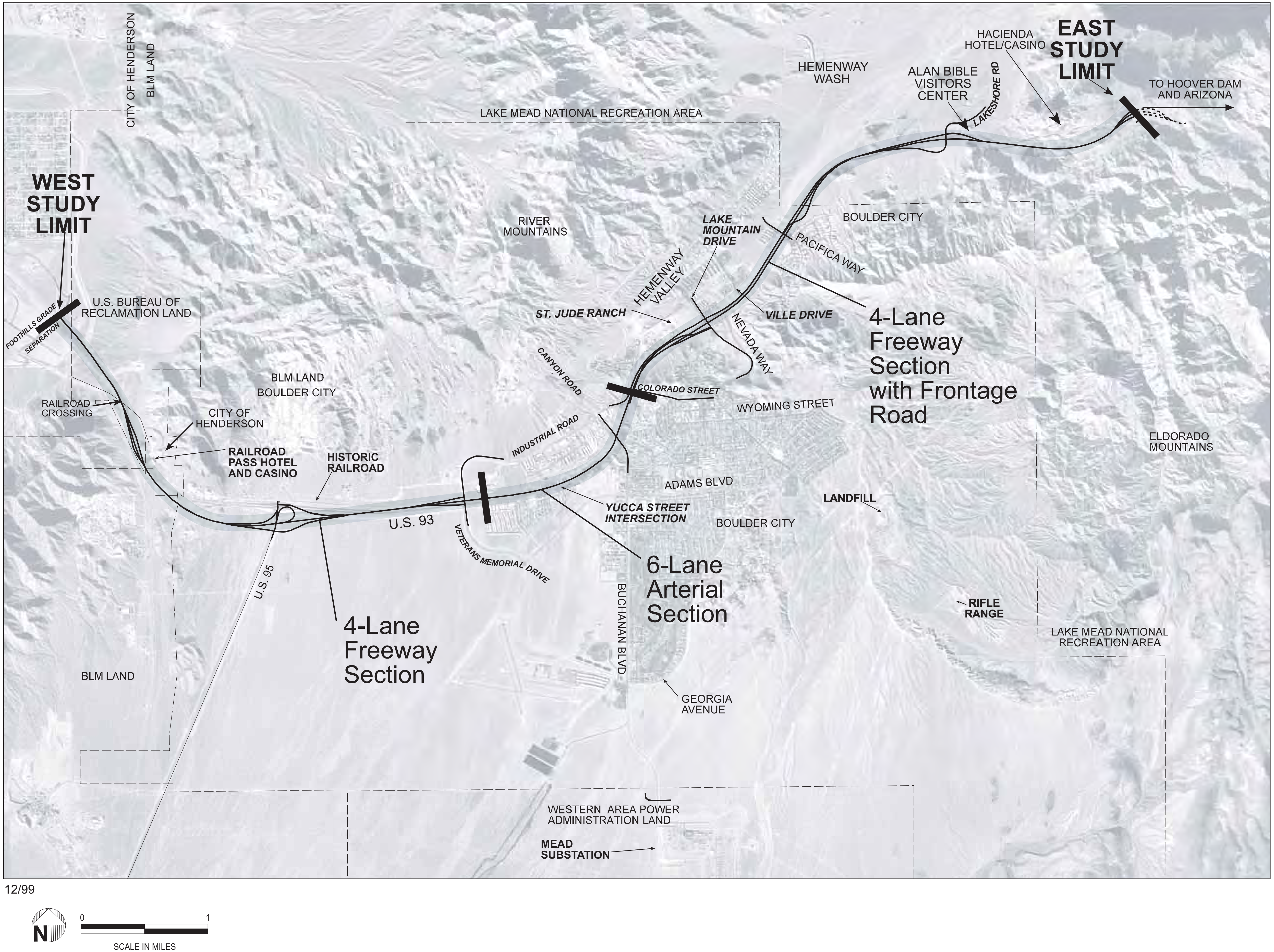

FIGURE ES-2
ALTERNATIVE B
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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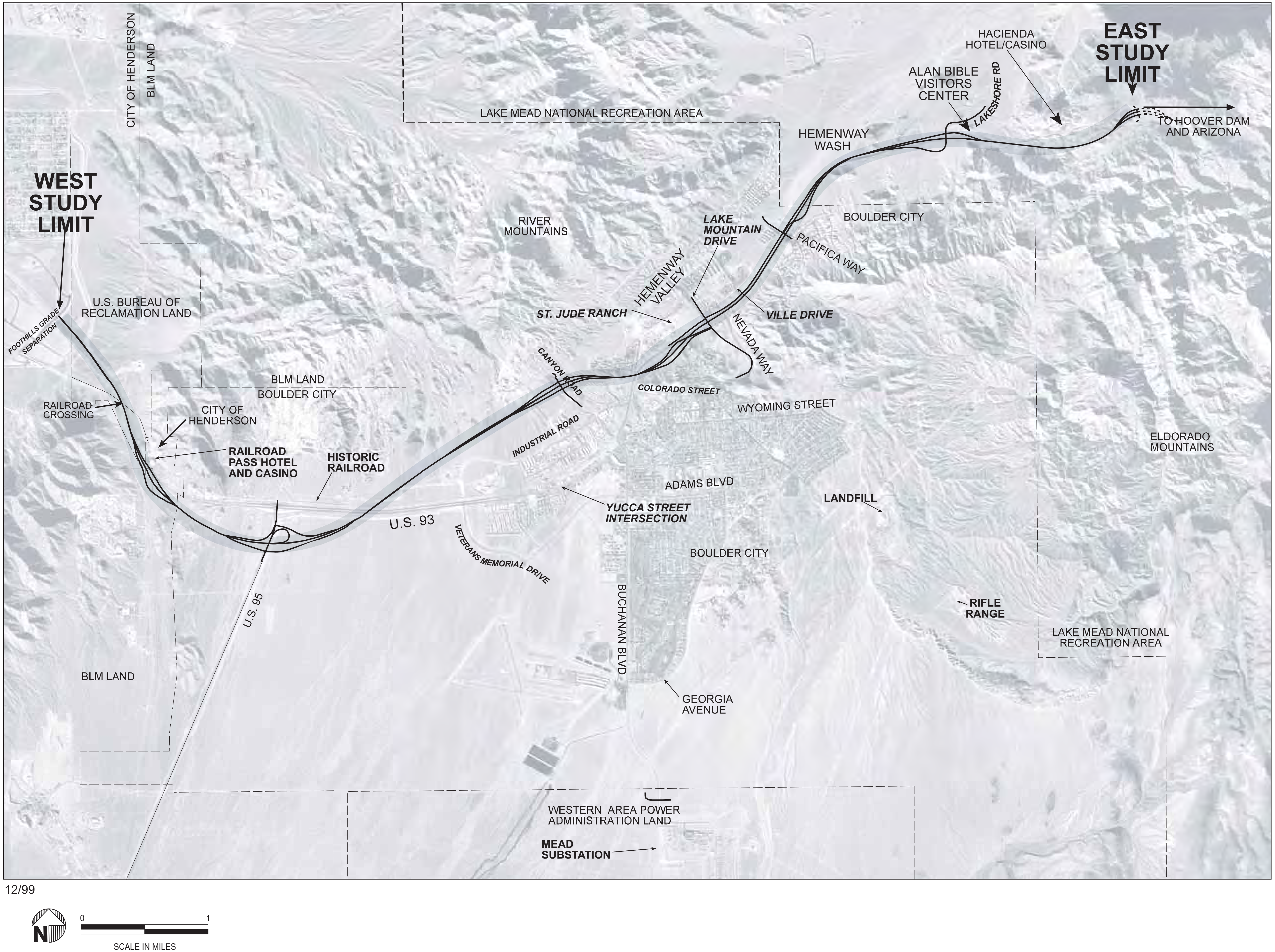

FIGURE ES-3
ALTERNATIVE C
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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The proposed freeway would be approximately 17.7 km (11 miles) in length.

The total estimated cost of this alternative is $220 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration, and contingencies.

Alternative D (Preferred Alternative)

The preferred Alternative D is proposed as a southern bypass of Boulder City connecting the western and eastern study limits of the project (Figure ES-4). Upon completion, it would consist of a continuous four-lane, controlled-access divided freeway and highway bypassing the developed area of Boulder City to the south. The alignment begins at the Foothills grade separation, crosses under the Boulder City Branch Railroad, and continues just south of the highway to a new interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues south and east to U.S. 95 with a new interchange approximately 1.9 km (1.2 miles) south of the present U.S. 93/95 interchange. The highway alignment then continues south and east toward the WAPA Mead Substation. The alignment runs approximately 1.4 km (0.85-mile) south of Georgia Avenue, just north of the Mead Substation, and then turns to run parallel to the transmission corridor between the landfill and the Boulder City Rifle and Pistol Club range prior to crossing a ridge representing an western extension of the Eldorado Mountains, called here the Eldorado Ridge, east of Boulder City (Figure ES-4). The highway will be developed as a limited access undivided highway from Georgia Avenue to the Hoover Dam Bypass Nevada Interchange. The highway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange.

There would be no public access to or from the highway near the Mead Substation. At Buchanan Boulevard, an emergency access ramp for fire, police, and other emergency vehicles would be constructed. Its use would be controlled by NDOT, and it would not be available to the public. It will be approximately 205 m (670 ft) long, and 15 m (50 ft) wide, and have locked gates at the entrance and at the connection to the highway. This facility would also accommodate special large-equipment deliveries to the Mead Substation, alleviating the need for these shipments to be transported through Boulder City to reach the substation. Alternative D would be approximately 24 km (15 miles) in length.

The total estimated cost of this alternative is approximately $345 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration, and contingencies.

A detailed discussion of the screening and evaluation criteria used to identify Alternative D as the preferred alternative is found in Section 2.6 of this FEIS. Compared to the other build alternatives, it would (1) result in fewer noise, air quality, visual, and social impacts to Boulder City; (2) result in less impacts to cultural resources; (3) cause less disruption of the existing corridor during construction; and (4) more effectively provide for flexible staging of construction. Alternative D also best meets the Purpose and Need compared to the other alternatives. Compared to the other build alternatives, Alternative D would result in more impacts to biological resources, to jurisdictional waters of the U.S., and to the LMNRA.

Environmental Impacts and Mitigation Measures

Table ES-1 summarizes the potential environmental and socioeconomic impacts of the four project alternatives. Where applicable, the impacts are categorized by either the construction or operational phases of project implementation. Appropriate mitigation measures to avoid or minimize adverse impacts are also summarized.

This FEIS is updated to reflect changes in impact evaluations since the release of the DEIS resulting from continued refinement of plans, as well as continued agency consultations. Correspondence related to these consultations is included in Appendix A. The following are among the developments that have resulted in updates to impact evaluations of the build alternatives:

1) Update of the historic structures inventory report and completion of the final report
2) Completion of initial State Historic Preservation Office (SHPO) consultation, and receipt of SHPO concurrence on determinations of eligibility
3) Receipt of concurrence from the U.S. Army Corps of Engineers (USACE) regarding which drainages are jurisdictional Waters of the U.S.
4) Consultations between NDOT and FHWA regarding which impacts constitute use under Section 4(f) of the U.S. Department of Transportation (U.S. DOT) Act of 1966 (49 U.S.C. § 303)
5) Refinement of alignment positions, their impacts to historic structures (including the Boulder City Branch Railroad), and cut and fill limits of the alternatives
6) Consultation between NDOT, FHWA, Nevada Department of Wildlife (NDOW), and the Environmental Protection Agency (EPA) regarding impacts to wildlife and Waters of the U.S. that would result from implementation of the build alternatives, particularly from Alternative D

To address safety concerns that could arise from sight-seers stopping along the roadway to take advantage of the expansive views at the crest of the Eldorado Ridge, a scenic vista point with pull-outs would be constructed here (Figure ES-4).

To further address impacts to wildlife and jurisdictional waters of the U.S., additional avoidance, minimization, and mitigation measures are identified in this FEIS. These include bridges by which the roadway corridor will avoid operational impacts to waters of the U.S. while providing crossings to wildlife, other bridges and appropriately-engineered culverts that will serve as wildlife crossings, and the use of appropriate fencing design to direct wildlife to those crossings. Design and placement of these structures will take place in consultation with the agencies having jurisdiction over these resources, such as NPS and NDOW.

Since release of the DEIS, additional data and consultations indicated the need to address cumulative impacts to desert bighorn sheep from enactment of any of the build alternatives, when combined with other development in the Railroad Pass to Hoover Dam area.

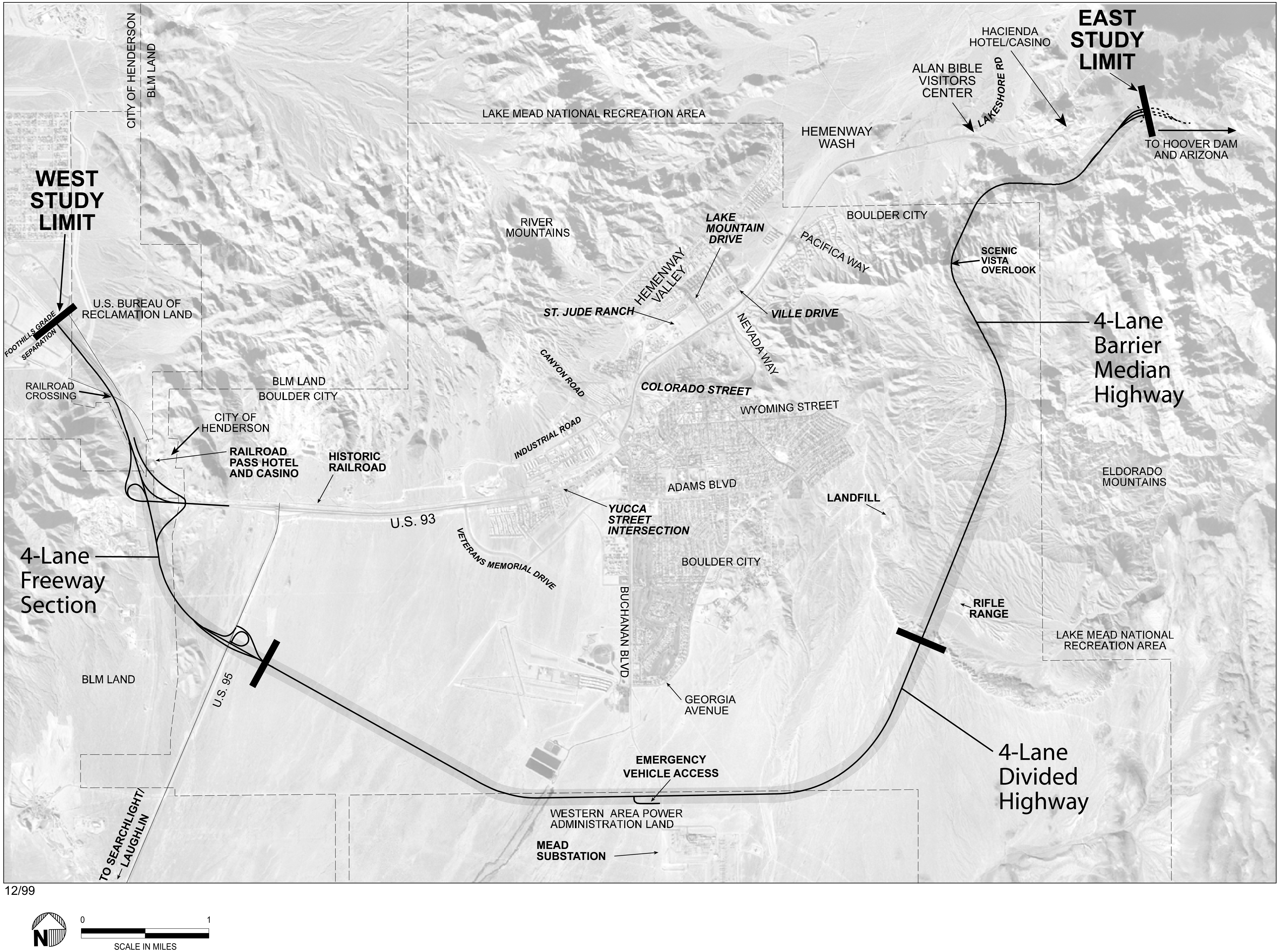

FIGURE ES-4
ALTERNATIVE D
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Therefore, commitments have been made by FHWA and NDOT to coordinate with and, when concurrent with the current project, support NPS and NDOW monitoring of bighorn sheep use of the area. FHWA and NDOT will also participate with NPS and NDOW in the development and implementation of a bighorn sheep management plan for existing U.S. 93, and in the further refinement of mitigation measures for this project. The City of Boulder City has also initiated the process to create a wildlife preserve in the western Eldorado Mountains to minimize further fragmentation of bighorn sheep habitat should the preferred Alternative D be constructed.

Areas of Controversy

Some Boulder City business owners are concerned about the perceived negative economic impacts related to removing drive-by traffic from the existing U.S. 93 business corridor, primarily impacting fast-food restaurants and motels. Because many of these businesses employ city residents, this loss in revenue would have an effect on the local economy if these perceived negative economic impacts were realized.

Conversely, the Boulder City residential community, primarily that of Hemenway Valley, is concerned about quality of life, specifically air quality, noise, accessibility to Boulder City, and safety along the corridor. The residential community generally prefers to move trucks off the present U.S. 93 corridor through Boulder City to reduce overall environmental risk, and this was part of the motivation behind the June 1999 initiative by the City of Boulder City recommending a southern bypass.

In briefings with the city councils and numerous public stakeholder meetings, support emerged to give consideration to an alternative alignment south of the Mead Substation. Reasons cited include air quality, traffic noise, visual impacts, and proximity of the freeway to residential areas. Such an alternative alignment was considered to address the concern of some people about the potential for a Buchanan Boulevard interchange with a new southerly U.S. 93 highway sometime in the future. After further review with the City, the PMT and public, an alignment south of the Mead substation was not supported due to the additional length of the highway and environmental impacts. The development of the highway north of the Mead Substation was acceptable as long as there is no public access including through traffic and large trucks on Buchanan Boulevard that would adversely impact quality of life primarily in the neighborhoods surrounding the municipal golf course. The City, PMT and public did agree that an access ramp could be built and used for emergency access and equipment access for WAPA to the substation.

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TABLE ES-1
Summary of Impacts and Mitigation

Air Quality (see Section 4.2)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Carbon monoxide (CO) concentrations are predicted to remain well below the federal standard. Ozone (O_3) emissions will be greatest for this alternative. Impacts to air quality within Boulder City would be greatest under this alternative.	Not applicable.
B	Construction would cause an increase in localized airborne dust and microscopic particulate matter (PM).	Construction activities would be regulated under applicable Clark County Department of Air Quality and Environmental Management (DAQEM) air pollution permit requirements. Control measures, such as a dust mitigation plan, shall be used as appropriate; and the project will follow the DAQEM Best Management Practice (BMP) manual. With mitigation, construction emissions will be minimal.	Impacts to air quality within Boulder City would be greatest of the build alternatives. However, CO concentrations are predicted to be well below the federal standard. The concentrations for Alternative B would be lower than for the No Build Alternative. In comparing PM_{10} levels for existing like roads with Alternative B, there has been no exceedance of the federal standard for PM_{10}. O_3 emissions would be less than for Alternative A.	Impacts would not exceed federal standards; therefore, no mitigation measures are required.
C	Same as for Alternative B.	Same as for Alternative B.	Impacts would be similar to those from Alternative B.	Same as for Alternative B.
D	Same as for Alternative B.	Same as for Alternative B.	Impacts to air quality within Boulder City would be the least of the alternatives.	Same as for Alternative B.

TABLE ES-1
Summary of Impacts and Mitigation

		Noise (see Section 4.3)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Traffic noise levels would eventually approach or exceed the NDOT noise abatement criterion (NAC) at some residential locations with the No Build Alternative.	Not applicable.
B	Short-term noise impacts would occur during construction.	Although construction noise impacts would be temporary, standard noise mitigation measures will be implemented. For instance, all equipment will comply with applicable equipment noise standards and will be maintained according to manufacturers' specifications. Temporary or portable acoustic barriers will be installed around stationary construction noise sources in noise-sensitive areas (i.e., residential), as needed. NDOT will develop and implement a plan for controlling noise in sensitive areas, if needed.	There would be mixed effects on residential noise with Alternative B; some areas would have decreased noise levels, while others would have increased noise levels, exceeding the NAC.	NDOT will develop and implement a plan for controlling noise in sensitive areas, if needed. Noise barriers will be constructed to mitigate noise impacts that exceed the NAC.
C	Same as for Alternative B.	Same as for Alternative B.	Some residential areas would experience an increase in noise levels.	Same as for Alternative B.
D	Same as for Alternative B.	No sensitive receptors would be present; therefore, no mitigation measures would be required during the construction of this alternative.	Traffic noise levels through developed areas of Boulder City would decrease with the implementation of Alternative D. However, the new highway would cause an increase in noise levels in portions of the Lake Mead National Recreation Area (LMNRA).	No mitigation measures are required due to the lack of sensitive receptors (i.e., population concentrations) in the vicinity of the right-of-way.

TABLE ES-1
Summary of Impacts and Mitigation

		Biology/Threatened Species (see Section 4.4)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Continued and anticipated increased use of the existing roadway corridor would result in a corresponding increase in the barrier that exists impeding bighorn sheep movement between the River Mountains and Eldorado Mountains bighorn herds.	Not applicable.
B	This alternative would cross desert tortoise, gila monster, and bighorn sheep habitat. However, it would impose the least disturbance on wildlife and vegetation of all build alternatives (327 acres of habitat). Habitat disruption would be minimal because construction would occur along existing highway right-of-way.	Protected or sensitive plants will be removed from the project site prior to construction. The plants will then be replanted within the project area. Fencing and other barriers that will prevent wildlife from entering the construction right-of-way will be in place prior to commencement of construction. Artificial lighting will be used to the least extent possible. Construction will be scheduled to occur outside the nesting seasons of bird species protected by the Migratory Bird Treaty Act. If such scheduling cannot be employed, then obvious nest sites will be avoided. Burrows or other potential nesting cavities will be collapsed prior to the nesting season to prevent encounters with burrowing owls. If owl-occupied burrows are found during the nesting or brooding season, they will be avoided.	Operation of this alternative would result primarily in an increase in wildlife mortalities associated with vehicle/wildlife collisions. It would enhance the tendency of this roadway to impede bighorn sheep movement between the River Mountains and the Eldorado Mountains.	Fencing to prevent wildlife from entering the roadway will be installed and properly maintained, as deemed appropriate by state and federal wildlife agencies. Earth-floored box culverts would be installed to serve as wildlife crossings at appropriate locations with fencing designed to direct animals to these crossings. The design and placement of these measures will be developed in consultation with NPS, USFWS, and NDOW. Additional mitigation measures may be identified, and existing ones will be refined, in further resource agency consultations as part of the development of the BA for implementation of the project. Adherence to NDOT's commitments contained in the Clark County Multiple Species Habitat Conservation Plan will further mitigate the operational impacts of this roadway.

TABLE ES-1
Summary of Impacts and Mitigation

Alt.	Construction Impacts	Mitigation	Operational Impacts	Mitigation
		Biology/Threatened Species (see Section 4.4)		
		Specific measures mitigating impacts to the desert tortoise will be developed and implemented in cooperation with the United States Fish and Wildlife Service (USFWS). These measures will be developed in the course of preparing the Biological Assessment (BA) for implementation of project. These measures may include the use of biological monitors during construction as stipulated in the construction documents. Gila monster and chuckwalla will be removed by a qualified specialist prior to construction. If species of concern are present, other appropriate mitigation, as determined by state and federal regulatory agencies and the Clark County Multi-Species Habitat Conservation Plan (MSHCP), will be implemented.		To the greatest extent possible, the highway will be kept free of attractants such as trash and unnatural lighting. Signs warning drivers of the presence of wildlife will be utilized where warranted.
C	This alternative would cross desert tortoise, gila monster, and bighorn sheep habitat. In total, this alternative would cause 460 acres of habitat disturbance.	In addition to the measures listed under Alternative B, data specific to bighorn sheep populations, including field data and observations, will be evaluated and utilized in the selection of crossing sites to mitigate potential impacts to bighorn sheep.	Same as for Alternative B.	Same as for Alternative B.

TABLE ES-1
Summary of Impacts and Mitigation

Biology/Threatened Species (see Section 4.4)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
D	Alternative D would traverse desert tortoise, gila monster, and bighorn sheep habitat. It results in a total of 679 acres of disturbance. Impacts would include the reduction and fragmentation of desert bighorn sheep habitat on Eldorado Ridge, an area currently heavily utilized by these sheep. Bat roosting areas may be disturbed.	Same as for Alternative C. Bat roosting sites will be identified and avoided when possible.	Same as for Alternative B. In addition, Alternative D would have a greater contribution to the cumulative impact to bighorn sheep created by development impeding the migration of bighorn sheep between mountain ranges, and result in fragmentation of bighorn habitat on Eldorado Ridge.	Same as for Alternative B. In addition, three bridges to be constructed north of the Eldorado Ridge area will serve a dual use as wildlife crossings and be equipped with ungulate proof fencing to direct wildlife to those crossings. NDOT also commits to supporting the NPS and NDOW bighorn sheep monitoring program, and to coordinating with these and other affected agencies in efforts to develop a bighorn sheep management plan for the current U.S. 93 corridor. In cooperation with Boulder City, a wildlife preserve will be established in the Eldorado Ridge area to prevent further fragmentation of this habitat area.

TABLE ES-1
Summary of Impacts and Mitigation

Water Quality (see Section 4.5)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Increased traffic may contribute to the deterioration of water quality.	Not applicable.
B	Water quality in desert washes that drain the project area may degrade from stormwater runoff. Erosion impacts would result from activities such as the construction of new and temporary channels and access roads around the new facility, as well as modifications to the landscape and grading of the soil in the vicinity of the new facility. However, erosion impacts would not be as great as they would be for Alternative C or D. Long-term impacts to water quality of Lake Mead are expected to be minimal during construction.	A National Pollutant Discharge Elimination System (NPDES) permit will be implemented and enforced throughout construction. A site-specific Stormwater Pollution Prevention Plan (SWPPP) will also be implemented. The State of Nevada's Handbook of BMPs will be utilized as guidance in implementing BMPs. The South Valley Area 208 Water Quality Management Plan will also be consulted. Conformance with Sections 401 and 404 of the Clean Water Act will be maintained through the permitting process with the USACE.	Water quality in desert washes that drain the project area may degrade from stormwater runoff and erosion.	Soil along the banks of drainage channels at roadway crossings will be stabilized using erosion-control blankets or other approved methods to prevent erosion and sediment deposition. Offsite water quality controls, using BMPs such as sediment basins, will also be employed to treat runoff before discharge. Conformance with Sections 401 and 404 of the Clean Water Act will be maintained through the permitting process with the USACE.
C	Water quality in desert washes that drain the project area may degrade from stormwater runoff. Erosion impacts would be greater than for Alternative B, but not as great as they would be for Alternative D. Impacts to water quality of Lake Mead are expected to be minimal during construction.	Same as for Alternative B.	Same as for Alternative B.	Same as for Alternative B.

TABLE ES-1
Summary of Impacts and Mitigation

Alt.	Construction Impacts	Mitigation	Operational Impacts	Mitigation
		Water Quality (see Section 4.5)		
D	Water quality in desert washes that drain the project area may degrade from stormwater runoff; implementation of Alternative D would have a greater effect than Alternative B or C. Steeper grades in the construction area of Alternative D would have greater erosion impacts than would Alternative B or C. Impacts to water quality of the Colorado River are expected to be minimal during construction.	Same as for Alternative B.	Water quality in desert washes that drain the project area may degrade from stormwater runoff and erosion. Alternative D would have a greater impact than Alternatives B or C.	Same as for Alternative B.

TABLE ES-1
Summary of Impacts and Mitigation

		Wetlands/Waters of the U.S. (see Section 4.6)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	No impacts to wetlands. Waters of the U.S. crossed by the project may be impacted by discarded materials, waste by-products, and sediment from construction. A total of 3.58 acres of desert wash drainage that constitutes jurisdictional Waters of the U.S. would be affected.	No wetland mitigation measures would be required. Construction access, material stockpiling, and construction staging areas will be designated outside the limits of Waters of the U.S. Temporary barriers shall be installed to restrict debris from entering adjacent washes. Construction activities will be restricted during rainfall. BMPs established by NDOT will be implemented. Conformance with Sections 401 and 404 of the Clean Water Act will be maintained through the permitting process with the USACE.	No impacts to wetlands. A total of 1.70 acres of Waters of the U.S. would be impacted from fill material.	No wetland mitigation measures would be required. Bridge designs will minimize the effects of the structures on the washes. Piers and retaining walls shall be protected to prevent erosion and sedimentation. Energy dissipaters may be installed to reduce the energy of floodwaters and minimize natural deposition at the crossings. Conformance with Sections 401 and 404 of the Clean Water Act will be maintained through the permitting process with the USACE.
C	No impacts to wetlands. Waters of the U.S. crossed by the project may be impacted by discarded materials, waste by-products and sediment from construction. Alternative C would impact the same washes as Alternative B; however, it would affect a total of 3.82 acres of jurisdictional Waters.	Same as for Alternative B.	No impacts to wetlands. A total of 1.72 acres of Waters of the U.S. would be impacted from fill material.	Same as for Alternative B; Bridges, culverts, and other engineered features will be designed, to minimize impacts to Waters of the U.S.

TABLE ES-1
Summary of Impacts and Mitigation

		Wetlands/Waters of the U.S. (see Section 4.6)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
D	An artificially supported wetland area below the Boulder City sewage treatment plant would be affected; however, USACE jurisdictional authority is not applicable to this wetland because it is not self-sustaining. No impacts to USACE jurisdictional wetlands would occur. Waters of the U.S. crossed by the project may be impacted by discarded materials, waste by-products, and sediment from construction. Alternative D would cover a larger area and pass through steeper terrain, thereby having a greater overall impact than the other build alternatives. A total of 5.68 acres of Waters of the U.S. would be affected.	Same as for Alternative B.	No impacts to jurisdictional wetlands would occur. A total of 3.12 acres of waters of the U.S. would be impacted. Additional waters to the north of Eldorado Ridge would be avoided by spanning these with bridge structures.	Same as for Alternative B; bridges, culverts, and other engineered features will be designed, to minimize impacts to waters of the U.S.

TABLE ES-1
Summary of Impacts and Mitigation

		Floodplains (see Section 4.7)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	Construction impacts would total 21.7 acres, including the Hemenway Wash flood zone, Wash "B" at U.S. 93 near Veterans Memorial Drive, and other individual flood zones. The regulatory floodway in the Hemenway Wash area would also be impacted.	The State of Nevada's Handbook of BMPs would be utilized for implementing appropriate BMPs.	Operational impacts would total 10 acres, including the Hemenway Wash flood zone, Wash "B" at U.S. 93 near Veterans Memorial Drive, and other individual flood zones. The regulatory floodway in the Hemenway Wash area would also be impacted.	The Hemenway Wash channel will be relocated beyond the shoulder of the new roadway. Retaining walls along the north side of the alignment through Hemenway Wash would avoid operational impacts.
C	Construction impacts would total 18.8 acres, including the Hemenway Wash flood zone and other individual flood zones. The regulatory floodway in the Hemenway Wash area would also be impacted.	Same as for Alternative B.	Operational impacts would total 5.9 acres, including the Hemenway Wash flood zone and other individual flood zones. The regulatory floodway in the Hemenway Wash area would also be impacted.	The Hemenway Wash channel will be relocated beyond the shoulder of the new roadway. Because limits of cut and fill are narrower than with Alternative B, redrawing of the flood zone will be reduced. Retaining walls along the north side of the alignment through Hemenway Wash would avoid operational impacts.
D	A theoretical flood zone was drawn for washes impacted by Alternative D. Based on this, it is estimated that 6.3 acres would be impacted.	Same as for Alternative B.	Using the theoretical flood zone continuation line, operational impacts would total 4.1 acres. There would be no impacts to any regulatory floodways.	The least mitigation is needed for Alternative D. Improvements to drainage channels would be incorporated into the alternative design, and bridge structures or culverts under the new roadway will be incorporated into the hydraulic modeling.

TABLE ES-1
Summary of Impacts and Mitigation

		Cultural Resources (see Section 4.8)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	None.	Not applicable.	None.	Not applicable.
B	Effects to three archaeological sites eligible for the National Register of Historic Places (NRHP). Effects to 26 historic structures or groups of structures listed on or eligible for the NRHP.	Specific measures will be developed subsequent to an effects assessment, which will be prepared after the completion of detailed engineering design, in consultation with the SHPO, interested Native American groups, and other interested parties. Mitigation options include photographic recording, excavation, artifact analysis and curation, and archival research. Documentation of viewshed, structure relocation, interpretive signing, and Historic American Engineering Record (HAER) documentation. Additionally, a Memorandum of Agreement (MOA) has been entered into by FHWA, NDOT, Reclamation, BLM, and SHPO. The purpose of this MOA is to address the mitigation of impacts to one archaeological site on Reclamation and BLM land.	Same as construction impacts.	Same as construction mitigation measures.

TABLE ES-1
Summary of Impacts and Mitigation

		Cultural Resources (see Section 4.8)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
C	Effects to five archaeological sites eligible for the NRHP. Effects to 25 historic structures listed on or eligible for the NRHP.	Same as for Alternative B.	Same as construction impacts.	Same as construction mitigation measures.
D	Effects to three archaeological sites eligible for the NRHP. Effects to nine historic structures eligible for NRHP.	Same as for Alternative B. In addition, for the preferred alternative, procedures to develop the effects assessment and subsequent mitigation measures, including further Native American consultation, are stipulated in the Programmatic Agreement executed by agencies managing the affected resources, NDOT, FHWA, and the SHPO.	Same as construction impacts.	Same as construction mitigation measures.

TABLE ES-1
Summary of Impacts and Mitigation

Land Use/Section 4(f) (see Section 4.9)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	Five buildings would be demolished to provide for improvements associated with Alternative B. Commercial land uses adjacent to U.S. 93 may experience temporary access changes or restrictions during construction. Residential areas within Boulder City may be subject to detours due to construction activity. Hotel and casino land uses adjacent to U.S. 93 may experience temporary reroutings and detours during construction. Use of recreation lands noted immediately to the right under “Operational Impacts” would begin during the construction phase of this alternative.	If right-of-way is needed, the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 will govern the acquisition of any right-of-way necessary for this project. Relocation resources will be made available to all residential (if any) and business relocatees without discrimination. More detailed information on right-of-way acquisition and relocation assistance can be obtained by calling or visiting the Nevada Department of Transportation, Right-of-Way Office, 123 East Washington, Las Vegas, Nevada; telephone (702) 385-6540. A Traffic Control Plan would be prepared prior to commencement of construction activity, with inspection and enforcement during construction.	Proposed median islands would alter ingress and egress to commercial land uses. Some commercial structures would lose some parking and/or frontage and signage. However, better access would be provided to local businesses on existing U.S. 93. Approximately 48 acres of recreational land would be subject to use under Section 4(f), consisting of about 46 acres (or 0.0031%) of the LMNRA and about 2 acres of the River Mountains Loop Trail. This alignment would be inconsistent with several key Guiding Principles of the Boulder City Master Plan and constitute an unmitigatable adverse impact. Electrical utility transmission line impacts are expected at the west and east ends of the project area.	Measures to minimize harm to Section 4(f) lands have been developed and will be implemented in consultation with the affected jurisdictions. Coordination of electrical utility tower and line relocations with WAPA and/or responsible utility companies will be required.

TABLE ES-1
Summary of Impacts and Mitigation

		Land Use/Section 4(f) (see Section 4.9)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
C	Commercial land uses adjacent to U.S. 93 may experience temporary access changes or restrictions during construction. Impacts would be less than with Alternative B. Hotel and casino land uses adjacent to U.S. 93 may experience temporary reroutings and detours during construction. Use of recreation lands noted immediately to the right under “Operational Impacts” would begin during the construction phase of this alternative.	Same as for Alternative B.	Approximately 91 acres of recreational land would be subject to use under Section 4(f), consisting of about 41 acres (or 0.0027%) of the LMNRA, about 2 acres of the River Mountains Loop Trail, and about 48 acres of the planned Boulder Ridge Golf Course. Similar to Alternative B, this alignment would be inconsistent with several key Guiding Principles of the Boulder City Master Plan. This would constitute an adverse impact although not as severe as that occurring from Alternative B. Approximately 37 acres of land designated for Public and Public/Quasi-Public uses would be unusable for that purpose under Alternative C. Impacts to land designated for medium-density residential development in Hemenway Wash would occur. However, Alternative C provides increased support for the promotion of bicycle routes. Residential uses located south of the existing alignment would benefit from improved local vehicle circulation. Electrical utility transmission line impacts are expected at the west and east ends of the project area, and in the vicinity of upper Hemenway Wash.	Right-of-way mitigation same as for Alternative B. Measures to minimize harm to Section 4(f) lands have been developed and would be implemented in consultation with the appropriate jurisdictions. Electrical utility tower and line relocations will be coordinated with WAPA and/or responsible utility companies.

TABLE ES-1
Summary of Impacts and Mitigation

Alt.	Construction Impacts	Mitigation	Operational Impacts	Mitigation
		Land Use/Section 4(f) (see Section 4.9)		
D	Hotel and casino users adjacent to U.S. 93 may experience temporary reroutings and detours during construction. Use of recreation lands within the LMNRA, noted immediately to the right under "Operational Impacts," would begin during the construction phase of this alternative.	Same as for Alternative B.	Interchanges near the hotel/casino developments would change existing access. Alternative D would require the use of approximately 59 acres (0.0039%) of LMNRA land, which would be subject to Section 4(f) provisions. Operation of this proposed alignment would bypass the majority of land uses within Boulder City. Therefore, implementation of Alternative D would not create substantive conflicts with land use plans as articulated in the Boulder City Master Plan. Diversion of traffic away from developed land uses would benefit residential development within Boulder City. Electrical transmission line impacts are expected at the west end of the project area, in the vicinity of Mead Substation, north of the rifle range, and in the LMNRA (south of the Hacienda Hotel and Casino).	Right-of-way mitigation same as for Alternative B. Measures to minimize harm to Section 4(f) lands have been developed and would be implemented in consultation with the affected jurisdictions. Electrical utility tower and line relocations will be coordinated with WAPA and responsible utility companies.

TABLE ES-1
Summary of Impacts and Mitigation

Visual Impacts (see Section 4.10)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Future traffic increases would make it more difficult for drivers to enjoy views.	Not applicable.
B	Temporary changes to the visual environment in the Boulder City area would result from construction activities. Fugitive dust, the presence of construction equipment, and light emitted during nighttime construction would impact views. Less dust would be generated along Alternative B than Alternatives C and D.	Visual impacts due to dust would be minimal with implementation of dust suppression techniques, a dust mitigation plan, and the intermittent construction schedule. If nighttime construction occurs, lights will be shielded and directed away from residences.	Would alter views from several residential areas, resulting in unavoidable adverse impacts on views of Lake Mead from the Laguna Lane residences. Patrons' views from the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino would be altered, but minimally. Permanent highway lighting at major street crossings in Hemenway Valley would result in nighttime glare in some residential areas. The viewscape in the Boulder City area would be directly impacted. However, Alternative B would result in the least amount of viewscape alteration.	Impacts to viewsheds of historic structures will be mitigated according to the stipulations of the PA. Noise barriers, retaining walls, and cut and fill slopes will be designed to be aesthetically pleasing; and their color will blend with the surrounding environment. Bridge embankments will be treated to minimize erosion and planted with xeriscape vegetation. A trash collection program will be implemented along the highway under NDOT maintenance or the Adopt-A-Highway Program. Highway lighting will be shielded away from residences. As part of the design process, corridor landscaping will be addressed; and the desires of the stakeholders will be considered. NDOT's landscape policy will describe a landscaping minimum. The local agency (city, county, or RTC) may enhance the landscape design at any time, while staying within the policy guidelines, including the plant list and safety standards. The local entity will be expected to fund and maintain any enhancements.

TABLE ES-1
Summary of Impacts and Mitigation

Visual Resources (see Section 4.10)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
C	Fugitive dust, the presence of construction equipment, and light emitted during nighttime construction would impact views. Alternative C would generate more dust than Alternative B, but less than Alternative D. Temporary changes to the visual environment in the Boulder City area would result from construction activities.	Same as for Alternative B.	Would alter views from several residential areas, resulting in unavoidable adverse impacts on views of Lake Mead from the Laguna Lane residences. Major visual impacts to two historic structures. Patrons' views from the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino would be altered, but minimally. Permanent highway lighting at major street crossings in Hemenway Valley would result in nighttime glare in some residential areas. The viewscape in the Boulder City area would be directly impacted.	Impacts to viewsheds of historic structures will be mitigated according to the stipulations of the PA. Cut and fill slopes and retaining walls will be designed to be aesthetically pleasing, and their color will blend with the surrounding environment. Bridge embankments will be treated to minimize erosion and planted with xeriscape vegetation. A trash collection program will be implemented along the highway under NDOT maintenance or the Adopt-A-Highway Program. Highway lighting will be shielded away from residences. Corridor landscaping will be addressed as part of the design process.

TABLE ES-1
Summary of Impacts and Mitigation

		Visual Resources (see Section 4.10)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
D	Fugitive dust and the presence of construction equipment would impact some views. Alternative D would generate the most dust of all the alternatives; however, it would affect the least views.	Visual impacts due to dust would be minimal with implementation of dust suppression techniques, a dust mitigation plan, and the intermittent construction schedule.	Patrons' views from the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino would be altered, but minimally. The viewscape south of the developed portion of Boulder City would be directly altered. Alternative D would result in the most new roadway development through undeveloped area. This would result in the greatest viewscape modification south of the developed portion of Boulder City, but the least alteration from most vantage points within the City itself.	Cut and fill slopes and retaining walls will be designed to be aesthetically pleasing, and their color will blend with the surrounding environment. Bridge embankments will be treated to minimize erosion and planted with xeriscape vegetation. A trash collection program will be implemented along the highway under NDOT maintenance or the Adopt-A-Highway Program. A lookout point of Lake Mead will be developed on Eldorado Ridge. Corridor landscaping will be addressed as part of the design process.

TABLE ES-1
Summary of Impacts and Mitigation

Economic Impacts (see Section 4.11)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	Hiring construction workers, subsequent worker expenditures, and purchasing construction materials would result in positive regional economic benefits from increased sales, employment, and earnings. Negative local business sales impacts may also occur due to the impacts listed below. Congestion, noise, dust, and interrupted or reduced access to businesses could result in reduced revenue. Traffic delays could result in a temporary increase in transportation costs for the delivery of goods and services. Commercial trucks and vehicular traffic may experience delays during construction of the interchanges at the western and eastern project limits. The hotel/casino developments may experience short-term reroutings and detours. Retail businesses would be impacted due to reduced accessibility and visibility.	A Traffic Control Plan will be prepared prior to commencement of construction activity. The use of flaggers, detours, and temporary signage may alleviate these impacts.	Proposed median islands would make access to some businesses more difficult than with Alternative A. This could result in lower revenues to businesses dependent on drive-by traffic. Five businesses would be removed, slightly reducing employment opportunities.	U-turns would be possible at selected locations. Right-of-way mitigation, described under Land Use (Section 4.11), would be applied.

TABLE ES-1
Summary of Impacts and Mitigation

		Economic Impacts (see Section 4.11)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
C	Construction would result in positive regional economic benefits from increased sales, employment, and earnings. Negative local business sales impacts may also occur, but would be less than from Alternative B. Intermittent delays to traffic would occur. Commercial trucks and vehicular traffic may experience delays during construction of the interchanges at the western and eastern project limits. The hotel/casino developments may experience short-term reroutings and detours.	Same as for Alternative B.	Lower sales, employment, and tax revenue could be experienced by the retail district along U.S. 93 between Veterans Memorial Drive and Canyon Road.	Highway signs indicating the availability of food, gas, and lodging services may be placed prior to each new interchange.

TABLE ES-1
Summary of Impacts and Mitigation

Economic Impacts (see Section 4.11)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
D	Construction would result in positive regional economic benefits due to increased sales, employment, and earnings. Negative local business sales impacts would occur, but would be less than that resulting from the implementation of Alternative B or C. Commercial trucks and vehicular traffic may experience delays during construction of the interchanges at the western and eastern project limits. Traffic accessing the hotel/casino developments may experience short-term reroutings and detours.	Same as for Alternative B.	Alternative D is likely to result in a noticeable, short-term negative economic impact to the town. In the long-term, it is uncertain if Boulder City would experience more or less economic growth than it would under the other alternatives, but a severe long-term negative impact is unlikely.	Same as for Alternative C.

TABLE ES-1
Summary of Impacts and Mitigation

Social Impacts (see Section 4.12)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	As traffic volumes continue to increase, congestion problems would increase along the existing alignment, as well as indirect impacts to air quality and from noise. The increased traffic volumes would also exacerbate barrier effects, impeding access for pedestrians and bicyclists, as well as local traffic to segments of the community separated by this route. High crash rates along U.S. 93 would remain the same or worsen.	These adverse impacts would not be mitigated without some change to the physical configuration of U.S. 93.
B	Effects from construction that contribute to social impacts from the implementation of this alternative are discussed in the FEIS sections addressing Noise, Economics, Visual, Bicycles/Pedestrians, Land Use/ Section 4(f), and Air Quality. These include impacts to retail businesses due to decreased accessibility and relocation, increased noise, and fugitive dust.	Mitigation of social impacts resulting from construction of this alternative are presented in the FEIS sections addressing Noise, Economics, Visual, Bicycles/ Pedestrians, Land Use/ Section 4(f), and Air Quality for Alternative B. These include implementing a Traffic Control Plan that will include the use of flaggers, detours, and temporary signage to minimize these impacts.	Effects that contribute to social impacts resulting from the operation of this alternative are much the same as for Alternative A (above), and are described in sections addressing Noise, Economics, Visual, Bicycles/ Pedestrians, Land Use/ Section 4(f), and Air Quality for Alternative B. In addition, they would include the removal of five businesses and accessibility impacts resulting from proposed median islands, potentially resulting in some decline in revenues.	Mitigation of social impacts resulting from the effects of the operation of Alternative B would result from the enactment of the measures presented under Noise, Economics, Visual, Bicycles/Pedestrians, Land Use, Section 4(f) Evaluation, and Air Quality in this FEIS. Fair market value would be provided to the property/ business owners of the five businesses to be acquired. NDOT would follow the *Federal Highway Administration's Uniform Relocation Act* and would be responsible for administering support services to assist these property owners.

TABLE ES-1
Summary of Impacts and Mitigation

Social Impacts (see Section 4.12)				
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
C	Effects from construction that contribute to social impacts from the implementation of this alternative are discussed in the FEIS sections addressing Noise, Economics, Visual, Bicycles/Pedestrians, Land Use/ Section 4(f), and Air Quality for Alternative C. They would be somewhat less than for Alternative B.	Same as for Alternative B.	Effects from operation of Alternative C that would result in social impacts are presented in the FEIS sections addressing Noise, Economics, Visual, Bicycles/Pedestrians, Land Use/ Section 4(f), and Air Quality impacts. They would be less than those from implementation of Alternative B would, but greater than those resulting from Alternative D.	The mitigation measures described under Noise, Economics, Visual, Bicycles/Pedestrians, Land Use, Section 4(f) Evaluation, and Air Quality for Alternative C in the FEIS would also result in the mitigation of social impacts.
D	Because it lies to the south and east of Boulder City, social impacts resulting from the construction of Alternative D would be less than any other of the alternatives. These are summarized in the sections on Noise, Economics, Visual, Bicycles/Pedestrians, Land Use/Section 4(f), and Air Quality in the FEIS.	Same as for Alternative B.	The diversion of most nonlocal traffic away from developed areas in Boulder City would result in beneficial social effects through substantial alleviation of congestion, noise, and traffic safety impacts. Safety, accessibility, and connectivity would improve for bicyclists and pedestrians. Indirect economic impacts would be similar to, but greater than, Alternative C. However, impacts may be offset over time by an increase in patronage resulting from decreased congestion and consequent enhanced accessibility and attractiveness of the area. Most studies (89 percent) show that the economic effects of highway bypasses are positive over time (Chapter 4, Table 4-30).	Social impacts resulting from the implementation of Alternative D would be largely beneficial. Therefore, no mitigation of social impacts would be required for the implementation of this alternative.

TABLE ES-1
Summary of Impacts and Mitigation

		Environmental Justice (see Section 4.13)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	No impacts.	Not applicable.	No impacts.	Not applicable.
C	No impacts.	No mitigation measures would be required.	No impacts.	No mitigation measures would be required.
D	No impacts.	No mitigation measures would be required.	No impacts.	No mitigation measures would be required.

TABLE ES-1
Summary of Impacts and Mitigation

		Bicycles/Pedestrians (see Section 4.14)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Current unsafe conditions would be exacerbated in the future.	Not applicable.
B	Bicyclists and pedestrians would be detoured from U.S. 93 during construction.	A traffic control plan would be developed and implemented that will provide for the safety of bicycle and pedestrian movements.	Current unsafe conditions would be exacerbated in the future. The Gold Strike Canyon Trailhead may also be impacted.	Construct or expand sidewalks along U.S. 93. Construct bus turnouts at stops on both sides of U.S. 93 and improve lighting at the bus stops. Install crossing facilities at key intersections and on bridges. Construct or relocate bicycle facilities along the corridor. Provide pedestrian and bicycle route signage. Maintain access to Old Highway 93 and NPS backcountry roads and trails. Relocate and maintain the Hemenway Wash drainage/loop trail.
C	Bicyclists and pedestrians would be detoured from U.S. 93 during construction; however, Alternative C would have less impact than Alternative B.	Same as for Alternative B.	There would be a greater impact to recreational facilities and the trails that lead to in-town bicycle/ pedestrian facilities than with Alternative B. The Gold Strike Canyon Trailhead may also be impacted.	Provide for crossing facilities, bus turnouts, pedestrian crossings, and bicycle facilities along the corridor. Maintain access to Old Highway 93 and NPS backcountry roads and trails. Relocate and maintain the Hemenway Wash drainage/ loop trail.

TABLE ES-1
Summary of Impacts and Mitigation

Alt.	Construction Impacts	Mitigation	Operational Impacts	Mitigation
		Bicycles/Pedestrians (see Section 4.14)		
D	Access points for National Park Service (NPS) backcountry roads and other recreational trails would be temporarily cut off.	Same as for Alternative B.	Alternative D would directly impact recreational trails and NPS backcountry roads through Eldorado Mountains, and other backcountry roads including Canyon Point Road, Boy Scout Canyon Road, and WAPA powerline access roads. The Goldstrike Canyon Trailhead may also be impacted. Traffic at the crest of the Eldorado Ridge may encounter stopped vehicles and pedestrians at this location taking pictures of the expansive view of Lake Mead to the north.	Construct grade separation at Mead Substation. Maintain access to Old Highway 93 and, where possible, NPS backcountry roads and trails. A scenic overlook will be constructed at this location to include vehicle pull-outs and parking to allow visitors to take advantage of the view without creating a roadway safety hazard.

TABLE ES-1
Summary of Impacts and Mitigation

Alt.	Construction Impacts	Mitigation	Operational Impacts	Mitigation
Hazardous Waste (see Section 4.15)				
A	Not applicable.	Not applicable.	Occasional accidents may occur, resulting in the release of hazardous waste or materials. Cleanup of the release would occur in response to each accident.	Not applicable.
B	No impacts.	No mitigation measures would be required.	In comparison to Alternative A, this alternative would reduce the rate of accidents involving hazardous materials.	No mitigation measures would be required.
C	No impacts.	No mitigation measures would be required.	In comparison to Alternatives A and B, this alternative would further reduce the rate of accidents involving hazardous materials.	No mitigation measures would be required.
D	No impacts.	No mitigation measures would be required.	Same as for Alternative C. In addition, implementation of Alternative D would result in an increased probability that, should a release of hazardous waste or materials occur, it would be further from the developed areas of Boulder City.	No mitigation measures would be required.

TABLE ES-1
Summary of Impacts and Mitigation

		Energy Use (see Section 4.16)		
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Comparatively, a total of 17,555 gallons of gasoline would be used during the peak hour under this alternative.	Not applicable.
B	Fuel usage during construction of this alternative would total 334 gallons per day based on a 10-mile-per-gallon (mpg) usage rate, or 548 gallons per day based on a 5-mpg usage rate.	No mitigation measures would be required.	Comparatively, only 15,700 gallons of gasoline would be used during the 2027 peak hour, resulting in a decrease in energy consumption as compared to Alternative A.	No mitigation measures would be required.
C	Construction of Alternative C would result in the least fuel usage of all the build alternatives, totaling 322 and 523 gallons per day based on a 10-mpg and 5-mpg usage rate, respectively.	No mitigation measures would be required.	Comparatively, this alternative would consume 16,660 gallons of gasoline during the 2027 peak hour, also resulting in a decrease in energy consumption compared to Alternative A.	No mitigation measures would be required.
D	As the longest alternative, Alternative D would result in the most energy consumption during construction. Based on a 10-mpg usage rate, 340 gallons per day would be consumed by construction, support vehicles, and other equipment, while 560 gallons per day would be consumed on a 5-mpg usage rate.	No mitigation measures would be required.	The longer length of this alternative would cause an increase in energy usage, a comparative total of 18,504 gallons consumed during the 2027 peak hour. However, this would be offset by the reduction in delay time and the indirect and circulation benefits it would provide for the entire Boulder City traffic network. The net result would be an overall savings in energy usage relative to Alternative A.	No mitigation measures would be required.

TABLE ES-1
Summary of Impacts and Mitigation

	Construction Impacts (see Section 4.17)			
Alt.	**Construction Impacts**	**Mitigation**	**Operational Impacts**	**Mitigation**
A	Not applicable.	Not applicable.	Not applicable.	Not applicable.
B	Traffic rerouting to allow for the passage of construction traffic would be necessary and most intense for this alternative. Construction activities would minimize access to business along this route and to residences in the Hemenway Wash area. Pedestrian and traffic safety concerns would be greatest for this alternative.	Traffic control and safety devices to warn oncoming motorists of construction activities shall be implemented. The contractor and NDOT will determine if flaggers are required. A traffic detour plan, in accordance with NDOT and FHWA safety procedures, shall be implemented to navigate motorists, bicyclists, and pedestrians around work areas. A Traffic Control Plan shall be implemented to prevent adverse impacts due to temporary access restrictions to commercial areas. Roads damaged by construction activities shall be repaired.	Not applicable.	Not applicable.
C	Traffic rerouting to allow for the passage of construction traffic would be necessary. Traffic routing and access through the Hemenway Wash area would be similar to Alternative B. Pedestrian and traffic safety issues would not be as severe as Alternative B.	Same as for Alternative B.	Not applicable.	Not applicable.
D	Traffic rerouting to allow for the passage of construction traffic would be necessary. Alternative D would cause the least amount of construction-related traffic through town. Pedestrian and traffic safety concerns would be minimal for this alternative.	Same as for Alternative B.	Not applicable.	Not applicable.

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Major Actions Proposed by Other Governmental Agencies

The following are reasonably foreseeable actions proposed by other governmental agencies that would occur near the project area. The actions are roadway improvements proposed in Nevada and Arizona affecting the U.S. 93 corridor.

Hoover Dam Bypass Project

The FHWA Central Federal Lands Highway Division prepared and approved the *U.S. 93 Hoover Dam Bypass EIS* for a new bridge crossing of the Colorado River near the dam. The purpose of this project is to (1) minimize the potential for pedestrian-vehicle accidents on the dam crest and approaches; (2) reduce traffic congestion and accidents on a segment of a major commercial route; (3) replace an inadequate highway river crossing with one that meets current roadway design criteria; (4) reduce travel time in the dam vicinity; and (5) protect Hoover Dam employees, visitors, equipment, power generation capabilities, and Colorado River waters while enhancing the visitors' experience at Hoover Dam.

In March 2001, FHWA released a ROD for the project identifying the Sugarloaf Mountain alignment as the preferred alternative. This alternative will take 5 years to construct, and completion is scheduled for 2007. The new bridge will cross the Colorado River about 460 meters (m) (1,500 feet) downstream of Hoover Dam and includes construction of approximately 3.5 km (2.2 miles) of highway approach in Nevada, a 579-m-long (1,900-ft-long) bridge, and approximately 1.7 km (1.1 miles) of highway approach in Arizona.

On the Nevada side, the new highway will diverge from U.S. 93 east of the Hacienda Hotel and Casino. The highway will run just south of U.S. 93 and cross in the vicinity of the Reclamation warehouse. The highway will then descend southeasterly to a new long-span bridge over the Colorado River. From the east end of the proposed bridge, the highway will traverse the northern base of Sugarloaf Mountain and then turn south, crossing a wide ravine, and reconnect to U.S. 93 in Arizona.

In the summer of 2001, FHWA proceeded with the design and implementation of the Hoover Dam Bypass project. In early 2003, construction began on the Arizona approach portion of the project, starting the first of five construction phases for this project. The entire project is planned for completion in 2008.

U.S. 93 Widening in Arizona

In August 2001, the Arizona Department of Transportation (ADOT) commenced work on an Environmental Assessment (EA) for a U.S. 93 improvement project in the LMNRA. ADOT proposes to widen and improve the present two-lane U.S. 93 to four lanes from the intersection of the new Hoover Dam Bypass highway to the improved four-lane divided section 21 km (13 miles) to the south at the LMNRA boundary. This segment of roadway is the final link for planned improvement of the U.S. 93 corridor between I-40 near Kingman and the Arizona terminus of the Hoover Dam Bypass Project. After the completion of the feasibility study and initial public scoping for this project, it was determined that widening of the present corridor is the most practicable approach. The Finding of No Significant

Impact (FONSI) for this project was signed in September of 2004, and work on the design of its first phase is scheduled to begin in 2006.

U.S. 95 Widening in Nevada

NDOT has a project in the 3-year Statewide Transportation Improvement Program (STIP) to widen the two-lane segment of U.S. 95 from Laughlin Highway (State Route [SR] 163), which is west of Laughlin, to U.S. 93 west of Boulder City. This segment of U.S. 95 will be widened to a four-lane highway. Improvements to U.S. 95 will be a three-phase project. The first phase was from the northern limits of Searchlight to 29 km (18 miles) north. This phase was completed in the fall of 2003. The second phase was from the northern end of the first phase, to the junction with U.S. 93 near Railroad Pass. Phase 2 was developed to be compatible with the preferred alternative (Alternative D), and was completed by late 2004. The third phase is from Searchlight to SR 163, 32 km (20 miles) to the south. Phase 3 is divided into two projects. Phase 3A will extend from SR 163 to the southern town limits of Searchlight, and is scheduled to be complete in summer 2006. Phase 3B will be from the southern to northern town limits, and is scheduled for completion in spring 2007. Phase 3A will be widening of the highway from two to four lanes, while Phase 3B will be widening from two to five lanes through town.

Other Federal Actions Required for This Project

Federal actions, including permit approvals and land transfers, needed for this project include those listed in Table ES-2.

TABLE ES-2
Federal Permits and Approvals Anticipated for the Boulder City/U.S. 93 Corridor Study

Federal Agency	Regulated Activity	Required Permit or Approval
U.S. Army Corps of Engineers	Discharge of dredge or fill material into U.S. waters	Section 404 Permits
State Historic Preservation Office	Potential of adverse effects on Historic Properties	Concurrence required by the Programmatic Agreement between affected agencies, SHPO, and ACHP, including concurrence from SHPO regarding effects to Historic Properties
NPS	Use of right-of-way for roadway	Easement
U.S. Bureau of Land Management	Use of right-of-way for roadway	Easement
Reclamation	Use of right-of-way for roadway	Easement
WAPA	Use of right-of-way for roadway	Easement
U.S. EPA	Stormwater discharges	NPDES Permit
USFWS	Impacts on special-status plant and wildlife species	Section 7 Biological Opinion

Next Steps in Corridor Study Process

The Boulder City/U.S. 93 Corridor Study FEIS will be used to determine and facilitate the various discretionary and stipulated actions required to implement the project (Table ES-2). These decisions will be identified in the ROD. Statements on the FEIS will be accepted and considered in the decision on this proposed action. The FEIS is being distributed for a minimum 30-day review period.

While issuance of the ROD completes the National Environmental Policy Act (NEPA) review process, consultation and other activities to maintain compliance with applicable regulations will continue. As noted above and throughout the FEIS, refined engineering details will be needed to coordinate the development of further mitigation and compliance actions. These details will allow completion of consultations with appropriate resource management and oversight agencies (Table ES-2), such as the SHPO (develop and implement final cultural resources mitigation measures under the PA), NDOW and USFWS (develop and implement final biological resources mitigation measures pursuant to the Endangered Species Act [ESA]), and the USACE and U.S. EPA (measures to mitigate impacts to waters of the U.S. and pollution control and prevention pursuant to the Clean Water Act [CWA]).

In addition to FHWA's approval of the ROD, the Nevada Revised Statutes (NRS) require approval of the board of county commissioners of the county in which freeways are proposed, and approval of the city council of any incorporated city directly affected thereby, before the project can move forward to construction. The ROD will explain the reasons for the project decision, based on information contained in the EIS, and document mitigation measures that will be incorporated in the project. After development of final design plans and specifications and acquisition of needed right-of-way and easements, construction may proceed.

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Acronyms

AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACRE	Associated Cultural Resource Experts
ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
ADT	average daily traffic
AFDC	Aid to Families with Dependent Children
AM	average mean
APE	area of potential effects
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATV	all-terrain vehicle
BA	Biological Assessment
BCBRR	Boulder City Branch Railroad
BDCU	Boulder Dam Credit Union
BFE	base flood elevation
bgs	below ground surface
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BP	before present
BWQP	Bureau of Water Quality Planning
°C	degrees Celsius
CAA	Clean Air Act
CANAMEX	Canada-to-Mexico corridor
CAT	Citizens Area Transit
CCC	Civilian Conservation Corps
CCDCP	Clark County Desert Conservation Program
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
cm	centimeters
CO	carbon monoxide
CWA	Clean Water Act
CWG	Community Working Group
DAQM	Department of Air Quality Management
dBA	decibel A-weighted
DEIS	Draft Environmental Impact Statement
DMHNSR	Division of Museums and History of Nevada State Railroad

1. Purpose and Need

1.1 Proposed Action

The proposed project involves traffic improvements to United States Highway 93 (U.S. 93) in the Boulder City, Nevada, area. The project limits are between a western boundary at the end of Interstate 515 (I-515) on U.S. 93/United States Highway 95 (U.S. 95) in Henderson (U.S. 95 Milepost [MP] 59.10), approximately 1.6 kilometers (km) (1 mile) north of the Railroad Pass Hotel and Casino, and an eastern boundary on U.S. 93, approximately 1.2 km (0.75 miles) east of the Hacienda Hotel and Casino. The eastern boundary is coincident with the planned western end of the U.S. 93 Hoover Dam Bypass project Nevada Interchange (see Section 2.1). The Boulder City/U.S. 93 Corridor Study covers a total distance of approximately 16.7 km (10.4 miles) on the present route of U.S. 93 (Figure 1-1).

U.S. 93 is the major commercial corridor for interstate and international commerce, and it is the single route through Boulder City, functioning as a principal urban arterial. It is a direct north-south link between Phoenix and Las Vegas, which are two of the fastest-growing areas in the United States (U.S.), and it carries a high volume of east-west traffic from Interstate 40 (I-40) to Las Vegas and to Interstate 15 (I-15). U.S. 93, in combination with other highways, creates a continuous Canada to Mexico (CANAMEX) corridor through the U.S. between Calgary, Alberta, and Nogales, Sonora (Figure 1-2). In Nevada, U.S. 93/95 is a four-lane divided facility from Las Vegas to just east of the U.S. 93/95 interchange in Boulder City. U.S. 93 and U.S. 95 are National Highway System (NHS) routes. In Arizona, U.S. 93 is a four-lane divided highway from Kingman to the Lake Mead National Recreation Area (LMNRA) boundary; the remaining segment of U.S. 93, totaling approximately 27 km (17 miles) from the LMNRA boundary over Hoover Dam to the eastern limit of the Boulder City Corridor Study near the Hacienda Hotel and Casino, is a two-lane undivided highway. Within the study corridor, U.S. 93 varies from a four-lane divided roadway to a two-lane roadway with numerous business driveways and cross streets.

The Federal Highway Administration (FHWA), in cooperation with the Nevada Department of Transportation (NDOT), is studying the Boulder City/U.S. 93 corridor and has prepared this Environmental Impact Statement (EIS) for a project to improve this highway corridor, located in Clark County, Nevada. The Draft EIS (DEIS) for the project, released to the public in March 2002, considered the following alternatives: (1) taking no action (Alternative A); (2) improving U.S. 93 on the existing alignment (Alternative B); (3) realignment of U.S. 93 as a new four-lane, limited-access highway parallel to existing U.S. 93 (Alternative C); and (4) realignment of U.S. 93 as a new four-lane, limited-access highway by bypassing the developed area of Boulder City to the south (Alternative D).

FHWA is the lead agency, and NDOT is serving as the sponsoring agency for the Boulder City/U.S. 93 Corridor Study. Cooperating agencies consist of the National Park Service (NPS), U.S. Bureau of Reclamation (Reclamation), Western Area Power Administration (WAPA), Bureau of Land Management (BLM), Regional Transportation Commission of Southern Nevada (RTC), Clark County, and the cities of Boulder City and

Henderson. The corridor study is a vital element in RTC's Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP) and NDOT's Statewide Improvement Program (STIP).

1.2 Purpose of the Project

The purpose of the project is to provide overall transportation improvements in the corridor by reducing traffic congestion and crashes, and to improve regional mobility while maintaining or improving local circulation and access to Boulder City businesses. The proposed Boulder City/U.S. 93 transportation improvements address:

- Resolving traffic problems in the vicinity of Boulder City
- Extending freeway status to the U.S. 93/95 interchange
- Improving operations at the junction of U.S. 93/95
- Creating a safer transportation corridor
- Accommodating future transportation demand
- Improving system linkage on U.S. 93 and maintaining route continuity

1.3 Need for the Project

1.3.1 Roadway Capacity

Traffic Demand and Level of Service

Traffic demand on the U.S. 93 roadway links in the project area has exceeded available capacity. One critical aspect of this demand-to-capacity problem is the high percentage of trucks, exacerbated by the relatively steep grades. Other key factors that limit capacity through this section of U.S. 93 are traffic signals and numerous access points to adjacent businesses and neighborhoods.

Traffic volumes in the Boulder City/U.S. 93 corridor will continue to increase in the future, and most segments and intersections will reach Level of Service (LOS) F in the next 10 years (Table 1-1). Table 1-2A shows current and projected average annual daily traffic (AADT) volumes and Volume/Capacity (V/C) ratios for key roadway segments; and Table 1-2B shows LOS at key intersections on U.S. 93 within the study limits (Figure 1-3). The tables also show the approximate year when LOS F is anticipated for each segment and intersection.

Traffic performance at key intersections and segments along the U.S. 93 corridor can be characterized on the basis of field observations of traffic conditions conducted in February 2000.

- Railroad Pass Intersection – LOS D currently occurs at the signalized intersection of U.S. 93/95 and the Railroad Pass Hotel and Casino. The combination of a steep grade, high truck traffic volumes, high travel speeds, minimal stopping sight distances, and sharp curves in the vicinity of this intersection increases delay and reduces safety. Based on forecast traffic volumes, this intersection will experience LOS F by 2004.

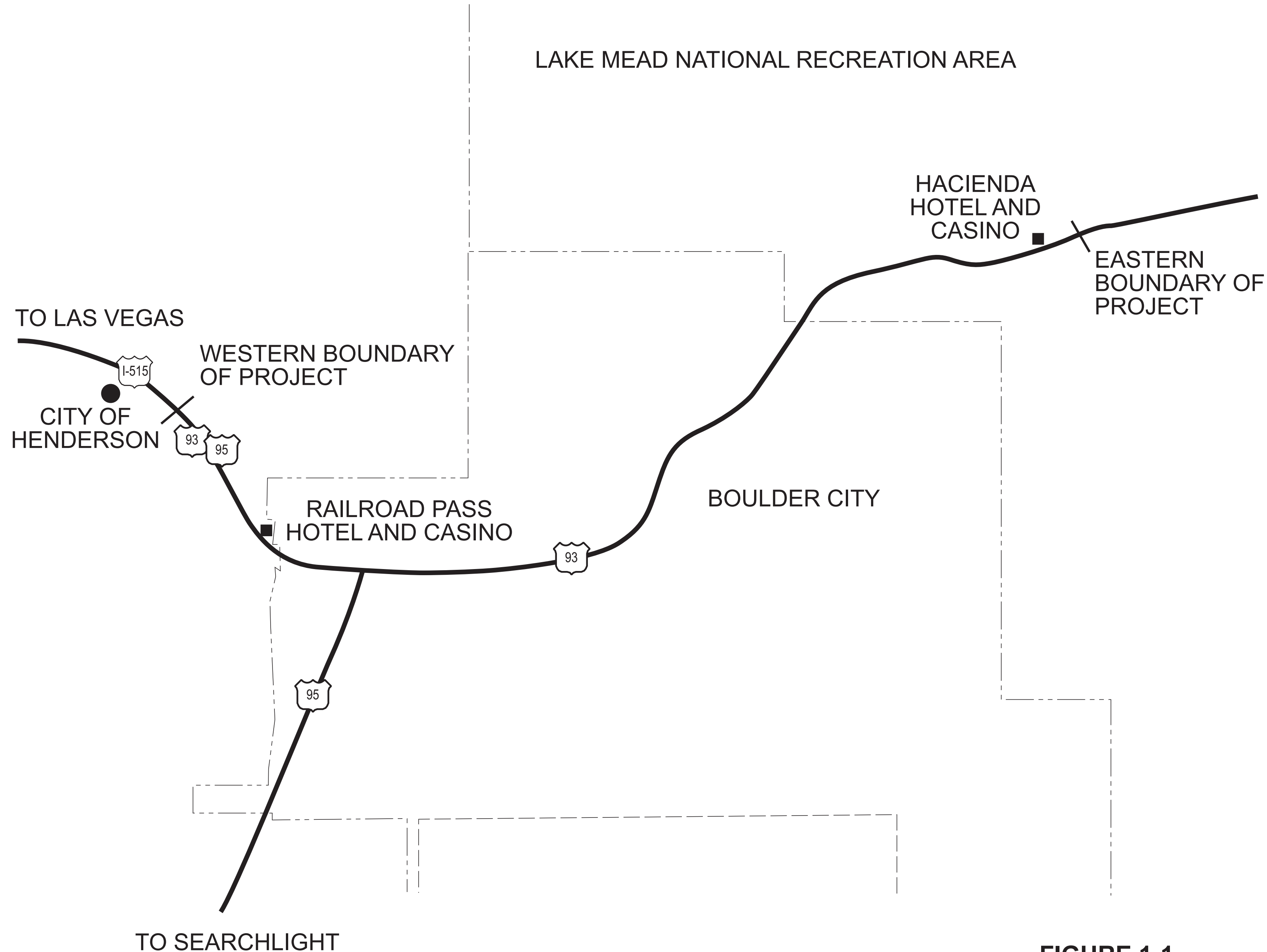

FIGURE 1-1
PROJECT VICINITY AND STUDY LIMITS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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FIGURE 1-2
U.S. 93 TRANSPORTATION CORRIDOR
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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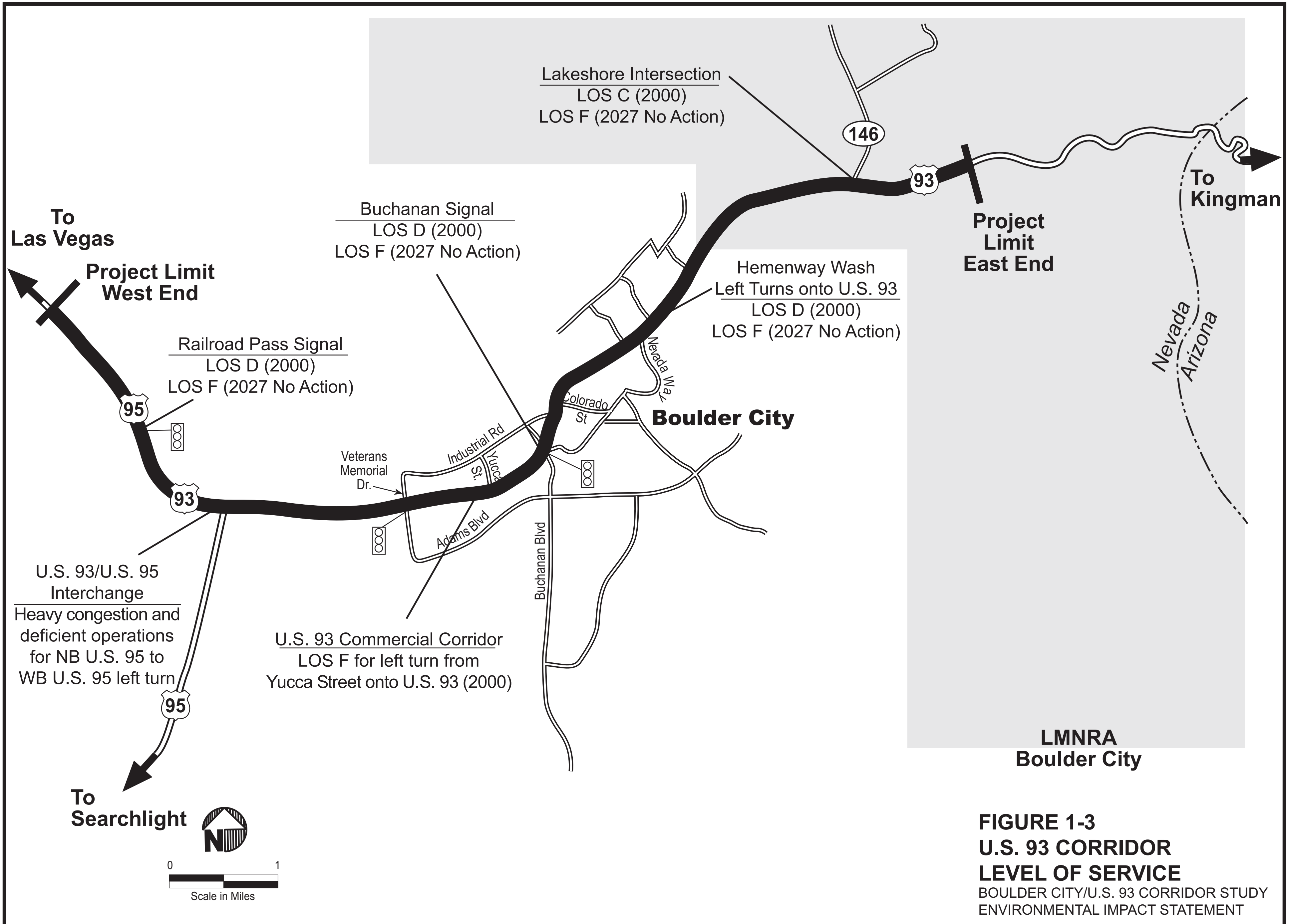

FIGURE 1-3
U.S. 93 CORRIDOR
LEVEL OF SERVICE
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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TABLE 1-1
Levels of Service (LOS)

Freeway LOS	Maximum Density (Passenger Cars/Mile/Lane)	Description
A	10	Free-flow operation. The ability to maneuver is almost completely unimpeded.
B	16	Reasonably free-flow operation. The ability to maneuver is only slightly restricted.
C	24	Near free-flow operation. The freedom to maneuver is noticeably restricted.
D	32	Speeds begin to decline. The freedom to maneuver is more noticeably limited.
E	39.3	Operation is at capacity. There is very limited room to maneuver.
F	–	Breakdown in vehicular flow.

TABLE 1-2A
Traffic Volumes (AADT) and Volume/Capacity Ratios (V/C) along U.S. 93

Location on U.S. 93	NDOT Counting Station	1999		2016		2027		LOS F by Year[2]
		AADT[1]	V/C	AADT	V/C	AADT	V/C	
West study limit to U.S. 93/95 interchange	230	38,300	0.63	56,300	0.92	66,000	1.12	2021
U.S. 93/95 interchange to Veterans Memorial Drive	331509	32,000	0.53	47,200	0.78	55,000[3]	0.94	2033
Veterans Memorial Drive to Buchanan Boulevard	1087	31,200	0.94	35,900	1.08	42,000	1.17	2006
Buchanan Boulevard to Pacifica Way	228	16,000	0.79	31,500	1.48	37,000	1.92	2004
Pacifica Way to Lakeshore Road	225	15,000	0.91	24,800	1.49	31,000	1.87	2002
Lakeshore Road to east study limit	222	13,000	0.79	21,500	1.30	29,000	1.63	2006

[1] The average daily traffic volumes have been adjusted for seasonal changes, per NDOT factoring procedures.
[2] Assumes straight-line growth.
[3] Assumes 22,000 ADT is diverted to the local network.

TABLE 1-2B
Projected LOS and First Year of LOS F at U.S. 93 Intersections

Location	1999 LOS	2016 LOS	2027 LOS	LOS F by Year[2]
U.S. 95 at Railroad Pass Hotel and Casino	D	F	F	2004
U.S. 93 at Buchanan Boulevard	D	E	F	2018
U.S. 93 at Lakeshore Road[1]	C	F	F	2006

[1] Assumes the intersection will not be signalized
[2] Assumes straight-line growth

- U.S. 93/95 Interchange – Failing operations were observed at this interchange for the northbound-to-westbound turning movement. The combination of truck traffic, steep grade, and the 90-degree turn at the intersection results in a peak-period queue of approximately 0.4 km (0.25 mile). Without improvements to this interchange, it is expected that this type of congestion will occur during more hours of the day and cause queuing to extend over a greater distance.
- U.S. 93 Strip Commercial Segment west of Buchanan Boulevard – LOS F currently occurs for drivers entering U.S. 93 at unsignalized intersections, public streets, and private driveways. Traffic making a left turn from the intersecting streets or driveways is forced to wait for a gap in traffic along U.S. 93 before making the turn. The high volume of cross traffic along U.S. 93 increases delay and reduces safety for vehicles making these movements.
- U.S. 93 through Hemenway Wash – LOS D is currently occurring for vehicles turning left onto U.S. 93. Using forecast traffic volumes for 2016 and 2027, LOS F will occur at these intersections in future years.

Traffic Diversion

Increasingly, Boulder City local traffic is diverting onto Veterans Memorial Drive. During the March 2000 Origin and Destination (O&D) survey, approximately 300 left turns were observed being made onto westbound U.S. 93 during the morning survey period. This would equate to an AADT of approximately 5,000 to 7,000 vehicles per day.

Travel Time

Time trials conducted in August 1999 determined that the average running speed for the 11.2-km (7-mile) Boulder City segment of U.S. 93 was 71 kilometers per hour (km/h) (44 miles per hour [mph]). For comparison, the average running speed for the 87-km (54-mile) segment of U.S. 95 from the U.S. 93/95 interchange to State Route (SR) 163 was 101 km/h (63 mph). Furthermore, out of the 288-km (179-mile) "loop" consisting of U.S. 93 between Henderson and Kingman, SR 68, SR 163, and U.S. 95, only the 9.6-km (6-mile) Hoover Dam crossing segment of these two Kingman-to-Henderson corridors operates at a lower average running speed than the Boulder City segment (24 km/h [15 mph] versus 71 km/h [44 mph]).

1.3.2 Roadway Deficiencies

U.S. 93 varies from a full-freeway section with a 110-km/h (70-mph) design standard at the western terminus of the study (near the Foothills Road grade separation) to a two-lane section at the project's eastern terminus (near the Hacienda Hotel and Casino). Within these study limits, the U.S. 93 roadway contains numerous deficiencies, including a broad range of design speeds, roadway sections, and geometry. Uncontrolled access conditions at various points and an at-grade railroad crossing add to the deficiencies. Figure 1-4 depicts the locations of roadway deficiencies along the U.S. 93 corridor within the study limits.

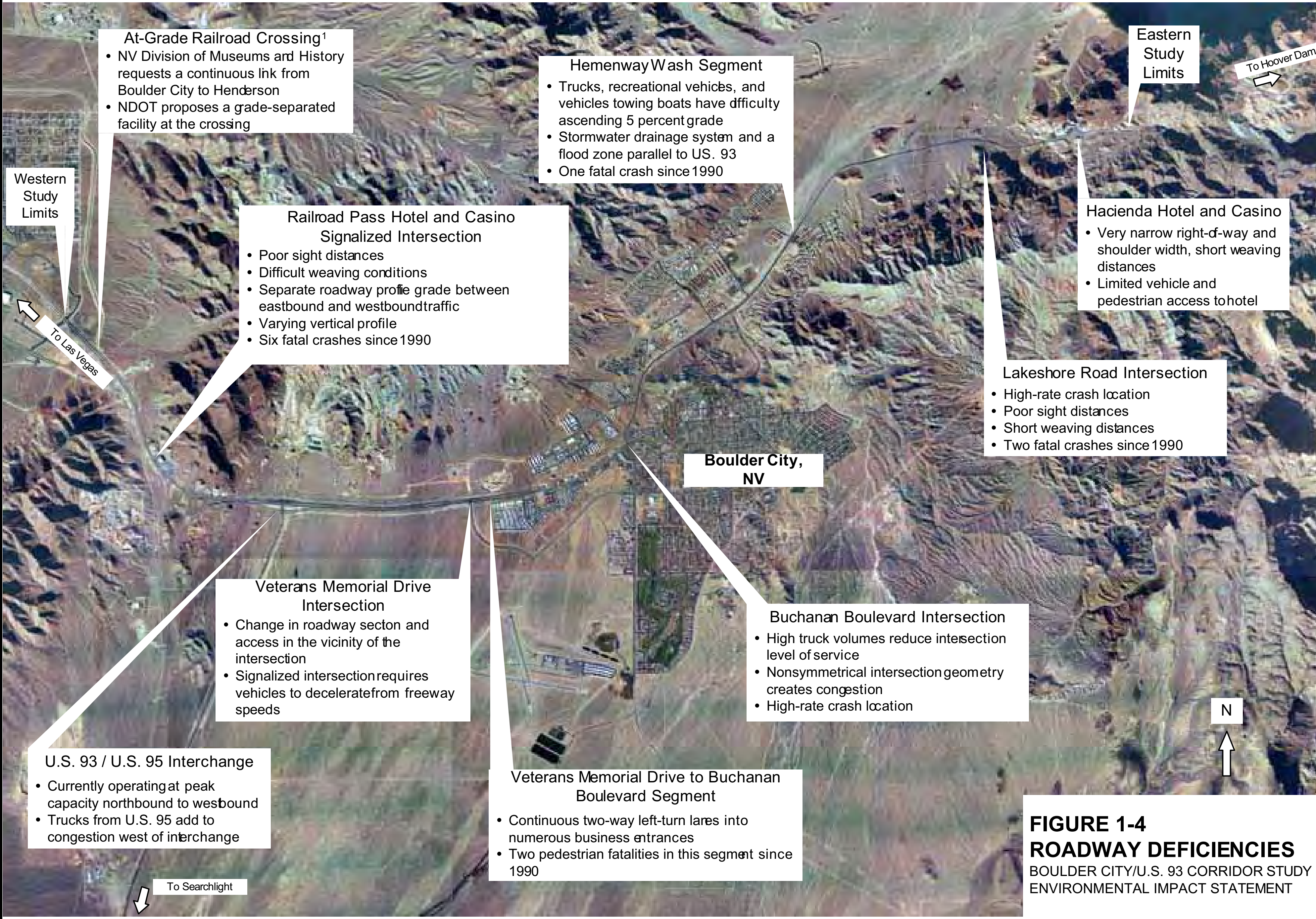

FIGURE 1-4
ROADWAY DEFICIENCIES
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

[1]Closed by NDOT in 1993 for traffic safety.

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1.3.3 Safety

Crash Rates along the Existing U.S. 93 Corridor

Traffic on U.S. 93 in Boulder City from Railroad Pass to Buchanan Boulevard has almost doubled over the last 15 years, from 17,200 AADT in 1985 to 32,000 AADT (between U.S. 93/95 to Veterans Memorial Drive) in January 2000. This equates to approximately 5.7 percent annual traffic growth along the U.S. 93 corridor through Boulder City. As shown in Table 1-2A, present traffic volumes are highest, approximately 38,000 AADT, between the west study limit and the U.S. 93/95 interchange. In response to increasing volumes in this area, NDOT closed the at-grade railroad crossing west of Railroad Pass in 1993 for traffic safety. It is anticipated that the number of crashes will grow commensurate with a continued increase in volumes. Two purposes of the project are resolving traffic problems in the vicinity of Boulder City and creating a safer transportation corridor. This will be accomplished partly by identifying corrective measures to reduce the number of crashes at the intersections of U.S. 93/95 and Railroad Pass Hotel and Casino, Buchanan Boulevard, and Lakeshore Road.

U.S. 93 Corridor Crash History

A total of 805 crashes were recorded in the period from January 1, 1994, to December 31, 1999, on the 18.2-km (11.3-mile) section of U.S. 93 passing through Boulder City between Milepost (MP) 13.81 (Foothills Road) and MP 2.5 (Hacienda Hotel). Of the 805 crashes, 715 involved passenger cars, while the others (11 percent) involved buses or large trucks. Table 1-3 categorizes the crashes occurring in this timeframe, dividing the 18.2-km (11.3-mile) length of U.S. 93 into four segments (note that the Buchanan Boulevard intersection is in Segment 3).

According to NDOT statistics, in almost every crash the cause was partially attributable to existing highway conditions such as sharp curves, uncontrolled access, poor sight distances, inadequate weaving distances, and vehicles accelerating into the traffic flow on a high-speed facility.

These data are converted to crash rates per million vehicle miles (MVM) in Table 1-4. Crash rates are determined by using the AADT values for the type of vehicle and the segment of the corridor, according to the following equation:

crashes/MVM = (# crashes) (10^6) / [(length of roadway) (AADT) (# days in study period)]

Within the U.S. 93 corridor defined by this project, NDOT has determined the following three intersections to be “high-crash intersections”:

- U.S. 93/95 at Railroad Pass Hotel and Casino: U.S. 93/95 MP 56.23 (within Segment 1)
- U.S. 93 at Buchanan Boulevard: U.S. 93 MP 8.08 (within Segment 3)
- U.S. 93 at Lakeshore Road: U.S. 93 MP 4.02 (within Segment 4)

TABLE 1-3
Number of Crashes in the U.S. 93 Study Corridor
January 1, 1994, to December 31, 1999

Type of Vehicle	Segment 1: U.S. 93/95 MP 13.81 (Foothills) to MP 11.36 (U.S. 93/95)	Segment 2: U.S. 93 MP 11.36 (U.S. 93/95) to MP 8.08 (just west of Buchanan)	Segment 3: U.S. 93 MP 8.08 (just west of Buchanan) to MP 6.65 (Nevada Way)	Segment 4: U.S. 93 MP 6.65 (Nevada Way) to MP 2.5 (Hacienda Hotel)	Total
Passenger cars	259	229	128	99	715
Buses	1	1	0	0	2
Light trucks	13	7	10	6	36
Heavy trucks	8	8	16	20	52
Total	**281**	**245**	**154**	**125**	**805**

Source: NDOT Traffic Safety Division (May 26, 2000, memorandum)

TABLE 1-4
Crash Rates (per MVM) in the U.S. 93 Study Corridor[1, 2]
January 1, 1994, to December 31, 1999

Type of Vehicle	Segment 1: U.S. 93/95 MP 13.81 (Foothills) to MP 11.36 (U.S. 93/95)	Segment 2: U.S. 93 MP 11.36 (U.S. 93/95) to MP 8.08 (just west of Buchanan)	Segment 3: U.S. 93 MP 8.08 (just west of Buchanan) to MP 6.65 (Nevada Way)	Segment 4: U.S. 93 MP 6.65 (Nevada Way) to MP 2.5 (Hacienda Hotel)	Average Through U.S. 93 Corridor
Passenger cars	4.01	1.15	3.65	0.87	1.57
Buses	2.44	0.79	0.00	0.00	0.69
Light trucks	10.46	1.83	5.22	2.93	3.33
Heavy trucks	2.55	0.83	1.68	1.96	1.36
Overall segment crash rate	**4.04**	**1.14**	**3.29**	**0.99**	**1.58**

[1]Crash Rate = 259 crashes x 10^6 / [0.86 miles x 34,330 AADT x 2,191 days]
[2]Statewide Principal Arterial Urban Crash Rate during this time period: 5.07 crashes/MVM
Source: NDOT Traffic Safety Division (May 26, 2000, memorandum)

Railroad Pass Crash History

Of the three high-crash intersections, the Railroad Pass Hotel and Casino intersection has the most crashes, the highest crash rates, and the greatest percentage of crashes involving commercial vehicles (light and heavy trucks and buses). In 1993, after a history of crashes and fatalities at the Railroad Pass intersection, NDOT installed a traffic signal at the intersection, stopping westbound traffic periodically and permitting continuous eastbound traffic.

Warning signals in both directions of travel prior to the intersection were planned to accompany the traffic signal, but they were not installed with the new signal. Then, after a series of crashes occurred at the intersection immediately following installation of the signal, NDOT put up temporary message boards containing a warning message in advance of the intersection. These boards remained in place until 1994, which is when the permanent warning signals were installed.

Safety was improved at the Railroad Pass intersection as a result of the installation of the traffic and warning signals. The beneficial effect of this safety improvement is seen in crash data collected by NDOT at this intersection, summarized in Table 1-5, as the number of crashes decreased between the 3 years before and after the signals were in place. However, while the number of crashes and crashes causing injury or death decreased, the number of rear-end collisions greatly increased. This is an indication that the Railroad Pass at-grade intersection requires further improvement.

TABLE 1-5
Comparison of Crash Statistics at U.S. 95/Railroad Pass Intersection (U.S. 95 MP 55.81 to MP 56.80) Before and After Installation of Traffic and Warning Signals

	Study Period		
NDOT Crash Statistic	**1/1/90 to 12/31/92**	**1/1/93 to 12/31/93**	**1/1/94 to 12/31/96**
Intersection signal status	No signal	Traffic signal at intersection; no warning signal	Traffic signal at intersection; warning signals
Total number of crashes	50	22	41
Overall crash rate (number per MVM)	1.68	1.86	1.00
Fatal crashes	3	0	0
Injury crashes	23	10	14
Rear-end crashes	6	3	22

Source: NDOT Traffic Safety Division (May 26, 2000)

Fatal Crash History along the U.S. 93 Corridor

In the study period from January 1, 1990, to December 31, 1999, historical data indicates 16 fatal crashes occurred along the U.S. 93 corridor. Table 1-6 breaks down these fatal crashes into type of vehicle involved and roadway segment, and indicates the high-crash intersection within the segment that contributed to the majority of the fatal crashes, as well as the number of fatalities. The segment with the most fatal crashes during this period is

Segment 1, which contains the Railroad Pass intersection. Since 1990, six of the seven fatal crashes in this segment occurred at the Railroad Pass intersection (the other occurred just west of the U.S. 93/95 interchange). Note that by comparing Table 1-5 with Table 1-6, it can be seen that an additional three fatal crashes occurred from 1997 through 1999.

TABLE 1-6
Fatal Crashes in the U.S. 93 Study Corridor
January 1, 1990, to December 31, 1999

NDOT Crash Parameter	Segment 1: U.S. 93/95 MP 13.81 (Foothills) to MP 11.36 (U.S. 93/95)	Segment 2: U.S. 93 MP 11.36 (U.S. 93/95) to MP 8.08 (just west of Buchanan)	Segment 3: U.S. 93 MP 8.08 (just west of Buchanan) to MP 6.65 (Nevada Way)	Segment 4: U.S. 93 MP 6.65 (Nevada Way) to MP 2.5 (Hacienda Hotel)
"High-crash" U.S. 93/95 intersection	Railroad Pass Hotel and Casino	None	Buchanan Boulevard	Lakeshore Road
Passenger cars fatal crashes	6	4	0	4
Light trucks fatal crashes	1	0	0	0
Heavy trucks fatal crashes	0	0	0	1
Total fatal crashes	7[2]	4	0	5
Number of fatal crashes/MVM[1]	0.10	0.02	0	0.04

Source: NDOT Traffic Safety Division (July 25, 2000)
[1]Statewide Principal Arterial Urban Fatal Crash Rate during this time period: 0.02 crashes/MVM
[2]Six of the seven crashes occurred at the Railroad Pass Hotel and Casino intersection

Fatal crash rates for each segment can be directly compared to the corresponding statewide principal arterial crash rate. According to current NDOT classifications, the entire reach of U.S. 93 considered in this study is classified as "urban;" therefore, it is comparable to the statewide principal arterial urban crash rate. The statewide fatal crash rate for the time period considered in Table 1-6 is 0.02 crashes per MVM.

Table 1-6 shows that three of the four segments of U.S. 93 through Boulder City have experienced a fatal crash rate per MVM that is equal to or greater than the Statewide Urban Principal Arterial Fatal Crash Rate of 0.02 for this time period. Segment 1 exceeded the statewide rate by the greatest amount, with a fatal crash rate of approximately five times the state average, while Segment 4 (which contains the Lakeshore Road intersection) contained a rate twice the state average. This fatal crash history indicates a safety problem within the U.S. 93 corridor through Boulder City.

Hazardous Materials Spill History at Railroad Pass

Hazardous materials incidents in the Railroad Pass vicinity along U.S. 93 have become a safety issue. These incidents include crashes that have been broken down into those involving hazardous materials spills and those where hazardous materials were being hauled but were not spilled. Table 1-7 displays the history of these incidents at Railroad Pass.

TABLE 1-7
Summary of Hazardous Materials Incidents at U.S. 95/Railroad Pass Intersection
Before and After Installation of Traffic and Warning Signals

	Study Period		
	1/1/90 to 12/31/92	**1/1/93 to 12/31/93**	**1/1/94 to 12/31/99**
Intersection signal status	No signal	Traffic signal at intersection; no warning signal	Traffic signal at intersection; warning signals
Hazardous materials incidents	3	3	2
Crashes involving hazardous materials spills	3	3	0
Total hazardous materials incidents in Nevada	51	25	180
Hazardous materials incident rate at the Railroad Pass intersection (number/MVM)[1]	0.101	0.254	0.024
Total hazardous materials incident rate for Nevada (number/MVM)	0.003	0.004	0.005

Source: City of Henderson Fire Department (November 20, 2000)
[1]Incidents per MVM calculated similar to crashes/MVM calculation

Table 1-7 indicates that the number of these incidents and the severity of the incidents (whether a hazardous material was released) have decreased in recent years. In the 1990 to 1992 time period, when there was no signal at Railroad Pass, three spills were recorded. In 1993 alone, when there was a traffic signal but no warning signals at the intersection, there were an additional three spills of hazardous materials. In the 6 years since the warning signals were installed on the approach to the intersection, there have been two incidents but no spills. This indicates an increase in safety at the intersection, but the need for improvement to minimize the chance of crashes involving hazardous materials remains.

The need for improvement is reflected in a comparison of hazardous materials incident rates at Railroad Pass versus the statewide average rates for the years considered (in incidents per MVM). Although improvement is shown, the two incidents at Railroad Pass between 1994 and 1999 are nearly five times as high as the average for the entire state of Nevada. Three incidents in the shorter 1990-to-1992 and 1993 study periods reflect a very large exceedance of the statewide average hazardous materials incident rate.

1.3.4 System Linkage and Route Continuity

U.S. 93 is a vital system link in the CANAMEX Corridor. Currently the Nogales, Mexico, border crossing handles more than 250,000 truck crossings annually and is the primary point of entry for produce shipped by truck into the U.S. from Mexico (FHWA, 1998). Truck demands are expected to increase as the North American Free Trade Agreement (NAFTA) effects continue to be realized.

The facility type approaching Boulder City from both directions is now, or is currently planned to be, a four-lane divided, high-speed limited-access highway. The urban arterial nature of U.S. 93 through Boulder City is inconsistent with the rest of the U.S. 93 corridor and acts as a bottleneck to regional and interstate commerce.

1.3.5 City Initiative

In June 1999 in response to perceived traffic problems, Boulder City voters passed an initiative by a vote of 61.3 percent. That initiative states the following:

> *Shall the People of the City of Boulder City enact the following new Chapter to Title 9 of the Boulder City Municipal Code:*
>
> *"CONSENT FOR DIVERSION OR CHANGE OF ROUTE OF HIGHWAY*
>
> *Whenever it is determined by the governmental entities concerned that a new bridge will be constructed over the Colorado River near Hoover Dam, and the State of Nevada, after the required studies and investigations, concludes that a new highway connecting the existing freeway that terminates near Railroad Pass Hotel and Casino to the new bridge approach is desirable, and if the preferred routing of this new highway, as determined by the required studies, meets the following criteria:*
>
> A. *It is south of the Boulder City Airport;*
> B. *It is at least three-fourths (3/4) of 1 mile from any existing residence in Boulder City; and*
> C. *At least two (2) interchanges will be provided to serve Boulder City, one just east and one just west of Boulder City and configured to permit all traffic the option to use the existing highway through Boulder City (heavy trucks may be prohibited) or the new highway around Boulder City;*
>
> *then the Boulder City Council shall give its consent to the State of Nevada for this preferred routing in accordance with the provisions of Chapter 408.397 of the Nevada Revised Statutes"*

1.3.6 County/City Consent

NRS 408.397 Procedure for Diversion or Change of Route of Highway.

> *Whenever in the construction, reconstruction, maintenance, or repair of any highway it appears to the director that any portion of the highway is dangerous or inconvenient to the traveling public in its existing location by reason of grades, dangerous turns, or other local conditions, or that the expense in the constructing, building, rebuilding, maintaining, or repairing of the highway would be unreasonably great and could be materially reduced or lessened by change of route, the director may divert or change the route, but:*
>
> 1. *The highway must not be changed or diverted to exclude any city or town unless the consent of the governing body of that city or town has been obtained; and*
> 2. *The director shall submit a plan of the proposed change to the board, which must be approved by the board before action is taken to effect the change.*

(Added to the Nevada Revised Statute [NRS] by 1957, 688; A 1977, 225; 1979, 1776; 1987, 1808; 1989, 1305)

NRS 408.403 Freeways.

1. *Upon a resolution of the board, the department under the provisions of this chapter may lay out, establish, acquire, open, construct, reconstruct, improve, maintain, repair, regulate, vacate, or abandon freeways, with the approval of the board of county commissioners of the county in which the freeways are proposed and with the approval of the city council of any incorporated city directly affected thereby.*
2. *The department has all such additional and necessary authority relative to freeways as it possesses relative to other highways, including the authority to acquire by gift, purchase, condemnation, or otherwise any real property or interests therein, including abutter's rights or access right required for a freeway.*
3. *Where an existing highway, in whole or in part, has been designated as, or included within, a freeway, existing abutter's rights of light, view, and air, and easements of access to and from abutting land may be extinguished by gift, purchase, condemnation, or otherwise.*
4. *As a necessary adjunct of any freeway, the department may lay out, establish, acquire, open, construct, reconstruct, improve, maintain, repair, vacate, or abandon frontage roads to provide service and access from areas adjacent to such freeway.*

(Added to NRS by 1957, 688; A 1987, 1808, 1989, 1305)

1.4 Previous Studies Conducted

There are two previous studies related to the Boulder City/U.S. 93 Corridor (U.S. 93 Buchanan Boulevard to Pacifica Way Environmental Assessment [EA] and U.S. 93 Colorado River Crossing Corridor Study), and there is one recently completed environmental study east of this project (Hoover Dam Bypass), as well as an ongoing multistate transportation study (CANAMEX), that are worth noting.

In 1982, NDOT conducted an EA for widening U.S. 93 from Buchanan Boulevard to Pacifica Way. This EA was performed as part of an ongoing sufficiency rating process of Nevada roads conducted by NDOT. The study analyzed two alternatives plus a no-build alternative for the reconstruction of the intersections of U.S. 93 with Buchanan Boulevard and Nevada Way.

A previous study in the project area addressed the feasibility of U.S. 93 alternative bypass corridors south of Boulder City. In 1994, NDOT completed the *U.S. 93 Colorado River Crossing Corridor Study* (NDOT, 1994). The study analyzed the feasibility and order of magnitude costs of two separate alignments south of Boulder City, called the Willow Beach and the Boulder City Southern Bypass Corridors. Also in 1994, NDOT developed a TRANPLAN (traffic circulation) model for Boulder City. This model is being updated as part of the current study to identify and plan for future traffic growth demands on the existing network system.

The Hoover Dam Bypass EIS began in the early 1970s when Reclamation began studies to address increased traffic on the U.S. 93 crossing over Hoover Dam. As a result of the traffic problems and to address the safety concerns at Hoover Dam, Reclamation began environmental studies in the late 1980s. Reclamation completed the studies to approximately the 75 percent level in the early 1990s, but they did not release the DEIS for public comment. Then, in 1997, NDOT, the Arizona Department of Transportation (ADOT), and FHWA, Central Federal Lands Division, initiated the EIS for the Hoover Dam Bypass. FHWA filed a Notice of Intent (NOI) to complete the EIS in September 1997. FHWA subsequently released the DEIS in September 1998 and the Final EIS (FEIS) in February 2001. The Record of Decision (ROD) was signed in March 2001. The Hoover Dam Bypass project is now under construction, and construction completion is anticipated in 2008.

An ongoing study related to this project is the CANAMEX Corridor Plan. The CANAMEX Corridor Plan is a joint infrastructure study performed with the states of Arizona, Nevada, Idaho, Utah, and Montana. The primary objective of the project is to develop a corridor plan to stimulate investment and economic growth. CANAMEX includes transportation, tourism, trade, and communications components in the designation of a continuous multi-lane roadway from Nogales, Mexico, to the Canadian border. The project passes through Boulder City along U.S. 93 en route to I-15. Additional information about the CANAMEX Corridor can be found at the following website address www.canamex.org.

2. Project Description and Alternatives

2.1 Introduction

Traffic on U.S. 93 in Boulder City doubled from 17,200 average daily traffic (ADT) in 1985 to approximately 32,000 ADT in 1999. This increase in traffic in the vicinity of the City of Henderson, Boulder City, and Hoover Dam continues, and it has created congestion. The significant traffic growth is due to increased local traffic on U.S. 93 in Boulder City and Hemenway Valley, an increased stream of recreational traffic to Lake Mead, an increased flow of traffic to Hoover Dam with the completion of the new visitor's center, and increased interstate truck traffic. Increased truck traffic is expected with the development of the CANAMEX Trade Corridor, which extends from the Mexican to the Canadian border. This high-priority corridor is being developed chiefly to facilitate transportation distribution, commerce, and tourism throughout the region.

The Boulder City/U.S. 93 Corridor Study was undertaken by NDOT at the request of Boulder City through the RTC to address traffic-related problems along U.S. 93 through the Boulder City area. Figure 1-1 depicts the project area and the study limits.

Corridor alternatives connecting the western and eastern study limits were developed from comments received as a result of the project public outreach and scoping program, which includes public open forum and scoping meetings, and project management team (PMT) meetings. Initial alignments identified were reduced to viable corridor alternatives, which were evaluated and then reduced to three build alternatives plus a "no-build" alternative for future study in the preparation of this EIS. The PMT, consisting of cooperating agencies, NDOT, and FHWA (see Section 1.1), have concurred on the identification of these alternatives, based on this evaluation process.

FHWA approved the Hoover Dam Bypass ROD in March 2001 for the Sugarloaf Mountain Alternative and initiated the preliminary and final design of the project in August 2001. This required the Boulder City/U.S. 93 Corridor Study and Hoover Dam Bypass design teams to begin coordinating the connection between both projects, located just east of the Hacienda Hotel and Casino near existing U.S. 93. Both projects have separate and distinct purpose and need statements, have been planned to operationally stand alone, and have been developed with logical termini consistent with FHWA regulations. The Hoover Dam Bypass project team's development of the Nevada interchange design east of the Hacienda Hotel and Casino is consistent with the ROD. This interchange design did not preclude or predetermine any of the build alternatives developed in this EIS or other alternatives that were considered in the Boulder City/U.S. 93 Corridor Study.

This chapter describes the alternatives considered for the Boulder City/U.S. 93 Corridor Study, and studies of those alternatives, screening criteria developed to aid in selecting alternatives to be evaluated, alternatives eliminated from detailed impact evaluation, and the preferred alternative.

A wide array of alternatives was considered and compared, and the identification of a preferred alternative was not made until impacts of the alternatives and comments on the DEIS and from the public hearings were fully evaluated (see Section 2.8). The four most reasonable alternatives fully evaluated (including the No Build Alternative) were developed to a comparable level of detail so that their comparative merits could be analyzed.

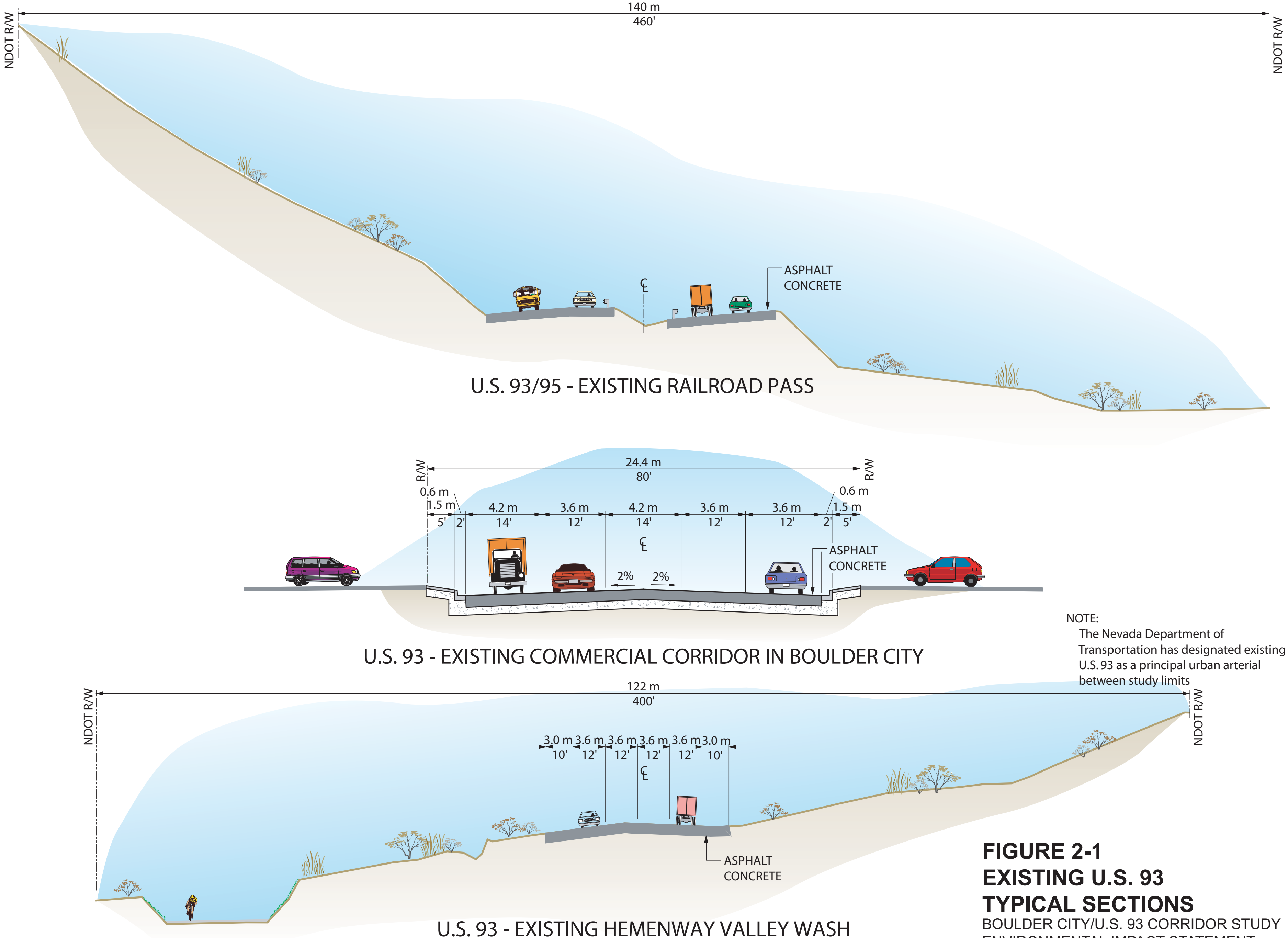
2.2 Project Description

The proposed project involves traffic improvements to U.S. 93 in the Boulder City area, referred to as the U.S. 93 Corridor. The project limits are between a western boundary on U.S. 95 in the City of Henderson, approximately 1.6 km (1 mile) north of the Railroad Pass Hotel and Casino, near the Foothills grade separation, and an eastern boundary on U.S. 93, approximately 1.2 km (0.75 mile) east of the Hacienda Hotel and Casino. The study covers a total distance of approximately 16.7 km (10.4 miles) on the present route of U.S. 93. Within the study corridor, U.S. 93 varies from a four-lane divided roadway to a two-lane roadway with numerous business driveways and cross streets.

The project seeks to provide transportation improvements in the corridor to reduce traffic congestion and crashes, and to improve regional mobility while maintaining or improving local circulation and access to Boulder City businesses. This may be accomplished by either widening and upgrading existing U.S. 93 or by realigning U.S. 93 as a freeway either north or south of the present highway. Figures 2-1 through 2-4 depict the existing U.S. 93, improved U.S. 93 (Alternative B), through-town freeway (Alternative C), and a southern freeway corridor (Alternative D, the preferred alternative).

2.3 Project History

Population growth and increased use of U.S. 93 over Hoover Dam and through Boulder City, Nevada, in recent decades has led to some analysis of the potential to improve the roadway in this area to accommodate the growth. The first consideration of improving the U.S. 93 Corridor occurred in 1982 when NDOT completed an environmental assessment to construct a Truck Bypass at the Buchanan Boulevard intersection and down Hemenway Wash. Since 1982, growth and development of the City in the Hemenway Valley Wash and increased traffic volumes along the corridor due to local and regional traffic compelled the Boulder City Council to request RTC and NDOT to address the growing traffic congestion. NDOT and FHWA initiated the environmental process at the beginning of 2000 to address the social, environmental, and economic considerations of improvements to the U.S. 93 Corridor.



NOTE:
The Nevada Department of Transportation has designated existing U.S. 93 as a principal urban arterial between study limits

FIGURE 2-1
EXISTING U.S. 93
TYPICAL SECTIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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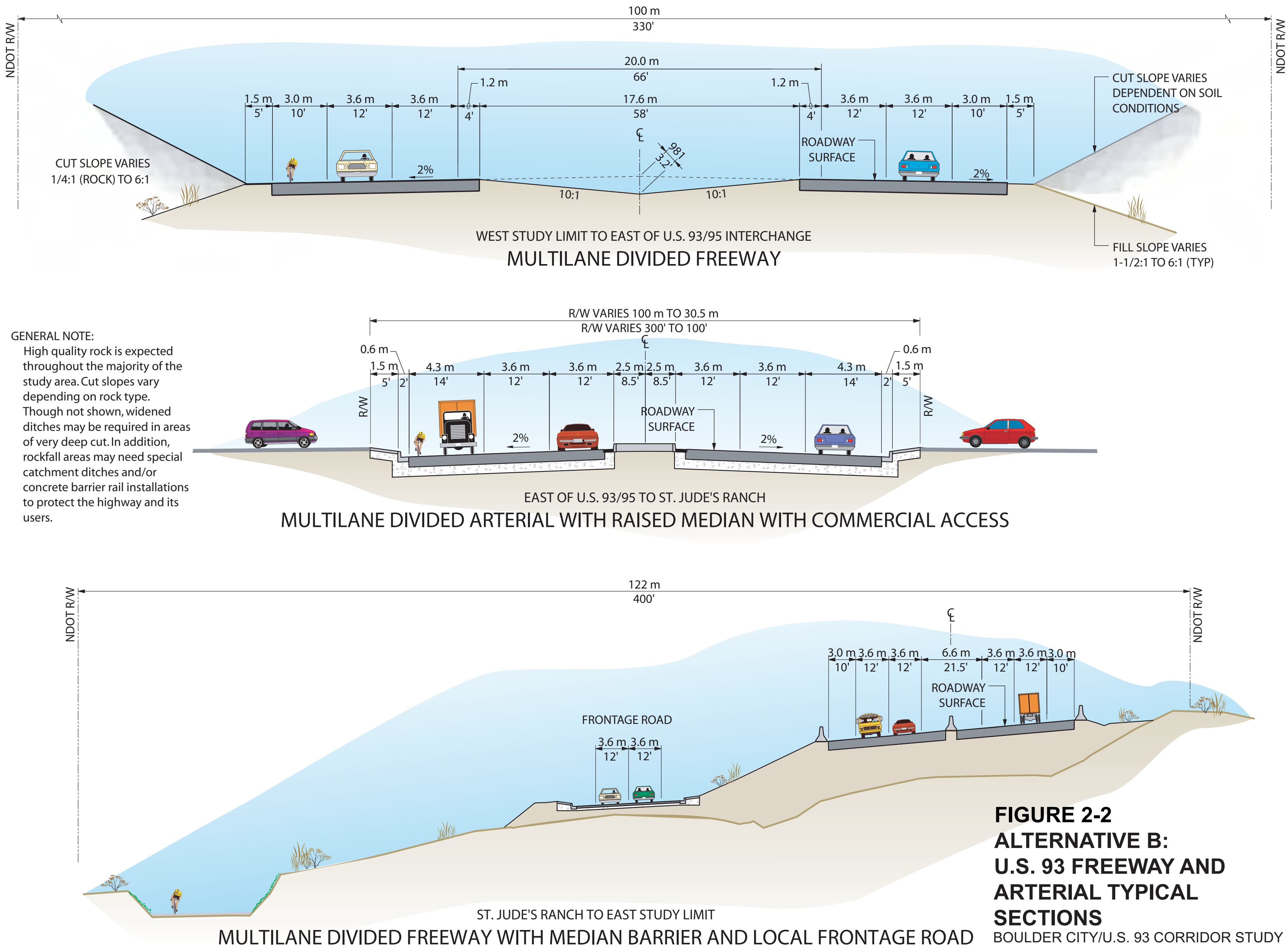

GENERAL NOTE:

High quality rock is expected throughout the majority of the study area. Cut slopes vary depending on rock type. Though not shown, widened ditches may be required in areas of very deep cut. In addition, rockfall areas may need special catchment ditches and/or concrete barrier rail installations to protect the highway and its users.

FIGURE 2-2
ALTERNATIVE B:
U.S. 93 FREEWAY AND ARTERIAL TYPICAL SECTIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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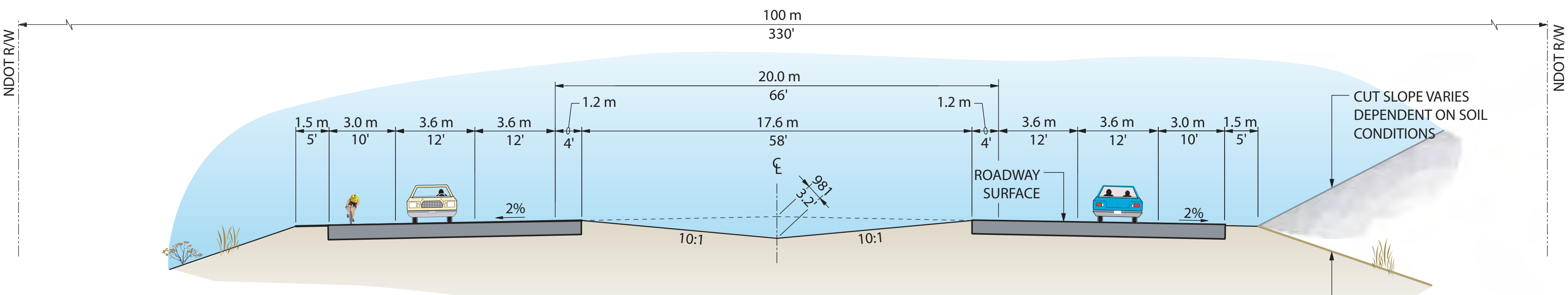
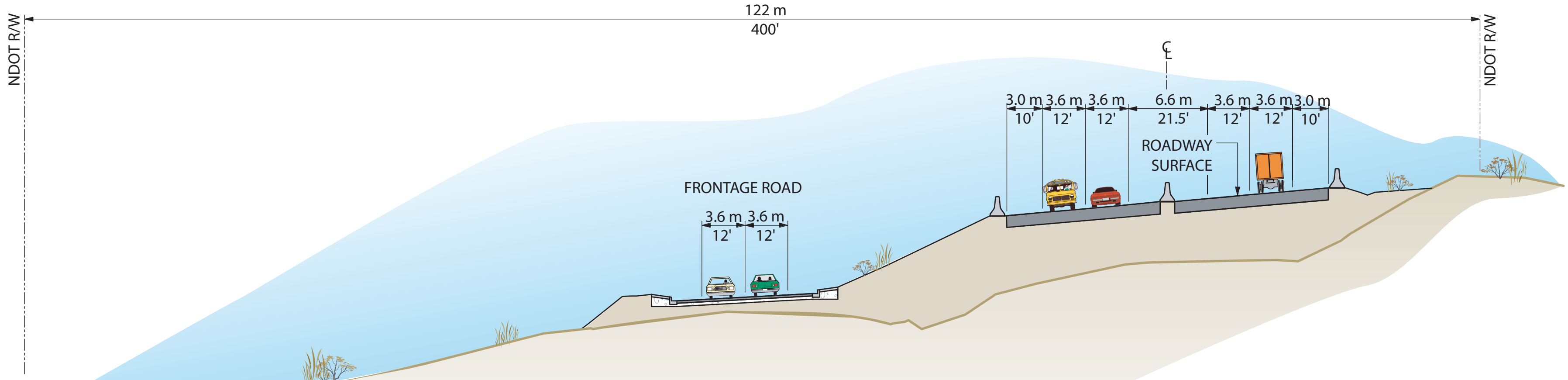


WEST STUDY LIMIT TO ST. JUDE'S RANCH

MULTILANE DIVIDED FREEWAY

GENERAL NOTE:

High quality rock is expected throughout the majority of the study area. Cut slopes vary depending on rock type. Though not shown, widened ditches may be required in areas of very deep cut. In addition, rockfall areas may need special catchment ditches and/or concrete barrier rail installations to protect the highway and its users.



ST. JUDE'S RANCH TO EAST STUDY LIMIT

MULTILANE DIVIDED FREEWAY WITH MEDIAN BARRIER AND LOCAL FRONTAGE ROAD

FIGURE 2-3
ALTERNATIVE C:
U.S. 93 FREEWAY
TYPICAL SECTIONS

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

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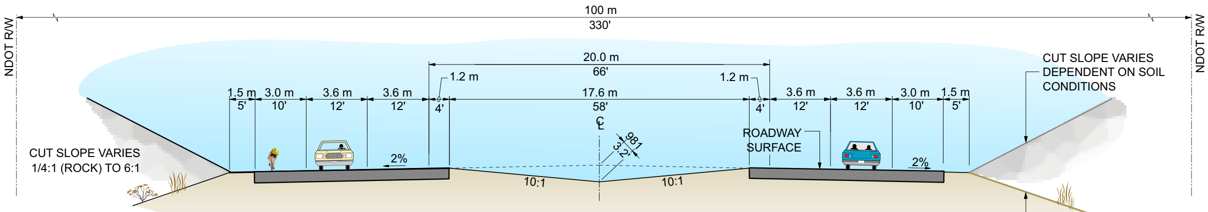
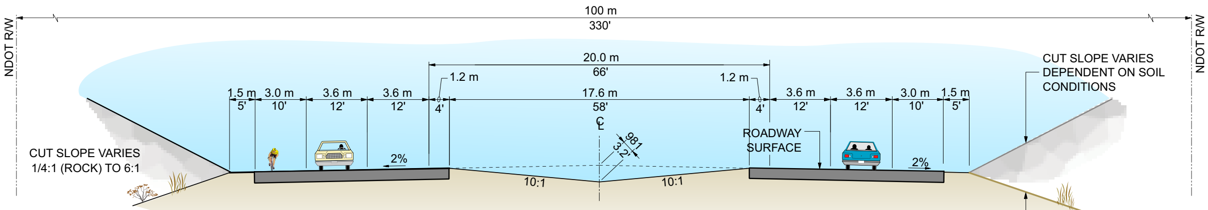
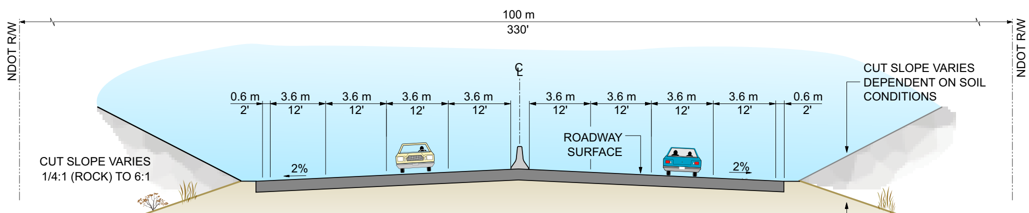


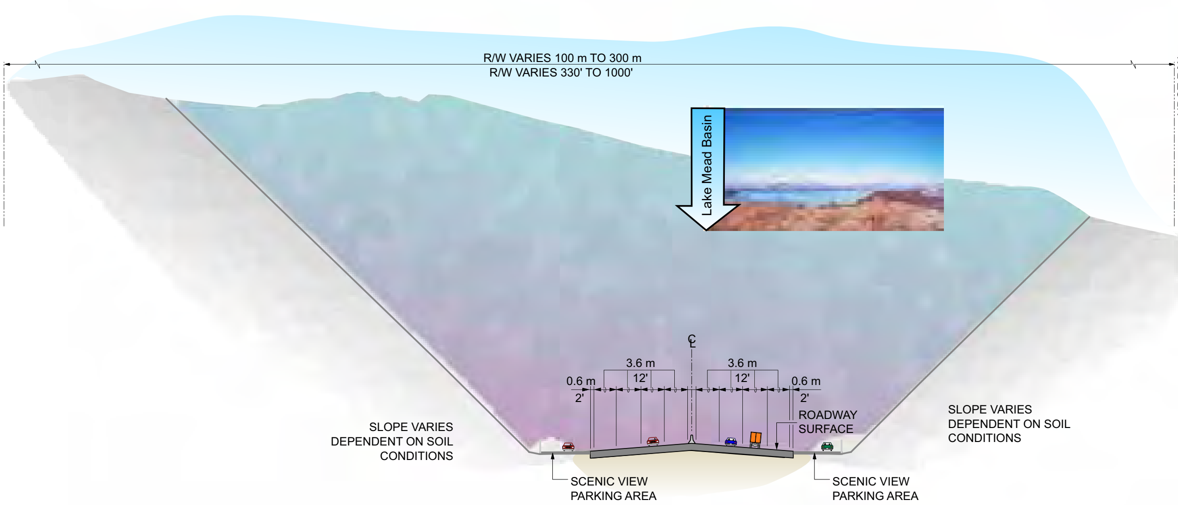
WEST STUDY LIMIT TO US 95 INTERCHANGE
MULTILANE DIVIDED FREEWAY



US 95 INTERCHANGE TO STATION "SA" 150+00
MULTILANE DIVIDED HIGHWAY



STATION "SA" 150+00 TO EAST STUDY LIMIT
MULTILANE DIVIDED HIGHWAY WITH MEDIAN BARRIER



MULTILANE DIVIDED HIGHWAY WITH MEDIAN BARRIER
AND SCENIC VIEW PARKING AREA

GENERAL NOTE:
High quality rock is expected throughout the majority of the study area. Cut slopes vary depending on rock type. Though not shown, widened ditches may be required in areas of very deep cut. In addition, rockfall areas may need special catchment ditches and/or concrete barrier rail installations to protect the highway and its users.

FIGURE 2-4
ALTERNATIVE D:
U.S. 93 HIGHWAY
TYPICAL SECTIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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The second time considerations for improving the transportation corridor were undertaken was in 1990 by Reclamation with the completion of the *Colorado River Crossing Phase A Study Report* (Reclamation, 1990). In this report, Reclamation identified nine alternative routes linking U.S. 93 in Arizona and Nevada. Of the nine routes, the five that crossed the Colorado River well south of Hoover Dam and entered Boulder City from the east or southeast were eliminated from consideration for the following reasons:

- Impact to LMNRA land is much greater than the alternatives that cross near Hoover Dam
- Greater costs based on a longer section of a new route
- Longer sections of U.S. 93 would have to be disposed of
- Perception of some Boulder City businesses that these routes would have a greater adverse impact to local businesses

The alternatives that remained for consideration included the existing alignment and three alternative crossings of Hoover Dam that reconnected with existing U.S. 93 east of Boulder City, all of which did not allow for any improvements to U.S. 93 through Boulder City.

Reclamation proceeded into the Phase B studies, analyzing the Hoover Dam crossing alternatives in more detail, and in 1992 published *The Colorado River Bridge-Hoover Dam, Arizona-Nevada, Phase B Corridor Studies* (Reclamation, 1992). The report contains plan and profile engineering development of the alternatives, as well as some environmental mitigation and a construction schedule. Concurrent with the Phase B studies, Reclamation proceeded with the preparation of a DEIS. However, a change in policy direction at Reclamation, a lack of funding, and concerns from some citizen groups for this project halted the DEIS preparation before its completion.

In 1994, NDOT completed the *U.S. 93 Colorado River Crossing Study* (NDOT, 1994). In this conceptual feasibility study, NDOT took a second look at the Willow Beach Crossing alternative, which was dropped from consideration in Reclamation's Phase A studies, and also analyzed a Hoover Dam Bypass (Sugarloaf Mountain)/Boulder City Southern Bypass combination alternative. This report, however, only conceptually addressed transportation and engineering aspects of the corridor alternatives and not environmental aspects. Environmental documentation of both the Hoover Dam Bypass and Boulder City transportation improvements began in separate EISs, entitled *U.S. 93 Hoover Dam Bypass Project* and the *Boulder City/U.S. 93 Corridor Study*. The U.S. 93 Hoover Dam Bypass Project reached a ROD in March 2001, with the Sugarloaf Mountain Alternative being selected by FHWA. The alternative consists of a freeway bridge crossing of the Colorado River approximately 460 meters (m) (1,500 feet [ft]) south of Hoover Dam (FHWA, 2001).

Boulder City revisited the topic of improvements to the U.S. 93 Corridor as it passes through Boulder City in 1997 when it made a formal request to the RTC. After the request, the project was given a higher priority on NDOT's Statewide Transportation Improvement Program (STIP) coincidental with the RTC's Regional Transportation Plan (RTP). Eventually, the project was selected for study, and it was determined that an EIS would be suitable due to its large scope and overall potential impact.

2.4 Alternatives Identification, Screening, and Evaluation

2.4.1 Initial Screening

Corridor improvement alternatives were developed based on the problems and recommended solutions identified by the residents of Boulder City and the City of Henderson at two public meetings in January and April 2000 in Boulder City, as well as an agency scoping meeting and PMT meetings. A combination of the public involvement input, engineering, and environmental baseline analysis efforts produced 35 alignment segments, totaling over 640 km (400 miles). These initial alignments were described by segment so that different logical segment combinations yielded over 40 potential corridor alignments. Figure 2-5 illustrates the segments subject to initial screening.

The initial alignments (Figure 2-5) were screened from an engineering and environmental perspective with the goal of identifying alignments that met the purpose and need for the project, while minimizing undesirable land use, environmental, and social impacts, thus narrowing the number of alternatives. The analysis included a comparative assessment of impacts with respect to engineering judgment, and an application of environmental considerations raised at the agency scoping meeting and PMT meetings. In their February 2000 meeting, the PMT identified 65 issues and concerns against which to qualitatively screen these initial alternatives. These included concerns regarding land use and community impacts, impacts to natural and cultural resources including sensitive species, recreational access, residential and business relocation, economic effects, impacts to landfill sites, pedestrian and traffic safety and congestion, and trucking and hazardous material transportation. This process used by the PMT reduced the number of segments to comprise 16 viable corridor alternatives, as depicted in Figure 2-6 (NDOT, January 2001).

2.4.2 Initial Evaluation of Corridor Alternatives

After the initial screening described above, 16 corridor alternatives remained (Figure 2-6) to be subsequently evaluated on 30 individual criteria, described below. The alternative corridors were grouped into three categories. The alternative aligned north through the River Mountains was designated as the Northern Alternative (NA). The seven alternatives aligned through the developed areas of Boulder City were designated as Through-Town Alternatives (TA). The six alternatives aligned south of the Boulder City Airport were designated as Southern Alternatives (SA). The remaining two alternatives utilized the existing U.S. 93 Corridor. They included a transportation systems management (TSM) alternative that provides surface improvements at intersections and no grade separations, and a U.S. 93 improved alternative that provides grade separations at key intersections and an overall widening of the roadway. The TSM and U.S. 93 Improved Alternatives were originally not given a “TA” designation, but evaluated with the through-town alternatives.

The corridors were further broken down into families of alternatives. Each “family” indicates a group of alternatives that share similar segments along their alignments. For example, corridor alternatives TA101, TA101A, and TA101B share the same roadway segment from the western study limit, south of the U.S. 93/95 interchange and north of existing U.S. 93 and Industrial Road, and only differ in their respective segments through Hemenway Valley. In addition, there were several northern corridor alternatives that made up an “NA” family of alternatives (NDOT, January 2001).

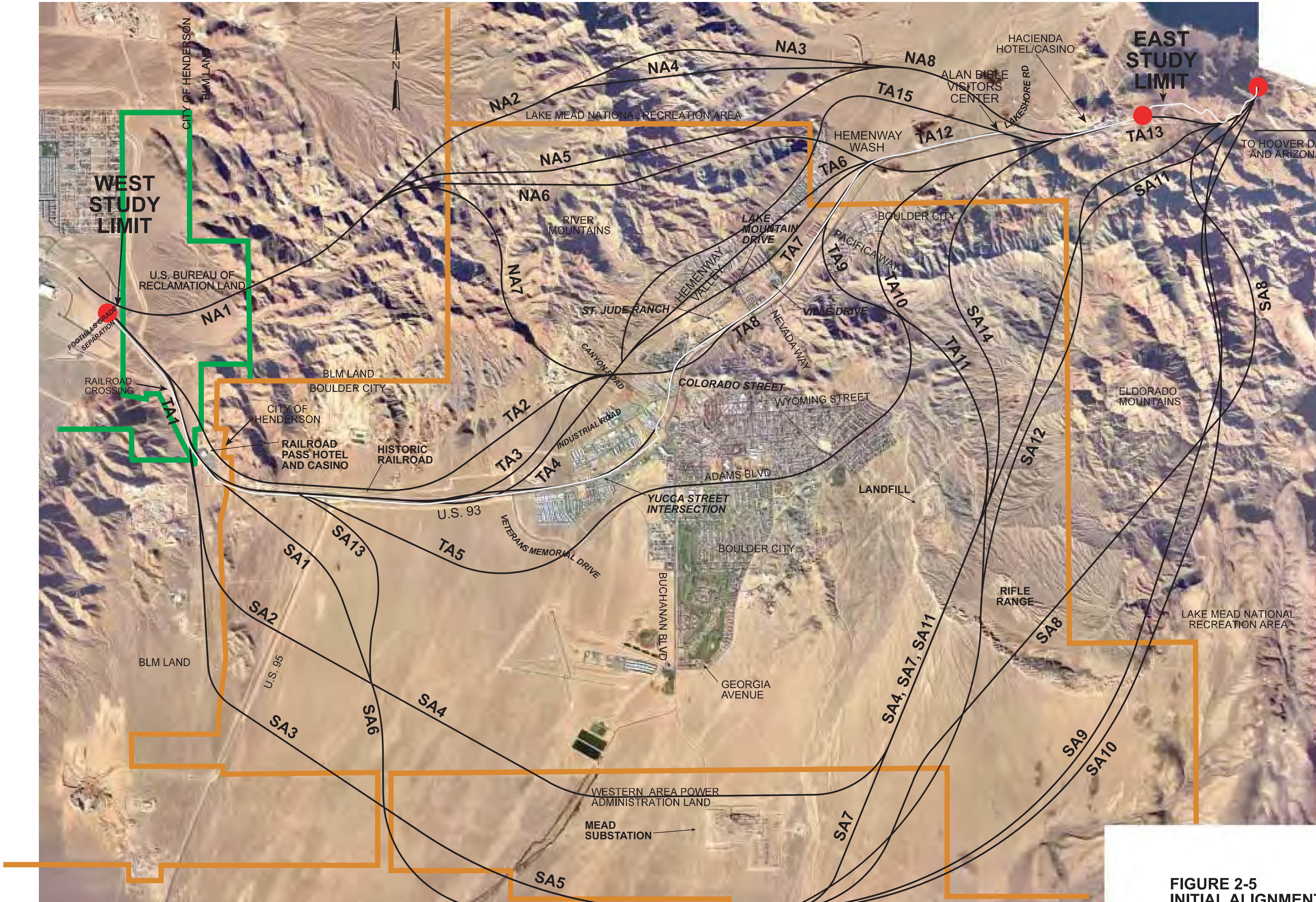

FIGURE 2-5
INITIAL ALIGNMENTS IDENTIFIED
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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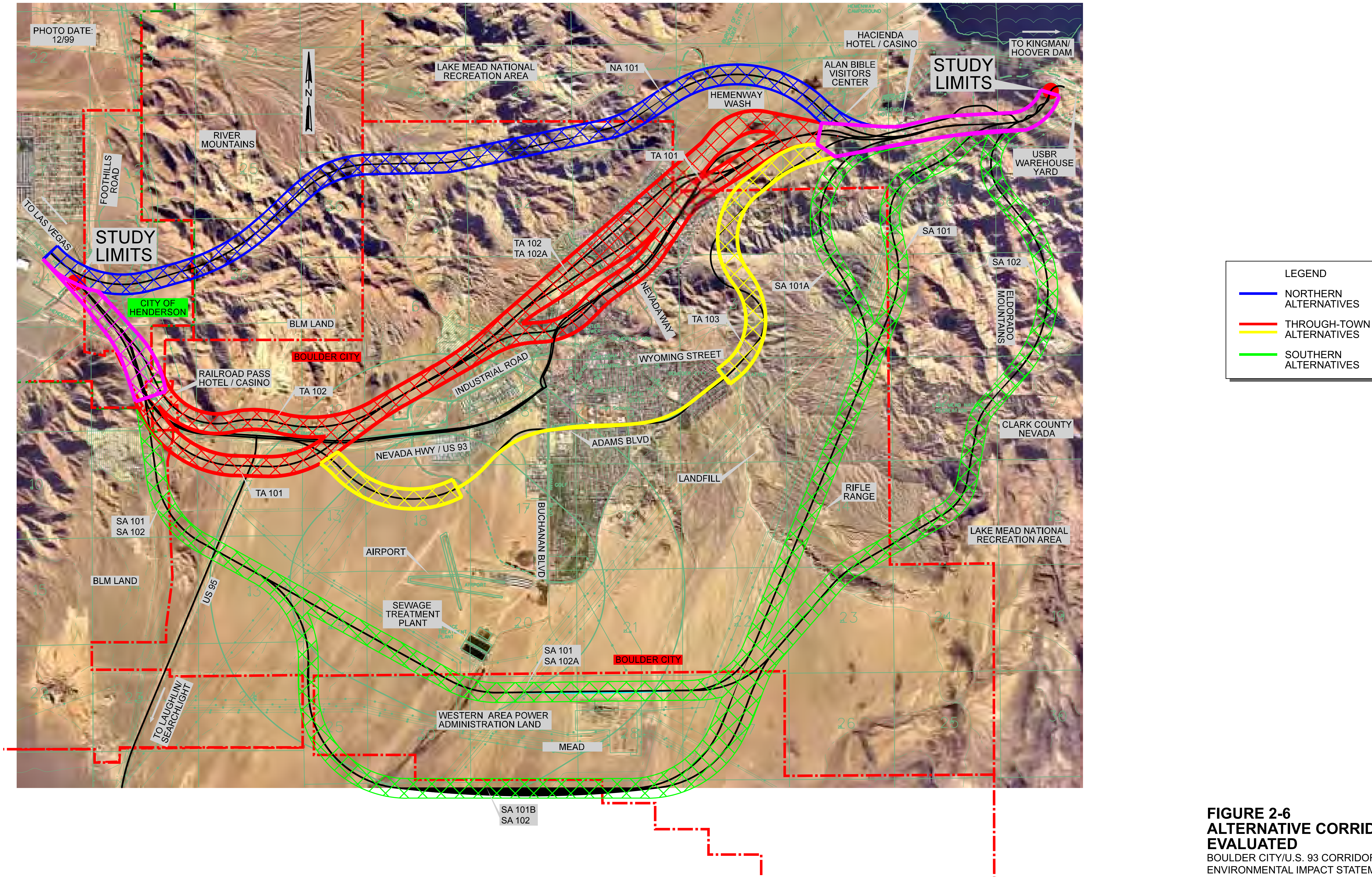

FIGURE 2-6
ALTERNATIVE CORRIDORS EVALUATED
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Preliminary horizontal and vertical alignments for each of the corridor alternatives were prepared based on minimizing cuts and fills along the roadway. The alignments conformed to the corridor topography, existing drainage patterns, existing local traffic circulation, and utilized American Association of State Highway and Transportation Officials (AASHTO) design guidelines. A digital color aerial map was prepared at a scale of approximately 1 inch equals 1,000 ft for the project area, created from color aerial photography and U.S. Geological Survey (USGS) quadrangle maps (NDOT, January 2001).

Northern Alternative

The Northern Alternative alignments pass to the north of Boulder City, beyond residential or commercial developments. During the initial engineering and environmental evaluation, the northern alternatives were represented by corridor alternative NA101 (Corridor NA101), which was considered to be the most reasonable of the northern alignments (NDOT, January 2001, Appendix A). Corridor NA101 originates near the Foothills Road grade separation, crosses the high River Mountains through Hidden Valley along the northern limits of Boulder City, passes through Hemenway Wash, crossing the existing U.S. 93 and Lakeshore Road intersection, and ties in to existing U.S. 93 in the vicinity of the Hacienda Hotel and Casino (NDOT, January 2001, Appendix B).

Corridor NA101 was selected for criteria screening evaluation, because all of the northern routes exhibited nearly identical properties.

Through-Town Alternatives

This family of alternative alignments pass through or near town, are compatible with the local network, and generally follow the same geographic corridor as existing U.S. 93. Nine “build” alternatives were considered (NDOT, January 2001, Appendix B). There are three segments that can be combined to make six possible through-town corridor freeway alternatives: TA101, TA101A, and TA101B. The family of Corridor TA101 alternatives realign U.S. 93 westerly through Railroad Pass and consider the same three segments through Hemenway Wash. Because the Hemenway Wash area produces fairly large stormwater flows along existing U.S. 93, all through-town alignments are being considered as abovegrade through the wash segment.

Corridor TA102 alternatives realign U.S. 93 easterly through Railroad Pass and consider three alternative corridors through Hemenway Wash. Corridor TA103 (the Adams Boulevard Alternative) is an arterial improvement that extends the Adams Boulevard corridor with tie-ins just east of the existing U.S. 95 interchange and just west of the Lakeshore Road intersection with existing U.S. 93. An expansion of the existing U.S. 93 facility (U.S. 93 Improved Corridor Alternative), with interchanges at critical intersections, was also considered. This alternative was initially referred to as the “Low-Build” Alternative; it subsequently passed through the screening evaluation and, after refinement, became one of the four alternatives studied in detail in this EIS, referred to as Alternative B. Finally, a TSM alternative was initially evaluated, which provides only surface improvements to existing intersections of U.S. 93 and no grade separations.

Southern Corridor Alternatives

All southern corridors provide for an interchange upgrade at the Railroad Pass Hotel and Casino, a grade-separated crossing of the historic railroad, and a new U.S. 93/95 interchange. The six corridors were developed based on alignments north and south of the Mead Substation and through two different reaches of the Eldorado ridge (NDOT, January 2001, Appendix B).

These alternative alignments pass south of town, serving as a bypass corridor to existing U.S. 93. Six "build" corridors were initially considered. There are two families of corridors within the southern alternatives. The SA101 corridor alternatives consist of alignments that pass through the power line saddle east of Boulder City and through the Eldorado Mountains. The SA102 corridor alternatives include a segment that passes through the Eldorado Mountains further to the east, which takes these alignments well within the National Park Service (NPS) LMNRA boundary. While the SA101 area is aligned further west and avoids most of this LMNRA land, it requires much larger cuts and fills as the alignments traverse considerably steeper terrain.

2.4.3 Evaluation and Criteria

Evaluation criteria were developed by the PMT from the issues and concerns described by the residents of Boulder City and the City of Henderson at the two public meetings held in January and April 2000, as well as from the agency scoping meeting in February 2000. The PMT added issues and concerns to this list during PMT meetings in March and April A set of 30 criteria was subsequently developed and used to evaluate the 16 corridor alternatives. The criteria were developed by attending to key engineering, environmental, land use, and economic factors that impact the project and were grouped into the following six categories:

- Accessibility
- Operations
- Safety/Design
- Environmental Impacts
- Implementation
- Socioeconomic Impacts

The criteria were formed so that both quantitative and qualitative evaluations of the 16 alternative corridors could be derived. The criteria, not listed in any particular order, were defined as follows.

Accessibility Criteria

- **A1 – Access to Pedestrian Facilities:** This criterion accommodates the requirements of pedestrians in the vicinity of a given alternative. The intent of the criterion is to evaluate pedestrian mobility resulting from a given alternative.

- **A2 – Access to Approved Bicycle Facilities:** This criterion accommodates the transportation and recreation requirements of bicyclists in the vicinity of a given alternative. The intent of the criterion is to evaluate bicyclist mobility resulting from a given alternative.

- **A3 – Local Access for Residents:** This criterion evolved from an issue brought up at the first public meeting when a resident requested the project provide access for people who do not want to use the freeway. The measurement of this will indicate whether local Boulder City residents would be able to travel throughout the city while not being required to enter existing U.S. 93 or a new freeway.
- **A4 – Access to Recreational Facilities:** This criterion evolved from an issue brought up at the PMT Meeting, noting the need to maintain access to LMNRA by means of interchanges at appropriate intersections or other roadway connections. This access is measured for automobiles, as well as hikers and bicyclists.
- **A5 – Access to Businesses along U.S. 93:** This criterion evaluates the degree of access to existing businesses provided by a given alternative. It is measured on a physical basis of traffic proximity and ease of access, unlike Criterion S4, which measures the degree of business exposure to passing traffic.

Operations Criteria

- **O1 – Reduction of Truck Traffic through Town:** This criterion evolved from an issue presented at the first public meeting, which stated that "trucks are a safety problem." The criterion is measured by reduction of vehicle miles traveled (VMT), a distance parameter that indicates the number of miles logged by trucks traveling on the existing U.S. 93 roadway on a given day after construction of an alternative.
- **O2 – Congestion:** The alleviation of congestion at the three critical intersections within the study area (Railroad Pass, Buchanan Boulevard, and Lakeshore Road) is currently part of the Purpose and Need Statement. Future LOS, as determined by traffic modeling, is used to measure congestion alleviation, where "A" provides the highest degree and "F" provides the lowest. The V/C ratio is also incorporated into the evaluation as a measurement of efficiency of a given alternative.
- **O3 – Traffic Flow through Town:** The public made comments at both public meetings that travel time through Boulder City on existing U.S. 93 is too long. PMT members shared these thoughts. Corridor alternatives are measured with this criterion by average running speed, determined by traffic modeling of the various alternatives (NDOT, January 2001, Appendix C).
- **O4 – Accommodation for Mass Transit:** This criterion was included in the matrix to evaluate the potential of a given corridor alternative to accommodate mass transit needs within Boulder City. The issue was requested by the RTC.
- **O5 – Railroad Operations:** The Nevada State Railroad Museum expressed in the agency scoping meeting that a goal of this EIS should be to preserve the integrity of the historic Boulder City Branch Railroad (BCBRR) and restore the railroad crossing near Railroad Pass.

Safety/Design Criteria

- **D1 – Safety (I):** This safety criterion addresses the overall degree of safety within the entire corridor alternative. This includes geometric and other engineering considerations and traffic elements related to safety.

- **D1 – Safety (II):** This criterion specifically addresses the three key high-crash U.S. 93 intersections (Railroad Pass, Buchanan Boulevard, and Lakeshore Road), as determined by NDOT. The measurement is performed by modeling the decrease in traffic at these intersections with the construction of a given alternative and estimating the effect of the traffic reduction on the number of crashes.
- **D2 – Design Standards:** This criterion was created to quantify the length of new alignment that would be required to be constructed at six percent grade, the NDOT design maximum for a freeway. Operations are compromised when designing extended lengths of a six percent grade and from high truck usage.

Environmental Impacts

- **E1 – Visual Impacts (I):** This visual impact criterion deals with the physical adaptation of a new roadway to the existing environment in or adjacent to the corridor. High ratings are given to a structure that blends well and is nearly "hidden" in the surrounding terrain, while low ratings are given to a structure that is highly visible from long distances.
- **E1 – Visual Impacts (II):** This visual impact criterion deals with the illumination of the roadway and the lighting currently in existence in or adjacent to the corridor area. If an alternative could be designed with a new system of lighting that is highly visible from extended distances, the rating for that alternative would be low. Conversely, if an alternative would not contain much new illumination, the rating would be higher.
- **E2 – Floodplain Impacts:** This criterion was established to account for the infringement upon 100-year floodplains established by the Federal Emergency Management Agency (FEMA). These flood zones are typically more environmentally sensitive than other areas. In addition, this criterion provides a measurement of potential drainage modifications required upon construction of a given roadway alignment. A crossing of a substantial amount of acreage is an indicator that multiple and costly drainage modifications would be required.
- **E3 – Preserve Habitat:** This criterion was created to indicate the degree of impact or disturbance of sensitive and threatened and endangered species that are known to inhabit the project area. A high acreage count within the 100-m (328-ft) corridor indicates the possibility of a substantial level of mitigation, such as fencing, crossing areas, and other forms of mitigation. The desert tortoise, gila monster, and bighorn sheep are primary threatened and protected species that inhabit the project area.
- **E4 – Noise Levels in Residential Areas:** This criterion indicates the degree of mitigation (sound walls, berms, etc.) that would be required upon construction of a given alternative. Residences are counted in this preliminary general evaluation as the number of rooftops within the 66-decibel A-weighted (dBA) noise contour, incorporating preliminary estimates of traffic on a given alternative.
- **E5 – Known Hazardous Materials Impacts:** This criterion was included to account for mitigation measures that would have to be taken should a selected corridor impact a hazardous waste site, which can take the form of a spill, contamination plume, or potential hazardous site such as leachate from a landfill.

- **E6 – Water Quality:** Impacts to "Waters of the U.S." were used as a proxy for water quality impacts, defined in this study as bodies of water (which include mostly dry desert washes) that eventually flow to a navigable water source. In this study, these sources are the Colorado River and Lake Mead.

- **E7 – Recreational Areas Impacts:** Section 4(f) lands (public parks, recreation lands, wildlife refuges, etc.) impact is a necessary criterion because an overall Section 4(f) evaluation is required in the EIS, and infringement upon these lands is to be avoided or minimized. NPS has strongly urged the PMT to preserve existing recreational areas and is especially concerned about areas within the LMNRA that NPS has designated with a special zoning status as a highly sensitive area.

- **E8 – Cultural Resources:** This criterion takes into consideration known sensitive cultural areas, probable sensitive cultural areas, and historic resources within the project area. Cultural areas have been found to contain artifacts and campsites from pre-Hoover Dam miners, and Native American artifacts. Historic resources include the historic BCBRR, and several properties in downtown Boulder City, and historic transmission lines.

Implementation

- **I1 – Utility Impacts:** This criterion was measured by evaluating the number of potential utility conflicts and required relocations within a given corridor width.

- **I2 – Airport Impacts:** This criterion measures the effect of a new roadway on the Boulder City airspace approach zones. Airspace contours have been depicted on a study map along with the alternatives, allowing for measurement of this criterion. Consideration is also given to any corridor that impacts airport right-of-way.

- **I3 – Construction Impacts:** This criterion was used to measure the degree of impact of construction activities on the area around a selected corridor. In this level of analysis, an evaluation was given to each corridor alternative as to the impact of construction on traffic patterns in the vicinity of the work.

Socioeconomic Impacts

- **S1 – Neighborhood Cohesion:** This criterion evolved from an issue brought up at a PMT meeting, "Splitting the Community," where the concern is the overall effect on the residents of Boulder City.

- **S2 – Right-of-Way Impacts to Businesses and Mining Claims:** The business displacements that would occur upon construction of a given alternative are important indicators, from an economic perspective, of the overall effect on the Boulder City community. An approximate count of these displacements and a potential number of mining claims impacts were generated for each alternative.

- **S3 – Right-of-Way Impacts to Residences:** The potential number of residential displacements as a result of the construction of a given alternative was evaluated. Low ratings were given to any alternative that forced any substantial number of displacements.

- **S4 – Business Exposure:** This criterion was used to estimate the change in volume of vehicles passing by businesses on stretches of existing U.S. 93 as a result of implementation of a given alternative. This criterion was used to evaluate the overall economic effect of a potential decrease in exposure of businesses to passing traffic.
- **S5 – Current Land Use and Circulation Plan Impacts:** This criterion evolved from an issue brought up at a PMT meeting concerning the effect on planning for parcels of land within the Boulder City limits. The measurement of this criterion was expanded to capture the effect on expected land use of undeveloped areas, as well as anticipated traffic circulation planning in developed areas.

2.4.4 Evaluation Results

The corridor evaluation process employed an assessment by the PMT of the potential build alternatives (Figure 2-6) with respect to each of the 30 criteria described above. A rating of 1 to 5 was given, where a score of "5" indicates the most desirable alternative, and a score of "1" indicates a rating given to the least desirable alternative. For each individual criterion, a measurement scheme was determined that produced these ratings. In some cases, a qualitative analysis based on professional judgment was employed, such as for Criterion A1 (Access to Pedestrian Facilities), which rates the impact of an alternative on pedestrian safety, directness, convenience, and quality of environment. Conversely, a number of criteria were measured by quantitative means, such as Criterion E2 (Floodplain Impacts), which takes into account the acreage of floodplain impacts with 100-m-wide (328-ft-wide) corridor widths. For these quantitative measurements, a spread of ratings for the corridors was determined in the 1-to-5 range for the numerical values.

Discussions were held at PMT meetings in May, June, and July 2000 concerning a weighted ranking process whereby the corridor alternatives could be evaluated in a manner consistent with the values of all the agencies represented in this study. It was decided that the best manner of weighting the criteria is to attribute a percentage of desired weight to each of the 30 criteria, with the total equaling 100 percent. Each PMT member provided a distribution of weights for the 30 criteria, and the individual weights were averaged by percentages to produce the results shown in Table 2-1.

The screening results were presented to the PMT at meetings in June and July of 2000. Corridor SA102A, with the weighting applied, remained the most favorable alternative according to the Criteria Evaluation Matrix (NDOT, January 2001). Overall, the weighting system had little effect on the results, as compared to the unweighted results, with no single alternative increasing or decreasing in rank more than two places. However, the weighting process clearly identifies less desirable alternatives with respect to the criteria evaluation. Corridors TA102, TA102A, and TA103 occupy the bottom three spaces in both the weighted and unweighted versions of this analysis.

TABLE 2-1
Corridor Evaluation Summary (Weighted Results)

Corridor Alternative	Accessibility	Operations	Safety/Design	Environmental Impacts	Implementation	Socioeconomic Impacts	Corridor Average Rating	Corridor Rank
NA101	2.3	4.1	1.5	2.4	1.7	3.5	**3.09**	**8**
TA101	2.6	3.7	2.7	3.0	0.8	2.4	**3.03**	**9**
TA101A	2.5	3.7	2.2	3.0	0.5	2.1	**2.81**	**12**
TA101B	2.5	3.7	2.2	3.3	0.5	2.1	**2.86**	**11**
TA102	2.3	3.8	1.2	3.3	0.5	2.1	**2.64**	**14**
TA102A	2.3	3.8	1.2	3.0	0.9	2.1	**2.59**	**15**
TA102B	2.4	3.8	1.7	3.0	0.9	2.1	**2.76**	**13**
TA103	1.2	1.8	1.5	5.0	0.8	2.6	**2.59**	**16**
U.S. 93 Improved	1.5	2.9	2.5	4.6	0.9	2.8	**3.03**	**10**
U.S. 93 TSM	1.3	2.4	1.6	5.7	1.5	4.2	**3.33**	**6**
SA101	2.6	4.1	1.9	3.7	1.4	3.3	**3.40**	**3**
SA101A	2.6	4.1	2.0	3.2	1.6	3.4	**3.42**	**2**
SA101B	2.6	4.1	1.9	3.3	1.4	3.3	**3.32**	**7**
SA101AB	2.6	4.1	2.0	2.9	1.6	3.3	**3.32**	**5**
SA102	2.6	4.1	2.2	2.9	1.7	3.3	**3.36**	**4**
SA102A	2.6	4.1	2.2	3.3	1.7	3.3	**3.44**	**1**

2.4.5 Review of Initial Evaluation

On June 27, 2000, the PMT met with FHWA management to discuss preliminary legal sufficiency aspects of the project. FHWA and NDOT management endorsed the criteria evaluation process used in the study and commented that the identification of alternatives to be studied further should be both a quantitative evaluation as well as a subjective evaluation of what alternatives would be better to study further.

An item on the agenda of the preliminary legal sufficiency meeting was dedicated to a discussion concerning a request by NPS to remove Corridors SA102 and SA102A from further consideration in this EIS. NPS, in a letter from Alan O'Neill, Superintendent, to John Price, FHWA Division Administrator (provided in Appendix A), stated that these two alternatives pass through LMNRA lands that are denoted by NPS as being "Natural Zones" and "Outstanding Natural Feature Subzones." For this reason, NPS contended the evaluation of Section 4(f) impacts on simply an acre-for-acre basis is not acceptable. It is the position of NPS that special consideration must be given to some criteria with respect to passing through these special zones. FHWA agreed that environmental regulations (23 *Code of Federal Regulations* [CFR] 771) state that if a given alternative has substantial Section 4(f) impacts, and there are other reasonable and prudent alternatives with more moderate Section 4(f) impacts, then FHWA is required to remove the given alternative from consideration. The PMT agreed that there are other reasonable and prudent alternatives remaining in this study. Therefore, FHWA agreed in writing (by letter dated December 14, 2000, Appendix A) to remove Corridors SA102 and SA102A from further consideration.

2.4.6 Alternatives Eliminated from Further Consideration

Sixteen potential corridor build alternatives were recognized by the PMT as viable for more detailed screening evaluation from the original 40 alignments identified during the initial public involvement and scoping phase of the project. The corridor build alternatives studied were developed to the point of identifying approximate centerline, and a 300-m-wide (1,000-ft-wide) construction impacts limit was established for purposes of the screening analysis (Figure 2-6). Those alternatives that incorporate only arterial improvements to existing roadways did not have a 300-m (1,000-ft) study limit defined. The following alternatives described (shown with corridor ranking and rating numbers) were eliminated from detailed study in this EIS based on the screening evaluation:

NA101 (Rank 8, 3.09 Rating)

Corridor NA101 originates near the Foothills Road grade separation; crosses the River Mountains through Hidden Valley along the northern limits of Boulder City; passes through Hemenway Wash, crossing the existing U.S. 93 and Lakeshore Road intersection; and ties into existing U.S. 93 in the vicinity of the Hacienda Hotel and Casino. The general topography across the route consists of low rolling hills for the first 7 km (4.5 miles) and then a large mountain (Radar Mountain), which rises about 200 m (650 ft) above the surrounding ground. Passing through the west side of Radar Mountain, the alignment would require two parallel tunnels measuring approximately 3.4 km (2.1 miles) in length. The alignment also has 8.7 km (5.4 miles) of 6 percent grades, far greater than any other alternative (see Section 2.4.1 for additional details).

TA101A (Rank 12, 2.81 Rating)

The alignment of Corridor TA101A splits off from Corridor TA101 east of Buchanan Boulevard (see Section 2.4.2 and description of Alternative C, Section 2.7.3). It then continues above existing grade, down a steep Hemenway Wash power transmission corridor through a residential area. Grade separations would be provided at Lake Mountain Drive, Ville Drive, and Pacifica Way. The reach down Hemenway Wash requires 2.4 km (1.5 miles) of 6 percent grades.

TA101B (Rank 11, 2.86 Rating)

The alignment of Corridor TA101B splits off Corridor TA101 east of Buchanan Boulevard (see Section 2.4.2 and description of Alternative C, Section 2.7.3). It then continues along the alignment of the TA102 corridor, northwest of Corridor TA101A (see Figure 2-6 and NDOT, January 2001). This alignment is also above existing grade and down a steep Hemenway Wash power transmission corridor through a residential area. Grade separations would be provided at Lake Mountain Drive, Ville Drive, and Pacifica Way. The reach down Hemenway Wash requires 2.5 km (1.6 miles) of 6 percent grade.

TA102 (Rank 14, 2.64 Rating)

The Corridor TA102 alignment realigns U.S. 93 northeasterly through Railroad Pass, passing north of the Railroad Pass Hotel and Casino and running parallel and north of U.S. 93 until veering northeasterly, following TA101, around the Industrial Road developments. It follows the most northerly powerline corridor located south of the homes along Marina Drive and provides interchanges at the west end, at U.S. 95, at Buchanan Boulevard, and at the east end. This corridor was created in part to avoid the current historic railroad at-grade crossing on U.S. 95. Corridor TA102 has 2.5 km (1.6 miles) of 6 percent grade.

TA102A (Rank 15, 2.59 Rating)

The Corridor TA102A alignment is very similar to TA102, except where it passes through a parallel utility corridor south of Corridor TA102 in the same Hemenway Valley residential area. The Corridor TA102A alignment contains slightly less 6 percent grade along the centerline (2.4 km versus 2.5 km [1.5 versus 1.6 miles]) compared to Corridor TA102. Corridor TA102A also crosses the Hemenway Wash outfall area in a more longitudinal direction than Corridor TA102.

TA102B (Rank 13, 2.76 Rating)

Corridor TA102B is identical to Corridor TA101, with the exception of the west-end segment containing the northerly bypass of Railroad Pass. This includes the bypass of the existing at-grade historic railroad crossing and the hotel casino intersection with U.S. 95 (see Section 2.6.4 and description of Alternative C, Section 2.7.3).

TA103 (Rank 16, 2.59 Rating)

Corridor TA103 is an arterial improvement only (no freeway status along the entire alignment) that begins just east of the existing U.S. 93/95 interchange. U.S. 93 is then realigned to tie into existing Adams Boulevard at the Veterans Memorial Drive intersection. Existing Adams Boulevard is used in its current configuration through Boulder City. The east end of Adams Boulevard is extended to thread to the northern face of the Eldorado Mountain ridge. It begins a 3,400-m (2.1-mile) descent along a 6 percent grade on the face of the Eldorado ridge to tie with existing U.S. 93 just east of the Lakeshore Road intersection. The profile for Corridor TA103 utilizes gentle grades for the entirety of the alignment, with the exception of 2,600 m (1.6 miles) of 6 percent grade from Wash "C" to the eastern tie-in with existing U.S. 93.

U.S. 93 TSM (Rank 6, 3.33 Rating)

The TSM Alternative would improve key intersections by adding approach and departure lanes, turn lanes, and traffic signals at key locations. It also provides additional connectivity for the local circulation system so that traffic can avoid using U.S. 93 during local trips. The alternative assumes that an additional eastbound lane is added between Buchanan Boulevard and Lakeshore Road to create a four-lane section. Specific TSM improvements consist of reconfiguring the U.S. 93/Buchanan Boulevard intersection to eliminate the

U.S. 93 traffic left and right turns at the intersection; realignment of Industrial Road and Colorado Street to form a single four-legged intersection with U.S. 93; adding a signalized intersection at U.S. 93 and Nevada Way in Hemenway Wash, with the north leg of the intersection connecting with Lake Mountain Drive and Ville Drive; and a new signalized intersection at Yucca Street and U.S. 93.

SA101B (Rank 7, 3.32 Rating)

Corridor SA101B provides a route that circulates to the south of Boulder City and south of the Mead Substation, connecting with the existing U.S. 93 Corridor east of the Hacienda Hotel and Casino. Corridor SA101B diverges from Corridor SA101 (see Section 2.4.3 and description of Alternative D, Section 2.7.4) easterly and westerly of the Mead Substation to enable the alternative to pass south of the substation. The same amount of 6 percent grades (a total of 2.5 km [1.6 miles]) through the Eldorado Mountains east of Boulder City are found in Corridor SA101B as in Corridor SA101.

SA101AB (Rank 5, 3.32 Rating)

Corridor SA101AB provides a route that circulates to the south of Boulder City and south of the Mead Substation, connecting with the existing U.S. 93 Corridor east of Boulder City but east of the Hacienda Hotel and Casino (utilizing the same final segment as Corridor SA101A). Corridor SA101B uses both "A" and "B" alternate segments described elsewhere (see SA101B, Section 2.6.9, Section 2.4.3, and Alternative D, Section 2.7.4). The same 6 percent grades (a total of 2 km [1.3 miles]) are found in Corridors SA101AB and SA101A (see description of Alternative D, Section 2.7.4).

SA102 (Rank 4, 3.36 Rating)

This alternative provides a route that circulates to the south of Boulder City and connects with the existing U.S. 93 Corridor east of town in the vicinity of the Hacienda Hotel and Casino. Corridor SA102 follows an identical path as the Corridor SA101B alternative over the first half (west to east) of its alignment, crossing the alluvial fan on flat grades (see Section 2.4.3 and description of Alternative D, Section 2.7.4). East of the Mead Substation, the alternative alignment veers to the northeast towards Boy Scout Canyon, then begins a steady, curvilinear descent through mountainous terrain. Several structures will be required to cross many washes and canyons before concluding the 27.5-km (17.1-mile) corridor at the eastern terminus. There is one 1.7-km (1-mile) section of 6 percent grade occurring near the eastern terminus.

SA102A (Rank 1, 3.44 Rating)

Corridor SA102A follows an identical path as Corridor SA102, with the exception of its passing north of the Mead Substation. The realignment of the corridor north of the Mead Substation reduces the length of the corridor to 24.9 km (15.5 miles), approximately 2.5 km (1.6 miles) shorter than Corridor SA102.

2.4.7 Corridor Evaluation Summary

Table 2-2 lists the potential build alternatives subject to initial evaluation and summarizes the main reasons for elimination of the alternatives described above. The numerical results attained in the criteria evaluation process were used in conjunction with professional judgment of the PMT and consultants to identify the three build alternatives (highlighted in Table 2-2) which, in addition to the No Build Alternative, are studied in detail in this EIS. The PMT reached the following major conclusions during the alternatives evaluation process:

- There is not enough benefit to routing an alignment south of the Mead Substation (SA101B and SA102) to counter the additional cost of a longer roadway and greater environmental impacts.
- Corridor TA103 (Adams Boulevard) and U.S. 93 TSM Alternatives will not satisfy the Purpose and Need statement (Chapter 1) in this EIS.
- The TA102 family of corridors, which incorporate a segment that passes north of Railroad Pass Hotel and Casino, would have an unavoidable adverse impact on the historic railroad, the future Park Place golf course, and U.S. 93 connectivity with U.S. 95.
- Public opinion at Public Meetings No. 1 and No. 2 in January and April 2000 generated enough interest in a Through-Town Alternative that a freeway and a widening of the existing roadway option should be considered.
- The Through-Town Alternative identified for further detailed study should be the most desirable alignment within this family of alternatives, much in the same way the original group of 40 alignments was brought down to the 16 corridors that were evaluated.
- Cost alone cannot be the reason to eliminate an alignment alternative.

Table 2-2 summarizes the weighted evaluation rating and ranking for each corridor alternative, as well as the respective reasons for inclusion or removal from further consideration in the study. (For further details on the alternatives evaluation and elimination process, see Section 2.5 and NDOT, January 2001.)

TABLE 2-2
Corridor Evaluation Summary

Corridor Alternative	Weighted Rating	Weighted Rank	PMT Decision on Alternative
NA101	3.09	8	Eliminated due to very poor safety/design and environmental impacts ratings and very high construction costs
TA101	3.03	9	Highest-rated Through-Town Alternative – carried forth into the EIS for detailed study as Alternative C
TA101A	2.81	12	Eliminated due to poor overall ratings, especially in implementation and socioeconomic categories
TA101B	2.86	11	Eliminated due to poor overall ratings, especially in implementation and socioeconomic categories
TA102	2.64	14	Eliminated due to very poor overall ratings – all TA102 family alternatives eliminated because of negative impacts of routing behind Railroad Pass Hotel and Casino
TA102A	2.59	15	Eliminated due to very poor overall ratings – all TA102 family alternatives eliminated because of negative impacts of routing a freeway behind Railroad Pass Hotel and Casino

TABLE 2-2
Corridor Evaluation Summary

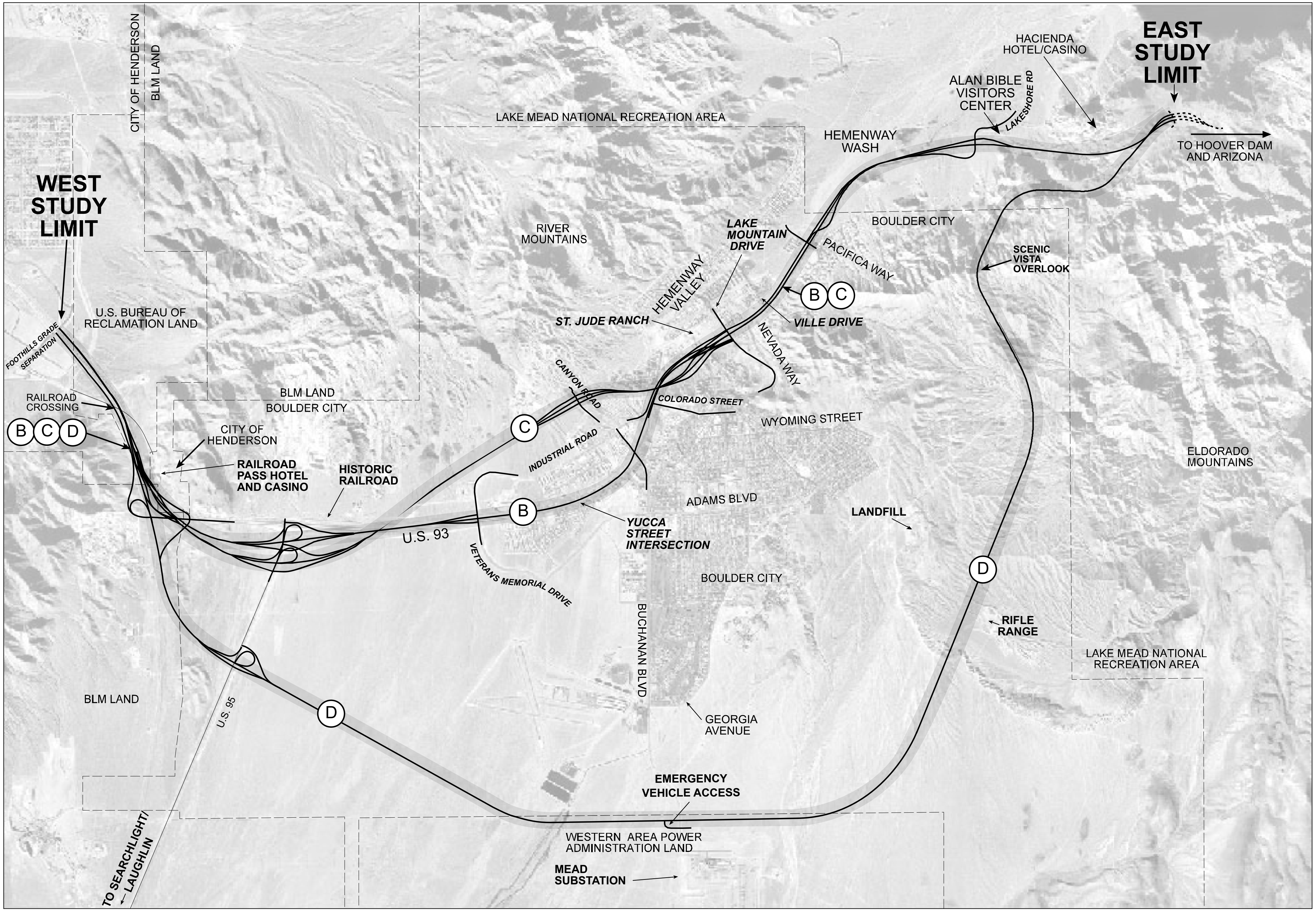
Corridor Alternative	Weighted Rating	Weighted Rank	PMT Decision on Alternative
TA102B	2.76	13	Eliminated due to poor overall ratings, especially in implementation and socioeconomic categories; TA102 family eliminated
TA103	2.59	16	Eliminated due to very poor ratings, negative community cohesion impacts, does not meet Purpose and Need
U.S. 93 Improved	3.03	10	Carried forth into the EIS for detailed study as Alternative B
U.S. 93 TSM	3.33	6	Minor surface improvements does not meet the project Purpose and Need
SA101	3.40	3	Combined with SA101A to make SA101C, and carried forth into the EIS for detailed study as Alternative D
SA101A	3.42	2	Combined with SA101 to make SA101C, and carried forth into the EIS for detailed study as Alternative D
SA101B	3.32	7	Eliminated from consideration, insufficient benefit to routing south of the Mead Substation to warrant added roadway length
SA101AB	3.32	5	Eliminated from consideration, insufficient benefit to routing south of the Mead Substation to warrant added roadway length
SA102	3.36	4	Eliminated from consideration due to NPS request to remove corridor due to unusually high LMNRA Section 4(f) infringement on Park Service Natural Zones
SA102A	3.44	1	Eliminated from consideration due to NPS request to remove corridor due to unusually high LMNRA Section 4(f) infringement on Park Service Natural Zones

Note: The shaded build alternatives were retained for detailed evaluation in the EIS; all others were eliminated from further consideration.

2.5 Alternatives Studied in Detail

Subsequent to the initial evaluation of the sixteen alternatives described above, thirteen were rejected (Table 2-2), leaving three build alternatives and the no-build alternative for further study in the EIS. The areas of potential effect of the corridors studied are 300 m (1,000 ft) wide, with the exception of those alternatives that incorporate only arterial improvements to existing roadways (Figure 2-7). Based on a comprehensive review of the screening evaluation results, the PMT eliminated all but four alternatives (three build alternatives plus a "no-build" alternative) from further consideration during several workshop meetings in June and July 2000. After eliminating corridor alternatives based on the criteria screening, the PMT concurred upon the following three build alternatives from the 16 evaluated, along with the no-build, as most reasonable and feasible to carry into detailed evaluation in the EIS:

1) Existing U.S. 93 Improved
2) Through-Town Freeway Alignment
3) Southern Freeway Alignment



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

12/99

N

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SCALE IN MILES

FIGURE 2-7
ALTERNATIVES UNDER CONSIDERATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

LAS 155933.ED.EI.FE Figure 2-7 1/05

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The following sections describe the four alternatives that were identified by the PMT for detailed study in the Boulder City/U.S. 93 Corridor Study EIS. The project alternatives are described in greater detail in the *Boulder City/U.S. 93 Corridor Study Preliminary Engineering Report* (NDOT, November 2001). The proposed build alternatives and the overall project study area, including study limits, are shown in Figure 2-7.

2.5.1 Alternative A: No Build

The No Build Alternative would consist of leaving the existing roadway facilities along U.S. 93 through Boulder City as they are and would take no action to address current or projected traffic congestion, traffic circulation, or safety problems. This alternative assumes that no geometric improvements are made to the present-day roadway network within the study limits, except for expansion of U.S. 93 to a three-lane roadway section with a new westbound lane between the Hoover Dam Bypass tie-in (see Section 2.1) and Lakeshore Road. All intersections are assumed to remain unsignalized except for the existing signalized intersections at Railroad Pass, Veterans Memorial Drive, and Buchanan Boulevard.

2.5.2 Alternative B: Improvements to the Existing U.S. 93 Alignment

This build alternative is proposed as a freeway and arterial improvement combination that includes a general widening of existing U.S. 93 and other roadway improvements within the study limits (see Figures 2-2 and 2-7). The goal of the alternative is to make improvements to the present 17.7 km (11 miles) of roadway, mostly within the existing U.S. 93 corridor, in order to improve safety and reduce congestion through Boulder City. The proposed improvements consist primarily of a new four-lane divided freeway beginning from the Foothills grade separation, crossing under the existing at-grade railroad crossing, and continuing just south of the existing highway to a new diamond interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues to just east of a half-diamond interchange at Veterans Memorial Drive. The existing U.S. 93/95 interchange would be replaced by a new, higher-capacity interchange. A six-lane principal urban arterial would extend from east of the new half-diamond interchange at Veterans Memorial Drive to Colorado Street, with a new traffic signal at an improved Buchanan Boulevard/U.S. 93 intersection. There would be a four-lane median barrier divided freeway through Hemenway Valley to the eastern project limit, with existing U.S. 93 converted to a frontage road and interchanges at Lake Mountain Drive, Pacifica Way, and Lakeshore Road. The freeway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange east of the Hacienda Hotel and Casino (see Section 2.1). Table 2-3 describes the features and improvements of the current development of Alternative B. These features and improvements are further displayed in the plan and profile drawings in the *Preliminary Engineering Report* (NDOT, November 2001, Appendix A).

The total estimated comparative cost of this alternative is $220 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration, and contingencies.

TABLE 2-3
Development Features of Alternative B (Existing U.S. 93 Improved Alignment)

Feature Number	Location	Description
1	Western Study Limit	Alignment ties into existing I-515 at the Foothills Road grade separation in the City of Henderson, Nevada.
2	New Freeway Segment: Western Study Limit to U.S. 95 (Extension of I-515)	Construct a four-lane divided freeway (extending I-515) with a 20-m (65-ft) median from the western study limits to a new U.S. 93/95 interchange; the new alignment would be located just south of existing U.S. 93 in this area, and existing U.S. 93 would serve as a frontage road.
3	Historic Railroad Crossing (within Feature 2)	Construct a grade separation at the BCBRR and U.S. 93 (the new alignment passes approximately 7.6 m [25 ft] below the railroad grade).
4	Railroad Pass Interchange (within Feature 2)	Construct a diamond interchange, providing access to Boulder City via existing U.S. 93 near the Railroad Pass Hotel and Casino, and providing access to old Highway 95.
5	U.S. 93/95 Interchange	Construct an interchange at the junction of U.S. 93 and U.S. 95 just south of the existing interchange. The interchange would contain a combination of ramp and stop-controlled access points and would provide access to Boulder City via existing U.S. 93.
6	New Freeway Segment: U.S. 95 to Veterans Memorial Drive	Construct a six-lane divided freeway with a 20-m (65-ft) median from the new U.S. 93/95 Interchange to Veterans Memorial Drive.
7	Veterans Memorial Drive Interchange	Construct a half-diamond interchange at Veterans Memorial Drive, providing ramp access to north and south Veterans Memorial Drive and to west U.S. 93 from Veterans Memorial Drive.
8	New Arterial Roadway Segment: Veterans Memorial Drive to Buchanan Boulevard	Construct a seven-lane divided principal urban arterial roadway with either a raised median or a left-turn lane from the Veterans Memorial Drive Interchange to Buchanan Boulevard. The Yucca Street intersection would be signalized and access would be maintained to local businesses.
9	Buchanan Boulevard Intersection	Construct an intersection and install a new traffic signal at a realigned Buchanan Boulevard intersection, with Buchanan Boulevard widened and extended north to Canyon Road.
10	New Arterial Roadway Segment: Buchanan Boulevard to Colorado Street	Construct a six-lane divided arterial roadway with a raised median from the Buchanan Boulevard intersection to Colorado Street.
11	New Freeway Segment: Buchanan Boulevard to Eastern Study Limit	Construct a four-lane divided freeway (six lanes to St. Jude Street), with a barrier median, from Colorado Street to the eastern study limit; a frontage road would be constructed on the north side of the new alignment on existing U.S. 93 to provide local access circulation.
12	Lakeshore Road Interchange (within Feature 11)	Construct an interchange utilizing existing U.S. 93 to the north, allowing for access to Lakeshore Road and Hoover Dam.
13	Eastern Study Limit	Alignment ties into proposed Hoover Dam Bypass alignment at the eastern study limits (see Section 2.1).

2.5.3 Alternative C: New Through-Town Alignment

Alternative C would be a new through-town freeway connecting the western and eastern study limits of the project. It would consist of a continuous four-lane, controlled-access freeway parallel to existing U.S. 93 (Figures 2-3 and 2-7). Alternative C would be a divided freeway from the Foothills grade separation to the west end of Hemenway Valley, and from there it would be a barrier-median freeway to the eastern project limit. The alignment begins at the Foothills grade separation, crosses under the existing at-grade railroad crossing, and continues just south of the existing highway to a new diamond interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues to the east to approximately 0.8 km (0.5 mile) south of the U.S. 93/95 interchange. The existing U.S. 93/95 interchange would be replaced by a new, higher-capacity interchange. After the alignment turns north, crossing underneath U.S. 93, it runs parallel to and north of Industrial Road along the transmission line corridor. A new diamond interchange would be provided at Canyon Road. This alternative meets existing U.S. 93 at the west end of Hemenway Wash and generally follows the Alternative B alignment in the Hemenway Valley area with interchanges at Lake Mountain Drive, Pacifica Way, and Lakeshore Road. The freeway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange east of the Hacienda Hotel and Casino (see Section 2.1). The proposed freeway would be approximately 17.7 km (11 miles) in length.

Alternative C includes the following features and improvements described in Table 2-4. These features and improvements are further displayed in the plan and profile drawings in the *Preliminary Engineering Report* (NDOT, November 2001, Appendix A).

The total estimated comparative cost of this alternative is $220 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration and contingencies.

TABLE 2-4
Development Features of Alternative C (Through-Town Alignment)

Feature Number	Location	Description
1	Western Study Limit	Alignment ties into existing I-515 at the Foothills Road grade separation in the City of Henderson, Nevada.
2	New Freeway Segment: Western Study Limit to U.S. 95 (Extension of I-515)	Construct a four-lane divided freeway (extending I-515) with a 20-m (65-ft) median from the western study limits to a new U.S. 93/95 interchange; the new alignment would be located south of existing U.S. 93 in this area and existing U.S. 93 would serve as a frontage road.
3	Historic Railroad Crossing (within Feature 2)	Construct a grade separation at the BCBRR and U.S. 93 (the new alignment passes approximately 7.6 m [25 ft] below the railroad grade).
4	Railroad Pass Interchange (within Feature 2)	Construct a diamond interchange, providing access to Boulder City via existing U.S. 93 near the Railroad Pass Hotel and Casino, and providing access to old Highway 95.

TABLE 2-4
Development Features of Alternative C (Through-Town Alignment)

Feature Number	Location	Description
5	U.S. 93/95 Interchange	Construct an interchange at the junction of U.S. 93 and U.S. 95 approximately 0.4 km (0.25 mile) south of the existing interchange. The interchange would contain a combination of ramp and stop-controlled access points, and would provide access to Boulder City via existing U.S. 93.
6	New Freeway Segment: U.S. 95 to existing U.S. 93 in Hemenway Wash	Construct a four-lane divided freeway with a 20-m (65-ft) median from the new U.S. 93/95 interchange to Hemenway Wash, crossing underneath existing U.S. 93 and BCBRR just east of the interchange and passing north of the Boulder City commercial corridor. A new diamond interchange providing access to Boulder City via an extended Buchanan Boulevard will be provided. In this segment, the alignment passes through the area designated for the Boulder Ridge Golf Course.
7	New Freeway Segment: Hemenway Wash to Eastern Study Limit	Construct a four-lane divided freeway with a barrier median from the grade separation over existing U.S. 93 in Hemenway Wash to the eastern study limit; a frontage road would be constructed on the north side of the new alignment in Hemenway Wash to allow access to side streets.
8	Lakeshore Road Interchange (within Feature 7)	Construct a new interchange utilizing existing U.S. 93 to the north, allowing for access to Lakeshore Road and Hoover Dam.
9	Eastern Study Limit	Alignment ties into proposed Hoover Dam Bypass alignment at the eastern study limits (see Section 2.1).

2.5.4 Alternative D: Southern Alignment (Preferred Alternative)

Alternative D is proposed as a southern bypass of Boulder City connecting the western and eastern study limits of the project. It would consist of a continuous four-lane, controlled-access divided freeway and highway bypassing the developed area of Boulder City to the south (Figures 2-4 and 2-7). The alignment begins at the Foothills grade separation, crosses under the existing at-grade railroad crossing, and continues just south of the existing highway to a new interchange near the Railroad Pass Hotel and Casino. From there, the freeway continues east to U.S. 95 with a new interchange approximately 1.9 km (1.2 miles) south of the existing U.S. 93/95 interchange, and then a highway alignment continues south towards the Mead Substation. The alignment runs approximately 1.4 km (0.85 mile) south of Georgia Avenue, just north of the Mead Substation, and generally runs parallel to the transmission corridor between the landfill and the rifle range transitioning into a median barrier divided highway through the Eldorado Mountains east of Boulder City.

Subsequent to the release of the DEIS for this project, the need was identified by the cities of Boulder City and Henderson for an emergency access ramp at the crossing of the Southern Alternative and Buchanan Boulevard to decrease emergency vehicle response time (fire, police, and ambulances) to accidents along the new roadway. Rather than limiting access of emergency vehicles to the U.S. 95 interchange on the west and the Nevada Interchange on the east, access points a total distance of 11.6 miles apart, this 15-m (50-ft)-wide, gravel-surfaced ramp would provide a means for emergency vehicles to enter the highway approximately 3.6 miles further east of the U.S. 95 crossing. In particular, it would allow emergency access directly from southern Boulder City. Without this ramp, emergency vehicles from Boulder City would have to travel miles to either the east or the west before being able to turn onto the highway. Use of the emergency access ramp will be controlled by NDOT; it will have locked gates, and no public vehicular access would be allowed. The access ramp would also be used by WAPA for heavy equipment deliveries destined for the Mead Substation, and its use would alleviate the need to send these heavy trucks through Boulder City.

A scenic vista point would be constructed at the top of the ridge through the Eldorado Mountains for views of Lake Mead and the surrounding area. The highway would tie in to the U.S. 93 Hoover Dam Bypass Nevada Interchange east of the Hacienda Hotel and Casino (see Section 2.1). The proposed roadway would be approximately 24 km (15 miles) in length.

Alternative D includes the features and improvements described in Table 2-5. These features and improvements are further displayed in the plan and profile drawings in the *Preliminary Engineering Report* (NDOT, March 2002, Appendix A).

The total estimated comparative cost of this alternative is $345 million (in year 2002 dollars). The cost elements include construction, right-of-way, utilities, engineering, construction administration and contingencies. Alternative D has been identified as the preferred alternative (see Section 2.8).

TABLE 2-5
Development Features of Alternative D (Southern Alignment-Preferred Alternative)

Feature Number	Location	Description
1	Western Study Limit	Alignment ties into existing I-515 at the Foothills Road grade separation in the City of Henderson, Nevada.
2	New Freeway Segment: Western Study Limit to U.S. 95 (Extension of I-515)	Construct a four-lane divided freeway (extending I-515) with a 20-m (65-ft) median from the western study limits to a new U.S. 93/95 interchange; the new alignment would be located south of existing U.S. 93 in this area, and existing U.S. 93 would serve as a frontage road.
3	Historic Railroad Crossing (within Feature 2)	Construct a grade separation at the BCBRR and U.S. 93 (the new alignment passes approximately 7.6 m [25 ft] below the railroad grade).
4	Railroad Pass Interchange (within Feature 2)	Construct a new interchange, providing access to Boulder City via existing U.S. 93 near the Railroad Pass Hotel and Casino.
5	U.S. 93/95 Interchange (within Feature 2)	Construct a new interchange at the junction of U.S. 93 and U.S. 95 about 1.6 km (1 mile) south of the existing interchange. The interchange would contain a combination of ramp and stop-controlled access points, and would provide access to Boulder City via existing U.S. 93.
6	New Highway Segment: U.S. 95 to Eldorado Mountains foothills	Construct a new four-lane divided highway with a 20-m (65-ft) median from the new U.S. 93/95 interchange to the Eldorado Foothills; this portion of the alignment passes through the flat alluvial fan area approximately 1.4 km (0.85 mile) south of Georgia Avenue.

TABLE 2-5
Development Features of Alternative D (Southern Alignment-Preferred Alternative)

Feature Number	Location	Description
7	Emergency Access Ramp: Buchanan Boulevard (within Feature 6)	At the crossing of the Southern Alternative and Buchanan Boulevard, an emergency access ramp will be constructed to decrease response time by emergency vehicles to accidents along the new roadway. The ramp connection will consist of locked gates, and no public vehicular access would be allowed. The access would also be used by heavy equipment destined for the Mead Substation, and its use will be controlled by NDOT.
8	Georgia Avenue Wash Crossing (D-6; within Feature 6)	Alignment crosses the Georgia Avenue Wash (one of two major Boulder City drainages); flows are split between two sets of box culverts.
9	Mead Substation Access Road Grade Separation (within Feature 6)	Construct a grade separation at the access road and U.S. 93 (new U.S. 93 passes approximately 10 m [32 ft] above the access road grade).
10	Wash "C" Crossing (within Feature 6)	Crossing of Wash "C" (the second of two major Boulder City drainages); flow is directed into a channel at the crossing. Crossing provides recreational access to the Colorado River.
11	New Highway Segment: Eldorado Mountains foothills to Eastern Study Limit	Construct a four-lane divided highway tapered to a four-lane divided highway with a concrete median barrier through the Eldorado Mountains to the eastern study limit; alignment passes through several deep cuts and fill points and requires several structures.
12	Intertie Maintenance Road Crossing (within Feature 11)	A bridge will be constructed to span an existing dirt road which provides access to nearby electrical transmission facilities. The structure opening will be appropriate to serve a secondary function as a wildlife passage.
13	Eldorado Ridge Scenic Overlook (within Feature 11)	Construct a scenic overlook at the ridgeline of the Eldorado Mountains, offering views of Lake Mead and Boulder City to passing vehicles.
14	Eastern Study Limit	Alignment ties into proposed Hoover Dam Bypass alignment at the eastern study limits (see Section 2.1; Figure 2-7).

2.6 Determination of the Preferred Alternative

In a meeting on June 27, 2002, the PMT for the Boulder City/U.S. 93 Corridor Study completed the process preparatory to recommending the preferred alternative and identified Alternative D as the preferred alternative. At this meeting, each of the PMT members, representing cooperating agencies for the project, presented their individual evaluations of Alternatives B, C, and D, and the No Build Alternative relative to social, environmental, and economic impacts. An overall determination was agreed upon based on a compilation of all PMT member evaluations.

The relative scores for each of the alternatives were recorded by PMT members using the form illustrated in Table 2-6. The scores initially provided by PMT members at the June 27, 2002, meeting employed varying scales that, as a consequence, were not directly comparable from one PMT member's rating to another. To achieve comparability, the agency scores for each alternative were ranked by the PMT members on a uniform scale of 1 to 5. The summation matrix shown in Table 2-7 provides the individual PMT ranking for each of the alternatives, based on the criteria in Table 2-6. All PMT members were present for this ranking process, with the exception of Reclamation and BLM. The Reclamation representative's evaluation was provided prior to the meeting.

TABLE 2-6
Alternative Evaluation Matrix Initially Employed by PMT Members

Preferred Alternative Evaluation Criteria	Alternative A No Build	Alternative B Improvements to Existing U.S. 93	Alternative C Through-Town	Alternative D Southern
Social Impacts Criteria*				
- Accessibility				
- Operations				
- Safety/Design				
- Public Comments				
Environmental Criteria*				
- Criteria Scoring Matrix				
- DEIS Chapter 4				
- DEIS Chapter 7				
- Public Comments				
Economics Criteria*				
- DEIS Section 4.11				
- Implementation				
- Public Comments				

*Maximum score for each criterion or per criterion.

The first column for each alternative in Table 2-7 presents the total initial scores (summations of social, environmental, and economics criteria) provided by each of the PMT agencies, as described above. The second column for each alternative provides the corresponding rank (1 through 4, where 4 represents the top-ranked alternative of an individual agency). Note that Reclamation only provided the overall rank of the alternatives.

Both the sum of the individual scores and of the derived ranks led to the recommendation by the PMT of Alternative D as the preferred alternative. These analyses further indicated that Alternative C ranked second and Alternative B was a close third preference. Alternative A (No Build) was a distant fourth as appropriate to an alternative that does not meet the purpose and need for this project. Upon this determination, Scott Rawlins, NDOT Project Manager and chairman of the PMT, agreed that Alternative D (Southern Alternative) was to be identified by the PMT as the preferred alternative in the Boulder City/U.S. 93 Corridor Study. PMT members agreed at this PMT meeting to recommend to the Director of NDOT and the Division Administrator of FHWA to move forward with the study of Alternative D, recognizing that not all agencies had identified Alternative D as the best scoring alternative (Table 2-7).

TABLE 2-7
Preferred Alternative Evaluation Results

Evaluation Results by PMT Agency	Alternative A No Build		Alternative B Improvements to Existing U.S. 93		Alternative C Through-Town		Alternative D Southern	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
NPS	6.0	1	13.0	3	14.0	4	11.0	2
City of Henderson	8.5	1	9.0	2	9.2	3	9.7	4
City of Boulder City	8.0	2	7.0	1	8.0	3	12.0	4
RTC	10.3	3	9.8	2	9.5	1	10.4	4
WAPA	7.0	1	13.4	4	13.0	3	10.7	2
FHWA	5.0	1	5.0	1	8.0	3	12.0	4
NDOT	5.0	1	8.0	3	7.0	2	9.0	4
Clark County	10.5	3	10.6	4	7.9	2	5.8	1
Reclamation		1		2		3		4
Total	60.3	14	75.8	22	76.6	24	80.6	29

In the June 2002 PMT meeting it was concluded that the primary reasons for identifying Alternative D as the preferred alternative related to (1) the fact that it meets the purpose and need of this project and (2) it has the least impact to those environmental components that directly determine the quality of the human environment. On the other hand, impacts to the natural environment from the implementation of Alternative D will be greater than those resulting from implementation of any of the other build alternatives or the No Build Alternative. A memorandum to Thomas Stephens, NDOT Director, and John Price, FHWA Division Administrator, was transmitted by Scott Rawlins on June 28, 2002, identifying Alternative D as the preferred alternative. The memorandum discussed the basis for this identification, with the following considerations:

- Alternative D meets the Purpose and Need of the project, including (see Section 1.2, above):
  - Resolving traffic problems in the vicinity of Boulder City
  - Extending freeway status to the U.S. 93/95 interchange
  - Improving operations at the junction of U.S. 93/95
  - Creating a safer transportation corridor
  - Accommodating future transportation demand
  - Improving system linkage on U.S. 93 and maintaining route continuity
- Alternative D maintains the quality of life of the residents of Boulder City
- Alternative D would require significantly less disruption of the existing corridor during construction than any of the other build alternatives
- Alternative D lends itself to flexible staging of construction

- Based on public comments received, there is broad public acceptance of Alternative D
- Alternative D has fewer impacts to the human environment of Boulder City
- The noise impacts on the residents of Boulder City from Alternative D are fewer during the operation of the facility
- Alternative D contains fewer visual impacts to Boulder City than the other build alternatives
- Implementation of Alternative D would result in improved air quality along existing U.S. 93 in the Boulder City area

Alternative D resolves traffic problems on U.S. 93 by diverting through traffic from the urbanized environment of Boulder City onto a southern bypass. Traffic projections suggest that acceptable LOS is attained at all critical links and intersections through the design year. Alternative D does extend freeway status to a new, improved U.S. 93/95 interchange, as detailed in the development of the preferred alternative. Alternative D increases safety along the existing roadway by lowering the number of vehicles on existing U.S. 93 through Boulder City and by improving the connection of the roadway at the Railroad Pass Hotel and Casino, which is currently a high crash intersection (see Section 1.3.3).

Alternative D best addresses the purpose and need goals of accommodating future transportation demand, improving system linkage, and maintaining route continuity. The physical footprint of Alternative D allows for future expansion to accommodate increasing traffic volumes as growth continues in southern Nevada and Arizona, whereas Alternatives B and C are limited by the confines of Boulder City. Additionally, the preferred alternative links more appropriately with the freeway and highway sections on either side of the project, containing an easier transition from the I-515 freeway in Henderson to the west and to the new Hoover Dam Bypass highway to the east. Alternative B has an arterial segment that does not provide the best system linkage; and both Alternatives B and C require a complicated system of frontage roads and drainage improvements through Hemenway Valley, which Alternative D does not require.

Greater impacts to Section 4(f) lands (all in the LMNRA) will result from the implementation of Alternative D than from Alternative B or from the No Build Alternative. Alternative C has the most Section 4(f) impacts of all the alternatives. Implementation of measures described in Chapters 4 and 7 will mitigate these impacts. An evaluation of impacts to the NPS values and resources within the LMNRA resulting from the implementation of Alternative D has been completed, and it is provided in Appendix D. Additional assessments of effects and the development of appropriate mitigation measures will be prepared subsequent to the completion of the design development for the preferred alternative, when the specific project footprint and impacts can be delineated. Development of mitigation measures will be done in consultation with the appropriate PMT members, as well as other agencies such as USFWS, USACE, SHPO, NDOW, and EPA.

Additionally, Alternative D does not involve impacts to the River Mountains Loop Trail through Hemenway Wash (see Bicycle and Pedestrian Impacts, Section 4.14, and Chapter 7). Alternatives B and C would impact the trail, resulting in potentially costly and time-consuming relocation of a facility that has only recently been built. Alternative D would also impact fewer cultural resources than either Alternative B or C.

Finally, although implementation of Alternative D will result in some environmental impacts that are greater than Alternatives B and C, or the No Build Alternative, the PMT determined that the preferred alternative will maintain the quality of life that Boulder City predominantly desires. Numerous public comments (see Volume II of this FEIS) express the view that either Alternative B or C would divide Boulder City in half and forever change the small-town atmosphere that many residents moved there to acquire. Because U.S. 93 is the main route of travel from Arizona into Las Vegas, southern Nevada, and beyond, as well as serving as the CANAMEX Corridor route, it is necessary to have a facility in place that will accommodate travel demand. Implementation of Alternative D will accomplish that while minimizing impacts to and maintaining the desired quality of life in Boulder City.

2.7 Changes Since Publication of the DEIS

In addition to the incorporation of public and agency input on the DEIS and the identification of Alternative D as the preferred alternative, changes to this document since the publication of the DEIS also reflect refinement of the limits and types of resources affected, and of the alternative alignments, under the direction of the PMT. The following components of the process have led to the revision of impact evaluations for all build alternatives:

1. Update of the historic structures inventory report, and completion of the final report
2. Completion of initial SHPO consultation, and receipt of SHPO concurrence on determinations of eligibility
3. Receipt of concurrence from the USACE on which desert wash crossings impact Waters of the U.S., and consultation with the EPA on avoidance and mitigation measures
4. Receipt of additional biological resources data from Nevada Department of Wildlife (NDOW), and discussions with the EPA and NDOW regarding appropriate mitigation measures
5. Receipt of guidance from FHWA regarding which impacts constitute use under Section 4(f)
6. Receipt of guidance that existing right-of-way within the LMNRA is not considered part of that Section 4(f) resource
7. Refinement of alignment positions, their impacts to historic structures (including the Boulder City Branch Railroad), and cut and fill limits of the alternatives

Additional changes, chiefly reflected by updated mitigation measures, came as a result of consultations between NDOT, FHWA, NPS, NDOW, EPA and ACOE on avoidance, minimization, and mitigation measures for Alternative D impacts to biological resources and jurisdictional waters of the U.S.

In the DEIS, Alternative D included a directional interchange with a large footprint at the east study limit. At the request of the PMT, the east limit of this alignment was modified to tie in to the Hoover Dam Bypass Nevada Interchange.

Also, in July 2003, a Programmatic Agreement (PA) for the identification, evaluation and treatment of historic properties within the Area of Potential Effect (APE) of Alternative D was signed by the FHWA, SHPO, NDOT, NPS, Reclamation, WAPA, and the BLM. A copy of the PA is provided as Appendix E.

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3. Affected Environment

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_{10}) SIP and the Clark County CO SIP have been submitted to EPA. EPA approved the PM_{10} 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_3), CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, and lead (Pb).

TABLE 3-1
Federal Ambient Air Quality Standards

Pollutant	Averaging Time	Federal[a] Primary[b]	Federal[a] Secondary[b]
Ozone (O_3)	1-hour	0.12 ppm (235 μg/m^3) [c]	0.12 ppm (235 μg/m^3)
	8-hour (new)	0.08 ppm (157 μg/m^3)	0.08 ppm (157 μg/m^3)
Coarse Particulate Matter (PM_{10})	24-hour	150 μg/m^3	150 μg/m^3
	Annual AM	50 μg/m^3	50 μg/m^3
	Annual GM	–	–
Fine Particulate Matter ($PM_{2.5}$)	24-hour (new)	65 μg/m^3	65 μg/m^3
	Annual AM (new)	15 μg/m^3	15 μg/m^3
Carbon Monoxide (CO)	1-hour	35 ppm (40 mg/m^3)	–
	8-hour	9 ppm (10 mg/m^3)	–
Nitrogen Dioxide (NO_2)	1-hour	–	–
	Annual AM	0.053 ppm (100 mg/m^3)	0.053 ppm (100 mg/m^3)
Lead (Pb)	30-day	–	–
	Calendar Quarter	1.5 μg/m^3	1.5 μg/m^3
Sulfur Dioxide (SO_2)	1-hour	–	–
	3-hour	–	0.5 ppm (1,300 μg/m^3)
	24-hour	0.14 ppm (365 μg/m^3)	–
	Annual AM	0.03 ppm (80 μg/m^3)	–

AM – Average Mean
GM – Geometric Mean
ppm – parts per million
mg/m^3 – milligrams per cubic meter
μg/m^3 – micrograms per cubic meter

[a] National standards (other than O_3, PM_{10}, and those based on annual periods) are not to be exceeded more than once per year. The new O_3 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_{10}) or 98 percent ($PM_{2.5}$) of the daily concentrations, averaged over 3 years.

[b] 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.

[c] EPA promulgated new federal 8-hour O_3 and $PM_{2.5}$ standards on July 18, 1997. The federal 1-hour O_3 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_{10} 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_{10}, CO, SO_2, NO_2, O_3, 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_3, and PM_{10}. Table 3-2 presents a summary of the highest pollutant values for CO and PM_{10} 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[a]			Number of Days Exceeding Federal Standard[b]		
			1998	1999	2000	1998	1999	2000
CO[c]	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[a]			Number of Days Exceeding Federal Standard[b]		
			1998	1999	2000	1998	1999	2000
PM_{10}	24 hours	150 µg/m^3	69.0	76.0	188.0	0	0	2
	Annual	50 µg/m^3	14.3	15.4	19.1	0	0	0

Source: EPA, 2001.

Notes:

[a] Concentration units for CO are in ppm; Concentration units for PM_{10} are in µg/m^3.

[b] For annual standards, a value of 1 indicates that the standard has been exceeded.

[c] 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 Hourly L_{eq} (dBA)	Description of Land Use Activity Category
A[1]	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[1]	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

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

[1] 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.

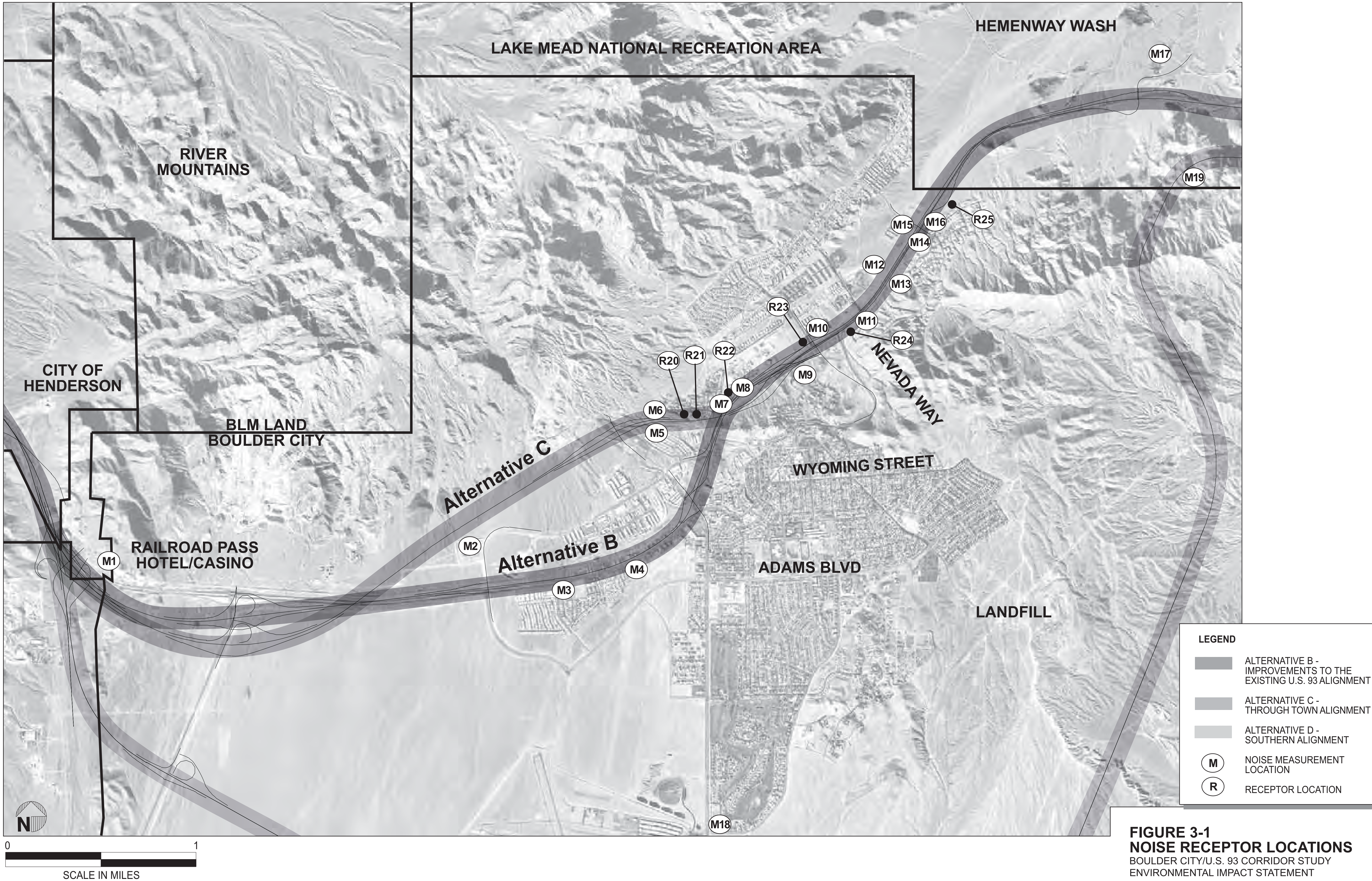

FIGURE 3-1
NOISE RECEPTOR LOCATIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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_{eq}	L_{min}	L_{max}	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_{eq}	L_{min}	L_{max}	Primary Noise Source(s)
M16	63.1 62.9 62.1 61.9	39.8 45.5 46.3 47.2	74.7 72.0 70.8 75.6	Traffic on U.S. 93
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 40.8	33.1 33.7	47.4 46.6	Aircraft overflights; some animals (U.S. 93 traffic too distant for impact)

L_{eq} – Equivalent average sound level during the measurement period.
L_{max} – Maximum sound level, or the highest sound pressure level in a specific time period.
L_{min} – 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_{eq})	Exceeds/Approaches NDOT NAC[1]
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

[1]The effective NDOT NAC for activity category B lands is a peak-hour L_{eq} 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[1] 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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1 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 (*Psorothamnus 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[2] (*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"[3] – 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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[2] 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).

[3] 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[1]	*Macrotis californicus*	Caves and mines
Mexican long-tongued	*Choeronycteris mexicana*	Riparian/desert canyons
California myotis	*Myotis californicus*	Crevices, caves, and mines
Small-footed myotis[1]	*Myotis ciliolabrum*	Habitats above 1,830 m (6,000 ft)[2]
Long-eared myotis[1]	*Myotis evotis*	Conifer forests[2]
Fringed myotis[1]	*Myotis thysanodes*	Crevices, caves, and mines
Long-legged myotis[1]	*Myotis volans*	Mid to high elevations[2]
Yuma myotis[1]	*Myotis yumanensis*	Crevices, caves, and mines
Western red	*Lasiurus blossevillii*	Riparian and wooded areas[2]
Hoary	*Lasiurus cinereus*	Forested habitats[2]
Silver-haired	*Lasionycteris noctivigans*	Forested habitats[2]
Western pipistrelle	*Pipestrellus hesperus*	Crevices, caves, and mines
Big brown	*Eptesicus fuscus*	Caves and mines
Townsend's big-eared[1]	*Corynorhinus townsendii*	Caves and mines
Spotted[1]	*Euderma maculatum*	Cliff faces
Allen's big-eared[1]	*Idionycteris phyllotis*	Trees, caves, and mines
Pallid	*Antrozous pallidus*	Crevices, caves, and mines
Brazilian free-tailed	*Tadarida brasiliensis*	Cliff faces, caves, and mines
Big free-tailed[1]	*Nyctinomops macrotis*	Canyonlands
Western mastiff[1]	*Eumops perotis*	Crevices and cliff faces

[1] USFWS species of concern.

[2] 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[4] 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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[4] 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.

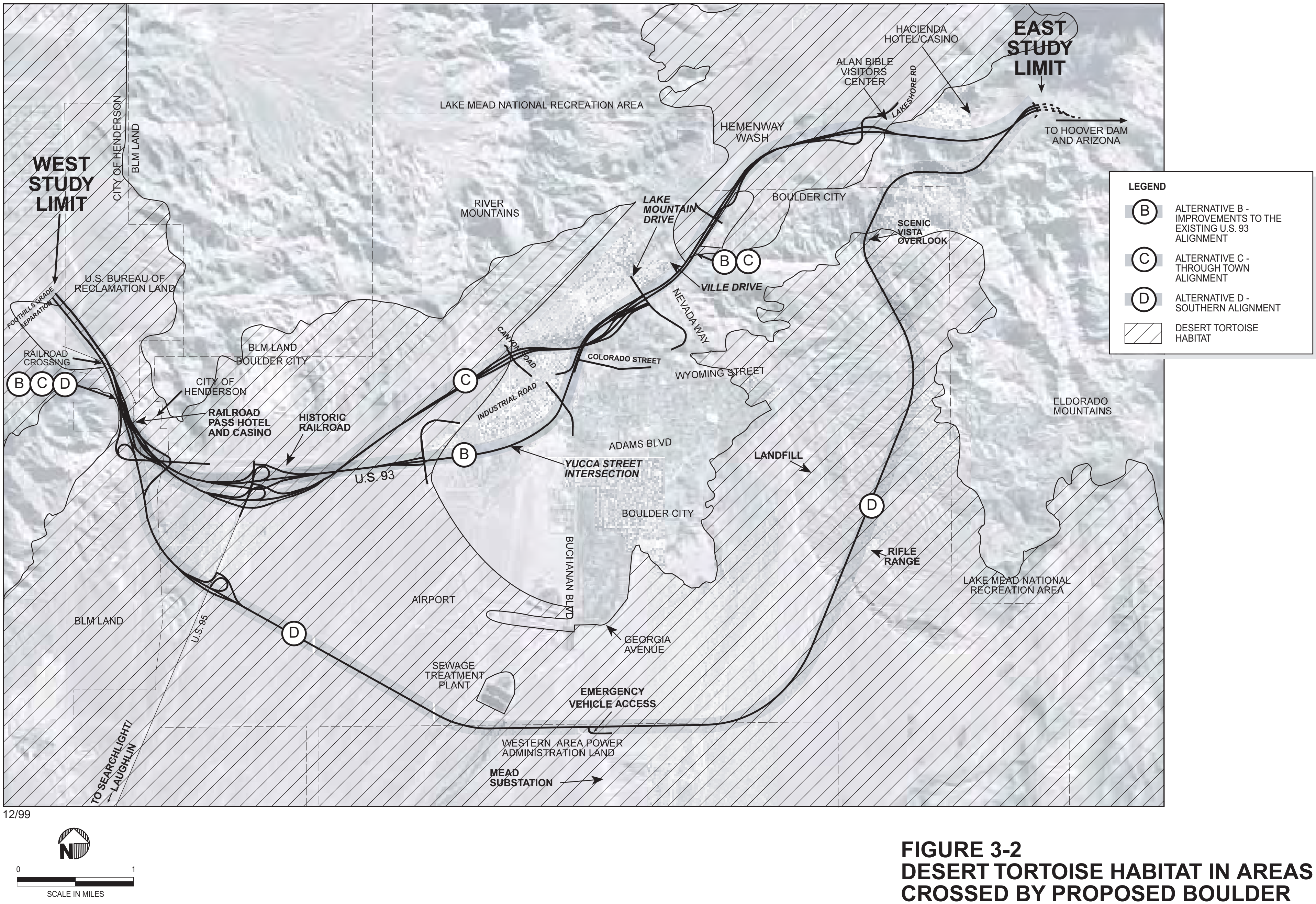

FIGURE 3-2
DESERT TORTOISE HABITAT IN AREAS CROSSED BY PROPOSED BOULDER CITY/U.S. 93 CORRIDOR ALIGNMENTS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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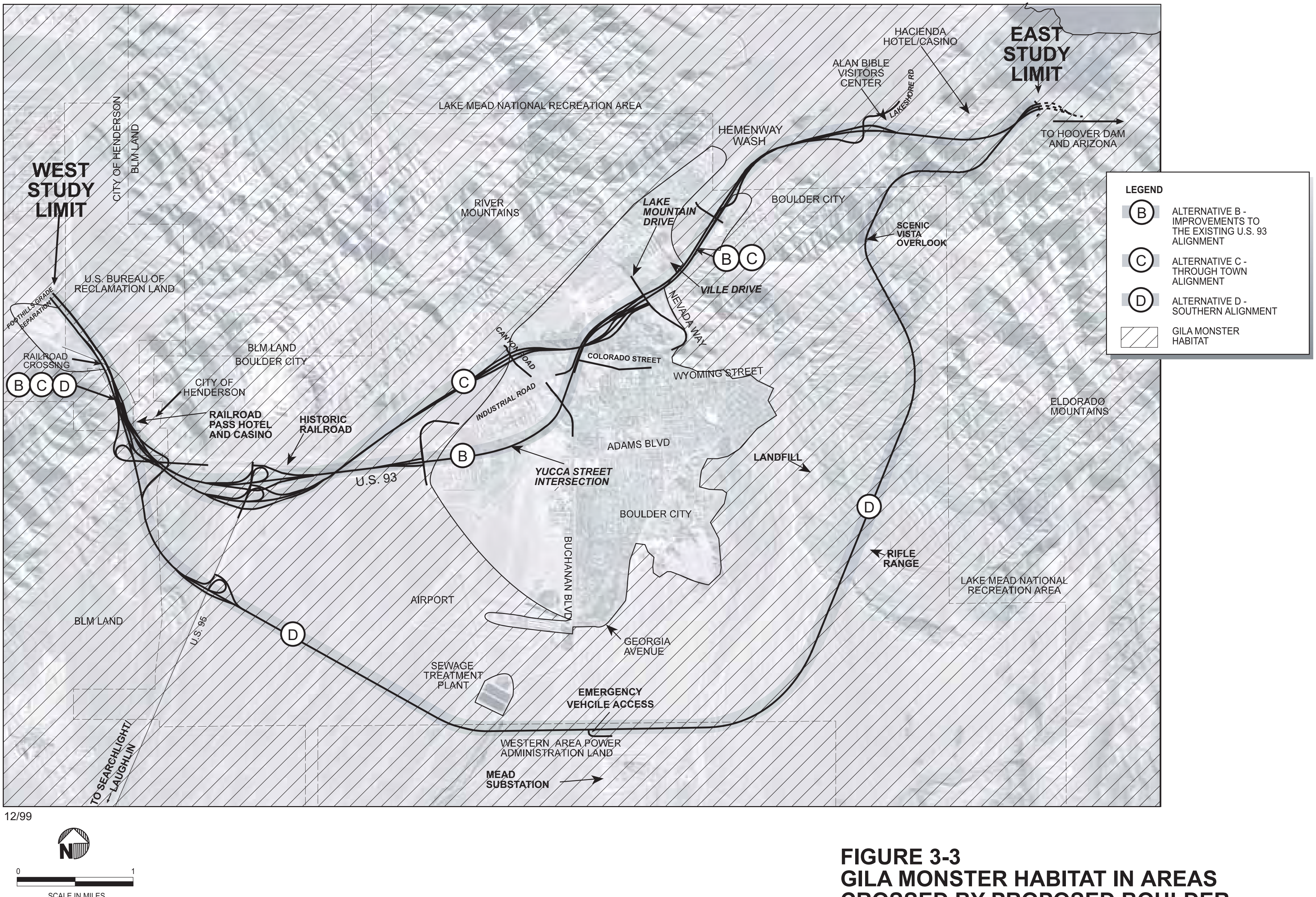

FIGURE 3-3
GILA MONSTER HABITAT IN AREAS CROSSED BY PROPOSED BOULDER CITY/U.S. 93 CORRIDOR ALIGNMENTS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
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Chuckwalla. Although not formally protected by either federal or state law, the chuckwalla is considered a species 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[5] 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[6] (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

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

[6] 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.

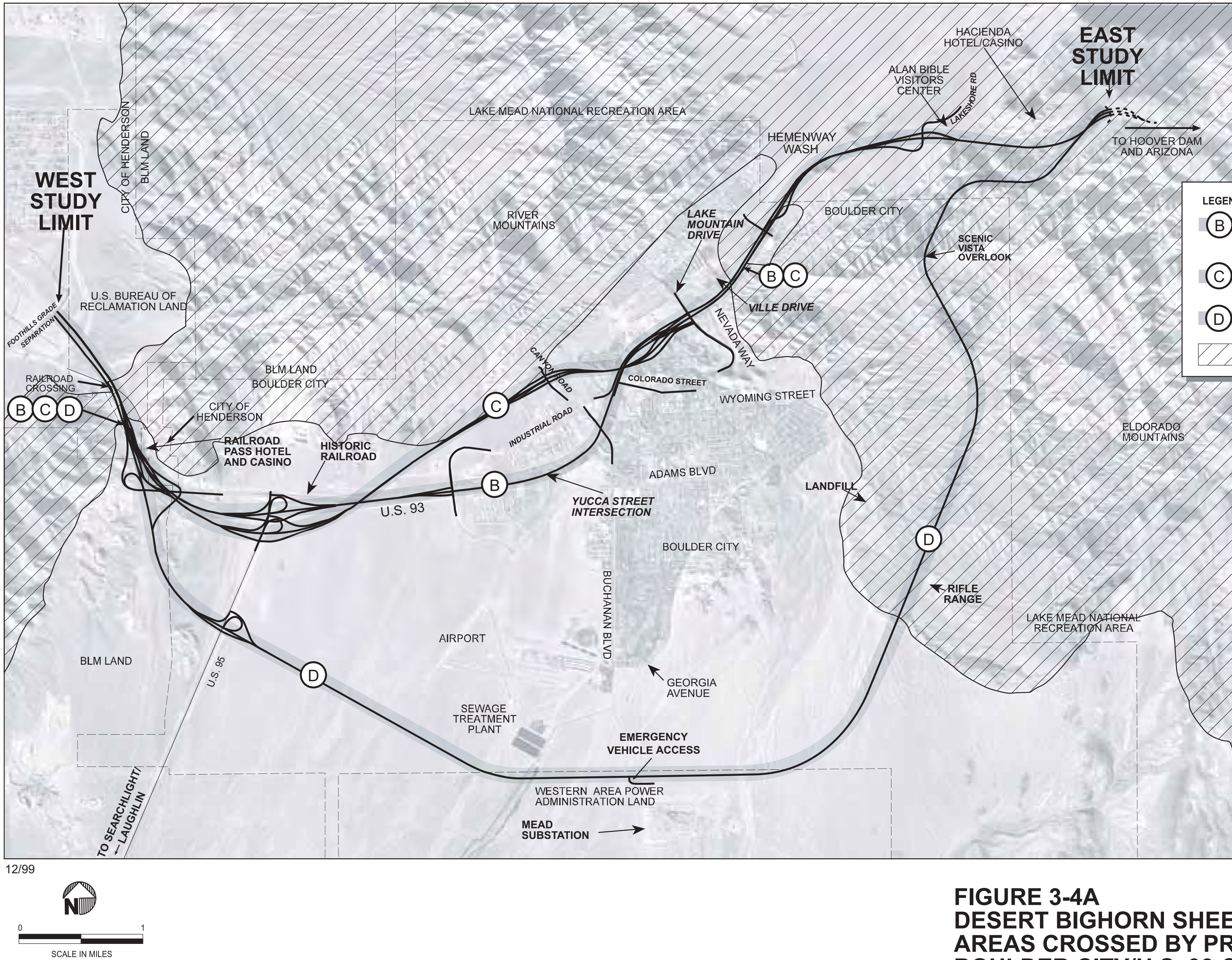

FIGURE 3-4A
DESERT BIGHORN SHEEP HABITAT IN AREAS CROSSED BY PROPOSED BOULDER CITY/U.S. 93 CORRIDOR ALIGNMENTS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
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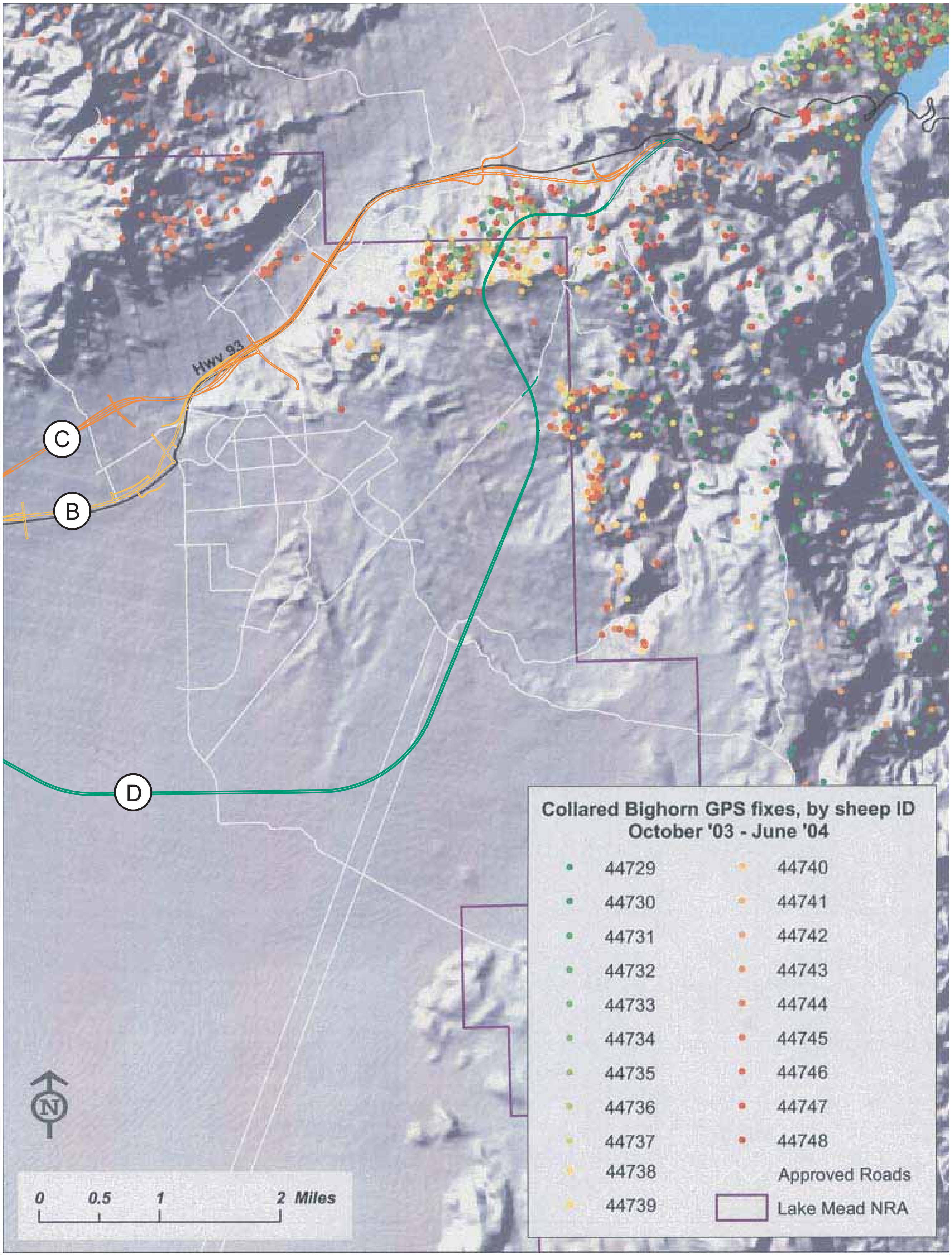

FIGURE 3-4B
DESERT BIGHORN SHEEP OCCURRENCES
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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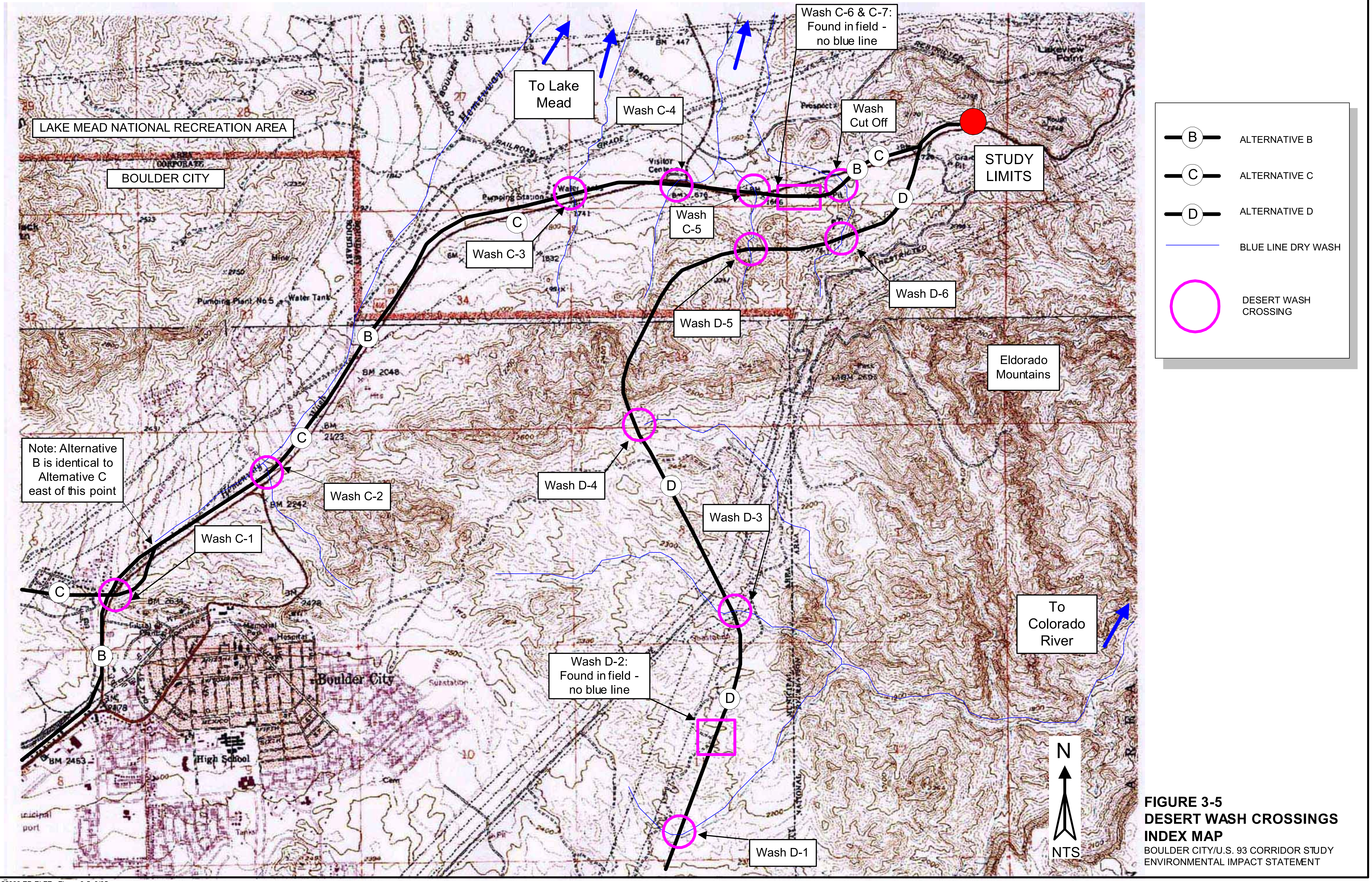

FIGURE 3-5
DESERT WASH CROSSINGS INDEX MAP
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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 ≤ 10 PCU above natural conditions	Recreation not involving contact with the water, and municipal or domestic supply, or both
Total Dissolved Solids (mg/L)	≤ 1,000	Municipal or domestic supply, or both, and irrigation
Nitrogen Species (N) (mg/L)	Nitrate ≤ 10 Nitrite ≤ 1 Ammonia ≤ 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 ≤ 90 mg/L, nitrite ≤ 5 mg/L, and TDS ≤ 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.

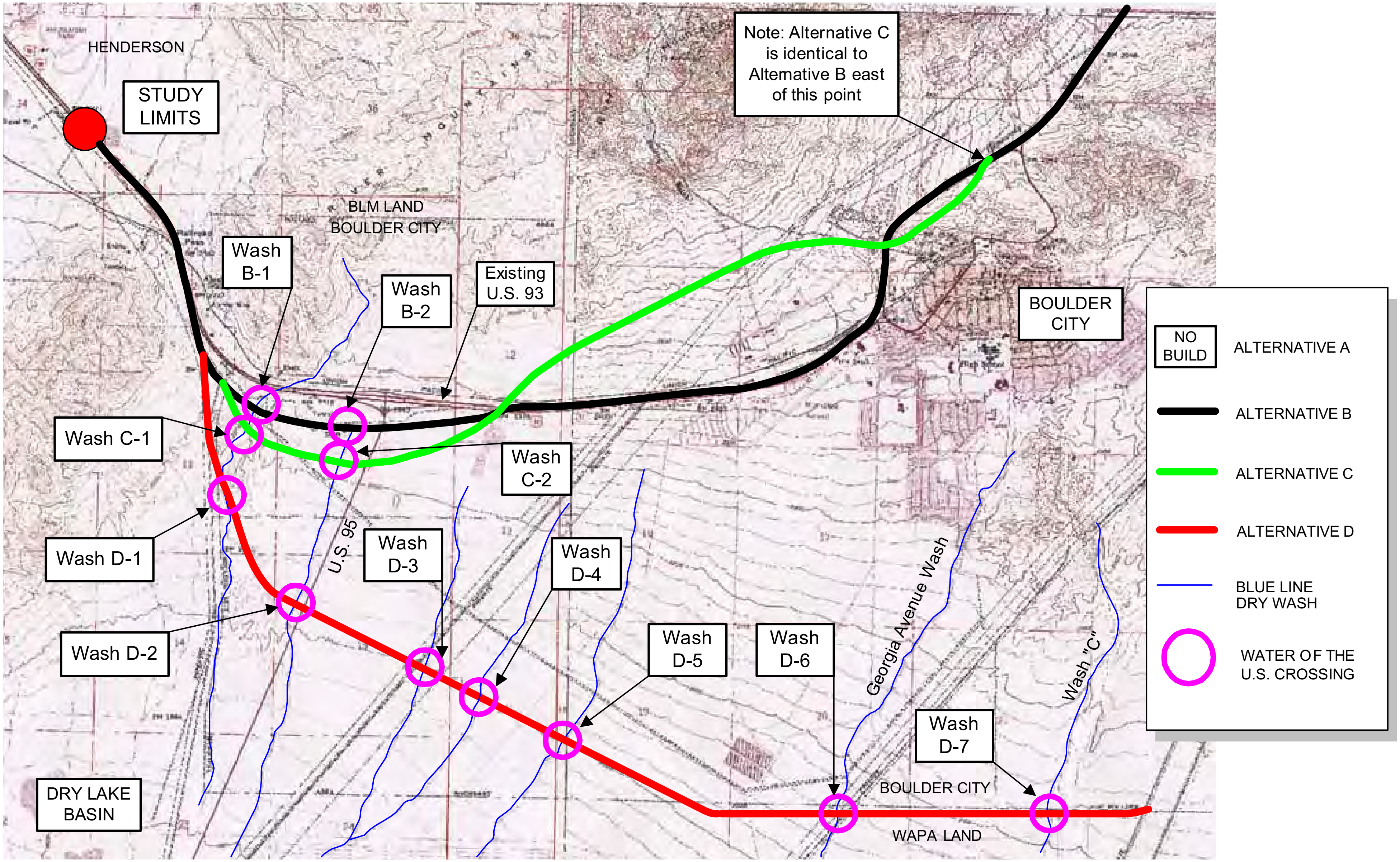

FIGURE 3-6
WASH CROSSINGS INDEX MAP - ISOLATED WATERS CONVEYING RUNOFF TO THE DRY LAKE BASIN OF ELDORADO VALLEY
BOULDER CITY/U.S. 93 CORRIDOR STUDY
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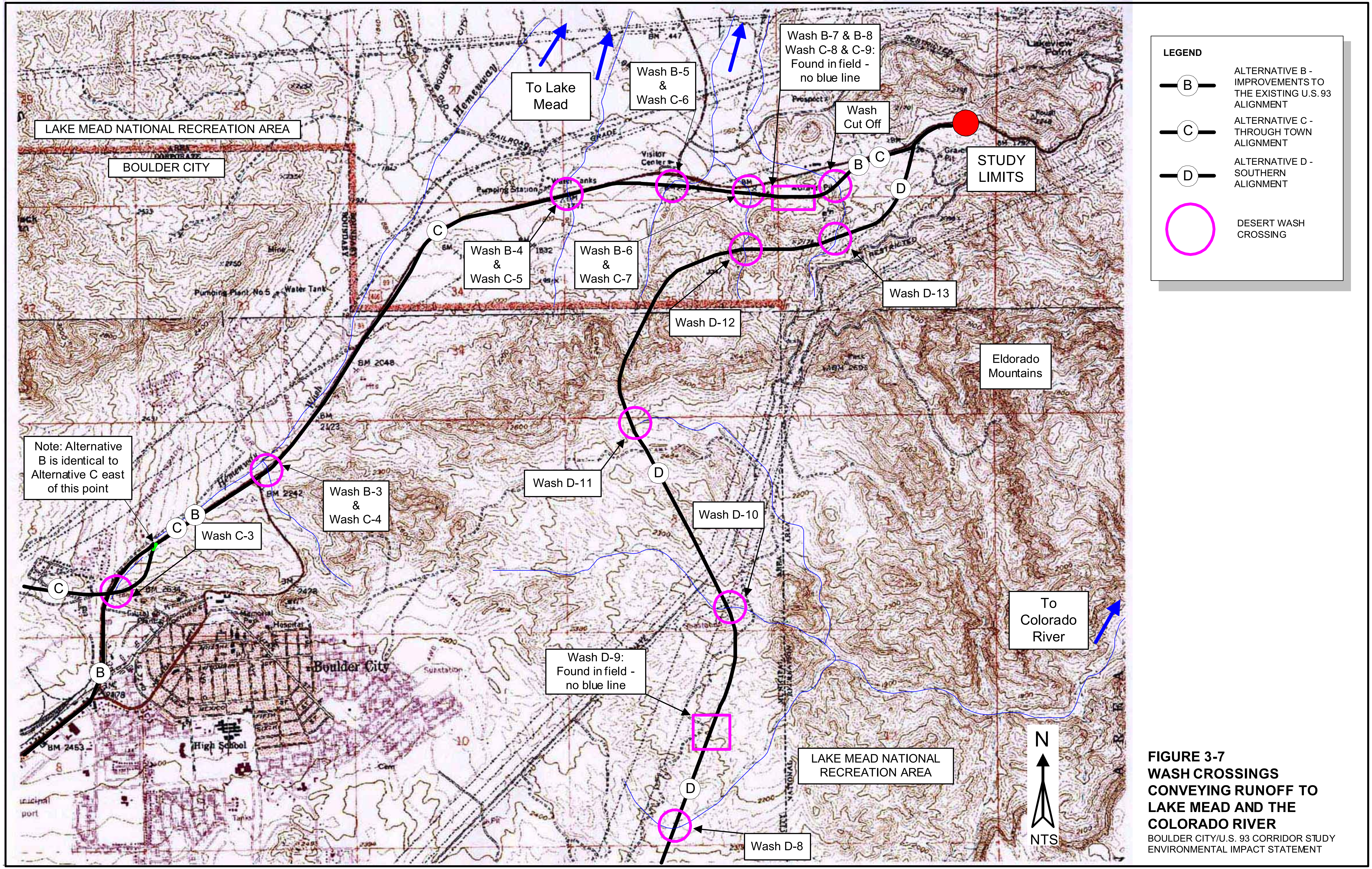

FIGURE 3-7
WASH CROSSINGS CONVEYING RUNOFF TO LAKE MEAD AND THE COLORADO RIVER
BOULDER CITY/U.S. 93 CORRIDOR STUDY ENVIRONMENTAL IMPACT STATEMENT

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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 (L*arrea 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 (Y*ucca 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
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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).

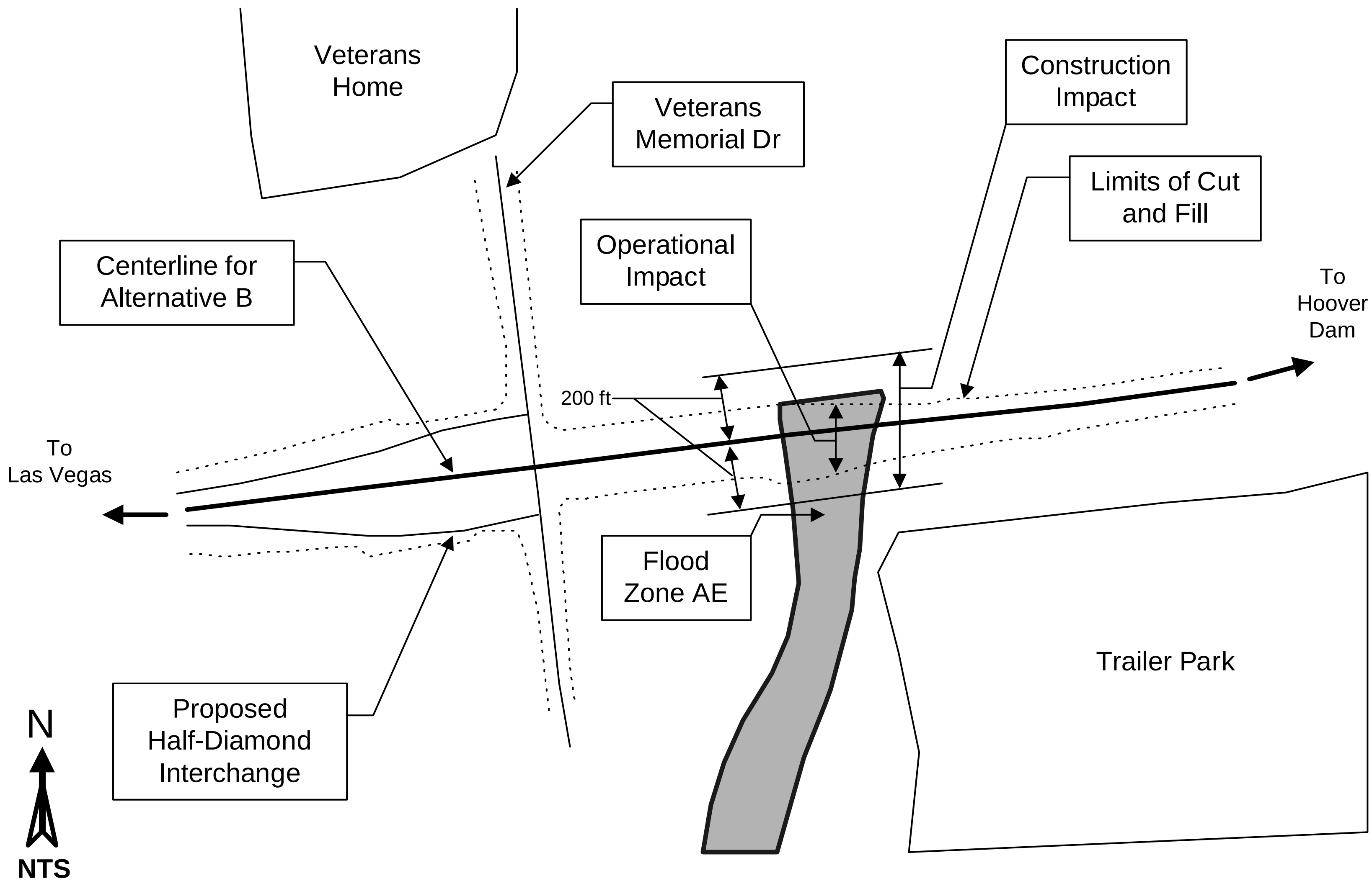
3.7.2 Existing Conditions

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^2) (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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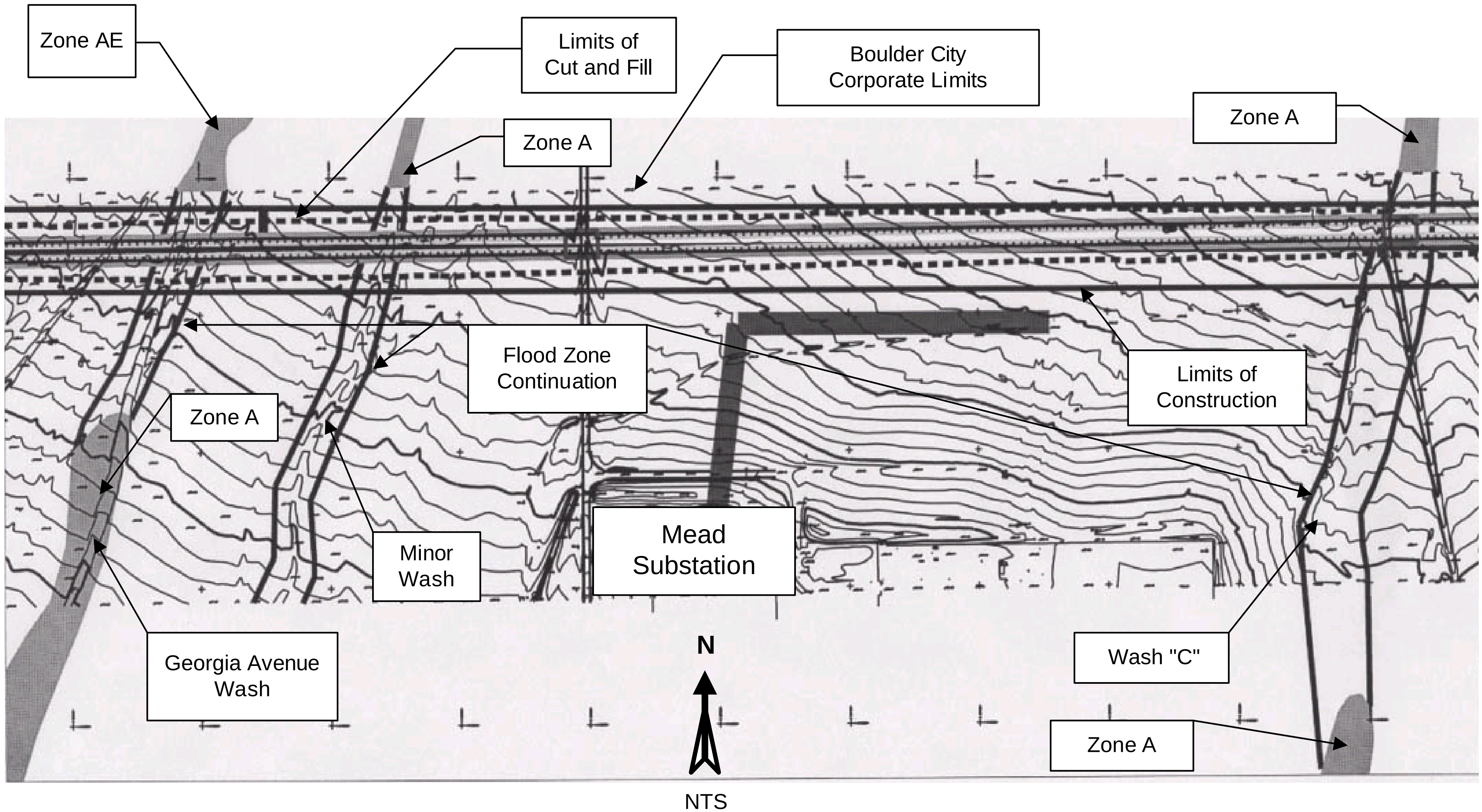

FIGURE 3-11
FLOODPLAIN DELINEATION FOR ALTERNATIVE D - ZONES A AND AE APPROXIMATE CONTINUATIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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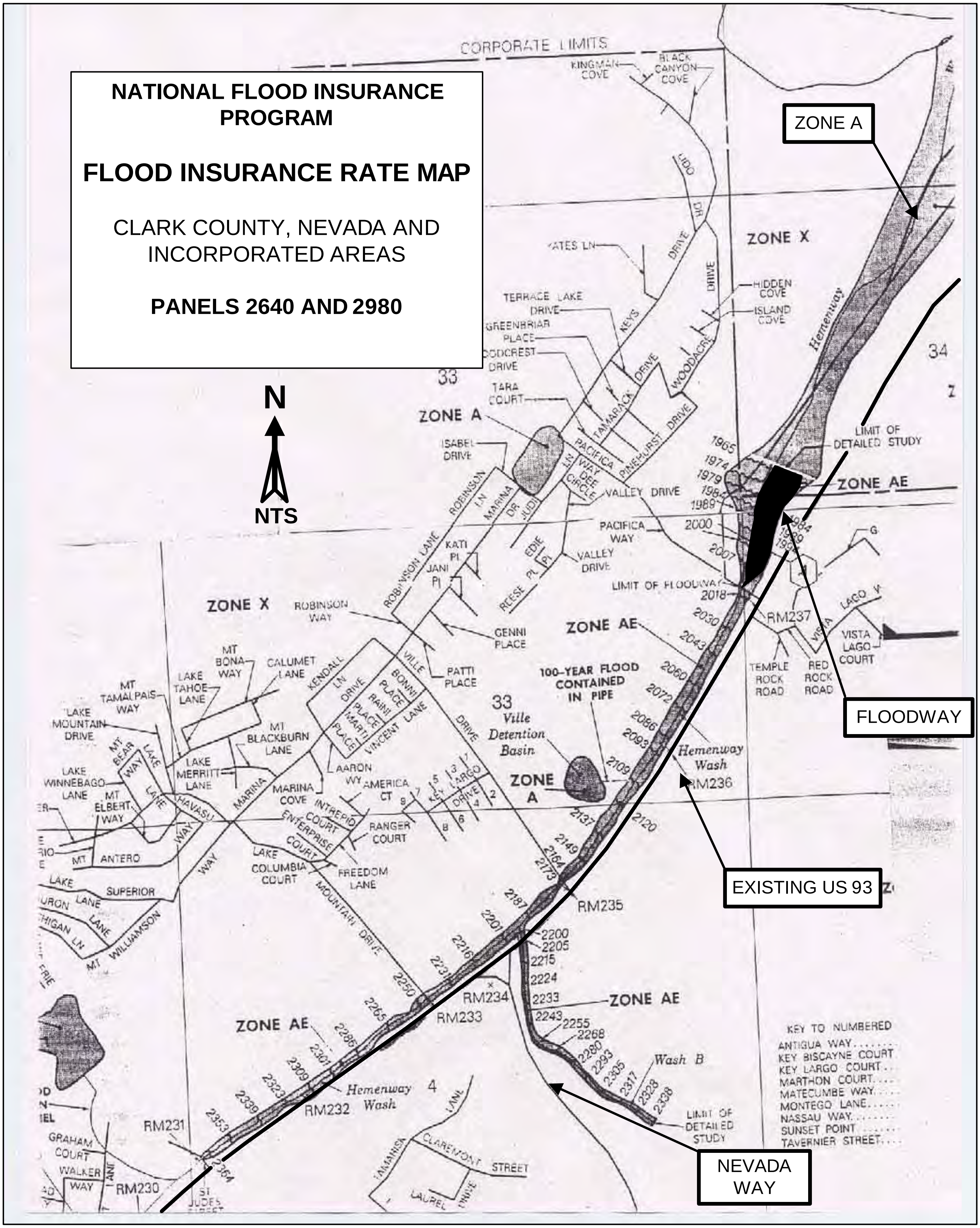

FIGURE 3-12
FLOOD INSURANCE RATE MAP FOR THE HEMENWAY WASH AREA
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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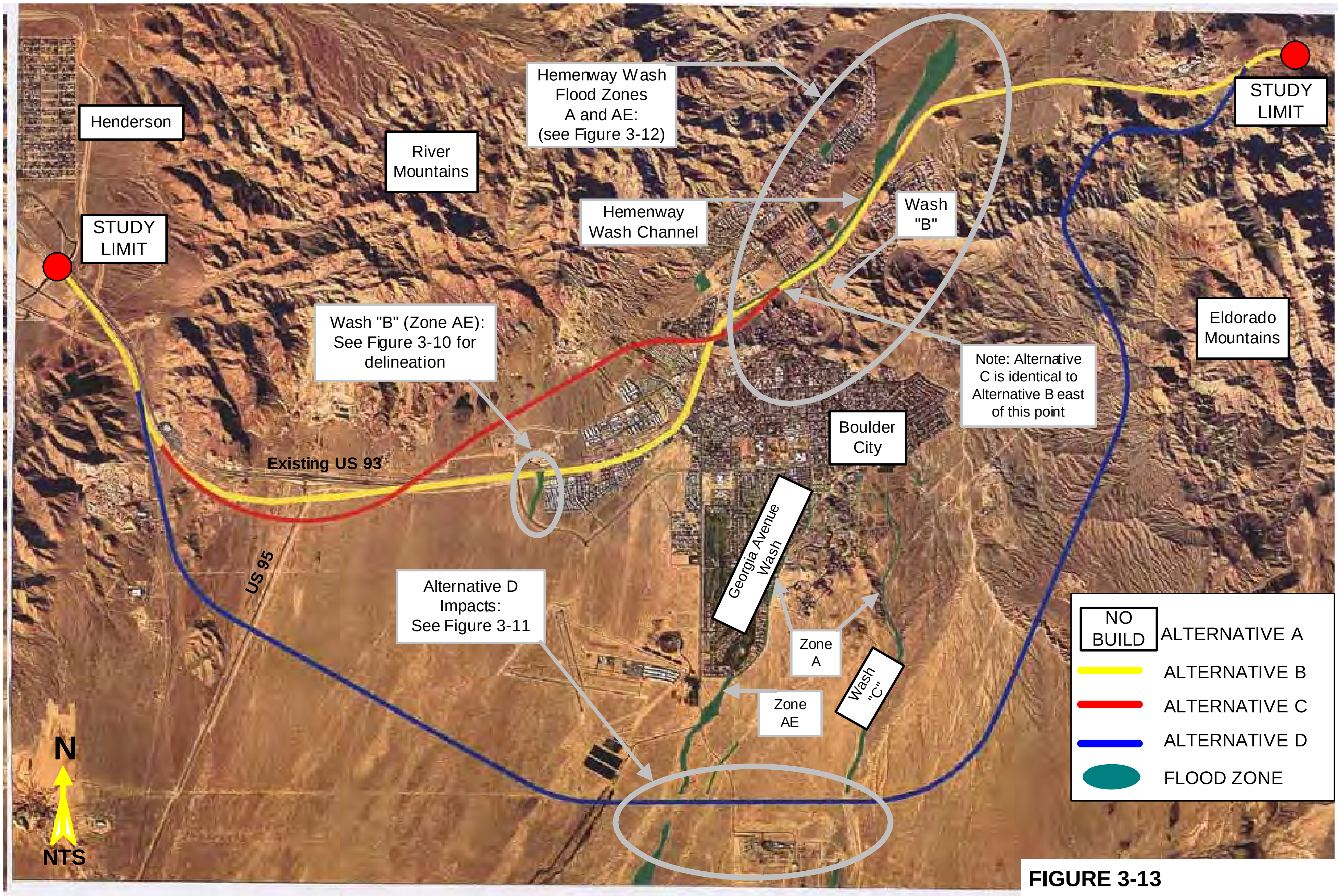

FIGURE 3-13
FLOODPLAIN IMPACTS MAP
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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

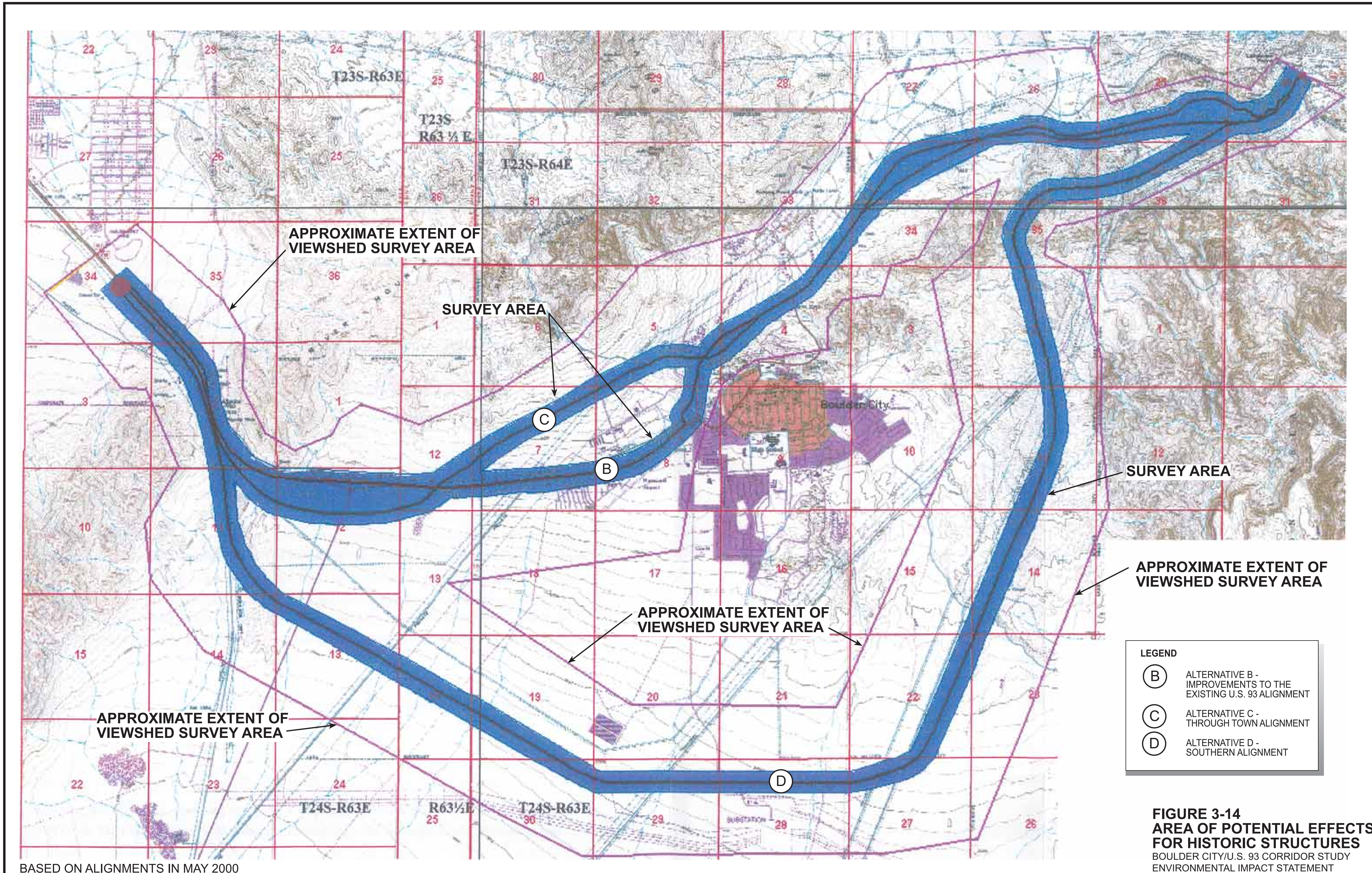

FIGURE 3-14
AREA OF POTENTIAL EFFECTS FOR HISTORIC STRUCTURES
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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[2]	B, C
26CK2371	Historic Prospect Campsite	HRC 1-2-11	Eligible d[2]	B, C
26CK2372	Historic Prospect Pit	HRC 1-2-11	Eligible d[2]	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[1]	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[1]	B, C, D
26CK4766	Scenic Overlook Stone Wall	BR46	Eligible a and d[1]	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[3]	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

[1] Sites recommended eligible as part of the Hoover Dam District.
[2] Sites recommended eligible as part of the Sullivan Mine District.
[3] 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). Archivally, 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 liner 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

Permanent Site No.	Temporary Site No.	Site Description	Management or Ownership	Build Alternative	Eligibility
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 [1]	Southern Sierras Transmission Line

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

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

[1] 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 McKeeversville	B, C
26CK6203	13 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6204	14 Valley View Lane	Residence	Yes	Associated with McKeeversville	B, C
26CK6205	17 Valley View Lane	Residence	No	Lacks integrity	B, C
26CK6206	200 Donner Way	Residence	Yes	Associated with McKeeversville	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 McKeeversville	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^2 (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^2 (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.

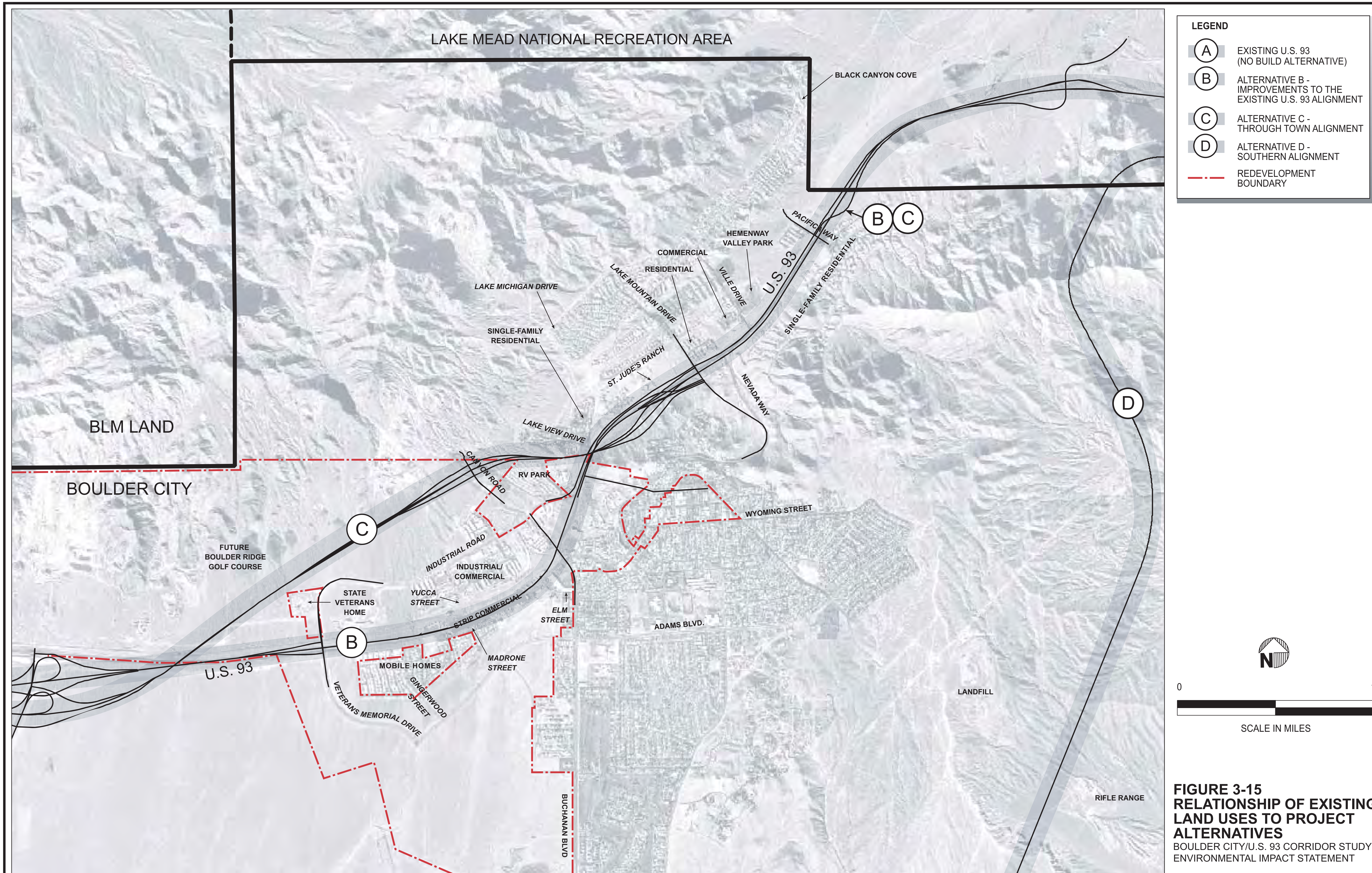

FIGURE 3-15
RELATIONSHIP OF EXISTING LAND USES TO PROJECT ALTERNATIVES
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

LAS 155933.ED.EI.FE Figure 3-15 1/05

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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.

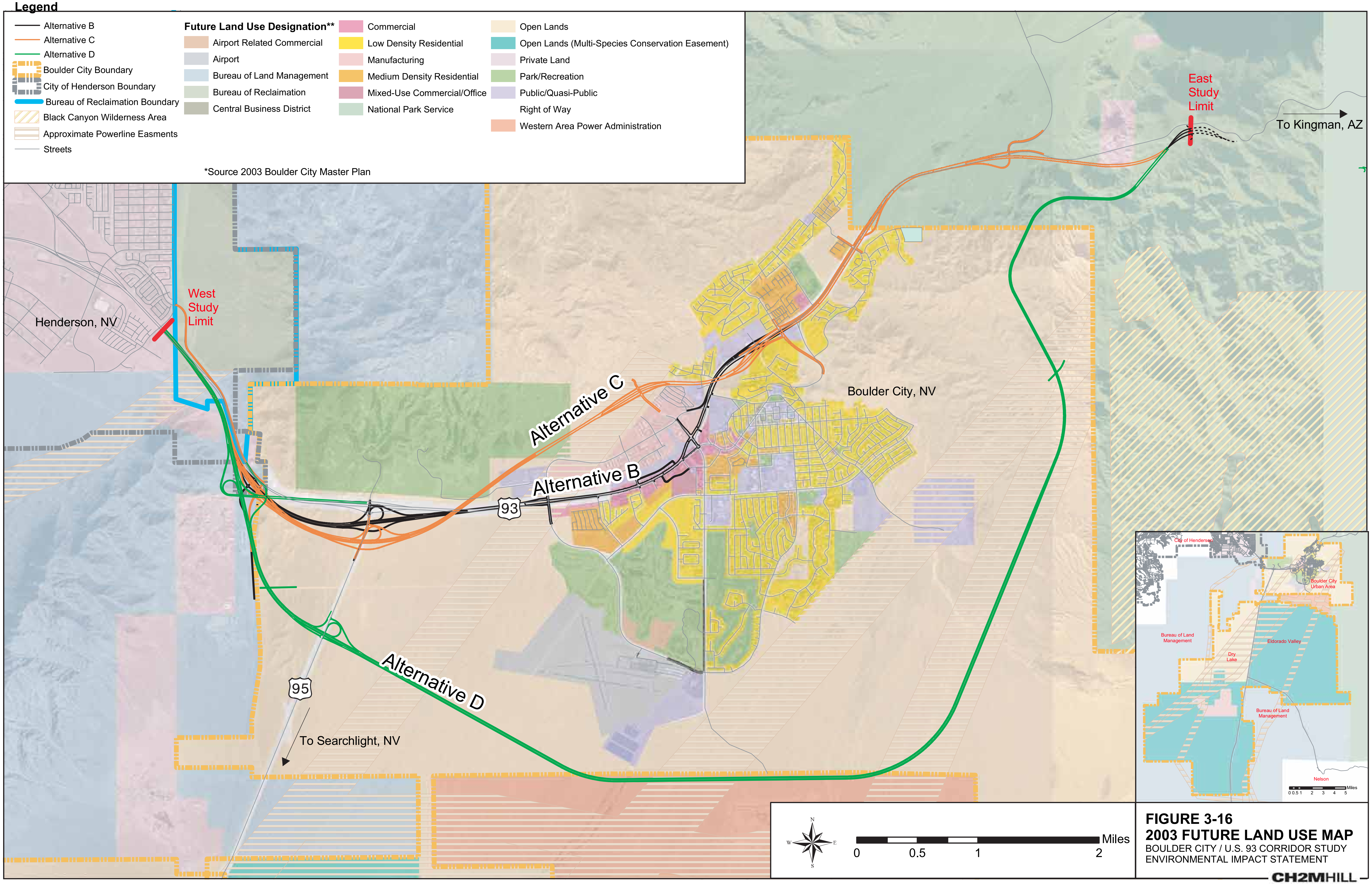

FIGURE 3-16
2003 FUTURE LAND USE MAP
BOULDER CITY / U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT
CH2MHILL

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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, 4th 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.

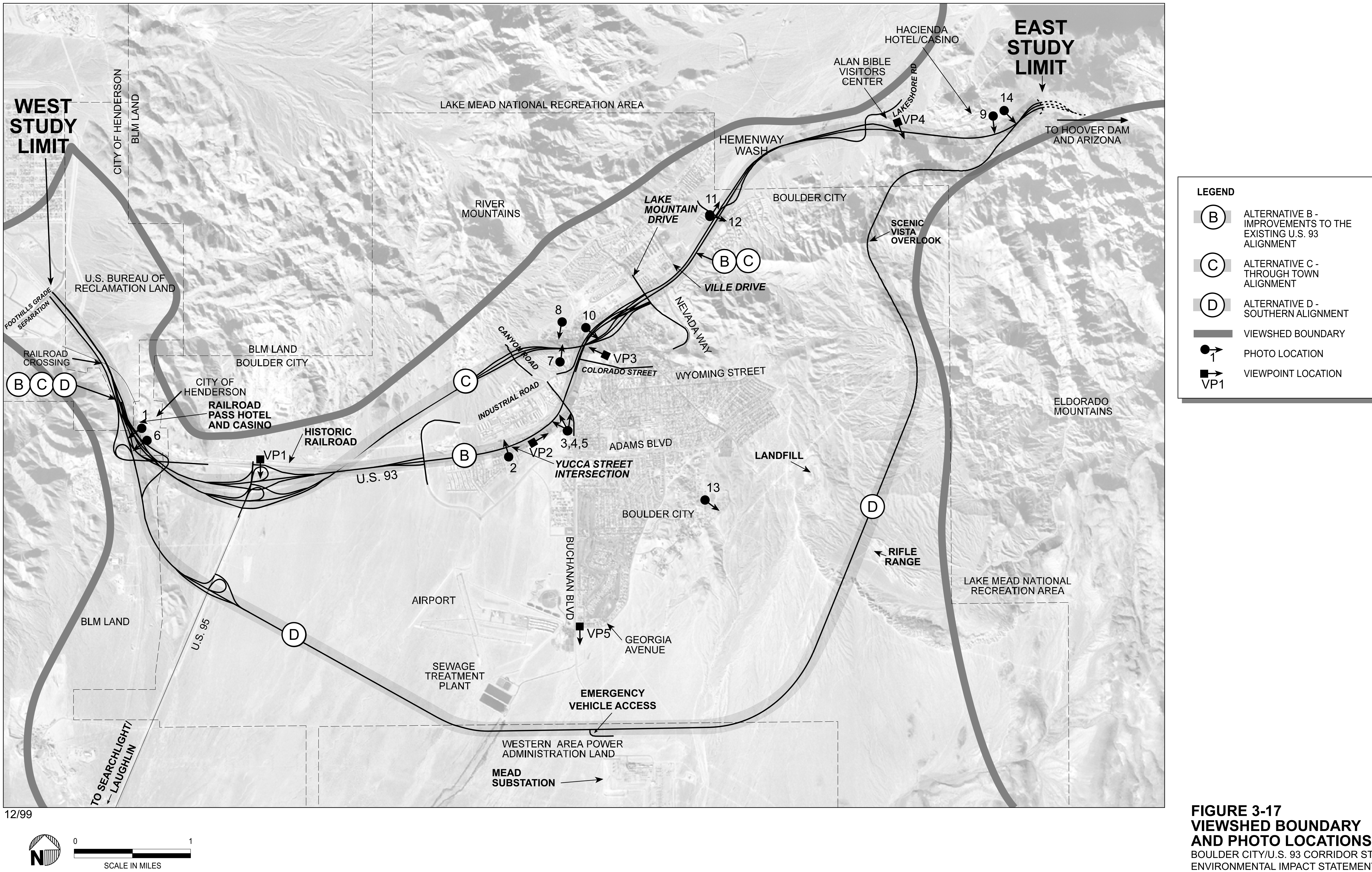

FIGURE 3-17
VIEWSHED BOUNDARY AND PHOTO LOCATIONS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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 relation ship 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.

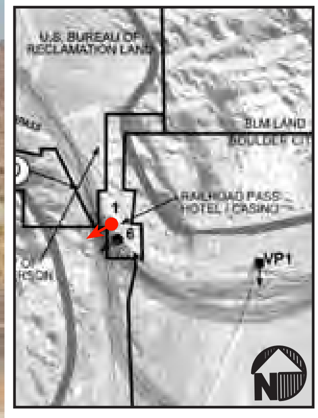

Photo 1: View of existing U.S. 93 looking southwest from the Railroad Pass Hotel and Casino parking lot. This view shows the approximate location where Alternative B crosses U.S.93 and the Hotel/Casino. It also shows the landscape through which Alternative B would be aligned. Currently, this is only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

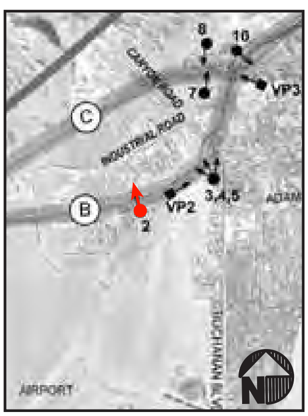

Photo 2: View of U.S. 93 from the Boulder City Trailer Park, just east of Yucca Street, looking northwest. As shown in the photo, the trailer park is at a lower elevation than the roadway. U.S. 93 would be widened in this area as part of Alternative B. As part of the widening, the vegetation shown in 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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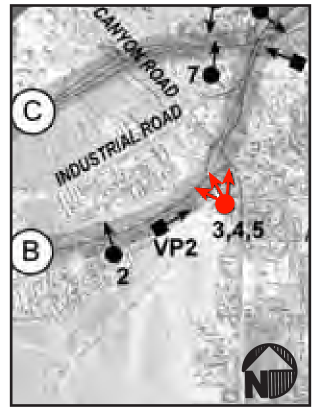

Photo 3: View of a building that may be removed due to realignment of U.S. 93 closer to the building as part of Alternative B.

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.

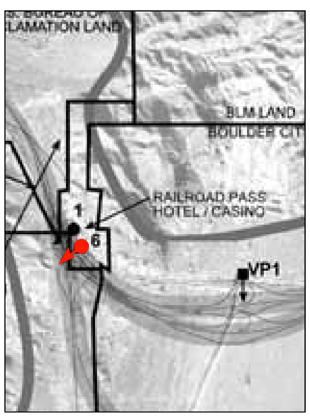

FIGURE 3-20
ALTERNATIVE C: PHOTO 6

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

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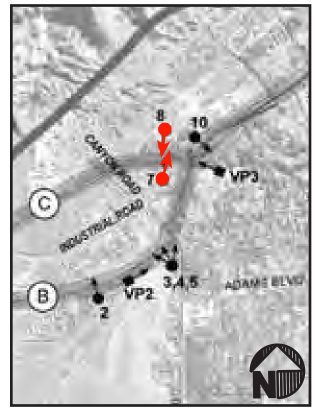

Photo 7: View showing where Alternative C would be aligned looking northeast from the RV residence located at 113 Pelican Way. This residence is within the Boulder Oaks RV Park. The alignment would be elevated and would be located in the undeveloped area between the cinder block wall and the residences 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.

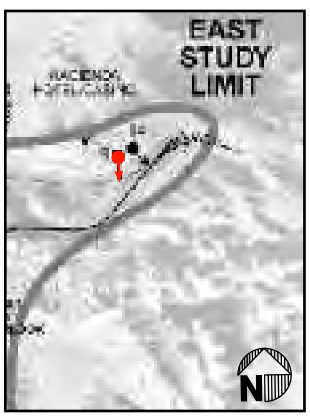

FIGURE 3-22
ALTERNATIVES B AND C: PHOTO 9
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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.

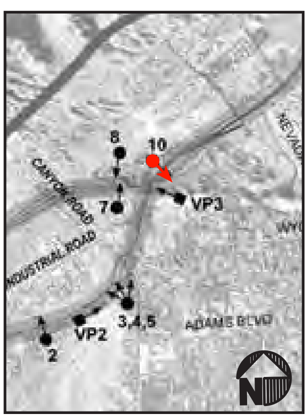

FIGURE 3-23
ALTERNATIVES B AND C: PHOTO 10
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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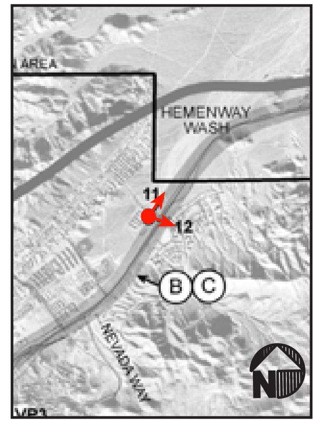

Photo 11: View of Lake Mead from the back yard of the residence located at 100 Laguna Lane looking northeast. The edge of Pacifica Way is seen in the photo as the dark area just below the fencing because Pacifica Way is at a lower elevation than the residences on Laguna Lane. Pacifica Way is an existing 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.

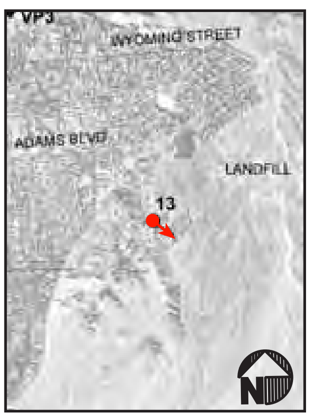

FIGURE 3-25
ALTERNATIVE D: PHOTO 13
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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

		Businesses		Employment	
SIC Code	Industrial Classification (SIC Description)	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[1]	255	5.0	32,120	4.9	44,151	4.6
Services[2]	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
TOTAL[3]	**5,057**	**100.0**	**656,139**	**100.0**	**965,141**	**100.0**

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

Notes:

[1] Finance, Insurance, and Real Estate.

[2] Includes agricultural services and firms not elsewhere classified.

[3] 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
TOTAL REVENUES	$14,227,614	100.0

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

	Clark County		State of Nevada	
Race	Persons	Percent of Total	Persons	Percent of Total
Total Population	**1,375,765**	**100**	**1,998,257**	**100**
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
Hispanic or Latino (any race)	302,143	22.0	393,970	19.7

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.

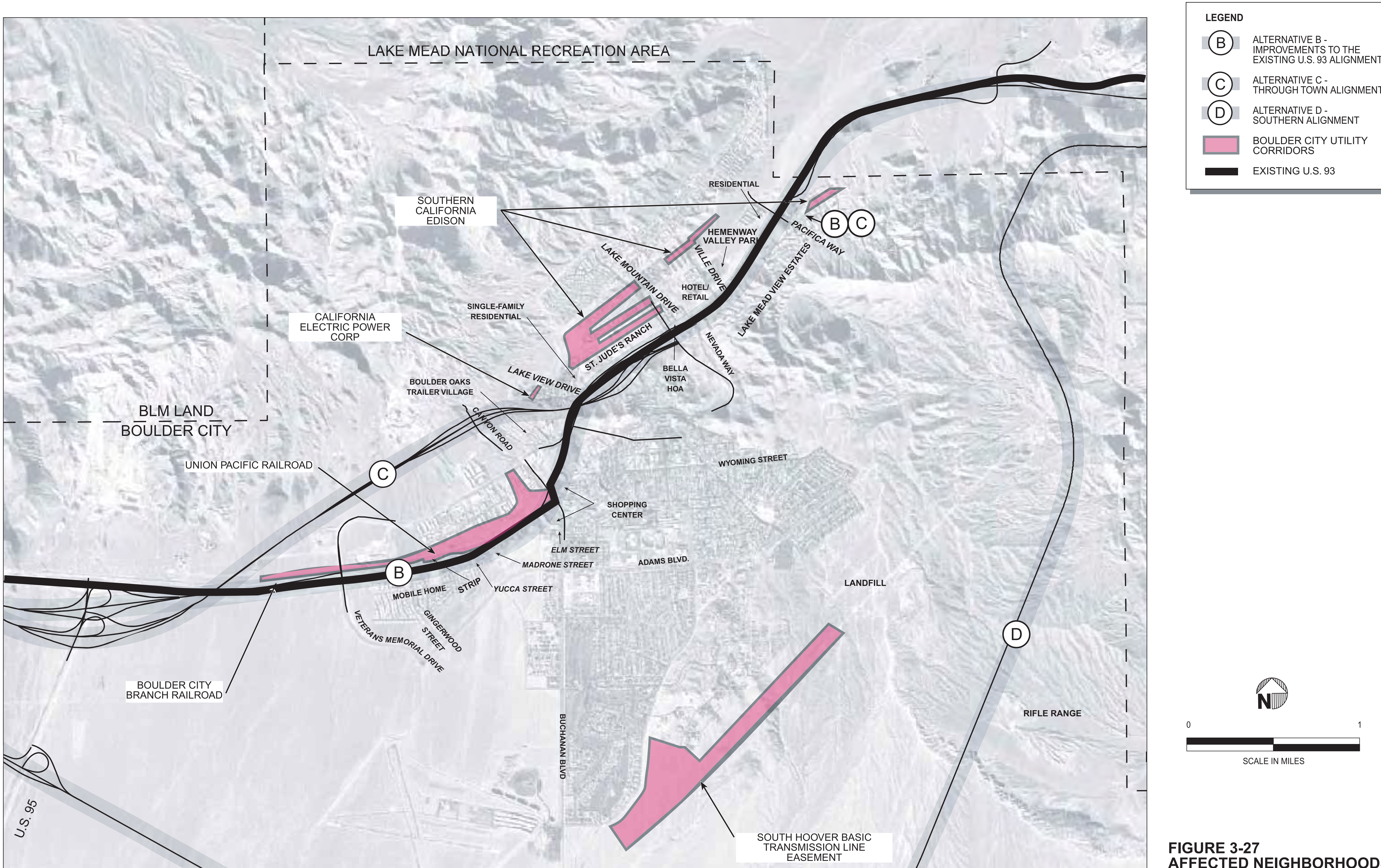

FIGURE 3-27
AFFECTED NEIGHBORHOODS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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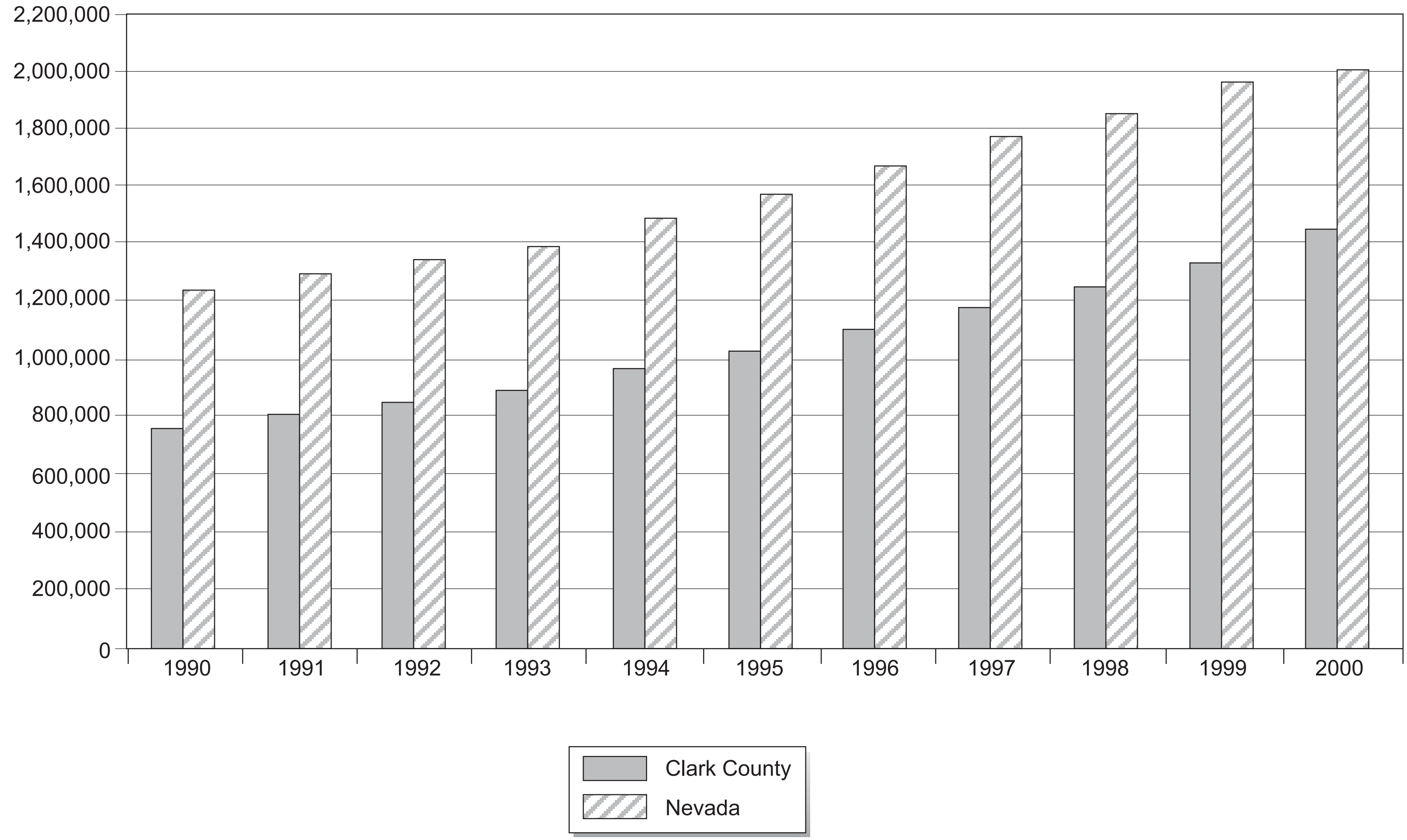

FIGURE 3-28
POPULATION ESTIMATES FOR CLARK COUNTY AND NEVADA
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

SOURCE: NEVADA STATE DEMOGRAPHER, 2001

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The original city limits established in 1958 encompassed an area of approximately 85 km^2 (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^2 (5 square miles). In 1995, another 518 km^2 (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.

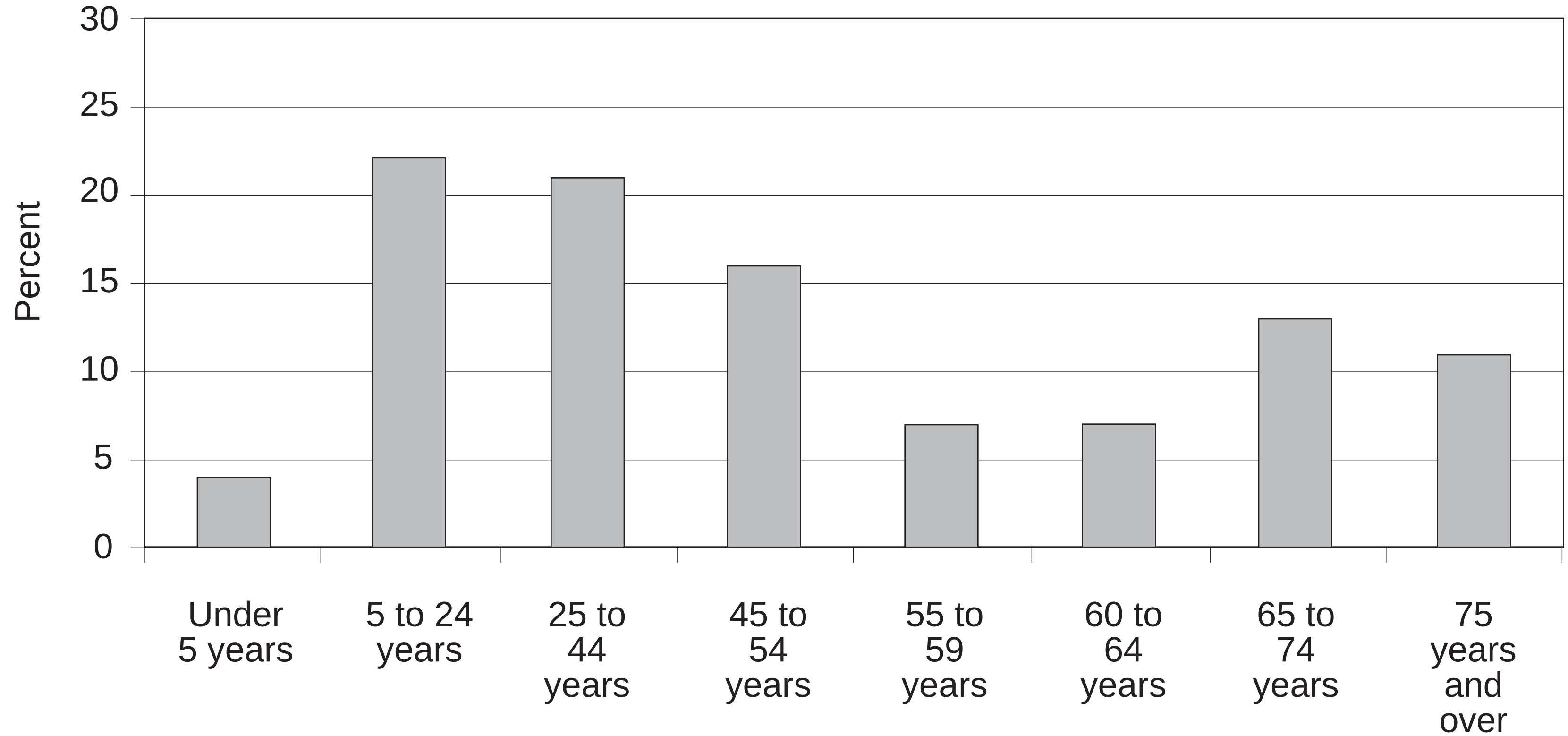

FIGURE 3-29
BOULDER CITY POPULATION DISTRIBUTION 2000 CENSUS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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

	Population		Population Change	
Area	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
Total Population	**14,966**	**100.0**	**1,375,765**	**100.0**	**1,998,257**	**100.0**
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
Total Population	**4,365**	**100.0**	**4,091**	**100.0**
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

Census Tract and Block Group	White (%)	Black (%)	American Indian (%)	Asian and Pacific Islander (%)	Other Race (%)	Hispanic Origin (%)
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

Geographic Area	Median Family Income	Percentage of County Median
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

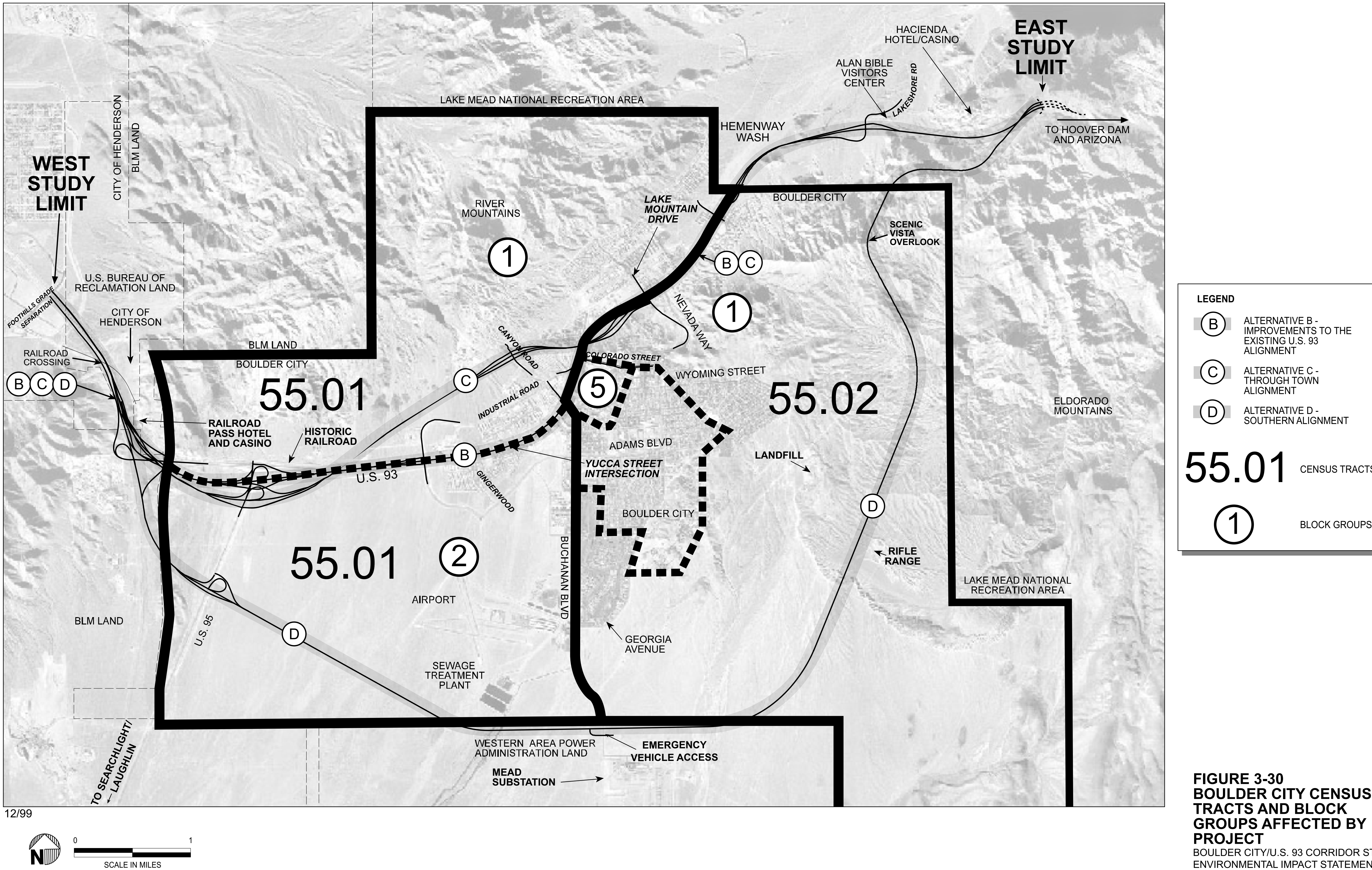

FIGURE 3-30
BOULDER CITY CENSUS TRACTS AND BLOCK GROUPS AFFECTED BY PROJECT
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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.

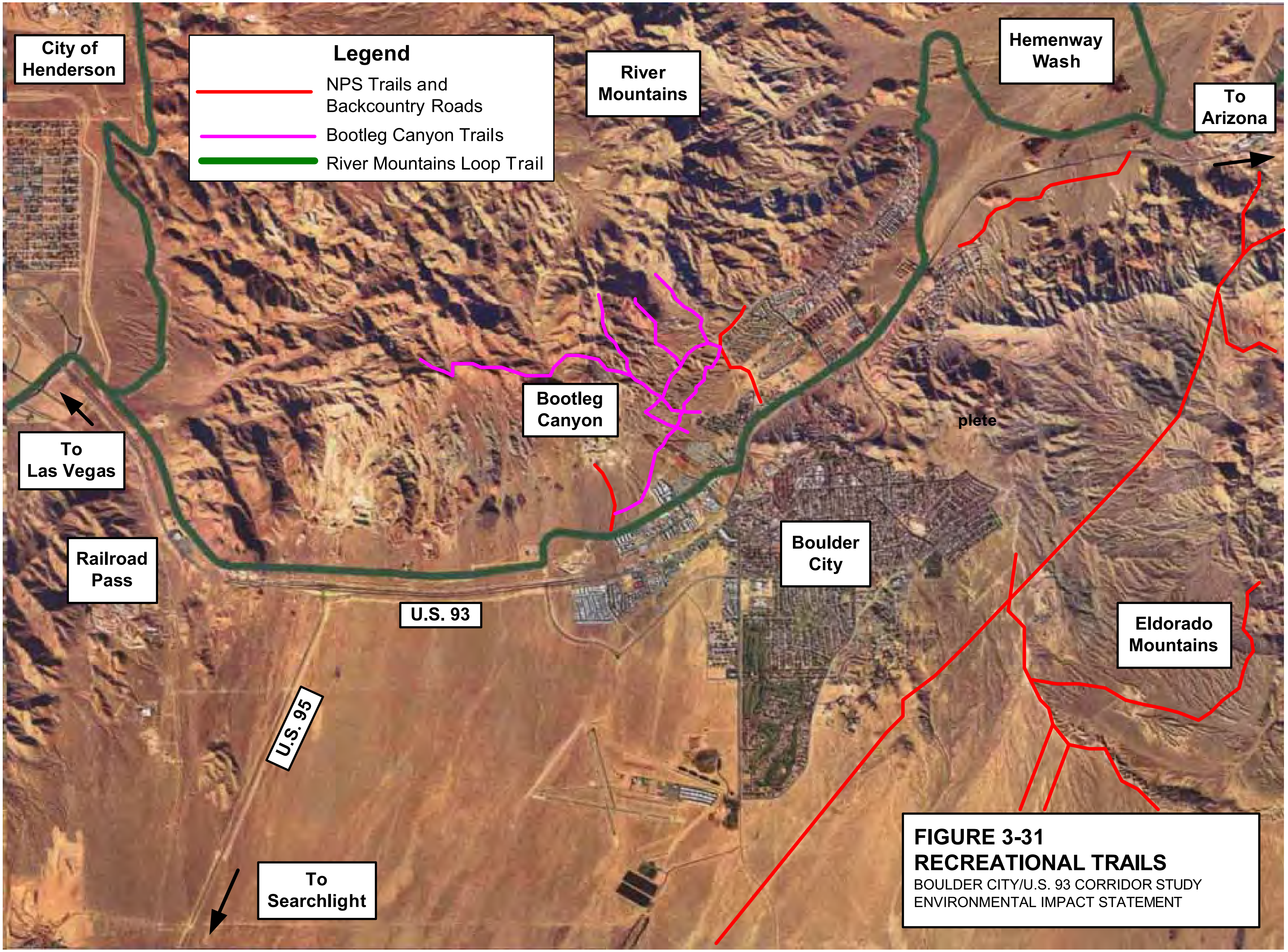

FIGURE 3-31
RECREATIONAL TRAILS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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). 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 21st 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.

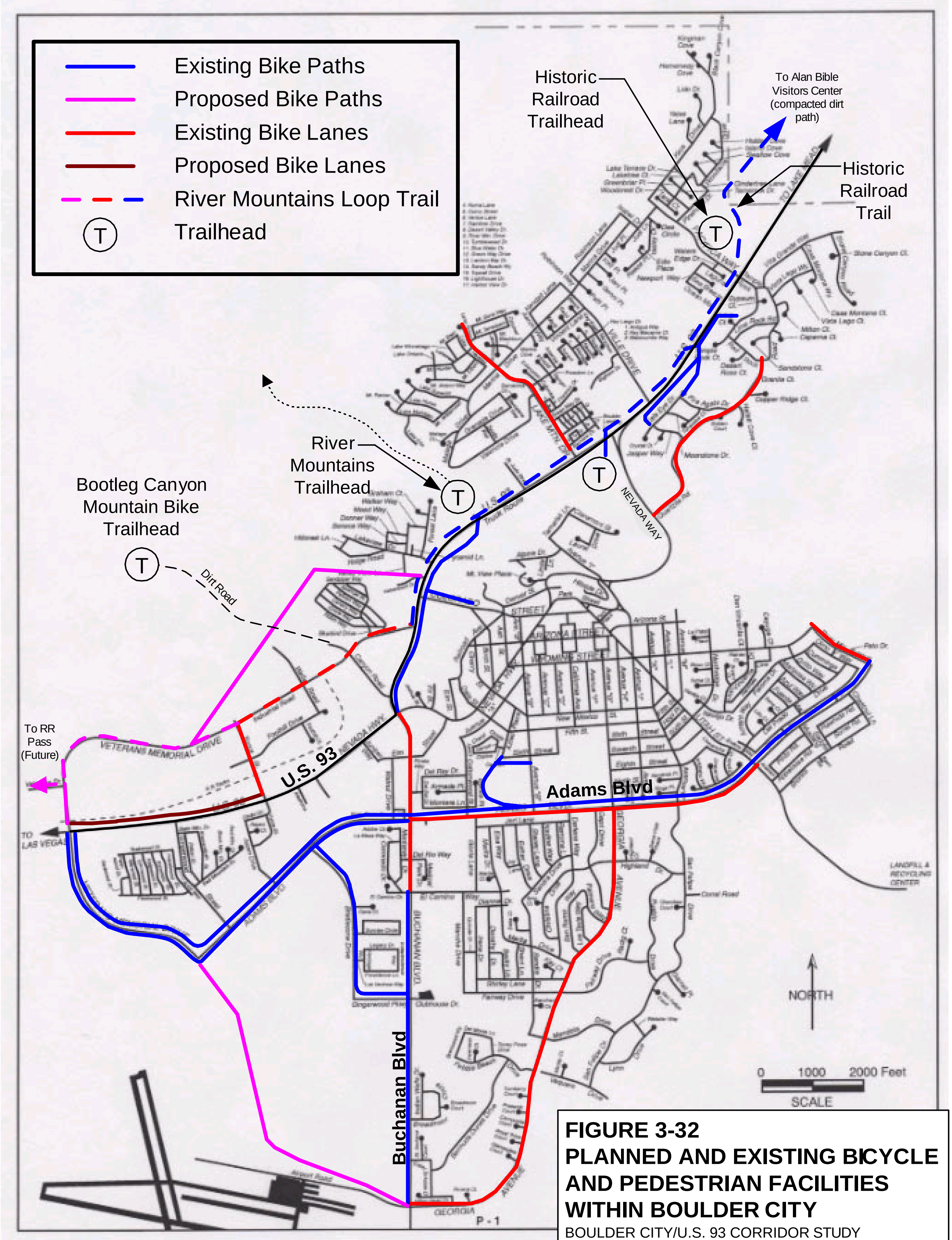

FIGURE 3-32
PLANNED AND EXISTING BICYCLE AND PEDESTRIAN FACILITIES WITHIN BOULDER CITY
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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

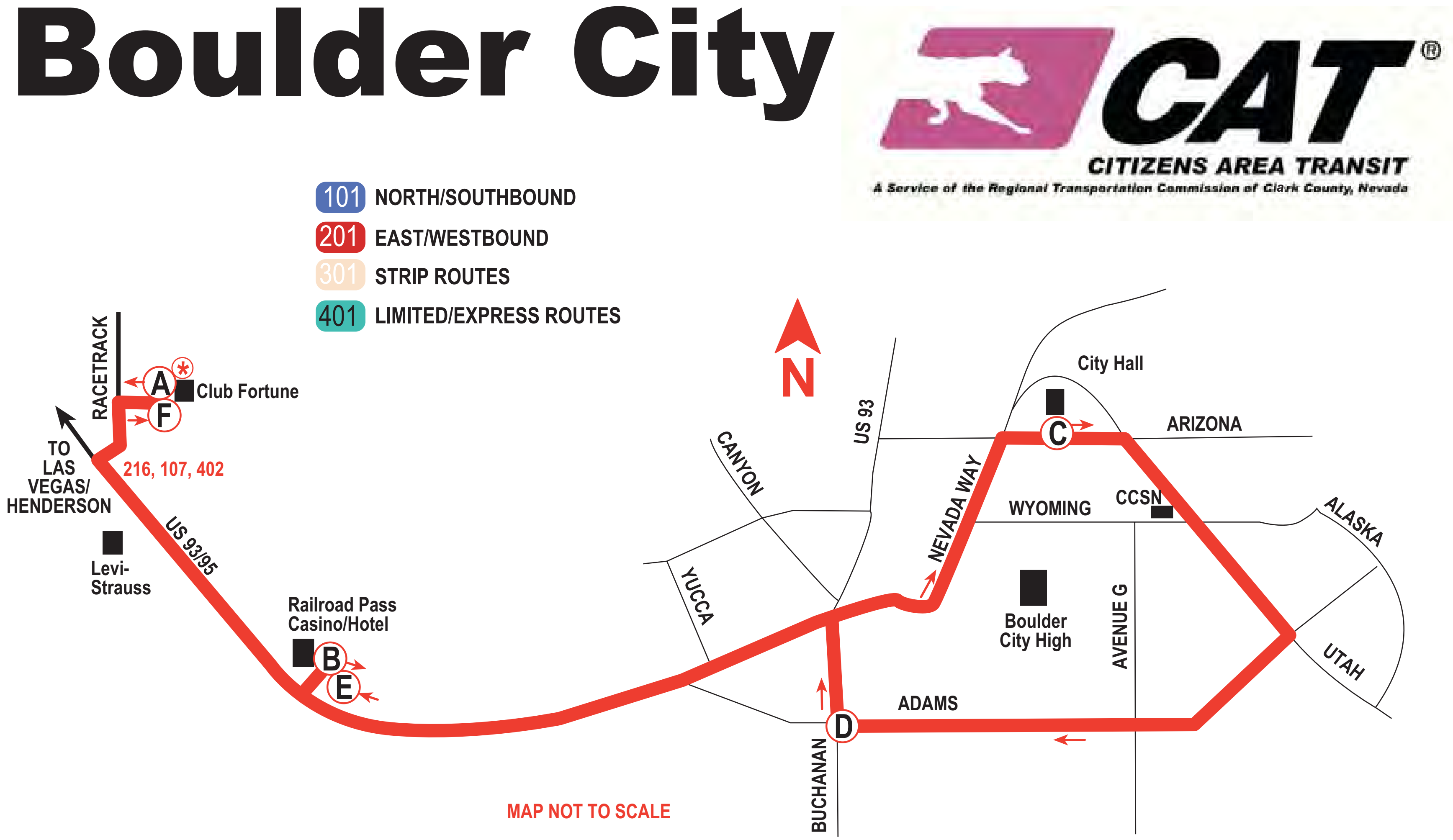

FIGURE 3-33
BOULDER CITY BUS ROUTES
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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.

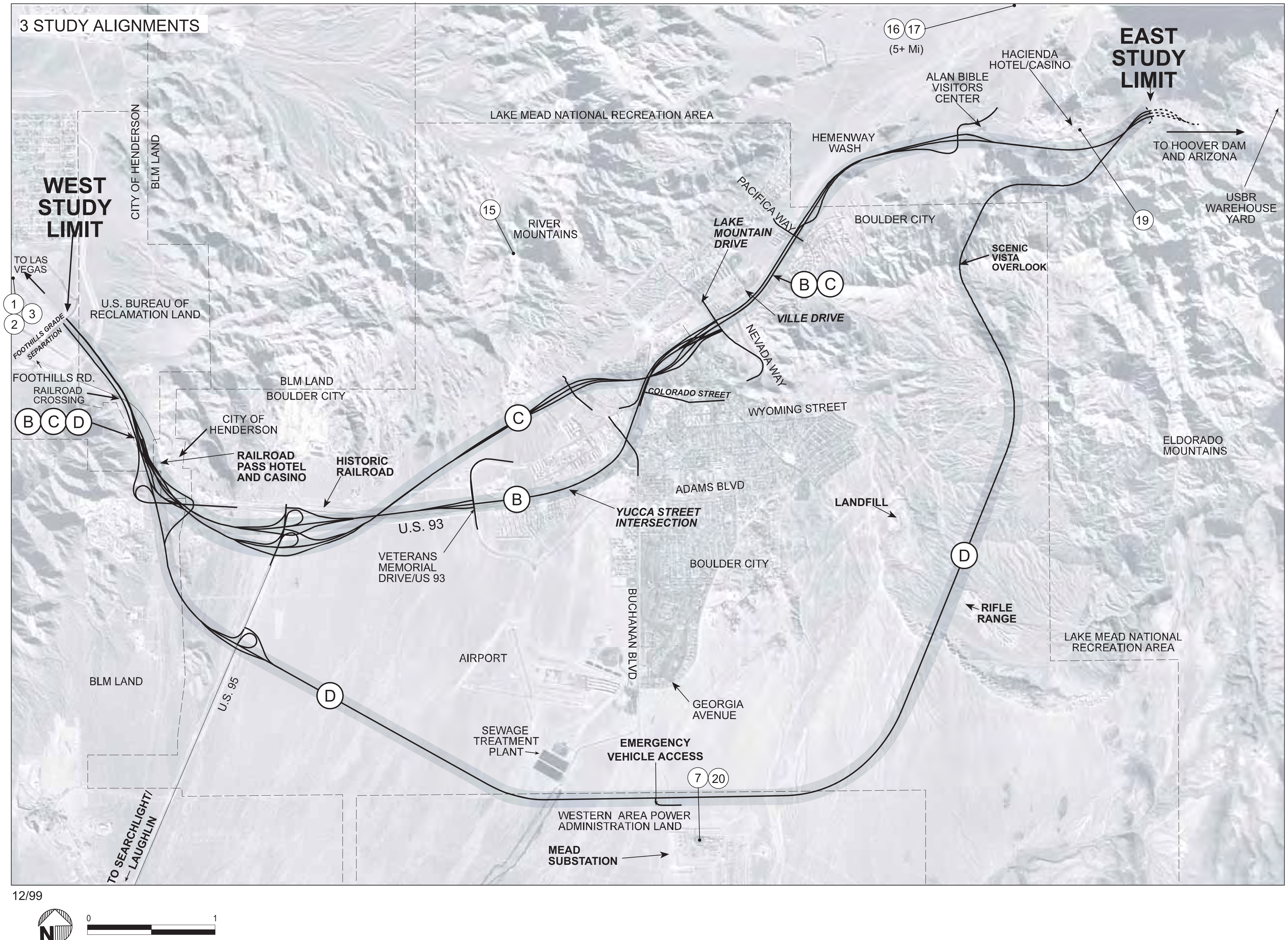
No groundwater resources are located in the River Mountains or the Eldorado Mountains, as volcanic rocks comprising these mountains are not considered suitable for the formation of significant aquifers. In addition, the low-lying area within the Boulder City limits and south into the alluvial fan also 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.



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- (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
1	GTE GOVERNMENT SYSTEMS
2	NDOT, U.S.95 AND WAGONWHEEL
3	BOULDER HIGHWAY DIESEL SPILL
7	DOE, MEAD SUBSTATION
15	FAA, RED MOUNTAIN VORTAC
16	WATER TREATMENT FACILITIES
17	LAKE MEAD FISH HATCHERY
19	LAKEVIEW STATION
20	DOE WESTERMEAD

FIGURE 3-34
POTENTIAL HAZARDOUS WASTE SITES SURROUNDING BOULDER CITY
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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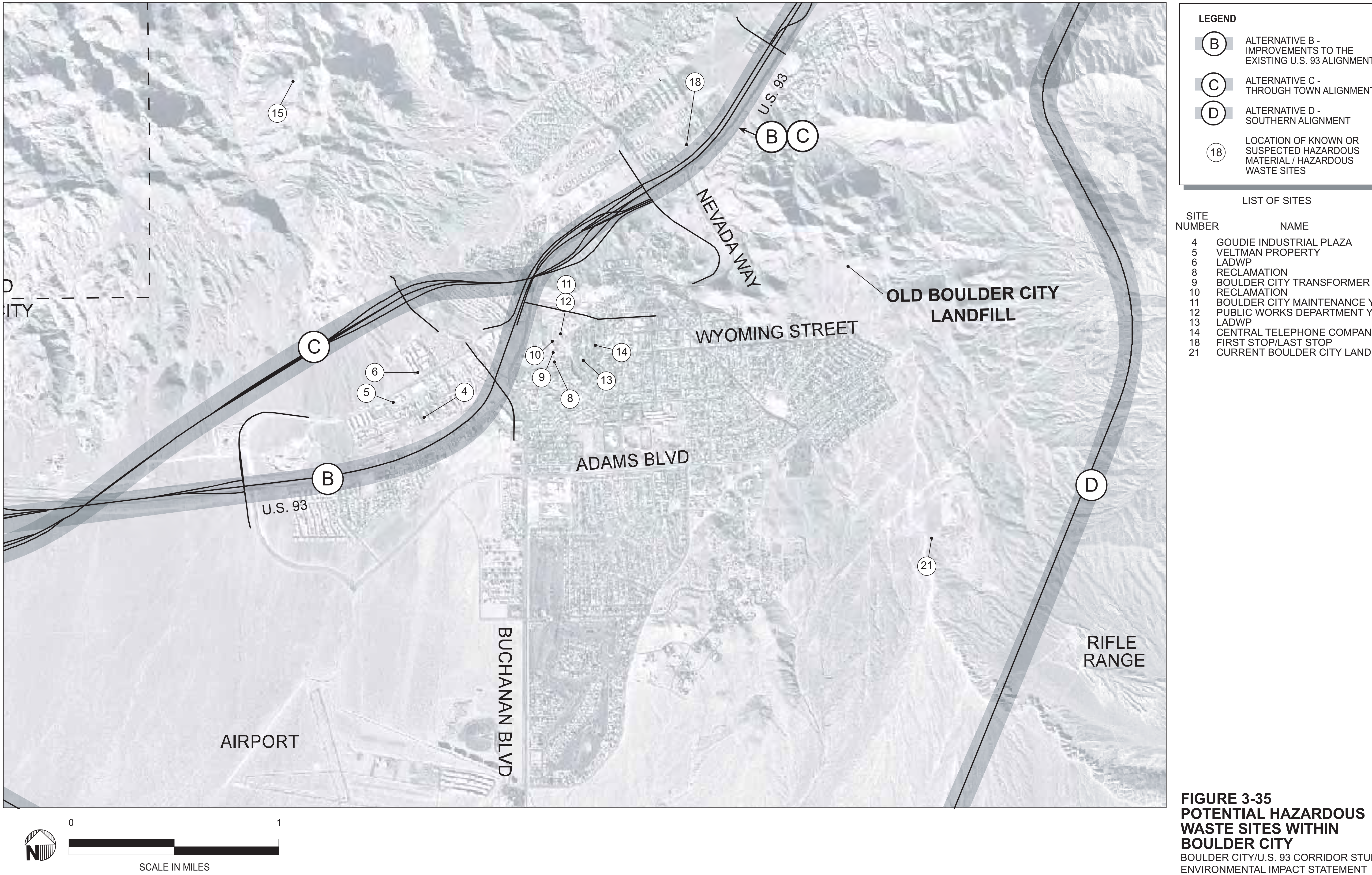

FIGURE 3-35
POTENTIAL HAZARDOUS WASTE SITES WITHIN BOULDER CITY
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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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 are 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.

Lowe 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.

4. Environmental Impacts and Mitigation

4.1 Introduction

Investigation and disclosure of the potential environmental impacts of federal actions is regulated under NEPA and amendments, as well as regulations published by the CEQ. CEQ defines significance of impacts as a function of both context and intensity. A potential impact must be considered in the appropriate context, such as impacts to society as a whole, the affected region, the affected interests, and the locality. Intensity refers to the severity of the impact on public health and the environment. These can include positive and negative impacts experienced on a short-term or long-term basis.

Probable adverse and beneficial social, economic, and environmental effects of Alternatives A (no-build), B (existing), C (through town) and D (Southern Bypass) are described in this chapter. The information provides a basis for evaluating the comparative merits of the alternatives. Impacts to specific resources in the natural and human environment were evaluated for each alternative, including the preferred alternative (Southern Bypass) and the No Build Alternative. This chapter also identifies possible mitigation measures to avoid, minimize, or compensate for any adverse impacts.

4.2 Air Quality

4.2.1 Environmental Impacts

Construction Impacts

Without mitigation measures, substantial short-term impacts to localized air quality could result from construction of the proposed project. These impacts would result from fugitive dust generated by clearing and grading activities and from tailpipe emissions generated from the use of construction equipment and vehicles. Dust emissions and impacts vary substantially from day to day, depending on the level of activity, the specific operation being conducted, and the prevailing meteorological conditions. Fugitive dust may adversely affect sensitive receptors (i.e., people who are more susceptible to the adverse impact of air pollutants). These include the elderly, young children, and those individuals suffering from respiratory disorders. Although human breathing passages readily filter most dusts, tiny particles can easily bypass this natural filtering system and lodge deep in the lungs. Areas near the construction site would be the most susceptible to this nuisance from construction activities. Wet dust suppression techniques, such as watering and applying chemical stabilization, will be used during construction to suppress the fine particulate from leaving the surface and becoming airborne through the action of mechanical disturbance or wind. The application of these mitigation measures will be a condition of project construction permits. Through these measures and by monitoring fugitive dust generation, exceedances will be avoided.

A mixture of construction equipment, including loaders, trucks, scrapers, backhoes, water trucks, pavers, compactors, generators, bulldozers, and other miscellaneous equipment, would be used during construction activities. Appropriate permits will be sought before any equipment, such as a Type II asphalt concrete batch plant, started operation. Most of the heavy-duty equipment would be powered by diesel fuel, which emits more nitrogen oxide (NO_X), sulfur oxide (SO_X), and PM_{10} than gasoline-powered equipment. The latter, however, emits more hydrocarbons and CO. When the equipment is initially started up, some visible emissions and possibly odorous emissions can be expected.

Operational Impacts

CO Analysis. In order to evaluate the impact of the proposed project alternatives on air quality, a dispersion modeling analysis was conducted on the two highest volume/lowest LOS intersections in the study corridor in accordance with the guidelines provided in *Guideline for Modeling Carbon Monoxide from Roadway Intersections* (EPA, 1992). In general, CO impacts are typically localized and occur when vehicular traffic is likely to impact a roadway's LOS and, as a result, subject sensitive receptors to CO hot spots, which primarily result from the idling and acceleration of vehicles at intersections. As a result, it is necessary to consider the potential for CO hot spots at locations where traffic is congested. The modeling analysis resulted in scaled 8-hour CO concentrations that were then added to a background CO concentration of 2.5 ppm to give the total 8-hour CO concentration. The maximum 8-hour concentration from the last 3 years of monitoring was used as the 8-hour background concentration. The results of the modeling analyses for each alternative are shown below in Table 4-1.

TABLE 4-1
CO Concentrations (ppm)

Intersection	Maximum 1-hour Concentration (ppm)	Maximum 8-hour Concentration (ppm)
U.S. 93 and Railroad Pass (Alternative A)	8.7	4.6
U.S. 93 and Railroad Pass (Alternative B)	6.3	2.9
U.S. 93 and Railroad Pass (Alternative C)	6.7	3.2
U.S. 93 and Railroad Pass (Alternative D)	8.0	4.1
U.S. 93 and Buchanan Boulevard (Alternative A)	8.1	4.2
U.S. 93 and Buchanan Boulevard (Alternative B)	9.0	4.8
U.S. 93 and Buchanan Boulevard (Alternative C)	7.5	3.8
U.S. 93 and Buchanan Boulevard (Alternative D)	8.0	4.1
NAAQS	**35.0**	**9.0**

The majority of the project lies in the CO attainment area. According to the CO protocol, a "Level 7" (screening) analysis was performed for the build alternatives. The build alternatives passed the screening method, and no further analysis was required. However, in order to better quantify the CO impacts, the two intersections were modeled, rather than the suggested three intersections in the CO protocol. The more refined analysis of modeling the intersections demonstrated that the build alternatives would result in a decrease in

CO impacts at the two intersections with the worst LOS. Therefore, the project will not cause any new violations of the CO standard, nor would it increase the frequency or severity of violations.

The screening results show that the build alternatives can be compared to roads in the nonattainment area that have similar geometry, meteorology, traffic lane volumes, percentage of cold starts and heavy-duty gas truck, and the same or lower background concentration. The roads in the nonattainment area are in attainment, so it can be assumed that the project build alternatives would be in attainment. The roads in Clark County used for comparison were I-15, I-95, I-215, and Flamingo Road. This level of analysis is sufficient under the screening methodology.

CO concentrations at the U.S. 95 and Railroad Pass intersection, which is in the nonattainment area (see Chapter 3), are predicted to be well below the federal standard. The three build alternatives concentrations are less than the No Build concentration for the Railroad Pass intersection. The lower concentrations represent an improvement in CO levels for the three project build alternatives.

The CO concentrations for the U.S. 93 and Buchanan Boulevard intersection are well below the federal standards for the three build alternatives and the No Build Alternative. The highest CO concentration at the Buchanan Boulevard intersection was for Alternative B, and the increased concentration would be due to the large volume of traffic projected for this alternative. Alternative D provides for an emergency vehicle and construction equipment delivery access ramp connection from the highway to Buchanan Boulevard.

Summarizing the comparative operational impacts of the alternatives, Alternative A has the highest estimated CO concentration at the U.S. 93 and Railroad Pass intersection. Alternative B has the lowest CO concentration at the U.S. 93 and Railroad Pass intersection, but it has the highest concentration at the U.S. 93 and Buchanan Boulevard intersection. Alternative C has the lowest concentrations at the U.S. 93 and Buchanan Boulevard intersection, and it is only moderately higher than the lowest concentrations at U.S. 93 and Railroad Pass. Alternative D (the preferred alternative) is estimated to have the same CO concentrations at both intersections, which are higher than the other build alternatives at the U.S. 93 and Railroad Pass intersection and fall between the other build alternatives at the U.S. 93 and Buchanan Boulevard intersection.

PM_{10} Analysis. Vehicle traffic generates a small amount of PM_{10}. The major source of PM_{10} emissions from roadways is road silt from passing tires. There are currently no reliable models for predicting the emissions and concentrations of PM_{10} from roadways. The technique that was used to predict impacts from PM_{10} emissions was to compare the project alternatives with existing roadways. This approach is currently being used in California as an interim method while guidelines are being developed, and it was approved for use on this project by NDOT (Mike Painter, pers. comm., 2001).

Alternative B is comparable to the existing Flamingo Road in Las Vegas. Flamingo Road is a six-lane arterial that runs east-west through Las Vegas. Alternative B has similar characteristics to Flamingo Road with regards to the number of lanes, median, stoplight intersections, and surroundings of urban development. Flamingo Road has been accounted for in the PM_{10} SIP for Clark County and has not been deemed a major source of emissions in the Clark County PM_{10} SIP; therefore, it follows that Alternative B would not have a PM_{10} impact.

Alternatives C and D are comparable to Interstate 215 (I-215) in the Green Valley/ Henderson area. This portion of I-215 has four lanes with a median barrier, and the general characteristics of I-215 and the project alternatives are similar. There has not been an exceedance of the federal standard in the I-215 area; therefore, it follows that the roadway would have no PM_{10} violations.

O_3 Analysis. Ground-level O_3 is commonly referred to as photochemical smog. O_3 itself is colorless – the brown haze associated with smog is mostly composed of the O_3 precursors, mainly NO_2. O_3 is generated during the day in a complicated set of photochemical mechanisms, but it is primarily driven by the following equation:

$NO_2 + O_2 + \text{sunlight} \rightarrow NO + O_3$

In this equation, O_3 represents ozone, a ground-level pollutant. The main precursors (required components) of O_3 production are compounds of NO_X, mainly NO_2. Precursors for O_3 are typically produced by combustion engines, including automobiles.

Although the entire project area is currently in attainment for O_3, there has been some concern that O_3 levels in Boulder City are higher than other parts of the Las Vegas Valley. This contention has led to the concern that if traffic congestion remains a problem on U.S. 93 through Boulder City, O_3 levels could rise to dangerous levels in the future. A random sample of O_3 concentrations collected at the Boulder City monitoring station throughout the course of a year indicated that Boulder City levels, though in compliance with NAAQS, are frequently similar to those collected at downtown Las Vegas (City Center) and North Las Vegas (Craig Road) monitoring stations.

Because vehicular emissions contribute to the NO_X precursors required for the production of ground-level O_3, one theory explaining why O_3 readings in Boulder City are similar to urban Las Vegas stations would be the existing high production of NO_X from vehicles traveling on U.S. 93. High traffic volumes, especially in combination with idling vehicles, produce higher levels of NO_X, which could potentially led to higher O_3 levels.

However, a greater indication of the impact of vehicle emissions on air quality would be to analyze the CO levels at the same monitoring station. It is generally accepted that high CO levels are representative of "hot spots" in congested roadways, where idling vehicles tend to release greater amounts of CO due to incomplete combustion in their engines. This draws a correlation between the production of CO and the NO_X precursors. Historically, the Boulder City station reports lower CO readings than the two urban stations in Las Vegas and North Las Vegas. In fact, it has been generally observed that CO readings at the Boulder City station remain some of the lowest in the Las Vegas Valley, consistently in the "Good" air quality index range.

Because the Boulder City monitoring station, which is relatively close to U.S. 93 as it passes through the often-congested Hemenway Wash, does not exhibit high CO readings on a normal basis, it can be concluded that emissions from vehicles do not greatly reduce air quality with respect to CO. Therefore, it is reasonable to conclude that those same idling vehicles cannot be the primary contributor to the relatively high O_3 concentrations at the Boulder City station.

It has been demonstrated that the future CO concentrations from the project Build Alternatives will be less then the No Build Alternative, so it can be assumed that the NO_X emissions will also be less. Since the No Build Alternative does not contribute appreciably to the O_3 concentrations, then it can be assumed that the Build Alternatives will not adversely impact the O_3 levels.

It is clear from traffic projections that the No Build Alternative would increase congestion on U.S. 93. This, in turn, would tend to slightly increase precursor emissions and could increase O_3 levels in the air shed. The better traffic flow and projected future CO concentrations with the Build Alternatives, including the preferred alternative, indicate that NO_X emissions would be less than with the No Build Alternative.

4.2.2 Mitigation

Conformity Statement

A small portion of the project is in an air quality nonattainment area; therefore, the project must be included in a transportation plan that conforms to the purposes of the CAA. FHWA and the Federal Transit Administration made an air quality conformity determination on RTC's Transportation Plan and Transportation Improvement Plan (TIP), both of which include this project, on March 27, 2001. In addition, it must be demonstrated that this project does not create any new violations or increase the frequency or severity of existing violations of the NAAQS. Per the analysis included in Section 4.2.1, the project will not create any new violations of the NAAQS, nor would it increase the frequency or severity of existing violations.

Construction Mitigation

Construction emissions, if left unmitigated, would result in an adverse, but temporary, impact. However, control measures, such as a dust mitigation plan, shall be used as appropriate and the project will follow the DAQEM Best Management Practice (BMP) manual for construction activities during construction of the project alternatives. These BMPs are based on soil type and construction activity, and they are designed to decrease PM_{10} emission impacts.

I. Site Preparation
- Minimize land disturbances by initiating construction in phases, where possible
- Use watering trucks to minimize dust
- Cover trucks when hauling dirt
- Stabilize the surface of dirt piles, if not removed immediately
- Use windbreaks to prevent any accidental dust pollution
- Limit vehicular paths and stabilize these temporary roads within the temporary construction area

II. Construction
- Cover trucks when transferring materials
- Use dust suppressants on traveled paths that are not paved

- Minimize unnecessary vehicular and machinery activities
- Minimize dirt track-out by washing or cleaning trucks before leaving the construction site (alternative to this strategy is to pave a few hundred feet of the exit road just before entering the public road); and
- Excavation and grading operations will be suspended when constant wind speeds are measured to be at least 25 miles per hour (mph) or if instantaneous wind speeds (gusts) are measured to be at least 40 mph. Wind speeds shall be determined at the DAQEM air quality monitoring station in Boulder City. Suspension will continue until 1 hour after the wind speed falls below the constant or gust maximum

III. Post-Construction

- Revegetate any disturbed land not paved
- Remove unused material
- Remove dirt piles
- Revegetate all vehicular paths created during construction to avoid future off-road vehicular activities

Anticipated construction activities would be regulated under applicable DAQEM air pollution permit requirements (e.g., dust control). In addition, air quality impacts will be mitigated by maintaining appropriate tuning of construction equipment engines, avoiding excessive idle times, and assuring that all mufflers and exhaust systems meet manufacturer specifications.

Operation Mitigation

The estimated CO impacts from vehicular traffic during project operations would not exceed the 1-hour or 8-hour NAAQS for CO. Therefore, no mitigation measures are required. There will be no violations of the CO standards. The project will not cause any new violations of the CO standard or increase in the frequency or severity.

4.3 Noise

4.3.1 Environmental Impacts

The focus of this assessment is on evaluating noise impacts of Alternatives A, B, and C. Because Alternative D (the preferred alternative) is far from most noise-sensitive areas within the developed portions of the project study area, with the exception of the LMNRA, it is not evaluated in detail in this study. It is expected that Alternative D would result in reduced traffic noise levels at all noise-sensitive receptors located along the current U.S. 93 alignment, due to the redirection of approximately one-third of all traffic to the bypass alignment.

Construction Impacts

Noise from construction activities would add to the existing noise environment in the immediate project area. Activities involved in construction would generate noise levels, as indicated in Table 4-2, ranging from 88 to 92 dBA at a distance of 15 m (50 ft). Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Construction noise impacts could result in annoyance or sleep disruption if nighttime operations occur or if unusually noisy equipment is used. Because of this, construction activities in developed areas rarely occur during nighttime periods.

Noise would also be generated during the construction phase by increased truck traffic associated with transport of heavy materials and equipment on area roadways. This noise increase would be of short duration and would probably occur primarily during daytime hours. Construction noise levels would be similar for Alternatives B and C in Hemenway Valley, where the two alignments are identical.

TABLE 4-2
Construction Equipment Noise

Construction Phase	Loudest Equipment	Maximum Sound Level at 15 m (50 Ft) ($dBA-L_{eq}$)
Clearing and Grubbing	Bulldozer, backhoe	89 dBA
Earthwork	Scraper, bulldozer	91 dBA
Foundation	Backhoe, loader	88 dBA
Superstructure	Crane, loader	89 dBA
Base Preparation	Truck, bulldozer	91 dBA
Paving	Paver, truck	92 dBA

Source: U.S. Department of Transportation, 1977.

Operational Impacts

Forecast future (2027) traffic volumes on U.S. 93 and the potential new highway alignments and on- and off-ramps were obtained from the traffic studies performed for this project (NDOT, August 2001a). Truck volumes on the future roadway system were estimated based on the traffic counts obtained during the noise monitoring periods and from the project traffic forecasts. Table 4-3 summarizes future traffic noise levels at the selected receptor locations and compares them to existing peak-hour traffic noise levels (see Figure 3-1). This analysis and the table below utilize two types of noise assessment locations, as follows:

- Monitoring Location (M): An outdoor location where measurements of existing traffic and/or background noise levels are conducted.
- Receptor Location (R): An outdoor listener location chosen for analysis where frequent human use occurs and a lower noise level would be of benefit. Receptor locations typically include, but are not confined to, the monitoring locations.

TABLE 4-3
Comparison of Existing and Projected Future (2027) Peak-Hour Noise Levels – Without Mitigation (in dBA)

Receptor Location/ Land Use	Existing (1999)	Alternative A (No Build)	Alternative B (Through Town)	Alternative C (North Town)	Alternative D (Southern)
M1/Hotel	**70**	**73**	63	64	–
M2/Veterans Home	45	45	45	49	–
M3/Mobile Homes	61	63	63	55	–

TABLE 4-3
Comparison of Existing and Projected Future (2027) Peak-Hour Noise Levels – Without Mitigation (in dBA)

Receptor Location/ Land Use	Existing (1999)	Alternative A (No Build)	Alternative B (Through Town)	Alternative C (North Town)	Alternative D (Southern)
M4/Mobile Homes	65	**66**	**67**	60	–
M5/RV Park	43	43	43	**70**	–
M6/Residential	42	42	42	**62**	–
M7/Residential	63	**67**	**66**	65	–
M8/Church, School	59	63	64	60	–
M9/Residential	53	57	59	60	–
M10/Residential	63	**66**	65	65	–
M11/Residential	62	**66**	**75**	**75**	–
M12/Residential	62	**66**	**66**	**66**	–
M13/Residential	62	**66**	**72**	**72**	–
M14/Residential	62	65	**71**	**71**	–
M15/Residential	62	65	61	61	–
M16/Residential	62	65	**70**	**70**	–
M17/Hotel	**66**	**69**	64	64	–
M18/Residential	53	53	53	53	53
M19/LMNRA	41	41	41	41	56-65[1]
R20/Residential	42	42	42	**65**	–
R21/Residential	42	42	42	**67**	–
R22/Residential	58	60	61	60	–
R23/Residential	61	63	63	64	–
R24/Residential	62	65	**69**	**69**	–
R25/Residential	57	59	62	62	–

Shading indicates noise levels that approach or exceed the NAC, or substantially exceed existing noise levels.
Source: NDOT, August 2001a.

[1] Noise levels expected at 45 to 165 m (150 to 550 ft) from the Alternative D centerline, assuming a clear line-of-sight from outlying areas to the highway.

The following findings are drawn from data presented in Table 4-3:

- Existing traffic noise levels at all residential locations along U.S. 93 are below the NAC. The only locations where the NAC is currently exceeded are along U.S. 93 near the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino.
- **No Build (Alternative A):** By 2027, increases in vehicular traffic on U.S. 93 would result in traffic noise levels at some residential locations that approach or exceed the NAC.

Such locations would include the mobile home park at the southeast corner of Yucca Street and U.S. 93 (M4); the first few homes located at the northeast corner of Lakeview Drive and Forest Lane (M7); the condominiums located at the northeast corner of Lake Mountain Drive and U.S. 93 (M10); portions of the new single-family homes located along the southeast side of U.S. 93 between Nevada Way and Pacifica Way (M11 and M13); and the property line of the residential vacant lots between Ville Drive and Pacifica Way (M12). The two hotels near the west and east project termini would still be exposed to high traffic noise levels.

- **Alternative B:** For this alternative, future traffic noise levels along U.S. 93 near the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino would decrease well below the NAC due to the realignment of U.S. 93 away from these locations. For other noise-sensitive locations west of the Buchanan Boulevard intersection, future noise conditions under Alternative B would be very similar to those under the No Build Alternative. Alternative B would have mixed effects for residential locations in the Hemenway Wash area, compared to No Build conditions, and would result in decreased traffic noise levels at some locations and increased noise levels at others. Generally, noise levels at the first row of all residential uses southeast of U.S. 93 between Nevada Way and Pacifica Way, and some homes east of Pacifica Way, would exceed the NAC.

- **Alternative C:** Similar to Alternative B, future traffic noise levels along U.S. 93 near the Railroad Pass Hotel and Casino and Hacienda Hotel and Casino would be well below the NAC due to the realignment of U.S. 93 away from these locations. The mobile homes and the RV park located between Veterans Memorial Drive and Buchanan Boulevard would also experience noticeable decreases in traffic noise levels. The new Veterans Home (location M2) would be well shielded from the new U.S. 93 alignment, experiencing only minimal increases in noise exposure. The areas that would be the most adversely affected by the proposed Alternative C would be the Boulder Oaks RV Park and the single-family homes south of Lakeview Drive and Ridge Road along the proposed U.S. 93 alignment (the area represented by M5, M6, R18, and R19). At these locations, future noise levels would increase "substantially" and approach or exceed the 67-dBA criterion. Noise impacts on residential locations in the Hemenway Wash area would be similar to Alternative B.

- **Alternative D (Preferred Alternative):** Under this project alternative, noise-sensitive areas located along the existing U.S. 93 alignment would experience major reductions in traffic noise levels relative to existing conditions. No adverse noise effects to sensitive receptors are expected to occur anywhere in the developed portion of the study area, as the nearest noise-sensitive areas, outside of the two hotels near the project limits, would be at least 1.2 km (0.8 mile) away from the proposed alignment. Existing homes north of Georgia Avenue (southernmost homes in Boulder City) would experience future traffic noise levels of about 53 dBA during peak traffic hours. Future noise levels at this location would not exceed existing noise levels. The exterior areas of the Railroad Pass Hotel and Casino may experience peak-hour noise levels near the NAC, similar to the other two build alternatives. However, since there would be a shift in roadway alignment away from the hotel, future noise levels would decrease well below the existing levels. Within a limited area of the LMNRA, future traffic on Alternative D would potentially result in substantial increases over existing background noise levels. Areas within a distance of approximately 165 m (550 ft) from the highway, and away from the existing U.S. 93, would experience substantial noise level increases.

The impairment analysis prepared by NPS to address impacts resulting from the implementation of Alternative D in the LMNRA is presented in Appendix D. To assess noise impacts, it uses as a baseline existing conditions rather than the proximity of sensitive receptors. Because no developed facilities currently exist within that portion of Alternative D that crosses the LMNRA, except near its eastern terminus, the NPS analysis concludes that there will be "moderate to major" impacts resulting from the implementation of the preferred alternative on LMNRA lands.

4.3.2 Mitigation

Construction Mitigation

For this project, construction equipment operating at the site will conform with contractual specifications that require the contractor to comply with all local noise control noise rules, regulations, and ordinances. If a special plan for controlling construction noise in a sensitive location is needed, a plan will be developed to be included in the contract documents. Furthermore, there are no FHWA or NDOT criteria for construction noise impacts. Although construction noise impacts would be temporary, the following standard measures would be implemented to minimize such impacts:

- Whenever possible, limit operation of heavy equipment and other noisy activities to daylight hours.
- Ensure that all engine-powered equipment has mufflers installed and maintained according to the manufacturer's specifications.
- Require all equipment to comply with applicable equipment noise standards.
- Locate stationary construction equipment and vehicle staging areas as far from nearby noise-sensitive properties as possible.
- Limit unnecessary idling of equipment.
- Reschedule construction operations to avoid periods of noise annoyance, as determined by the NDOT resident engineer and defined in special provisions.
- Notify nearby affected parties prior to extremely noisy work.
- Install temporary or portable acoustic barriers around stationary construction noise sources in noise-sensitive areas, as needed. This measure does not apply to the preferred alternative (Alternative D) because no adverse noise effects are expected to occur anywhere in the developed portion of the study area, as the nearest noise-sensitive areas, outside of the two hotels near the project limits, would be at least 1.2 km (0.8 mile) away from the proposed alignment.

Operational Mitigation

Of all potential traffic noise mitigation measures that can be used to mitigate noise impacts, the construction of noise barriers (i.e., walls, earthen berms, or a combination of berms and walls) is the most practical, reasonable, and effective choice for this project. The three project build alternatives under consideration were chosen on the basis of engineering and environmental screening studies, which included traffic noise considerations, as well as input from the public through numerous meetings and workshops.

An FHWA traffic noise computer model was used to determine the noise level reduction that would be provided by various barrier heights and locations for barriers placed either along the proposed U.S. 93 right-of-way or next to the proposed roadway pavement edge. Table 4-4 shows the results of this analysis. The following observations can be made from the noise modeling process and data presented in Table 4-4:

- Under Alternative B, a noise barrier of a height of 2 m (8 ft) above the proposed U.S. 93 pavement surface would be sufficient to reduce future peak-hour traffic noise levels within the mobile home park located at Yucca Street and U.S. 93 to levels below the NAC. Such a barrier would provide about a 9-dBA noise reduction at the first row of mobile home lots south of U.S. 93.
- Also under Alternative B, a right-of-way barrier of a height of 4 m (14 ft) above the ground would reduce the noise levels within the backyards of homes on Forest Lane, north of Lakeview Drive, to levels below the NAC. This barrier would also block the line-of-sight to the exhaust stacks of heavy trucks traveling on the roadway, which are assumed in the model to be 3.5 m (11.5 ft) above ground level.
- Under Alternative C, east of the proposed U.S. 93/Canyon Road interchange, the existing property-line wall for homes within the Boulder Oaks RV Park would have to be replaced by a barrier of a height of 3 m (10 ft) above the ground. On the north side of U.S. 93, a variable-height noise barrier between 3 and 4 m (10 to 14 ft) above the roadway surface should be considered near the north edge of the roadway to attenuate noise to the single-family homes along Ridge Road and Lakeview Drive. A right-of-way barrier would not be practical in this area because the ground elevation is below the proposed roadway grade at most locations.
- For both Alternatives B and C in the Hemenway Wash area, property-line barriers 2 m (8 ft) above residential building pads would be needed to reduce future noise levels within the backyards of existing and proposed single-family homes adjacent to U.S. 93 and east of Nevada Way below the NAC. Such barriers would be sufficient to block the view to the exhaust stack on a heavy truck traveling through the area.
- For the preferred alternative (Alternative D), in determining and abating traffic noise impacts, FHWA requires primary consideration to be given to exterior areas where “frequent human use” occurs and a lowered noise level would be of benefit. Although traffic movements on the proposed Alternative D would increase noise levels through that area of the LMNRA, such areas are not deemed to be of frequent human use. Therefore, noise abatement is not required for these areas.

TABLE 4-4
Future (2027) Peak-Hour Noise Levels - With Noise Barriers (in dBA)

Receiver Location	Noise Level with No Mitigation	Height of Noise Barrier				
		2 M (8-Ft)	3 M (10-Ft)	3.5 M (12-Ft)	4 M (14-Ft)	4.5 M (16-Ft)
Alternative B						
M4	67	58*	57	56	55	55
M7	66	63	61	59	58*	57
M11	75	63*	61	59	59	58
M13	72	60*	59	57	56	56
M14	71	59*	58	57	56	55
M16	70	58*	57	57	56	55
R24	69	58*	56	55	54	53
Alternative C						
M5	70	64	62*	61	60	59
M6	62	56	55*	54	54	53
M11	75	63*	61	59	59	58
M13	72	60*	59	57	56	56
M14	71	59*	58	57	56	55
M16	70	58*	57	57	56	55
R20	65	58	57*	57	56	56
R21	67	64	62	61	59*	58
R24	69	58*	56	55	54	53

Notes: Future noise levels at the noise receptor locations not shown in this table would comply with the NAC.
Shaded cells depict the barrier heights at which a minimum 5-dBA noise level reduction is achieved. Boxed cells show barrier heights resulting in future noise levels below “substantial” increase and below the NAC.
Noise levels marked with an asterisk (*) indicate the height at which the noise barrier begins to break the line-of-sight to the exhaust stack on a heavy truck, assumed to be 11.5 ft above the ground.
Source: NDOT, August 2001a.

NDOT noise policy provides guidance for determining the overall reasonableness of noise abatement options. Based on this policy, noise barrier reasonableness is determined by considering the amount of noise reduction provided, number of people protected, and the cost of abatement. Cost is an important factor in deciding whether a noise barrier should be recommended for mitigation. NDOT policy considers noise abatement to be “reasonable” if the cost per “benefited resident” is at or below $10,000 (1992 dollars). The average Nevada home is assumed to have 2.5 residents. A noise barrier cost of about $161 per square meter ($15 per square ft) was used in this analysis (NDOT, August 2001a).

Table 4-5 summarizes the results of noise barrier cost calculations based on the foregoing discussion and a count of existing homes or vacant lots slated to become homes within the project area. Homes were counted using field observations, aerial photos, and current maps of the project study area. Figures 4-1 and 4-2 show the noise barriers that have been evaluated in this study.

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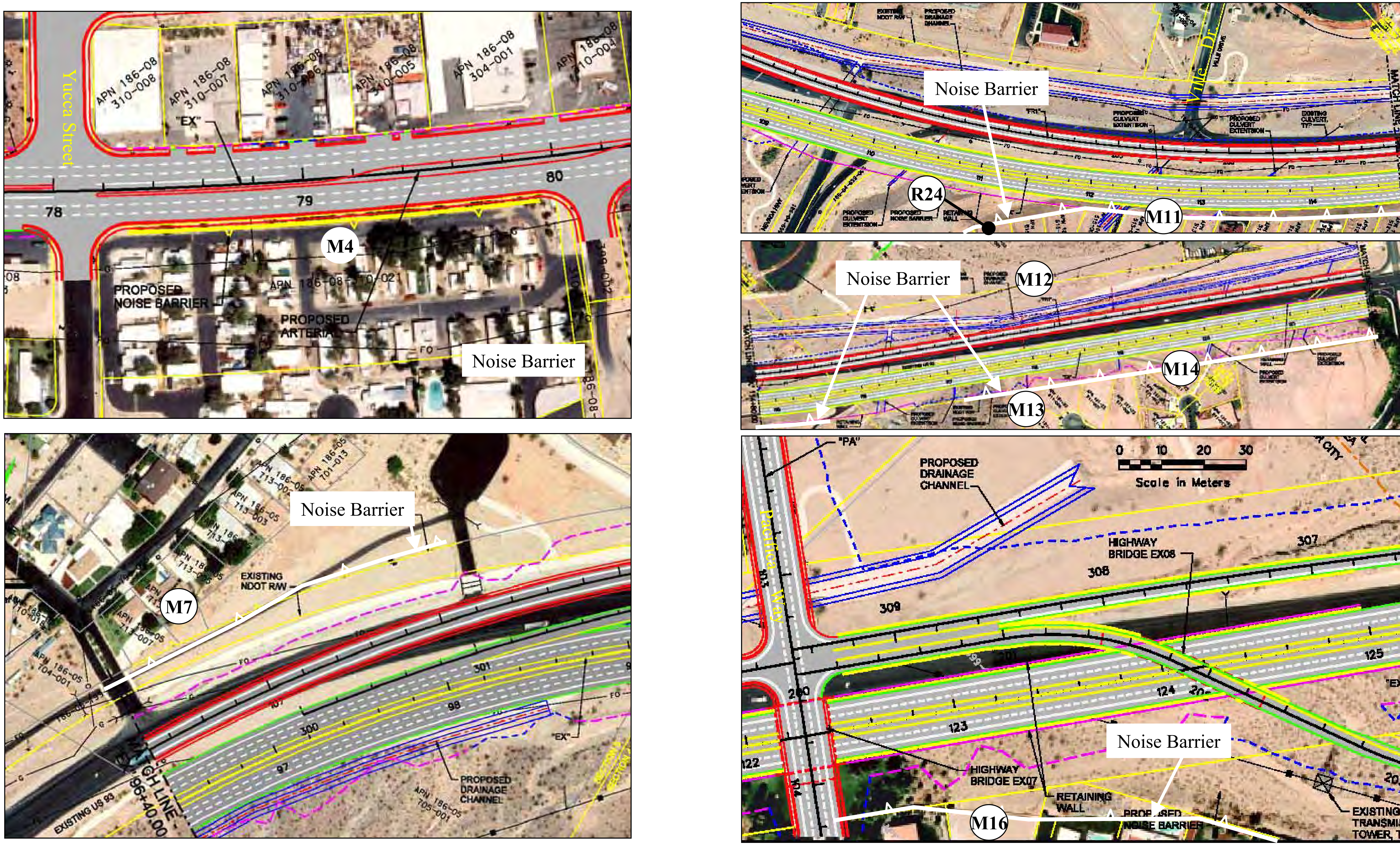

FIGURE 4-1
PRELIMINARY NOISE BARRIER LOCATIONS - ALTERNATIVE B
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

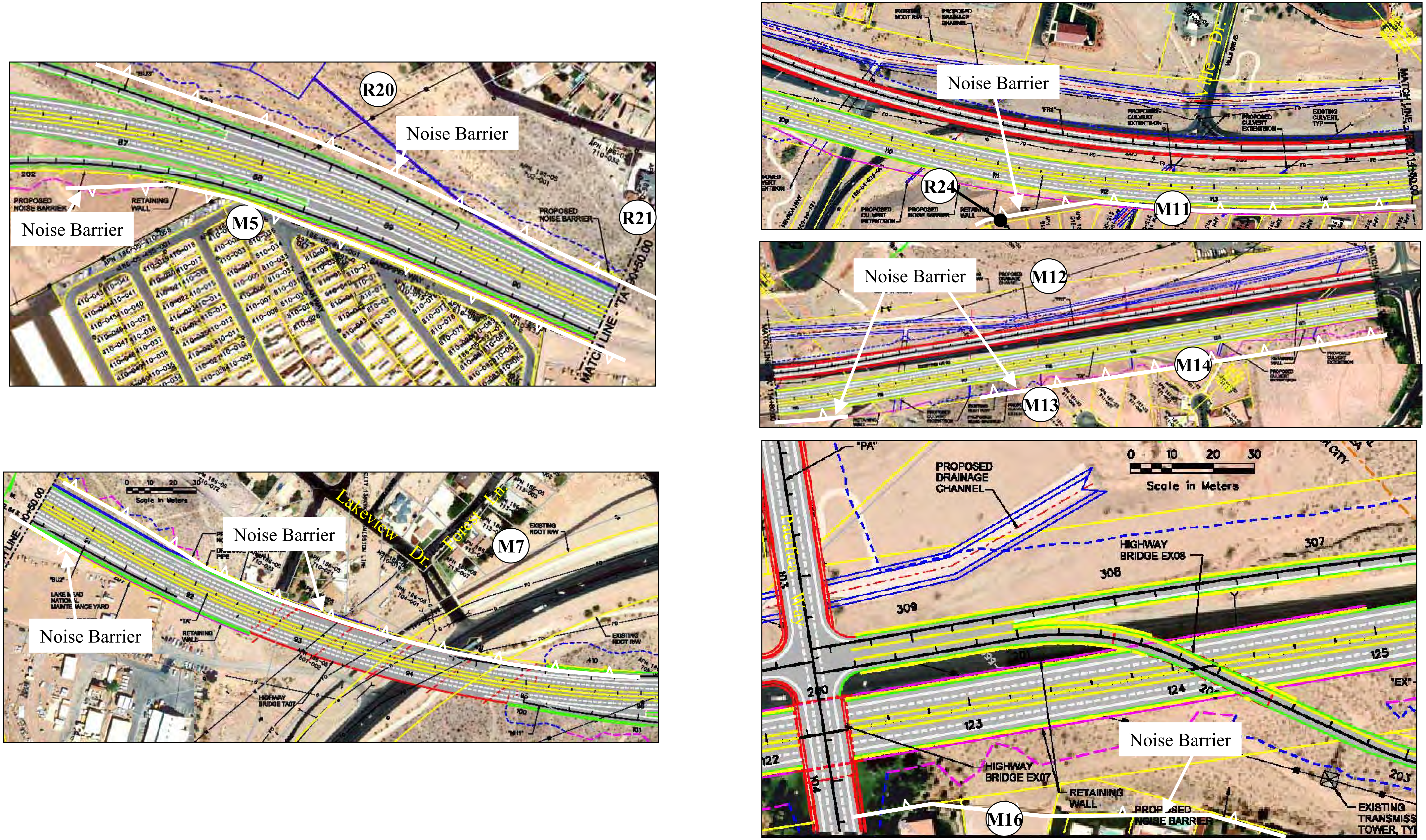

FIGURE 4-2
PRELIMINARY NOISE BARRIER LOCATIONS - ALTERNATIVE C
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Based on the data in Table 4-5, it would be reasonable, from a cost standpoint, to construct noise barriers at all the identified noise-impacted locations to reduce future traffic noise levels below the NAC. These locations include existing residences, as well as graded residential building pads, which are assumed will be constructed before building of either Alternative B or C would begin. It should be noted that this finding is preliminary and subject to change upon availability of actual barrier cost data, detailed roadway geometry, and updated information on the number of people affected.

TABLE 4-5
Preliminary Barrier Cost Analysis

Barrier Location	Number of Benefited Residences[1]	Barrier Length (m)	Barrier Height (m)	Total Barrier Area (m^2)	Total Barrier Cost	Cost per Benefited Resident	Reasonable to Build Noise Barrier?
Barrier along the North Side of Mobile Home Park at Yucca Street and U.S. 93	10	191	2.44	467	$75,200	$3,100	Yes
Barrier along the Property Line of Boulder Oaks RV Park	20	400	3.05	1,220	$196,400	$9,800	Yes
Barrier along the North Side of U.S. 93, East of Canyon Road Interchange	22	909	3.05 to 4.27	3,258	$524,500	$9,600	Yes
Property-Line Barrier along the North Side of Homes Just East of Nevada Way	16	548	2.44	1,336	$215,100	$5,400	Yes
Property-Line Barrier along the North Side of Homes South of Pacifica Way	12	435	2.44	1,062	$171,000	$5,700	Yes
Property-Line Barrier along the North Side of Homes North of Pacifica Way	7	230	2.44	562	$90,500	$5,200	Yes
Barrier along the North Side of U.S. 93, Near Lakeview Drive	6	204	4.27	873	$140,600	$9,400	Yes

[1]A benefited residence is defined as any residential unit being provided a noise reduction of 5 dBA or more by the barrier regardless of whether the unit exceeds the NAC.

Source: NDOT, August 2001a.

4.4 Biology/Threatened Species

The No Build Alternative (Alternative A) would result in no new habitat disturbance in the project area. However, continued and anticipated increased use of the existing roadway corridor would result in a corresponding increase in the barrier that exists preventing bighorn sheep movement between the River Mountains and Eldorado Mountains bighorn herds.

4.4.1 Construction Impacts

Adverse impacts to plants and animals presently occupying the permanent construction zone would occur for all build alternatives, including the preferred alternative (Alternative D). Existing vegetation and habitat will be removed.

During the actual construction process, dust, noise generation, and other construction-related disturbances will occur, which may affect plants and wildlife. Construction may possibly fragment existing habitat patterns, leading to a reduction in quality of habitat abutting the construction zone. Modifications in the drainage characteristics stemming from placement of the new highway in alluvial areas may adversely affect existing plant community structure. Conversely, runoff draining from the new highway may foster creation of a narrow "green belt" – a strip of larger and more dense vegetation – along the shoulders of the highway, which may provide enhanced habitat values to some species.

Alternative B

Because its nucleus already exists, Alternative B would impose the least disturbance to local vegetation and wildlife of the three proposed alignments. If this alternative is built, habitat disruption will be essentially confined to land now bordering the existing U.S. 93 corridor. By virtue of proximity to a long-established, major travel route, some habitat is already disturbed and holds generally reduced habitat values to many local species. Still, additional zones of at least relatively undisturbed land that lie beyond the present shoulders now paralleling the highway will be lost if the present U.S. 93 corridor is widened to accommodate the proposed project. These losses would extend along approximately 14.5 km (9 miles) of its roughly 17.7-km (11-mile) length, excluding only the already heavily developed areas within Boulder City. Assuming a 30-m (100-ft) width for the existing U.S. 93 corridor and a 120-m (400-ft) width for the proposed project construction zone (temporary and permanent impact area), new construction will disturb an additional 90 m (300 ft) along the approximately 15 km (9 miles) of undeveloped habitat. This translates to slightly more than 327 acres of new disturbance arising from this alternative (Table 4-6).

The gross acres of habitat disturbance, as described both in the text and in Table 4-6, do not directly correlate with loss of equal habitat values to any particular species across that entire acreage. Where multiple species are concerned, neither of these acreages can be assumed to represent a loss of identical magnitude to each species being impacted. The disturbed habitat will occur in an area that has been highly impacted by existing U.S. 93 and U.S. 95, the Union Pacific Railroad (UPRR) (formerly the Boulder City Branch Railroad), and urban residential and industrial development and expansion.

Alternative C

This alternative envisions constructing between 6 and 8 km (4 and 5 miles) of completely new highway, impacting approximately 242 acres (Table 4-6) within the 120-m (400-ft) construction zone located in the western half of the project area. New disturbance will also occur along the remaining roughly 10 km (6 miles) of this route (i.e., from the western terminus to about Railroad Pass, and from about the head of Hemenway Valley to the eastern terminus of the project). In these sections, new construction will impact roughly an additional 90-m-wide (300-ft-wide) corridor (218 acres). The total estimated area impacted by Alternative C would be 460 acres (Table 4-6) upon construction of the alternative.

New construction from about Railroad Pass to the point at which Alternative C crosses U.S. 93 would traverse an area of desert tortoise habitat. Although access roads and powerlines criss-cross this area, construction here would contribute to the isolation of the remaining, undisturbed land lying between Alternative C and U.S. 93, further reducing its utility to the tortoise and many of the other species currently occupying or using it. For all practical purposes, this island of habitat would retain little value to wildlife under Alternative C . Alternative C also crosses bighorn sheep (and, probably, gila monster) habitat in both the Railroad Pass vicinity and in the area along the foot of the River Mountains, west of Boulder City. It further fragments remaining, down-slope habitat in this vicinity by creating another island between itself and U.S. 93. At the east end of the project, Alternative C would cause expansion of local disturbance from U.S. 93. Similar to Alternative B, disturbed habitat resulting from the constriction of Alternative C will occur in an area that is has previously been impacted by existing U.S. 93 and U.S. 95, the railroad, golf course development, and urban residential and industrial development and expansion.

Alternative D (Preferred Alternative)

Alternative D consists of about 20 km (14 miles) of new highway, impacting approximately 679 acres (Table 4-6). Habitat disturbance resulting from this alternative, from the point of divergence from U.S. 93/95 to the Boulder City Rifle and Pistol Club range, occurs in an area currently impacted by U.S. 93/95, UPRR, the airport, sewage treatment plant, Mead Substation, rifle range, landfill, numerous dirt roads and transmission lines, and high ORV and recreational use. South of the Alternative D alignment are major transmission line corridors and associated roads, the WAPA substation facility, and numerous dirt roads supporting heavy ORV use. That portion of the alternative occurring north of the Boulder City Rifle and Pistol Club range to its convergence with U.S. 93, across the Eldorado Mountains ridgeline (Eldorado Ridge) is less disturbed desert habitat, albeit still with numerous bladed access roads and transmission tower facilities.

Constructing Alternative D without mitigation would increase the current existing habitat impacts and degradation occurring in the northern Eldorado Valley. Currently, U.S. 95 to the west and U.S. 93 to the north impact this area.

TABLE 4-6
Comparison of Habitat Impacts Associated with Constructing Various Alternative Routes of the Proposed Boulder City Corridor Project

Alternative	Acres of Habitat Disturbance
Alternative A	0
Alternative B	327 [1]
Alternative C	460 [2]
Alternative D (Preferred Alternative)	679 [3]

[1] New construction overlies existing U.S. 93 corridor. Project will disturb an estimated 90-m-wide (300-ft-wide) corridor along 15 km (9 miles) of U.S. 93 (327 acres). There is a probability of adverse impacts to desert tortoise, desert bighorn sheep, and gila monster throughout.

[2] Primary impacts accrue from 8 km (5 miles) of all new construction (242 acres). Area desert tortoise sign indicates a low-density tortoise population north and south of U.S. 93, and there is occasional desert bighorn sheep sign north of the highway. Occasional gila monsters are also probably present. Tortoise and bighorn sign is sparse along the remaining approximately 10 km (6 miles) of corridor, which generally overlies U.S. 93/95 and U.S. 93 (218 acres). Note: the estimated width of new disturbance in these sections is 90 m [300 ft]).

[3] Desert tortoise sign indicates a low-density desert tortoise population from the alignment's point of divergence from U.S. 93/95 to just beyond the junction with U.S. 95 – about 2.5 km (1.5 miles) totaling 73 acres. Tortoise sign is very sparse to absent (sandy soils around water treatment facility) in the next 6 km (3.5 miles) totaling 169 acres, but it reappears west of Buchanan Boulevard and maintains low-density average thereafter (15 km [9 miles] totaling 436 acres). Occasional bighorn sheep sign (low density) is found in the foothills just south of Railroad Pass, but it is absent from Eldorado Valley. Bighorn sign is again apparent near the rifle range, increasing from low density around the range to high density on the ridgeline approximately 4 km (2.5 miles) north, totaling 121 acres. Bighorn sign is continuously heavy through the Eldorado Mountains (5 km [3 miles] totaling 145 acres). Gila monsters may occur along the corridor (20 km [14 miles] totaling 679 acres), particularly in more upland habitats.

Impacts to local desert tortoise, gila monster, and chuckwalla populations may occur as the alignment swings south along and through the low foothills south of Railroad Pass. These same species may also be impacted by the passage of this route through the Eldorado Mountain headwater slopes, north of the Boulder City Rifle and Pistol Club range, and the Eldorado Ridge farther north. Road cuts through the latter area will require relatively shallow angle side slopes in order to prevent undue sloughing and rock fall onto the roadway. As a result, the physical imprint of construction in these areas may possibly extend beyond the permanent road corridor.

Identifying key lambing areas with certainty is somewhat problematic. However, the almost routine presence of ewes and lambs in the Black Canyon vicinity of the Eldorado Mountains certainly indicates a high probability that the area to the east of Alternative D holds suitable lambing areas. Its rugged landscape contains numerous reasonably secluded and sheltered sites that can be used as birthing sites.

Bighorn sheep habitat in the vicinity of and on the Eldorado Ridge area will be reduced by this alternative. Recent data indicate that the ridge and slopes leading into Goldstrike Canyon are favored bighorn sheep habitat (Figure 3-4B). The rugged terrain here is preferred by these nimble animals, and is also used in the east-west movements involved in the exchange of individuals between the River Mountains and the Eldorado Mountains (Cummings, NDOW, personal communication). Positioning of a new, major highway corridor through this area would contribute to the disruption of sheep movement patterns. From a broader view looking at bighorn populations in the different mountain ranges (Eldorado, River, and McCullough Mountains) impacts from the construction of Alternative D would be chiefly cumulative. As noted in Section 3.4, the existing U.S. 93 corridor as well as the development in the Hemenway Wash area have posed barriers to bighorn sheep migration routes since the mid-twentieth century at least. Construction of Alternative D (or Alternatives B or C) would contribute to this barrier, but would not create it.

4.4.2 Operational Impacts

Operational impacts consist primarily of those arising from using and maintaining the highway. They include changes imposed upon the project area simply by the ongoing physical presence of the highway itself, direct wildlife mortalities stemming from animal/vehicle impacts, other traffic-related disturbances (including increased traffic volumes, noise, trash, reduced air quality, and localized contamination of soil by highway runoff), drainage-related problems caused by the highway having modified previously existing hydrologic patterns, and the secondary effects associated with development of adjacent areas that probably would not be developed without the highway (Alternative C).

Initially, wildlife use of the project area will be changed if a new highway is built through it or the existing highway is expanded. Regardless of which alternative is selected, the new highway will accommodate increased average daily traffic volume and may increase existing negative highway/wildlife interactions, while decreasing interactions on existing U.S. 93. Without mitigation, species could suffer direct mortalities as a result of being hit by vehicles using the new roadway.

Desert bighorn sheep occurring within the project area in the vicinity of the Eldorado Mountains will continue to utilize the area, and therefore, are expected to attempt highway crossings at various points along the new roadway. The precipitous terrain in the vicinity of these crossing areas is consistent with the habitat requirements of desert bighorn sheep and makes them less vulnerable to predators. By the same token, however, the rugged terrain also makes these animals less visible to occupants in moving vehicles and more susceptible to vehicle collisions when attempting to cross the roadway in these areas.

As a group, reptile – and particularly snake – populations occupying habitats near roadways are frequent victims of highway mortalities. The poikilothermic (cold-blooded) metabolism of these predominantly nocturnal hunters often leads them to remain on the surface of a road longer than is necessary to simply cross it because they seek the warmth stored by the mass of the roadway.

Vehicle collisions with local wildlife and the proliferation of highway-related trash may precipitate an increased presence of scavenging predators, including ravens, along the new road corridor.

4.4.3 Mitigation

The mitigation measures identified in this section will be refined when detailed engineering plans are completed, providing the data needed to conduct the biological assessment of the preferred alternative. The surveys completed to date were primarily designed to illuminate differences between the alternative alignments. An in-depth biological resources survey of the preferred alternative will reveal more complete wildlife-use patterns than are currently apparent. With that knowledge, and in consultation with USFWS, NDOW, and NPS, detailed mitigation measures will be developed.

Construction Mitigation

The use of fencing and other barriers that prevent animals from entering the roadway construction corridor will mitigate impacts to local wildlife. Similarly, including structures, such as bridges and culverts that permit wildlife to safely cross over or beneath the highway at points other than where traffic grade separations are already planned, will greatly reduce the extent to which wildlife movement is disrupted.

Vegetation. Agency review and assessment of project-associated impacts to vegetation may precipitate a mitigation requirement to salvage various plants found inside the construction zone. Protected or otherwise sensitive plants will be identified and removed from the construction corridor prior to onset of construction per state and federal guidelines and methodology, as required. Salvaged plants will then be held for replanting along construction zone margins, other project-affected areas (e.g., former equipment staging grounds), or alternate lands. Plant salvage activities will probably have the greatest likelihood for success if carried out in other than the spring flowering season. Vegetation and topsoil salvage and replacement, invasive plant species control, and onsite project monitoring will be conducted as stipulated by the various federal and state agencies on lands under their regulatory jurisdiction. Agency guidelines and management practices regarding project site restoration will be implemented as required. landscaping. The potential for the introduction of noxious weeds will be reduced by the institution of a noxious weed control program that calls for construction equipment to be cleaned prior to their use on this project.

Reptiles. The primary reptile of concern in the project area is the desert tortoise. Because of its federal threatened status, prior to implementation of the preferred alternative, consultation with USFWS is required under Section 7 of the Endangered Species Act (ESA) (Musgrave et al., 1998). That consultation will be pursuant to a Biological Assessment (BA) of the preferred alternative and development of measures to mitigate impacts to the tortoise. Typical mitigation includes conducting a tortoise-specific survey across the project area, including the construction zone, equipment staging areas, and access roads. This initially entails identifying and marking all tortoise burrows within the area to be disturbed no sooner than 90 days in advance of disturbance (because tortoises are highly mobile animals and frequently construct new burrows). Each burrow is examined for resident tortoise. Empty burrows are collapsed to prevent reoccupation, and tortoise found onsite are removed and released into a suitable, empty, offsite burrow. Physically clearing tortoise from a site facing disturbance is done within 24 hours of initial construction activity. A site is not considered clear of tortoise until at least two passes are made across it without finding any new tortoise sign. Mitigation will be conducted as stipulated in the Biological Opinion (BO) for the implementation of Alternative D, issued by USFWS. Proposed specific measures to mitigate impacts to desert tortoise will be developed as part of the BA process in consultation with appropriate state and federal agencies (e.g., NDOW, NPS, and USFWS). Mitigation requirements will likely include having contractor and agency biological monitors onsite during all construction activities, and installation of tortoise-proof fencing in the construction zone. Pursuant to the Clark County MSHCP, a per-acre fee for tortoise habitat destroyed by project-associated construction will also be assessed. These fees are used to offset costs of tortoise recovery.

Avoiding these uncommonly seen lizards when they are encountered during construction can minimize gila monster losses. If the situation warrants, having them removed from the project site will prevent most avoidable lizard deaths.

Avoiding chuckwalla habitat is the best way to minimize their loss. The propensity of this lizard to hide in rock crevices and other similar shelters when approached or threatened makes it somewhat difficult to remove. However, persons trained in the habits of the animal can effectively remove them. This will be done immediately ahead of construction.

Biological monitors will greatly reduce the potential for the take of desert tortoise and species of concern on the project site.

Birds. Bird mortalities can most effectively be minimized by scheduling construction to occur outside spring and summer months in areas where resident species are found to be nesting and brooding. If such scheduling cannot be employed, then avoiding obvious nests will reduce the possibility of their being abandoned by the parent birds.

Numerous bird species are protected under the Migratory Bird Treaty Act (MBTA). It is unlawful to take, kill, or possess migratory birds as defined by the MBTA and subsequent amendments (16 U.S.C. 703-712). Potential for impacting migratory birds may occur depending on the season during which construction activities take place. Migratory birds pass through southern Nevada. Habitat for migratory birds does occur in the project area. Therefore, impacts to migratory birds may occur as a result of the proposed project. If construction occurs during the breeding season, an onsite biological monitor will survey the impacted area for nests prior to construction. If nests are encountered before or during construction, they will be avoided until the birds fledge.

Suitable burrows and other potential nesting cavities within the construction zone will be collapsed prior to the nesting season, largely preventing encounters with burrowing owls. This will be done as part of the above-described tortoise survey. If owl-occupied burrows are found during the nesting or brooding seasons (mid-March through August), they will be avoided until the young owls leave the nest or it is determined that the nesting attempt failed.

Mammals. If important bat roosts are discovered within or closely adjacent to a construction zone, they will be avoided until the animals naturally vacate the site. Bat surveys conducted prior to the start of construction activities will ensure suitable bat habitat is avoided. This may require delaying intended construction for a several-month period. Certain types of bat refuges, such as geothermally warmed sites used as winter roosts by nonhibernating California leaf-nosed bats, may be candidates for complete avoidance. Although such habitats are unusual, certain naturally occurring caves, and even some abandoned mines, can provide the necessary temperature regimes. Continued presence of such features is critical to maintaining some local bat populations.

Adequately addressing bighorn sheep movement patterns is an important biological resources issue for all build alternatives. Adverse impacts to bighorn sheep can be avoided by are best avoided avoiding their habitat, which is not feasible under any of the build alternatives. Adverse impacts to bighorn sheep can be reduced by avoiding their habitat during late-term pregnancy, lambing, and early rearing seasons (spring and summer months).

Potential bighorn sheep crossing areas have been identified, chiefly in the Eldorado Ridge area (see Figure 3-4B), but also in the vicinity of Railroad Pass. Prior to final design and location of any potential bighorn sheep crossings, the highway section occurring in sheep habitat will be walked with NDOW, NPS, and USFWS biologists to evaluate and select appropriate construction-phase mitigation measures. Current and past agency data specific to Eldorado Mountain bighorn sheep populations, as well as on-the-ground field data and observations, will be evaluated and utilized in the selection of crossing sites and other mitigation.

Operational Mitigation

Impacts to wildlife will be mitigated through proper maintenance of wildlife fencing and crossing points. Keeping the highway free of trash through a trash collection program, and eliminating unnecessary lighting and other attractants will help prevent wildlife entry onto the highway. Signs alerting drivers to possible presence of wildlife will be installed as appropriate.

Because bighorn sheep frequently use ridges and canyons as travel routes, standard cut-and-fill construction techniques through the steep, high-relief terrain found in the eastern portion of this project area could potentially create a barrier to sheep movement. To reduce the possibility of an increase in the rate of mortalities from attempted highway crossings, and to reduce adverse population impacts from an additional highway barrier further reducing contact between bighorn populations, features allowing movement of sheep across the new highway will be included in final project design. These features will include bridges and, where appropriate, large-size culverts. In consultation with NDOW and EPA, FHWA and NDOT have identified a number of crossing locations and structures for bighorn sheep as well as other wildlife along the route of the preferred Alternative D (see Figure 4-3).

Culverts. Box-culvert crossings are to be constructed below grade to allow their floors to be filled with soils similar to those of the surrounding habitat. Each will have wildlife fencing designed to facilitate its use as a crossing by wildlife such as the desert tortoise by directing animals to its openings. Their location will include:

- The planned recreational access crossing east of the Mead Substation. A multi-use earth-fill box culvert will be constructed for recreational access and wildlife crossing to the Eldorado Valley south of the alignment.
- At waters of the U.S. crossings D-8 and D-9, earth-fill box culverts will be constructed to cross these dry arroyos.
- At waters of the U.S. crossing D-10, two earth-fill box culverts will be constructed.
- In the vicinity of the eastern project limits at the Nevada Interchange (Figure 4-3), an earth-fill box culvert will be constructed to perpetuate the crossing established as part of the Hoover Dam Bypass project. Fence materials and construction in this bighorn use area will conform to NDOW and NPS standards for ungulate fencing.

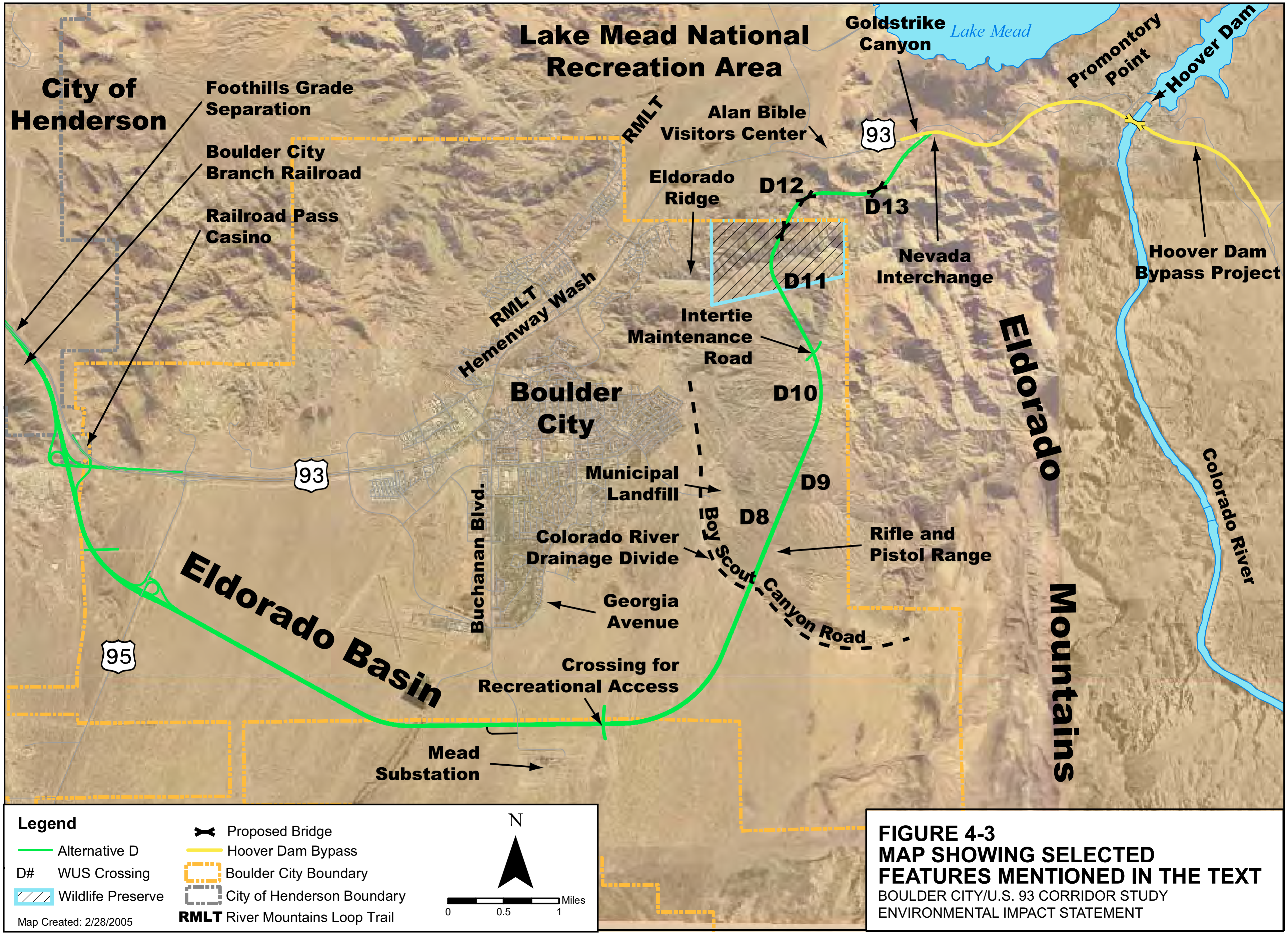

FIGURE 4-3
MAP SHOWING SELECTED FEATURES MENTIONED IN THE TEXT
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

LAS155933.ED.EI.FE Figure 4-3 3/05

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Bridges. The ruggedness of the Eldorado Ridge vicinity is a main reason that bighorn sheep frequent the area, and it also lends itself to the construction of larger spans more suitable for bighorn crossings. Bridges are proposed for the following locations; in some cases providing wildlife crossing as well as avoidance of a tributary representing a jurisdictional water of the U.S. (see Section 4.6). Fencing in proximity to the structure will be located to direct wildlife through the structure openings. For these structures, fence materials and construction will conform to NDOW and NPS standards for ungulate fencing. Bridge under-crossing locations will include the following:

- At the Intertie Maintenance Road north of the Boulder City Rifle and Pistol Club (Figure 4-3), spanning the existing dirt road.
- At a relatively deep canyon immediately north of the Eldorado Ridge.
- At waters of the U.S. crossings D-12 and D-13.

Other Mitigation Measures. Maintaining natural lighting to the extent possible, rather than providing for excessive electrical lighting of the highway will help lessen intrusive, nighttime glare that extends into adjacent lands and interferes with routine activities of nocturnal animals. Reliance on natural lighting will also reduce the attraction of the highway to wildlife, thereby decreasing highway-related wildlife mortalities.

Highway design will incorporate sufficiently long sight distances on curves to allow drivers ample time to see and safely react to wildlife that enters the travel corridor. Design should also be flexible enough to avoid impacting, to the extent practicable, any particularly sensitive wildlife areas identified.

Use of a vegetation- and wildlife-friendly design, in concert with appropriate maintenance procedures, will continue to help reduce adverse impacts to local biota over the life of this highway. The NDOT is a responsible party under the *Clark County Multiple Species Habitat Conservation Plan* (MSHCP) and Section 2.8.9.2 of the MSHCP lists the conservation measures that NDOT is undertaking under that plan. NDOT is committed to follow-through on its conservation measures under this MSHCP, not only as they apply to species specifically noted in the MSHCP (e.g., the desert tortoise, chuckwalla, and certain bat species), but also as they apply to the ecosystem that supports wildlife. The following lists those NDOT conservation measures in the MSHCP that, when applied to this project and not duplicating actions listed above, constitute additional mitigation measures:

- Measure NDOT(6). Compile an inventory of all culvert/bridge crossings and tortoise fencing within the permit area. NDOT will include in its inventory of culvert/bridge crossings those to be constructed as part of the build-out of Alternative D, as well as tortoise fencing that may be installed.
- Measure NDOT(7). Complete the NDOT land disturbance/take form when land disturbance/takes occur. The NDOT land disturbance/take form(s) completed pursuant to the implementation of this project will be included in the regular reports supplied to the USFWS and Clark County.

- Measure NDOT(17). Ensure new roadside structures are designed and constructed to prevent animals from becoming trapped. New roadside structures erected as part of this project will be designed and constructed in such a fashion as to prevent wildlife from becoming trapped by or in them.
- Measure NDOT(23). Install movement directing devices in conjunction with highway/ roadway protective fencing. Fencing in the vicinity of wildlife crossings will be designed in such a fashion as to direct wildlife to those crossings. Other culverts and crossing will be installed with the appropriate wildlife fencing (i.e., desert tortoise fencing) to reduced the impacts of habitat fragmentation.
- Measure NDOT(24). Ameliorate existing, or install new, under-road culverts to allow passage of terrestrial species. Under-road culverts, wildlife fencing, and other measures installed during the construction of Alternative D will, to the maximum extent possible, be designed and constructed to facilitate the passage of terrestrial species.

Development and Implementation. The FHWA and NDOT will involve NPS, NDOW and other affected agencies in reviews of wildlife crossings during final design development. At that time those agencies will be afforded the opportunity to provide input regarding the efficacy of these designs to meet NDOT's MSHCP commitments. In addition, it is anticipated that other mitigation measures will be identified in consultation with these agencies and the USFWS during the preparation of the Biological Assessment (BA) for this project (see below). In addition, measures to address cumulative impacts to bighorn sheep populations will be implemented, as described in Chapter 6.

4.4.4 Agency Permits and Reviews

Because a formally listed species – desert tortoise – resides within the proposed project area, and because this project receives federal (FHWA) funds, a BA that includes data from the survey of biota and habitat values along the preferred route of the project (Alternative D) will be assembled to establish the extent to which tortoise (and other protected or sensitive species) will be subject to impact. A tortoise-specific survey will be conducted as part of the BA. As required under Section 7 of the ESA (Musgrave et al., 1998), a report of the assessment effort will be submitted to USFWS as part of the formal consultation process. Upon reviewing the BA, USFWS will issue its BO describing impacts to the tortoise expected to accrue from project construction. USFWS will also stipulate required and/or suggested mitigation designed to offset those impacts. If handling and/or moving tortoise is a mitigation measure, the BO will serve as the authorizing document.

Formal tortoise surveys incorporate a search pattern using more narrowly spaced transects (10 m [32 ft] or less) to ensure complete visual coverage of the area being examined and to facilitate identification of all tortoise sign thereon. If removal of tortoises from the survey area is required to mitigate project impacts, multiple passes across the area to be cleared are necessary to assure no tortoises are overlooked. Tortoise surveys must also be conducted within 90 days of actual construction.[1] Finally, to minimize the chance of tortoise

[1] Because of the dynamic nature of tortoise populations, USFWS, the agency charged with enforcing the ESA, typically considers results of a formal tortoise survey as valid for no more than 90 days.

reoccupying a construction site after having been removed, tortoise clearance must typically be completed within 24 hours of site disturbance (i.e., initial clearing and grubbing).

As described above, NDOT and FHWA will continue to consult with state agencies, such as NDOW, and other federal agencies, such as NPS and BLM, on mitigation for impacts to species managed by them. Necessary permits to handle and/or remove affected species will come from those agencies.

4.5 Water Resources

4.5.1 Environmental Impacts

Construction Impacts

Construction impacts of the three build alternatives center around the effects on the water quality of stormwater runoff and the potential for erosion. This section evaluates the effects of the construction of a new facility in the project area on the overall water quality, potential permitting requirements and other necessary regulatory compliance, and provides an evaluation of erosional effects.

Stormwater Runoff Quality Impacts for Build Alternatives. Water quality in the desert washes that drain the project area would be impacted, and may degrade, during construction of the build alternatives. Events such as the accidental discharge of waste products created during construction are of primary concern. Equipment that is operated in the vicinity of washes within the construction area may leak various petroleum compounds and contaminate small areas of the work site. In addition, staging areas utilized for the fueling of equipment are also subject to this risk.

Other concerns for discharge of hazardous materials that might degrade water quality include areas set aside for the cleaning of equipment over the course of the construction period. Elevated levels of phosphates, as well as suspended and dissolved solids, are water quality parameters of concern for the build alternatives. When combined with surface runoff, these compounds could be discharged to nearby receiving waters (Lake Mead or the Colorado River). The travel time for these contaminants is potentially short, on the order of minutes until reaching the terminus. Figure 4-4 shows an existing wash and crossing of existing U.S. 93 that conveys stormwater directly into Hemenway Wash and travels approximately 8 km (5 miles) before emptying into Lake Mead.

The most rapid discharge of stormwater to receiving waters (Lake Mead and/or the Colorado River) potentially poses the greatest risk, in terms of water quality degradation from unintended waste discharges. Alternatives B and C would have the same travel times and would have identical potential water quality effects on Lake Mead. The average time to reach the receiving water for both Alternatives B and C wash crossings is 3.5 minutes shorter than the average time for the Alternative D wash crossings. This is partially attributed to the fact that the Alternatives B and C drainages are shorter in distance to the receiving waters than those of Alternative D. Although the average construction slopes are steeper for Alternative D, larger average channel width and natural composition

(Alternatives B and C contain some concrete channel drainages) help in slowing down the average stormwater flows. Therefore, because Alternatives B and C retain runoff a shorter time from the receiving water, the two alternatives have a potentially greater negative impact to surface water quality.

Erosion Impacts for Build Alternatives. The erosional effects of the build alternatives would be primarily from activities such as the construction of new and temporary channels, and access roads around the new facility, as well as modifications to the landscape and grading of the soil in the vicinity of the new facility. New cut and fill slopes would erode by a combination of sheet and concentrated flow, and the eroded material would likely be transported downslope into the drainage system and eventually the receiving waters. This would potentially have negative impacts on both Lake Mead and Colorado River water quality.

Table 4-7 compares the magnitude of cuts and fills required for the build alternatives. Details of the profiles of these alternatives can be found in the *Boulder City/U.S. 93 Corridor Study Preliminary Engineering Report* (NDOT, November 2001). Based on preliminary geotechnical analysis, construction cuts in rocky areas in excess of 25 m (80 ft) in height would require the use of a "bench" or catchment area at the base of the cut to prevent falling rocks and debris from entering the roadway. Additionally, cuts in areas with suitable rock material could be constructed at a slope of 1:1 or steeper, which unless properly engineered could be more susceptible to erosion. Table 4-7 demonstrates that the preferred alternative (Alternative D) would have a substantially greater overall length of deep cuts along its alignment than Alternatives B or C.

TABLE 4-7
Comparison of Cut and Fill Depths for Build Alternatives

Build Alternative	Deepest Cut (m/ft)	Largest Fill Depth (m/ft)	Length (m/ft) along Alignment Centerline with Cut Depth > 25 m (80 ft)
Alternative B	30 m/98 ft	15 m/49 ft	30 m/98 ft
Alternative C	30 m/98 ft	15m/49 ft	30 m/98 ft
Alternative D (Preferred Alternative)	70 m/230 ft	30 m/98 ft	630 m/2,065 ft

In general, steeper grades in construction zones and of constructed facilities pose greater erosion potential. Table 4-8 compares the steepest roadway grades of each alternative and the total length of these grades. Additional details of the roadway grades for the alternatives can be found in the *Boulder City/U.S. 93 Corridor Study Preliminary Engineering Report* (NDOT, November 2001). Table 4-8 demonstrates that Alternative D has both the steepest maximum grade (6.0 percent) as well as the greatest total length of steep grades of all the alternatives in the study.

FIGURE 4-4
ALTERNATIVE C
WASH CROSSING C-1
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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TABLE 4-8
Comparison of Steepest Grades for the Project Alternatives

Alternative	Steepest Grade	Length of Steepest Grade (m/ft)
Alternative A (existing U.S. 93)	5.5%	800 m/2,625 ft
Alternative B	5.7%	1,250 m/4,100 ft
Alternative C	5.7%	1,500 m/4,920 ft
Alternative D	6.0%	4,200 m/13,780 ft

Therefore, of the three build alternatives, construction of Alternative D would have the most negative water quality impact with respect to erosion potential for the following reasons:

- The alternative would have substantially steeper grades, specifically in the eastern half of the alignment through the Eldorado Mountains
- The alternative would require a larger number of new utility access roads to maintain access to power line facilities and other utilities in the vicinity
- The alternative would have more cut and fill and continuous steep slopes along the sides of the new roadway that have a tendency to erode and deposit into drainage channels

Operational Impacts

The long-term operational effects of construction of a build alternative on the water resources of the project area consider the impact of contaminant runoff and erosion throughout the life of the new facility. This includes water quality impacts as a result of accidental contaminant material or waste discharge, the redirection of stormwater runoff (necessitated by channelization and grading of the terrain), and the continuous erosion of adjacent land areas.

Stormwater Runoff Quality Impacts for Build Alternatives. Water quality in the desert washes that drain the project area will be impacted and may degrade during operation of the build alternatives. Discharge from culverts and roadway channels will continue to flow into the Colorado River, Lake Mead, or the Dry Lake Basin and will often contain chemicals, such as greases and oils from automobiles and trucks on the new facility, and trash discarded from vehicles and along the roadside. Chemical spills resulting from vehicle accidents are also a possible source of water quality degradation.

Consistent monitoring and water quality data is not kept for the washes that flow into the receiving waters in the project area. Nevertheless, it can safely be assumed that the water quality of existing stormwater runoff is somewhat degraded due to the existence of urban development in the project area and potential contaminants resulting from highway runoff. However, the short-term impacts to water quality of the Colorado River and Lake Mead are expected to be minimal during the operation of the facility than during construction, assuming proper mitigation measures are implemented in the design and construction of the facility.

In general, Alternatives B and C would have a slightly greater impact than Alternative D due to their closer proximity to receiving waters and the shorter travel times of contaminants carried in the surface runoff. However, Alternative D would result in greater impacts to water quality with respect to bridge-generated runoff. If this alternative were identified as the preferred alternative, further design would determine bridge runoff mitigation measures. In the eastern end of the alignment, there are a number of large bridge structures along the alternative that cross wide canyons, where stormwater runoff eventually reaches either the Colorado River or Lake Mead.

Erosion Impacts for Build Alternatives. The erosional effects of the build alternatives do not have as widespread an impact when considering only permanent, postconstruction effects on water quality, as the temporary facilities that can lead to short-term erosion are no longer in place. Similar to construction impacts, however, Alternative D would result in potentially greater impact on water quality due to erosion.

The continuous steep slopes associated with the roadway profile of the eastern portion of Alternative D would generate sedimentation from those slopes and the associated channels and culvert crossings of the new roadway, without mitigation measures for erosion prevention. In general, exposed cut and fill slopes would continue to erode throughout the life of a facility in the absence of stabilization by vegetative or mechanical means, and the degree of sediment production would be highest for Alternative D because of the substantially greater slope area.

No Build Alternative. The No Build Alternative (Alternative A) would also have an operational impact on the overall water quality of the project area. The deterioration of water quality would be attributed to natural conditions of erosion and drainage of contaminants along the existing roadway, exacerbated by a forecasted increase in traffic in the design year.

4.5.2 Mitigation Measures

Construction Mitigation

Construction of any of the build alternatives, including the preferred alternative, will require acquisition of a National Pollutant Discharge Elimination System (NPDES) Construction General Permit from the State of Nevada (assuming that greater than 5 acres of existing drainage is disturbed), to outline requirements for monitoring and maintaining water quality in surface runoff to the affected environment. The terms and conditions written in the permits will limit discharge of pollutants and set water quality standards that will be implemented and enforced throughout construction of the project. Additionally, periodic inspection for compliance with these standards will be required as a condition of this permit.

Stormwater Pollution Prevention Plan. As part of the NPDES permit requirements, a site-specific Stormwater Pollution Prevention Plan (SWPPP) will be needed for the project. The SWPPP is the tool used to control the discharge of pollutants into the stormwater runoff and is geared toward the requirements of the Nevada general stormwater permit. It will include, at a minimum, the following items:

- A detailed site description, which includes a description of the nature of the construction activities
- A description of the sequence of intended major soil disturbing activities
- Estimates of total area of the site and total area of the site to be disturbed
- An estimate of the runoff coefficient of the site during both pre- and postconstruction phases, as well as data describing the soil or quality of any discharge leaving the site
- A general location map and a site map showing the following:
  - Drainage patterns and approximate slopes expected after major grading operations
  - Locations of major structural and nonstructural controls
  - Locations of stabilization practices
  - Locations of offsite materials, waste, borrow, or equipment storage areas
  - Location of surface waters and where stormwater discharges to those surface waters
- The location and description of any discharge associated with industrial activity other than construction
- A description of measures that will be implemented as part of the construction activity to control pollutants in stormwater discharges
- A description of specific stormwater controls, such as detention basins, infiltration basins, swales, rip-rap, or retaining walls.
- A description of planned maintenance activities that will be necessary to keep erosion and sediment control measures identified in the SWPPP in effective operating condition
- A description and record of the inspection of erosion and sediment control devices, the disturbed areas of the construction site, equipment and material storage areas, and the construction entrance and exit points
- A description of all nonstormwater-related discharges associated with construction activity, such as dewatering, and a description of the pollution prevention measures to control these discharges

Best Management Practices. Construction mitigation will require the adoption of BMPs for improvements with respect to water quality at the construction site. The State of Nevada's Handbook of Best Management Practices (State Conservation Commission, not dated) shall be utilized as a guidance document for implementing appropriate BMPs. In addition, the Las Vegas Valley 208 Water Quality Management Plan, as amended (Watson, 1997), shall also be consulted to identify appropriate BMPs for implementation. The SWPPP will include a commitment to revise the BMPs whenever they are found to be deficient.

Following are BMPs for maintenance of water quality during construction of the build alternatives.

- Construction equipment must be cleaned on a regular basis to minimize potential deposition and runoff contamination from petroleum-based chemicals. To accomplish this BMP, the equipment must be inspected daily for leaks and repaired immediately upon discovery of a leak.

- Designated locations shall be provided for servicing, washing, and refueling of equipment, away from temporary channels or swales that would quickly convey runoff to the drainage system and into a receiving water.
- Contaminated material shall be kept at a safe distance (a minimum of 30 m [100 ft]) from an entry into the drainage system. Temporary barriers and containers are required to confine the contaminated materials. Upon completion of construction, all contaminated material on the construction site must be removed and disposed of in accordance to federal, regional, and local regulations. A spill response, containment, and cleanup plan will be developed and implemented
- A temporary spill containment system shall be installed and maintained directly north of the Alternative B or C alignments within Hemenway Wash, east of Lakeshore Road to approximately the Hacienda Hotel and Casino. At this point, the northern limits of cut and fill are the closest to a receiving water of any alignment at any other location (approximately 300 m [1,000 ft]). In addition, the slope continuously descends to the lake from this area.
- If construction of temporary access roads produces a channel that contains a path of least resistance to a major drainage, a silt barrier shall be placed and maintained to trap sediment before it flows with surface runoff to offsite channels. Trapped sediment and debris that accompanies it shall be taken offsite before the barrier is removed after completion of construction. Where needed, small basins to trap sediment with surface runoff and to detain it during the construction period will be installed.
- Fugitive dust from construction activities, unpaved and paved roads, wind erosion of disturbed surfaces, etc., shall be controlled by implementing the following, or similar, BMPs:
  - Apply EPA-approved nontoxic chemical soil stabilizers to all inactive construction areas (i.e., previously graded areas inactive for more than 5 days).
  - Water active grading areas at least twice daily during the dry season.
  - Suspend all excavation and grading operations when constant wind speeds are measured to be at least 40 km/h (25 mph) or if instantaneous wind speeds (gusts) are measured to be at least 64 km/h (40 mph). Wind speeds shall be determined at the DAQEM air quality monitoring station in Boulder City. Suspension shall be ongoing until 1 hour after the wind speed falls below the constant or gust maximum.

Operational Mitigation

Operational mitigation will minimize the effects of erosion and sedimentation that are likely to result from changes to the terrain upon completion of any of the proposed build alternatives, including the preferred alternative. In addition, mitigation measures will be required to protect against surface runoff contamination from spills on the new road, requiring treatment of possible contamination to maintain current levels of water quality.

One BMP required for the build alternatives consists of stabilizing soil along the banks of drainage channels at roadway crossings to prevent erosion and sediment deposition.

Soil stabilization may be accomplished using measures such as erosion-control blankets, which are effective in reducing erosion that occurs upon heavy precipitation. Erosion-control blankets are installed to cover bare soil. The blanket stabilizes the soil and protects it from wind erosion, thereby reducing the potential for the introduction of sediment into stormwater runoff. The blanket shall be composed of natural material, such as straw, wood excelsior, or coconut fiber for biodegradability in the desert environment.

The following specifications apply for an erosion-control blanket:

- All rocks, clods, debris, and vegetation shall be removed to ensure full contact between the blanket and the soil surface
- The blanket shall be anchored to the soil using metal wire staples as specified in the special provisions or recommended by the manufacturer

Other soil stabilization and offsite water quality controls will be developed during the design phase, consisting of plans and specifications for:

- Stabilization of cut-and-fill slopes through replacement of conserved topsoil, boulders, and vegetation previously stripped from cuts
- Permanent sediment basins to treat runoff before discharge and for containment of hazardous material spills
- Retaining walls and other structures, rather than cut-and-fill slopes, at specific locations depending on hydraulic analysis to reduce runoff velocities and erosion potential
- Erosion-resistant drainage channels and energy-dissipating structures at all culverts where discharge velocity will cause downstream erosion

Unavoidable Adverse Impacts

Constructing the roadway will increase both short-term and long-term sediment yields over existing conditions. Removing existing vegetative and rock cover will disturb existing conditions, increasing the sediment yield and impacting local, and to a lesser extent, regional water quality. However, implementation of the measures outlined in the SWPPP, in accordance with the NPDES Construction General Permit, coupled with an effective program to implement and monitor BMPs and other measures to minimize harm, is expected to reduce the long-term impacts to water quality.

4.5.3 Agency Permits and Reviews

Prior to obtaining an NPDES Construction General Permit for the project, a NOI will be filed with the BWQP. A SWPPP will accompany the NOI. A copy of the project FEIS will also be provided to facilitate agency review and processing of the permit.

4.6 Wetlands/Waters of the U.S.

Following verification and delineation of the waters of the U.S. crossings, an estimate of impacted area was produced for each of the crossings. Figure 4-5 shows a sketch of wash crossing C-7 (see Figure 3-7), a crossing consisting of two distinct channels separated by a raised natural "island," both conveying surface runoff into a culvert that passes under existing U.S. 93. Approximate limits of cut and fill for Alternative C are shown in this figure, and the area of impact is calculated from the dimensions shown.

Some of the wash crossings on Alternative D (the preferred alternative) were not accessible during the field investigation for delineation due to exceptionally rugged terrain. For these crossings, a mapping evaluation of the impacted area was performed, using the contours generated during the detailed mapping phase of the project and a similar estimation of limits of cut and fill for each crossing. Figure 4-6 depicts a sample mapping evaluation of wash crossing D-11. In addition, some of the wash crossings of Alternatives B and C, in the alluvial fan area, were map-delineated.

4.6.1 Construction Impacts

Without mitigation, construction impacts could include disturbance of soils in areas where roadways, culverts and bridges are built; where access roads are needed; in construction staging areas; and in areas where material stockpiling will occur. Siting these construction areas near waters of the U.S. could cause discharge of hazardous materials into the washes or accelerate erosion. It is assumed that all stockpiled material would be removed following construction. Permanent impacts to waters of the U.S. result from the roadway, bridge and drainage structures (including limits of cuts and fills) constructed within the NDOT right-of-way.

An offset line located 60 m (200 ft) from the centerline on each side of the alignments is used to quantify construction (temporary and permanent) impacts for most of the crossings. In most cases, this offset line extends beyond the limits of cut and fill, which is used to quantify operational (permanent) impacts. However, in some sections along the proposed alignments, there are larger areas of cut or fill (such as Alternative D through the Eldorado Mountains). At wash crossings within those areas, the limit of construction impact would extend beyond the 60-m (200-ft) allowance to the actual cut or fill limit, and the construction impact area would be equal to the operational impact areas.

Figures 3-6 and 3-7 show the impact of the three build alternatives on blue line streams denoted as waters of the U.S. Tables 4-9, 4-10, and 4-11 identify the potential acreage of fill area required for these waters at the crossings of Alternatives B, C, and D, respectively.

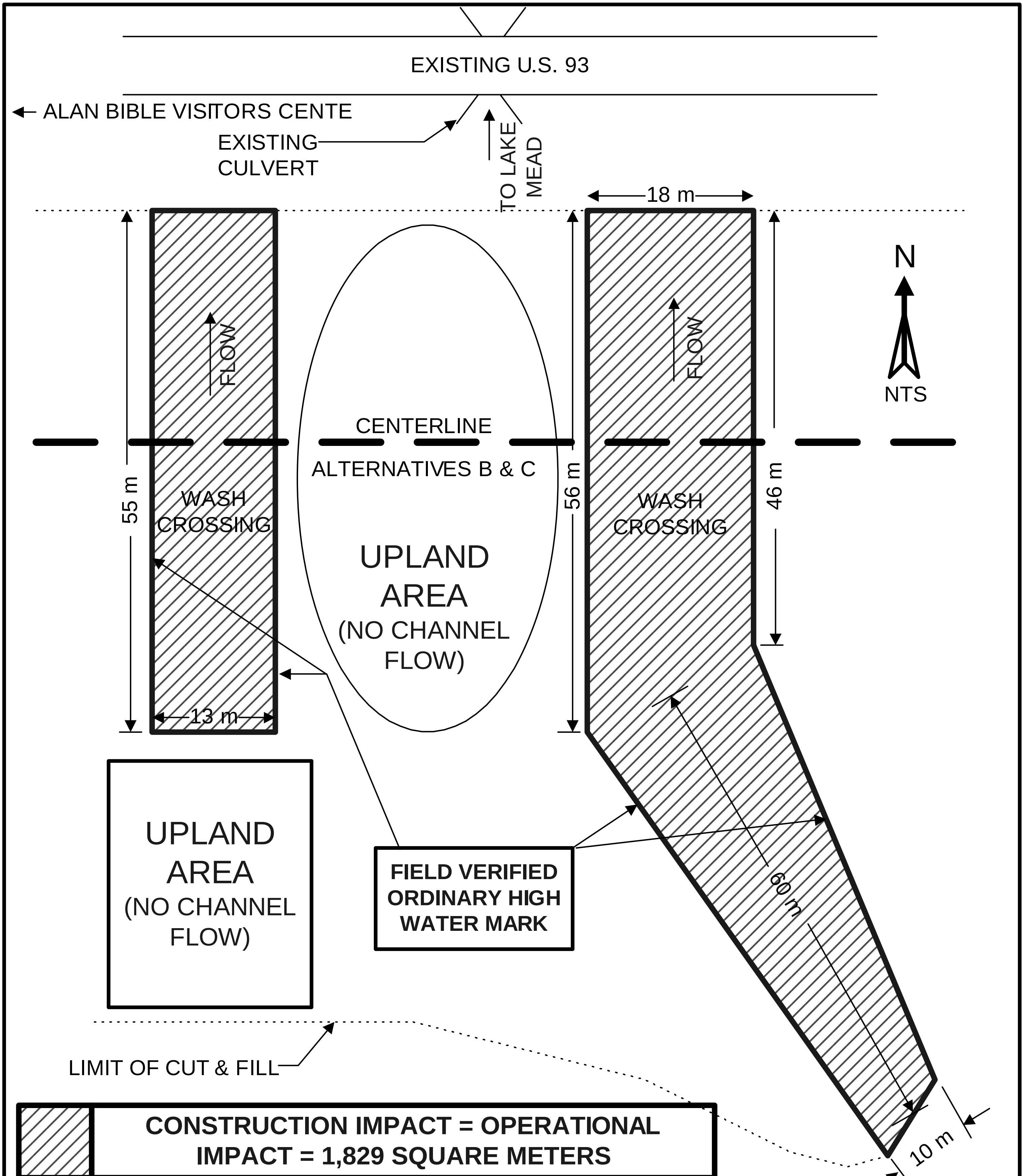

FIGURE 4-5
URISDICTIONAL WATERS OF THE U S
FIELD DELINEATION WASH CROSSING C-
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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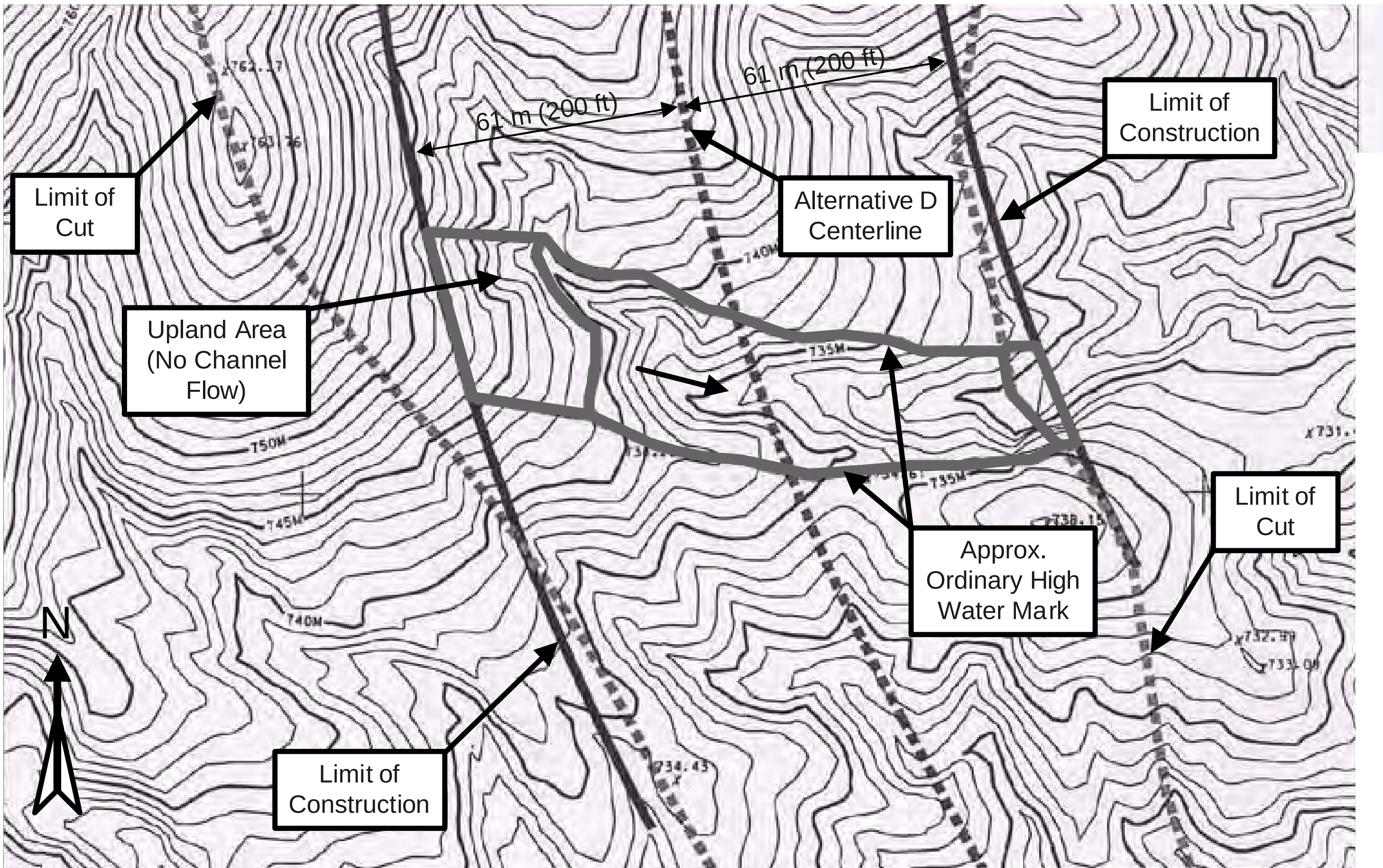

Construction Impact Area = 3,950 m^2	Operational Impact Area = 2,971 m^2
<u>Calculation Process</u> 1. Western boundary is the 61-meter (200-foot) offset from the Alternative D centerline (limit of construction). 2. Northern and southern boundaries are the approximate ordinary high water marks (estimated using contours). 3. Eastern boundary is the 61-meter (200-foot) offset from the Alternative D centerline (limit of construction).	<u>Calculation Process</u> 1. Western boundary is the beginning of the upland area where there is no channel flow. 2. Northern and southern boundaries are the approximate ordinary high water marks (estimated using contours). 3. Eastern boundary is the limit of cut.

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

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Alternative B

As shown in Figures 3-6 and 3-7, the Alternative B centerline is approximately within the existing U.S. 93 corridor as it pertains to impacts to waters of the U.S. Because the drainages along the alignment west of Buchanan Boulevard (Figure 3-6) all convey stormwater to the Dry Lake Basin south of Boulder City (not a navigable water), the impacts to waters of the U.S. are limited to the “disjunct” jurisdictional waters (see Section 3.6). East of Buchanan Boulevard, all waters of the U.S. drain to the navigable Lake Mead.

Table 4-9 depicts the potential construction-related impacts on waters of the U.S. (separated into isolated and navigable water tributaries) at the various crossings of Alternative B. Wash crossings that are closer to existing U.S. 93 tend to have a smaller degree of impact than those that are further away from the existing alignment and into steeper and more rugged terrain. Without use of BMPs, discarded materials, such as waste byproducts of construction activities and sediment from construction disturbance, may be washed into these drainages, impacting the overall system.

TABLE 4-9
Construction Impact Area for Waters of the U.S. Crossings – Alternative B

Water of the U.S. Crossing	Method of Delineation	Designation	Construction Impacts Affected Area (m^2)	Construction Impacts Affected Area (acres)
B-1	Mapping	Isolated	5,254	1.30
B-2	Mapping	Isolated	1,300	0.32
B-3	Field	Jurisdictional	2,304	0.57
B-4	Field	Jurisdictional	915	0.23
B-5	Field	Jurisdictional	8,166	2.02
B-6	Field	Jurisdictional	2,502	0.62
B-7	Field	Jurisdictional	297	0.07
B-8	Field	Jurisdictional	297	0.07
B-9	Field	–	Wash obstructed[1]	Wash obstructed
Total Impact			21,035	5.20
Total Jurisdictional Waters Impacted	–	–	14,481	3.58

[1]Wash B-9 has been obstructed due to construction of the wastewater treatment facility and no longer conveys stormwater in the path of the blue line stream.
m^2 – square meters

Because this alternative would widen the existing facility, a fully lined concrete channel on the north side of U.S. 93 through Hemenway Wash from Lakeview Drive to Pacifica Way would require relocation a few meters to the north. Relocation of portions of this channel for widening U.S. 93 would not result in placement of fill in the channel; thus, the constructed channels are not included with the desert washes impacted.

Note that Wash B-9 (see Figure 3-7) has not been considered in the analysis of potential impacts to waters of the U.S. in the calculations of construction impacts in Table 4-9. This is because the wash has been cut off by construction of a small wastewater treatment facility, which services the Hacienda Hotel and Casino to the north of existing U.S. 93 (Figure 4-7). Stormwater flows off the mountains to the south and runs by sheet flow through the treatment facility area. No outlet was found for the stormwater in this area; therefore, a determination of "no impact" was made.

Alternative C

The washes impacted by Alternative C are the same as those of Alternative B, as the alignments share the same centerline through most of Hemenway Wash to the eastern study limits. Table 4-10 displays the impact area for Alternative C, for both isolated and navigable waters. (See Figures 3-6 and 3-7 for locations of Alternative C wash crossings.)

Alternative D (Preferred Alternative)

Impacts during construction of Alternative D would cover a larger area and produce a greater amount of potential fill into waters of the U.S. (see Table 4-11) than Alternatives B or C. This is because as the alternative passes through the southern foothills and into the Eldorado Mountains, there will be a need for larger cuts and fills in the vicinity of the major wash crossings (and greater limits of cut and fill – some in excess of the 60 m (200 ft) of assumed construction impacts). These larger cut-and-fill areas were included in the analysis of construction impacts. Note that Crossing D-1 runs parallel to an existing wash for approximately 500 m (1,600 ft), producing a large impact on this isolated drainage.

TABLE 4-10
Construction Impact Area for Waters of the U.S. Crossings – Alternative C

Water of the U.S. Crossing	Method of Delineation	Designation	Construction Impacts Affected Area (m^2)	Construction Impacts Affected Area (acres)
C-1	Mapping	Isolated	6,789	1.68
C-2	Field	Isolated	1,300	0.32
C-3	Field	Jurisdictional	985	0.24
C-4	Field	Jurisdictional	2,304	0.57
C-5	Field	Jurisdictional	915	0.23
C-6	Field	Jurisdictional	8,166	2.02
C-7	Field	Jurisdictional	2,502	0.62
C-8	Field	Jurisdictional	297	0.07
C-9	Field	Jurisdictional	297	0.07
C-10	Field	–	Wash obstructed[1]	Wash obstructed
Total Impact			23,555	5.82
Total Jurisdictional Waters Impacted	–	–	15,466	3.82

[1]Wash C-10, also designated as Wash B-9 for Alternative B, has been obstructed due to construction of the wastewater treatment facility and no longer conveys stormwater in the path of the blue line stream.

FIGURE 4-7
WASH CROSSING B-9 (CUTOFF AT WASTEWATER TREATMENT FACILITY) LOOKING NORTH - ALTERNATIVES B AND C
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Several of the crossings for the southern alignment will require bridges over canyon washes that convey stormwater through the Eldorado Mountains. It is assumed in this study that bridge construction will also result in construction impacts and permanent fill into waters of the U.S. Structural piers, retaining walls, and abutment excavation associated with bridge construction will produce these impacts. The United States Army Corps of Engineers (USACE) has visited the project area, has reviewed the EIS technical studies, and has concurred with the designation of jurisdictional waters of the U.S. (See comment letter A6, Volume II). Drainages of the Eldorado Valley that terminate in the dry lake to the south of the study area are not jurisdictional waters of the U.S. Those generally to the southeast and east of Boulder City and that drain to either Lake Mead or to the Colorado River are waters of the U.S. In addition, the wetlands below the Boulder City wastewater treatment plant are not self-supporting; therefore, they are not jurisdictional wetlands.

TABLE 4-11
Construction Impact Area for Waters of the U.S. Crossings – Alternative D (Preferred Alternative)

Water of the U.S. Crossing	Method of Delineation	Designation	Construction Impacts Affected Area (m^2)	Construction Impacts Affected Area (acres)
D-1	Mapping	Isolated	21,139	5.22
D-2	Field	Isolated	937	0.23
D-3	Mapping	Isolated	2,114	0.52
D-4	Mapping	Isolated	2,842	0.70
D-5	Mapping	Isolated	2,684	0.66
D-6	Field	Isolated	1,300	0.32
D-7	Field	Isolated	817	0.20
D-8	Field	Jurisdictional	2,861	0.71
D-9	Field	Jurisdictional	3,270	0.81
D-10	Mapping	Jurisdictional	5,945	1.47
D-11	Mapping	Jurisdictional	3,950	0.98
D-12[1]	Mapping	Jurisdictional	0	0.00
D-13	Mapping	Jurisdictional	6,968	1.72
Total Impact	–	–	54,827	13.54
Total Jurisdictional Waters Impacted	–	–	22,994	5.68

(1) Originally identified in the DEIS as a crossing where fill would be required, subsequent engineering analysis has led to the conclusion that a bridge will be placed here, resulting in a spanning of the wash crossing and no construction impact to jurisdictional waters.

No Build Alternative

The No Build Alternative (Alternative A) would have no impact on existing waters of the U.S. The drainage system along existing U.S. 93 would remain the same and only naturally occurring modifications to drainage systems (due to erosion and other minor earthen modifications) would occur.

Overall Evaluation of Construction Impacts

Table 4-12 compares the alternatives with respect to construction impacts on jurisdictional waters of the U.S. Alternative D would have greater temporary, construction-phase impact on waters of the U.S. crossings than Alternatives B or C, although the difference would be less than 2.1 acres.

TABLE 4-12
Construction Impact Area for Waters of the U.S. Crossings – Comparison of Build Alternatives

Build Alternative	Jurisdictional Waters of the U.S. Construction Impacts Affected Area (acres)	Total Waters Construction Impacts Affected Area (acres)[1]
Alternative B	3.58	5.20
Alternative C	3.82	5.82
Alternative D	5.68	13.54

[1] Includes isolated, non-jurisdictional waters.

4.6.2 Operational Impacts

Build Alternatives

Waters of the U.S. impacts during operation of the three build alternatives are shown in Tables 4-13 through 4-15. The impacted areas are smaller for most of the crossings because the limits of impact do not include construction areas for access, staging, and material stockpiling. Waters of the U.S. impacts are measured using the OHWM and the limits of cut and fill at the individual crossings.

TABLE 4-13
Operational Impact Area for Waters of the U.S. Crossings – Alternative B

Water of the U.S. Crossing	Method of Delineation	Designation	Operational Impacts Affected Area (m^2)	Operational Impacts Affected Area (acres)
B-1	Mapping	Isolated	5,254	1.30
B-2	Mapping	Isolated	780	0.19
B-3	Field	Jurisdictional	187	0.05
B-4	Field	Jurisdictional	449	0.11
B-5	Field	Jurisdictional	4,083	1.01
B-6	Field	Jurisdictional	1,829	0.45
B-7	Field	Jurisdictional	149	0.04
B-8	Field	Jurisdictional	149	0.04
B-9	Field	–	Wash obstructed	Wash obstructed
Total Impact	–	–	12,880	3.18
Total Jurisdictional Waters Impacted	–	–	6,846	1.70

TABLE 4-14
Operational Impact Area for Waters of the U.S. Crossings – Alternative C

Water of the U.S. Crossing	Method of Delineation	Designation	Operational Impacts Affected Area (m^2)	Operational Impacts Affected Area (acres)
C-1	Mapping	Isolated	5,682	1.40
C-2	Field	Isolated	780	0.19
C-3	Field	Jurisdictional	123	0.03
C-4	Field	Jurisdictional	187	0.05
C-5	Field	Jurisdictional	449	0.11
C-6	Field	Jurisdictional	4,083	1.01
C-7	Field	Jurisdictional	1,829	0.45
C-8	Field	Jurisdictional	149	0.04
C-9	Field	Jurisdictional	149	0.04
C-10	Field	–	Wash obstructed[1]	Wash obstructed
Total Impact	–	–	13,431	3.32
Total Jurisdictional Waters Impacted	–	–	6,969	1.72

[1] Wash C-10, also designated as Wash B-9 for Alternative B (see Figure 3-7), has been obstructed due to construction of the wastewater treatment facility and no longer conveys stormwater in the path of the blue line stream.

TABLE 4-15
Operational Impact Area for Waters of the U.S. Crossings – Alternative D (Preferred Alternative)

Water of the U.S. Crossing	Method of Delineation	Designation	Operational Impacts Affected Area (m^2)	Operational Impacts Affected Area (acres)
D-1	Mapping	Isolated	21,139	5.22
D-2	Field	Isolated	937	0.23
D-3	Mapping	Isolated	2,114	0.52
D-4	Mapping	Isolated	2,842	0.70
D-5	Mapping	Isolated	2,684	0.66
D-6	Field	Isolated	1,300	0.32
D-7	Field	Isolated	817	0.20
D-8	Field	Jurisdictional	1,245	0.31
D-9	Field	Jurisdictional	2,453	0.61
D-10	Mapping	Jurisdictional	5,945	1.47
D-11	Mapping	Jurisdictional	2,971	0.73
D-12[1]	Mapping	Jurisdictional	0	0.00
D-13[1]	Mapping	Jurisdictional	6,968	0.00
Total Impact	–	–	51,415	10.98
Total Jurisdictional Waters Impacted	–	–	19,582	3.12

[1] Originally identified in the DEIS as a crossing where fill would be required, subsequent engineering analysis has led to the conclusion that a bridge will be placed here, resulting in a spanning of the wash crossing and no operational impact to jurisdictional waters.

No Build Alternative

The No Build Alternative (Alternative A) would have no impact on existing waters of the U.S. The drainage system along existing U.S. 93 would remain the same, and only naturally occurring modifications to drainage systems (due to erosion and other minor earthen modifications) would occur.

Overall Evaluation of Operational Impacts

Table 4-16 presents a comparative evaluation of the alternatives with respect to operational impacts on waters of the U.S. Construction of Alternative D would result in overall potential impacts on jurisdictional waters of the U.S. three times greater than Alternatives B or C. The discrepancy between the build alternatives is greater in operational impacts than for construction impacts because of the generally larger limits of cut and fill required in the construction of Alternative D.

TABLE 4-16
Operational Impact Area for Waters of the U.S. Crossings – Comparison of Build Alternatives

Build Alternative	Jurisdictional Waters of the U.S. Operational Impacts Affected Area (acres)	Total Waters Operational Impacts Affected Area (acres) [1]
Alternative B U.S. 93 Improved Alignment	1.70	3.18
Alternative C Through-Town Alignment	1.72	3.32
Alternative D (Preferred Alternative) Southern Alignment	3.12	10.98

[1] Includes isolated waters.

40CFR230 provides the statutory guidelines for compliance with Section 404(b)(1) of the Clean Water Act. The preamble to 40CFR230.10, “Restrictions on discharge”, notes that

> “Although all requirements in 230.10 must be met, the compliance evaluation procedures will vary to reflect the *seriousness of the potential for adverse impacts on the aquatic ecosystems* posed by specific dredged or fill material discharge activities.” (emphasis added)

In light of this overarching guideline for impact evaluation, the following facts are taken into consideration:

- The drainages crossed by the build alternatives are ephemeral desert washes in which there is approximately 3.25 to 3.30 inches of rainfall per a 100-yr six-hour storm event. Annual precipitation is approximately 5.8 inches in this area. This is borne out by the total absence of wet-ground plants or soils in the vicinity.
- These washes are in part incised into permeable alluvium with high infiltration capacity. Therefore any water that they do carry reaches the Colorado River or Lake Mead even less frequently than run-off events occur in the headwaters.

- Only half of average annual rainfall occurs during the warm season when torrential rains typically cause arroyo flow. Again, this indicates that runoff events are even less frequent than the annual average total of 5.8 inches would imply.
- The area supports sparse desert scrub. The poorly vegetated landscape, combined with the unconsolidated bedrock, leads to higher sediment yields compared to less arid portions of the country. Therefore, placing fill within the washes would add minimal sediment impacts relative to the existing conditions.
- Given the above, changes (increase *or* decrease) in sediment yield resulting from the construction of any of the build alternatives would be insignificantly small relative to the norm for any of these drainages.
- Construction of the preferred Alternative D, or any of the other build alternatives, would have no direct impact to any aquatic ecosystem.
- Any indirect impact to the aquatic ecosystems of Lake Mead or the Colorado River from the construction of Alternative D, or any of the other build alternatives, would be immeasurable and small.

Based on these considerations, then, there would be no adverse impacts to aquatic ecosystems resulting from any of the build alternatives.

4.6.3 Mitigation

By the construction of bridge spans avoidance of operational impacts to jurisdictional waters will be achieved at crossings D-12 and D-13 (Table 4-15). This section describes the additional measures that will be applied during construction and operation to minimize or mitigate impacts on waters of the U.S. The BMPs to be utilized are detailed in the Water Resources section of this FEIS (Section 4.5.2).

Construction Mitigation

Construction (temporary) impacts shall be avoided or minimized for all build alternatives by designating construction access, material stockpiling, and construction staging areas outside of the limits of waters of the U.S. (whose boundary exists at approximately the OHWM).

Construction of any of the build alternatives, including the preferred alternative, will require the removal of large amounts of rock in order to excavate the road base. This process will produce a considerable amount of soil and rock debris, which may be used as road fill on the project. As a mitigation measure, effective temporary barriers, such as silt screen fences and sediment traps, shall be installed to restrict debris from entering adjacent desert washes and waters of the U.S. Another measure that shall be applied is the restriction of construction activity within the washes during rainfall events. This restriction will minimize adverse impacts to jurisdictional waters from potential construction-related erosion and sediment runoff.

These and other BMPs, will be implemented to avoid and minimize impacts to waters of the U.S. and maintain the highest degree of water quality and maintenance of the natural landscape in the project area. A full description of BMPs is provided in Section 4.5.2 and in the Water Quality Technical Study for the Boulder City/U.S. 93 Corridor Study (NDOT, July 2001a).

Operational Mitigation

Bridges and culverts will be designed to minimize and mitigate the operational effects of these structures on washes containing waters of the U.S. Structural piers and retaining walls shall be protected to prevent erosion and deposition of material into the washes. Energy dissipaters, rip-rap, and detention/retention basins may be installed at the crossings to reduce the energy of floodwaters at the crossings and minimize changes in erosional characteristics in the wash crossings throughout the life of the facility. The bottoms of culverts will be placed below the grade of the washes and will be earth floored. Related operational water quality mitigation measures are described in Section 4.5.2.

4.6.4 Agency Permits and Review

Initial Consultations with USACE

As noted above, subsequent to field review of the preferred alternative, as well as the other build alternatives, the St. George Regulatory office of USACE issued a letter (Comment A6, Volume II) concurring that the drainages within the Eldorado Valley are not jurisdictional waters of the U.S. This is due chiefly to the fact that they are disjunct from other jurisdictional waters, being part of an internally drained dry-lake basin. USACE also concurred with the finding that drainages leading to the Colorado River or Lake Mead do represent jurisdictional waters (approximately north and west of the Boulder City Rifle and Pistol Club) by virtue of the fact that they do lead to waters used in interstate commerce and recreation.

Consultations with EPA

The EPA has been consulted regarding the selection of the least "Least Environmentally Damaging Practicable Alternative" (LEDPA) pursuant to their review authority as described in *The Memorandum of Agreement between the Environmental Protection Agency and the Department of The Army Concerning The Determination of Mitigation Under The Clean Water Act Section 404(b)(1) Guidelines* (February 6, 1990) (MOA). This MOA was executed to:

> "….articulate the policy and procedures to be used in the determination of the type and level of mitigation necessary to demonstrate compliance with the Clean Water Act (CWA) Section 404(b)(1) Guidelines."

In Section II(B) of the MOA it is noted that:

> "All waters of the United States …..will be accorded the full measure of protection under the Guidelines, including the requirements for appropriate and practicable mitigation. The determination of what level of mitigation constitutes 'appropriate' mitigation is based solely on the values and functions of the aquatic resource that will be impacted."

As noted above, the waters of the U.S. affected by this project consist of ephemeral desert washes that are dry in all except the most pronounced storm events. The aquatic resources associated with these washes lie downstream in the Colorado River and Lake Mead.

"Practicable" is defined in Section 230.3(q) of the Guidelines as

> "…. available and capable of being done after taking into consideration cost, existing technology, and logistics *in light of over all project purposes*" (emphasis added).

Among other components, Section 1.2 of this FEIS notes that the purpose of this project includes:

- Resolving traffic problems in the vicinity of Boulder City
- Creating a safer transportation corridor
- Accommodating future transportation demand
- Improving system linkage on U.S. 93

The practicability of a given alternative is assessed, therefore, in light of its capacity to meet the overall purpose of this project as articulated by the above goals. Hence, the LEDPA is identified in light of impacts to the resources and issues described in Chapters 3 through 7 of this FEIS, *and* its capacity to address overall project purposes, taking into consideration cost, existing technology, and logistics.

Alternative D (the southern bypass, preferred alternative) would remove through-traffic from the vicinity of Boulder City, and has the greatest capacity to resolve traffic problems as well as creating a safer transportation corridor of all the alternatives (including the No Build Alternative). It would most effectively accommodate future transportation demands and offer the greatest improvement to system linkage of all the alternatives as well. Therefore, Alternative D is the most practicable of the alternatives evaluated in light of the purpose and need of this project, as well as from the point of view of minimizing negative impacts to the environment of the City of Boulder City resulting from project implementation.

In terms restricted to construction and operational impacts to the environment of Boulder City from traffic, air quality effects, the relative contribution to, or detraction from, the visual and social context of Boulder City, and the capacity to meet the purpose and need, Alternative D, the Southern Alternative, represents the LEDPA. In addition, Alternatives B, and C would conflict with several key elements of Boulder City's newly adopted Master Plan, including:

- Protect Historic Structures - More historic structures would be affected by the implementation of Alternatives B and C,

- Preserve and enhance the air, water, and lands of the community - A highway through or near town would not promote these objectives,

- Promote strong community identity - Similarly, the distinct character and identity of Boulder City would be negatively impacted by the construction of either Alternatives B or C.

Section 2.8 presents a summary of the advantages of Alternative D, relative to the other alternatives, including the following:

- It will enhance the quality of life of the residents of Boulder City by, among other things,
  - Substantially reducing heavy truck and through-town traffic
  - Improving safety and air quality along the existing U.S. 93 roadway through the City
  - Avoiding the community disruption and segmentation of the City that a through-town or near-town alternative may cause
  - Minimizing disruption of the existing corridor, and disruption within the City, during construction (this also affects the logistical feasibility of an alternative; see below)
- Implementation of this alternative would result in the least visual impacts to Boulder City compared to the other build alternatives
- Public comments indicate a broad public acceptance of Alternative D and substantive concerns regarding impacts to the City from the other alternatives

As of the time of the final preparation of this document, consultations are still on-going between the FHWA, NDOT, and EPA regarding EPA's concurrence on the selection of the LEDPA.

The Section 404 Permit

As a result of their review of the data provided on the extent of impacts of waters of the U.S. that would result from the construction of the preferred Alternative D, the USACE recommended review of the conditions for a nationwide general permit number 14, and the Nevada Letter of Permission Procedures (LOP; Volume II, Letter A6). An LOP is a type of Individual Permit issued through an abbreviated process, which includes coordination with federal and state fish and wildlife agencies, as required by the Fish and Wildlife Coordination Act, and a public interest evaluation, but without publishing of an individual public notice. LOPs are usually applicable for projects with minor fill impacts, such as projects with minimal impacts to dry washes and lacking any wetlands. Processing time is normally 45 days or less.

Under Section 404 (b)(1) guidelines, a Section 404 permit will require justification that the proposed fill into the waters of the U.S. is unavoidable, and alternatives analysis to demonstrate that the proposed action achieves the basic purpose of the project. For unavoidable impacts, the guidelines also require appropriate and practicable mitigation.

Coordination and request for appropriate permits will be reinitiated during the preliminary and final design development of the preferred alternative. To facilitate the permitting process, it is anticipated that a pre-application consultation meeting with USACE, applicants, and interested agencies will occur. The following is a list of some of the key information needed by USACE for processing a Section 404 permit:

- A completed USACE form – *Eng Form 4345*
- A complete project description, including preconstruction photographs of the project site; locations and acreage to be to be impacted; volume and type of materials to be

placed into waters of the U.S.; a verified waters of the U.S. delineation report; description of the methods to avoid, minimize, or mitigate adverse impacts; BMPs, such as erosion control measures (see above); and proposed construction schedule

- Final Section 404(b) (1) Guidelines alternatives analysis
- A final mitigation plan that effectively addresses the unavoidable impacts to waters of the U.S.
- Applicable surveys, reports, and inventories that comply with the ESA and NHPA

For this project, a certification or a waiver must be obtained from NDEP, Bureau of Water Quality Planning, certifying that the proposed activity under which the Section 404 permit is sought will not violate state and federal water quality standards. NDEP may certify with specific conditions, which will be incorporated into the requirements of the Section 404 permit.

4.7 Floodplains

Degree of Impact to Floodplains

A floodplain evaluation estimates a level of risk or environmental impact with respect to encroachment on base floodplains. The following items are considered in the evaluation of floodplain impact:

- Flooding risks
- Impacts on natural and beneficial floodplain values
- Support of probable incompatible floodplain development
- Measures to minimize floodplain impacts
- Measures to restore and preserve the natural and beneficial floodplain values

There are also environmental, cultural, and aesthetic aspects to floodplains that must be considered when evaluating impacts from roadway construction. In many instances, undeveloped floodplains contain areas that are vital to a diverse ecosystem, including vegetation that provides crucial resting, feeding, and nesting areas for waterfowl and other biological species. In addition, water quality can be improved through a natural floodplain area, as floodplain vegetation often serves as a water filter for stormwater runoff, removing excess nutrients and pollutants from the water. Water quality is also often improved by the removal of eroded sediment runoff within the floodplain areas. Finally, natural undeveloped floodplains provide benefits to humans by providing a location for outdoor education and scientific study, recreational opportunities, and aesthetic values (Floodplain Management Association, 1996).

Floodplain Impact Delineation

To determine the impact of the build alternatives on the floodplains and floodways in the study area, the alignments were electronically overlaid onto the FEMA flood zones. This information was translated to GIS data files, which allowed acreages to be determined by electronic calculations.

A construction impact was noted if any portion of the flood zone intersected with the assumed area of construction access for a given build alternative. Flood zone impact areas were documented based on encroachments of drainage facilities in the project area, such as a detention basin or stormwater channel. The acreage of encroachment was determined at each site to assess the total degree of impact for a given alternative.

An operational (permanent) impact was noted if any portion of the alternatives intersected a flood zone. Typically, the operational impacts are less than the construction impacts because the area of impact is, for most cases, less.

4.7.1 Construction Impacts

Floodplains within the study area are located in and around detention basins and washes that drain surface runoff to either Lake Mead to the north or to the Dry Lake Basin through the alluvial fan south of Boulder City. The major drainages that would be impacted by at least one of the proposed build alternatives consist of the following (see Figures 3-10, 3-11, and 3-13):

- Hemenway Wash channel along U.S. 93 (impacted by Alternatives B and C)
- Wash "B," along the northeastern side of Nevada Way as it intersects U.S. 93 (impacted by Alternatives B and C)
- Wash "C," a north-south desert wash that drains Boulder City runoff into the alluvial fan, just east of Mead Substation (impacted by Alternative D)
- Wash "D," a small wash crossing existing U.S. 93 near Veterans Memorial Drive (impacted by Alternative B)
- Georgia Avenue Wash, a north-south desert wash that drains Boulder City runoff into the alluvial fan, just west of Mead Substation (impacted by Alternative D)

Construction impacts were generally determined by calculating the area of flood zone impacted within a 120-m (400-ft) construction corridor for each alternative alignment encroachment.

Alternative B

Alternative B would result in construction impacts totaling 19.9 acres, including the Hemenway Wash flood zone (Figure 3-13) and individual flood zones shown in Figure 3-10.

Alternative B would also impact the regulatory floodway in the Hemenway Wash area, at and immediately north of Pacifica Way (see Figure 3-13). Construction impacts in this area would total 0.4 acres. However, because there would be no permanent structures built as part of the construction activities (i.e., access, material stockpiling, and staging), this impact alone would not require either coordination with FEMA or the remapping of the floodway.

Alternative C

Alternative C would result in construction impacts totaling 18.8 acres, including the Hemenway Wash flood zones (see Figure 3-13 and individual flood zones shown in Figure 3-10. Alternative C would have similar construction impacts as Alternative B, with the exception of the avoidance of the Wash "B" impact at existing U.S. 93 near Veterans Memorial Drive.

Alternative C would also impact the regulatory floodway in the Hemenway Wash area, at and immediately north of Pacifica Way (see Figure 3-13). Construction impacts in this area would total 0.3 acres, which is less of an encroachment than Alternative B.

Alternative D (Preferred Alternative)

Current FEMA maps end at the Boulder City corporate limits (National Flood Insurance Program, 1995a, 1995b, and 1995c), and no flood zone designations have been assigned for the area through which Alternative D is located.

This lack of a floodplain designation in the southern alignment corridor is the result of limited hydraulic data on these desert washes, and not because of a discontinuation of the flood zone. Therefore, to delineate the floodplain impacts resulting from Alternative D, a theoretical flood zone continuation line was drawn for the washes that impact Alternative D, connecting the existing Zone A floodplains. These lines are shown in Figure 3-11, along with the limits of construction and operational impacts (cut and fill dotted lines) for Alternative D. Based on this information, Alternative D would result in impacts to 6.3 acres of floodplain.

Overall Evaluation of Construction Impacts

Table 4-17 presents a comparative evaluation of the proposed build alternatives with respect to the calculated construction-related impacts to 100-year floodplains and floodways. Alternatives B and C would have approximately three times the impact to floodplains as Alternative D, and both would impact the regulatory floodway in Hemenway Wash, while Alternative D would not.

TABLE 4-17
Construction Impact Area for Floodplain Encroachment - Comparison of Build Alternatives

Build Alternative	Floodplain Affected Area (acres)	Floodway Affected Area (acres)
Alternative A (No Build)	0.0	0.0
Alternative B (U.S. 93 Improved)	21.7	0.4
Alternative C (Through Town)	18.8	0.3
Alternative D (Southern)	6.3	0.0

4.7.2 Operational Impacts

Operational impacts are determined by adding the area of flood zone impact within the general limits of cut and fill for the individual alignments. It is assumed in this evaluation that the fill into the floodplain or regulatory floodway would be a permanent encroachment. The number of acres of floodplain that would be impacted by each of the three build alternatives within the project area is presented below.

Alternative B

Alternative B would result in operational impacts totaling 10 acres. The Hemenway Wash flood zones are shown in Figure 3-13, and the individual flood zones that would be impacted by this alternative are shown in Figure 3-10.

Alternative B would also impact the regulatory floodway in the Hemenway Wash area, at and immediately north of Pacifica Way (see Figure 3-13). Operational impacts in this area would total 0.4 acres. Because these would be considered permanent impacts to the regulatory floodway, mitigation measures will be required.

Alternative C

Alternative C would result in operational impacts totaling 5.9 acres. The Hemenway Wash flood zones are shown in Figure 3-13, and the individual flood zones that would be impacted by this alternative are shown in Figure 3-10. The impact to flood zones is approximately 40 percent less for Alternative C than for Alternative B because the proposed layout of the new freeway would result in narrower limits of cut and fill along the alignment.

Alternative C would also impact the regulatory floodway in the Hemenway Wash area, at and immediately north of Pacifica Way (see Figure 3-13). Operational impacts in this area would total 0.3 acres. Because these would be considered permanent impacts to the regulatory floodway, mitigation measures will be required.

Alternative D (Preferred Alternative)

The theoretical flood zone continuation line connecting the existing Zone A floodplains depicted in Figure 3-11 was used to determine operational impacts for construction of Alternative D. Limits of cut and fill were used as the boundary of impact for the three floodplain crossings. The total area of operational impact to the floodplains would total 4.1 acres. There would be no impacts to any regulatory floodways.

Overall Evaluation of Operational Impacts

Table 4-18 presents a comparative evaluation of the proposed build alternatives with respect to the operational (permanent) impacts to 100-year floodplains and regulatory floodways. Alternative B would have the greatest impact to floodplains, with larger areas of cut and fill than Alternative C. Both Alternatives B and C would impact the regulatory floodway in Hemenway Wash, while Alternative D would not.

TABLE 4-18
Operational Impact Area for Floodplain Encroachment - Comparison of Build Alternatives

Build Alternative	Operational Impacts Floodplain Affected Area (acres)	Operational Impacts Floodway Affected Area (acres)
Alternative A (No Build)	0.0	0.0
Alternative B (U.S. 93 Improved)	10.0	0.4
Alternative C (Through Town)	5.9	0.3
Alternative D (Southern) (Preferred)	4.1	0.0

4.7.3 Mitigation

Construction Mitigation

Should the preferred alternative be selected for construction, construction mitigation will require the adoption of BMPs for improvements with respect to maintaining the integrity of the floodplains located in the vicinity of the construction site. The State of Nevada's Handbook of Best Management Practices (State Conservation Commission, not dated) shall be utilized as a guidance document for implementing appropriate BMPs.

Following are BMP improvements to be applied, as appropriate, during construction of the selected alternative:

- Construction staging, access points, and material stockpiling shall be kept away from regulatory flood zones where possible.
- Temporary construction berms and other means of redirecting stormwater shall be constructed in such a way as to not expand an area with the potential for flooding.
- Designated locations shall be provided for servicing, washing, and refueling of equipment, away from channels or swales that would quickly convey runoff to the regulatory flood zones.
- Contaminated material shall be kept at a safe distance from entry into the flood zones. Temporary barriers and containers to confine the materials shall be used.

Operational Mitigation

Operational mitigation for the build alternatives shall be incorporated into the drainage appurtenances of the new facility. Desert wash crossings shall be preserved, when feasible, and stormwater shall be conveyed in a safe and effective way, with capacity for intense storm runoff such as in a 100-year flood.

Alternative B. Alternative B would widen the existing U.S. 93 through Hemenway Wash. This crossing would be the major floodplain impact for this alternative and would include an impact to the regulatory floodway. Limits of cut and fill extend out on the north side of the roadway across the existing Hemenway Wash channel. Upon construction of the alternative, this channel will be relocated to the shoulder of the new roadway, and the flood zone will be redrawn under the approval of FEMA.

Impacts to the Hemenway Wash resulting from Alternative B will require the redrawing of the flood zone. As a result, a Letter of Map Revision (LOMR) shall be applied for, which entails hydrologic and hydraulic modeling of the Hemenway Wash channel and its tributary contributing flows. The modeling process will result in the determination of base flood elevations (BFEs) for the channel within the new Flood Zone AE. The roadway design will include a system of bridges and culverts passing under new U.S. 93 that will best expedite stormwater through the wash system to Lake Mead, thus keeping the flood zone to a minimum and not affecting residential or commercial structures in the area.

Coordination with FEMA will be required for this alternative, and approval by FEMA will be required before construction. A possible exception to this requirement would be if stormwater modeling demonstrates that a "no-rise" situation would exist after the new roadway is constructed. For a “no-rise” to be applicable, it must be shown that the BFEs will not increase throughout the entire flood zone, and the width of the floodway must remain the same. If this is demonstrated, then typically all that is required is notification to the local community and approval by the city council.

Furthermore, mitigation requirements could be minimized if the flood zone impact is reduced with the construction of retaining walls along the north side of the alignment through Hemenway Wash. This is especially applicable for impacts to the floodway north of Pacifica Way. A retaining wall in this location would avoid impacts to the floodway altogether.

Alternative C. Because the limits of cuts and fills are narrower for Alternative C, the redrawing of the flood zone through Hemenway Wash will be simplified. However, the stormwater modeling process necessary for Alternative B will apply for Alternative C as well.

Alternative D (Preferred Alternative). Mitigation efforts will be simplest for Alternative D of all the proposed build alternatives. The alternative crosses three drainages that have FEMA-mapped floodways in the vicinity of the alignment, near the Mead Substation. The drainage design will comply with FEMA criteria. The drainage channels within the vicinity of Alternative D will be considered and perpetuated in the final design.

4.7.4 Agency Reviews

Should an alternative contain a severe impact on an established FEMA-mapped floodplain, coordination with FEMA to investigate the degree of the impact and possible means of mitigation will be required.

A severe floodplain impact would likely require an LOMR from FEMA for the flood zone impacted by construction. The LOMR requires new hydrologic and hydraulic modeling for the contributing hydrologic basin and a possible determination of new base flood elevations and a new flood zone SFHA.

4.8 Cultural Resources

The NHPA requires federal agencies to take into account the effect of any federal 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 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 cultural resource, through its evaluation, and to final treatment (mitigation) measures, if required, for historic properties. Compliance with Section 106 of the NHPA, as well as with other regulatory requirements, includes consultations with concerned Native American groups and other interested parties.

Adverse effects to 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 listing on the NRHP, or (2) if the project would destroy or degrade the setting of registered or eligible archaeological sites, structures or TCPs 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.

As noted in Section 3.8, above, in order to most effectively address cultural resources within the study area, archaeological sites, historic structures, and TCPs were addressed separately in the resource-specific inventories, and that approach is preserved herein.

4.8.1 Archaeological Resource Impacts

Archaeological Resources Potentially Impacted

A total of nine NRHP-eligible prehistoric and historic archaeological sites have been field-verified to be located within the 300-m (1,000-ft) APE, which is the potential construction impact zone, defined individually for each of the build alternatives under consideration in this EIS. The APE was defined to include potential locations of interchanges, construction easements, utility easements, and hydraulic improvements and/or impact areas. Those NRHP-eligible sites potentially impacted by the proposed undertaking are listed in Table 4-19.

TABLE 4-19
Total NRHP Recommended Eligible Archaeological Sites Located within the APE of One or More of the Project Build Alternatives

Site Number	Site Type	Project Alternative	Land Management Agency or Ownership	NRHP Recommendation
26CK1169/3024/5413	Squatters' Camp	B, C, D	Reclamation	Eligible
26CK5389	Camp Alunite	C	Boulder City	Eligible
26CK5473	Mine Shaft	B	Rail Road Pass Hotel and Casino (Private)	Eligible
26CK5256	Grey Eagle Mine	C	Boulder City	Eligible
26CK6270	Prehistoric Lithic Reduction	D	Boulder City	Eligible
26CK6274	McKeeversville Townsite	C	Boulder City	Eligible
26CK6277	Historic Mining Camp	D	Boulder City	Eligible
26CK6282	Historic Habitation	C	NPS	Eligible
26CK6286	Prehistoric Rockshelters	B	NPS	Eligible

Bold Site Number indicates site is within the APE of the preferred Alternative D.

4.8.2 Mitigation of Impacts to Archaeological Resources

All of the NRHP-eligible archaeological sites determined to be adversely affected by construction of the preferred alternative will require mitigation if they cannot be avoided. Measures to mitigate adverse effects will likely include documentation, including excavation, artifact analysis and curation, and exhaustive archive research. Specific mitigation requirements will be determined upon completion of an effects assessment in consultation with SHPO, the ACHP, concerned Native American groups, and other interested parties. This assessment will commence subsequent to the completion of more detailed, preliminary engineering of the preferred alternative. These measures, as well as others, are stipulated in the Programmatic Agreement (PA). The PA also stipulates that pursuant to the completion of the effects assessment, a Treatment Plan will be developed in consultation with the appropriate land management agencies, SHPO, the ACHP, and any interested Native American groups (see Section 4.9.3). No mitigation is required for those archaeological sites and isolated finds investigated, either as part of this corridor study or previously recorded by others, determined to not meet the eligibility criteria for inclusion in the NRHP.

Subject to the findings of the effects assessment and additional consultations noted above, the following sites were recommended for mitigation, depending on the selected alternative:

- Squatters' Camp (26CK1169/3024/5413)
- Camp Alunite (26CK5389)
- Mine Shaft (26CK5473)
- Grey Eagle Mine (26CK5626)
- Prehistoric Lithic Reduction Site (26CK6270)
- McKeeversville Townsite (26CK6274)
- Historic Mining Camp (26CK6277)
- Historic Habitation Site (26CK6282)
- Prehistoric Rockshelters (26CK6286)

In total, Alternative B has three eligible archaeological sites within its APE, Alternative C has five eligible sites, and Alternative D has three recorded eligible sites. Alternative A, the no action alternative, would not affect any archaeological sites.

Prior to the implementation of the preferred alternative, stipulations of the PA will be carried out as described above, and they will include an assessment of effects and development of a treatment plan, as appropriate and in consultation with the affected agency, the SHPO, and the ACHP, for the following archaeological sites within the APE of preferred Alternative D:

- Squatters' Camp (26CK1169/3024/5413)
- Prehistoric Lithic Reduction Site (26CK6270
- Historic Mining Camp (26CK6277)

A Memorandum of Agreement (MOA) was signed on January 25, 2002, among FHWA, NDOT, Reclamation, BLM, and SHPO stipulating mitigation measures to be completed for the Railroad Pass Squatters' Camp (26CK1169/3024/5413), an eligible site on land managed by Reclamation and the BLM. These mitigation measures will be followed prior to the commencement of construction in that area.

A Native American consultation plan (Blair and Lawrence, 2000) has been written and implemented between FHWA and the appropriate Native American representatives. Consultation and the assessment of effects resulting from the implementation of the preferred alternative, as described above, are a continuing process as stipulated in the PA. This consultation process is addressing Native American concerns, including the assessment of effects to any potential TCPs, as detailed engineering design is developed to adequately address those potential effects.

4.8.3 Historic Structures Impacts

In a letter dated November 21, 2002 (Appendix A), the SHPO concurred that 26 structures or groups of structures within the APE of the three build alternatives are eligible for listing in the NRHP. As described in Section 3.8, the APE for historic structures includes both a 300-m-wide (1,000-ft-wide) survey area centered on the proposed alternative centerline, and the usually wider potential visual impact zone. The APEs for historic structures used for this corridor study are shown in Figure 3-14.

The APE for Alternative B contains 26 historic structures that are eligible for the NRHP. The APE for Alternative C contains 25 of the same historic structures or groups of structures; however, Alternative C includes a different proposed route of U.S. 93 in some areas, different interchanges, and different ancillary road and street elements. Therefore, the location and nature of impacts of Alternative C are different in some cases than those of Alternative B on the same 25 NRHP-eligible properties. The APE for the preferred alternative (Alternative D) contains nine structures that are eligible for the NRHP, all of which are also found in the APE of Alternatives B and C.

Table 4-20 summarizes the potential impacts/adverse effects to historic structures for all three build alternatives under consideration. These data were compiled from information provided in the *Boulder City/U.S. 93 Corridor Study Historic Structures Survey* (ACRE, September 2002), and refined in subsequent analyses to finalize the assessment of impacts to Section 4(f) resources (see Chapter 7, below). Alternative A, the no action alternative, would affect no historic structures. (ACRE, September 2002). Although NDOT and FHWA have yet to consult with the Nevada SHPO on a Determination of Adverse Effects pursuant to Section 106 procedures (36 CFR 800.5) as stipulated in the PA, the findings from NDOT's historic structures survey provide a reliable indication of those historic properties likely to be adversely affected due to direct or indirect impacts from the project.

TABLE 4-20
NRHP-Eligible or NRHP-Listed Historic Structures within the APE of the Build Alternatives

Site Number	Name	Type of Resource	Potential Impacts	Build Alternative	Adverse Effect
26CK3917	Boulder City Historic District	Historic district	Minor visual	B and C	No
26CK4046a	U.S. Construction Railroad	Railroad grade	Minor visual, setting encroachment	B and C	No
26CK4046b, c	Six Companies, Inc. Railroad	Railroad grade	Minor visual, setting encroachment	B and C	No

TABLE 4-20
NRHP-Eligible or NRHP-Listed Historic Structures within the APE of the Build Alternatives

Site Number	Name	Type of Resource	Potential Impacts	Build Alternative	Adverse Effect
26CK5414	Boulder City Branch Railroad	Railroad	Damage, visual	B, C, and D	Yes
26CK6202	12 Valley View Lane	Residence	Minor visual – Alternative B Damage – Alternative C	B and C	Yes[1]
26CK6204	14 Valley View Lane	Residence	Minor visual – Alternative B Major visual – Alternative C	B and C	Yes[1]
26CK6206	200 Donner Way	Residence	Minor visual	B and C	No
26CK6211	205 Donner Way	Residence	Minor visual	B and C	No
26CK6215	303 Lakeview Drive	Residence	Minor visual	B and C	No
26CK6216	305 Lakeview Drive	Residence	Minor visual	B and C	No
26CK6220	307 Ridge Road	Residence	Minor visual	B and C	No
26CK6221	205 Lakeview Drive	Residence	Minor visual	B and C	No
26CK6233	Boulder City Pumping Station No. 2	Utilities facility	None	B and C	No
26CK6236	Old Lakeshore Road	Abandoned road	Destruction	B and C	Yes
26CK6237	LABPL Transmission Line 2	Electrical transmission line	Minor visual – Alternatives B and C Tower relocation or removal – Alternative D	B, C, and D	Yes[2]
26CK6238	LABPL Transmission Line 1	Electrical transmission line	Minor visual – Alternatives B, C and D	B, C, and D	No
26CK6240	Metropolitan Water District Line 1	Electrical transmission line	Minor visual – Alternatives B and C Tower relocation or removal – Alternative D	B, C, and D	Yes[2]
26CK6242	LABPL Transmission Line 3	Electrical transmission line	Minor relocation or reconstruction – Alternatives B, C and D	B, C, and D	No
26CK6244	Old Airport Hangar	Hangar	Minor visual	B	No
26CK6245	Old State Highway 4193	Road	Cavation/removal	B and C	Yes
26CK6246	Old Highway 95	Road	Minor visual – Alternative B Partial damage – Alternatives C and D	B, C, and D	Yes[3]
26CK6248	LMNRA Maintenance Warehouse	Government building	Minor visual	B and C	No
26CK6249	SCE North Transmission Line	Electrical transmission line	Tower relocation or removal – Alternatives B and C Minor visual – Alternative D	B, C, and D	Yes[4]
26CK6250	SCE South Transmission Line	Electrical transmission line	Minor visual – Alternatives B D and D Tower relocation or removal – Alternatives B and C	B, C, and D	Yes[4]

TABLE 4-20
NRHP-Eligible or NRHP-Listed Historic Structures within the APE of the Build Alternatives

Site Number	Name	Type of Resource	Potential Impacts	Build Alternative	Adverse Effect
26CK6251	Hoover-Basic South Transmission Line	Electrical transmission line	Tower or removal	B, C, and D	Yes
26CK6259	200 Lakeview Drive	Residence	Minor visual	B and C	No

[1] Alternative C only.
[2] Alternative D only.
[3] Alternatives C and D only.
[4] Alternatives B and C only.

4.8.4 Mitigation of Impacts to Historic Structures

Chapter 7, Section 4(f) Evaluation, contains descriptions of the recommended measures to mitigate unavoidable impacts to those historic structures that constitute Section 4(f) resources. Table 4-21 provides a summary of measures for the historic structures identified that may be adversely affected by implementation of the preferred alternative per Section 106 of the NHPA. However, if the SHPO concurs in a "no effect" or "no adverse effect" determination, mitigation may not be required in those cases (see Sections 4.8.3 and 4.8.5). An important part of mitigation for most structures is documentation of the structures in accordance with the standards of HAER, the Historic American Engineering Record, administered by NPS.

TABLE 4-21
Recommended Mitigation Measures for Historic Structures within the APE of the Preferred Alternative

Site Number	Name	Recommended Mitigation
26CK5414	Boulder City Branch Railroad	Documentation; construction to maintain railroad route
26CK6237	LABPL Transmission Line 2	Replace with towers of historic design or HAER documentation
26CK6238	LABPL Transmission Line 1	Replace with towers of historic design or HAER documentation
26CK6240	Metropolitan Water District Line 1	Replace with towers of historic design or HAER documentation
26CK6242	LABPL Transmission Line 3	Replace with towers of historic design or HAER documentation
26CK6246	Old Highway 95	HAER documentation
26CK6249	SCE North Transmission Line	Replace with towers of historic design or HAER documentation
26CK6250	SCE South Transmission Line	Replace with towers of historic design or HAER documentation
26CK6251	Hoover-Basic South Transmission Line	Replace with towers of historic design or HAER documentation

4.8.5 Agency Reviews

Investigations of cultural resources within the APE of the project alternatives, and the assessment of impacts presented in this section have, as their primary purpose, the analysis of impacts of the different alternatives to inform the selection of the preferred alternative, and 2) to disclose potential impacts resulting from the implementation of any of the alternatives. With the issuance of the ROD for this project, NEPA-mandated review of the Boulder City/U.S. 93 Corridor Study will be completed.

As noted above, a PA has been prepared stipulating ongoing consultations, effects assessment, and the development of treatment measures for historic properties pursuant to the implementation of the preferred alternative. The PA commits FHWA and SHPO, and other agencies as appropriate, to evaluate impacts and then develop and implement an agreed-upon Treatment Plan that will include specific mitigation measures to address adverse effects to historic properties (the archaeological sites, historic structures, and TCPs discussed herein). Consultation with agencies, as well as with concerned Native American groups and other interested parties, and implementation of the Treatment Plan will be completed prior to construction of the preferred alternative.

In addition, an MOA was signed on January 25, 2002, among FHWA, NDOT, Reclamation, BLM, and SHPO stipulating mitigation measures to be completed for the Railroad Pass Squatters' Camp (26CK1169/3024/5413), an eligible site on Reclamation- and BLM-managed land. These mitigation measures will be followed prior to the commencement of construction in that area.

Finally, consultations between NDOT, FHWA and Native American tribes/groups will be ongoing throughout the process involved in finalizing the detailed engineering design of the preferred alternative, and during subsequent effects assessments as stipulated in the PA.

4.9 Land Use

4.9.1 Construction Impacts

Construction staging areas, borrow pits, and batch plants have not yet been designated for any of the three build alternatives. Appropriate sites can be specified for use by the contractor during the final design stage. Construction impacts on commercial, industrial, and residential land uses are described below. Sections 4.12 and 4.17, Chapter 7, and Appendix D provide additional details on construction impacts on lands affected by the build alternatives, including NPS-administered lands.

Alternative A

The No Build Alternative would not involve any construction activity, and no construction-related impacts would result. See Chapter 6 for a discussion of cumulative impacts from other projects and programs affecting the local environment.

Alternative B

Implementation of Alternative B would result in displacement of several commercial buildings along the north side of U.S. 93, west of the intersection with Buchanan Boulevard. Five structures, which are part of the redevelopment district, would be demolished to provide the right-of-way needed for improvements associated with this alternative. Reconstruction of these buildings at their current locations would not be feasible. This is considered an unavoidable adverse impact of project implementation.

Commercial land uses adjacent to U.S. 93 may experience temporary access changes or restrictions during construction activities. Potentially affected land uses include the Railroad Pass Hotel and Casino, the Hacienda Hotel and Casino, and commercial land use west of Buchanan Boulevard. Any temporary access restrictions would conflict with existing commercial land uses and result in a short-term impact. Short term impacts to access to the Boulder Ridge Golf Course north of the project corridor and west of Boulder City proper would also occur.

Residential areas within Boulder City may be subject to detours due to construction activity. These areas include the mobile home development directly south of U.S. 93 and west of Buchanan Boulevard, as well as single-family and multi-family development within Hemenway Wash. Despite these temporary detours, ingress and egress would be available at all times during construction. In addition, emergency vehicle access would be maintained at all times. Therefore, construction activities would be compatible with residential land uses, and adverse impacts would not result.

Alternative C

Impacts resulting from construction of Alternative C would be similar to those described above for Alternative B. Specifically, this alternative has the potential to affect access to and from the hotel and casino land uses located proximate to either project terminus. However, Alternative C is located north of businesses along existing U.S. 93 and west of Buchanan Boulevard, so no impact would occur to these commercial land uses. While there would be potential impact to commercial uses outside of Boulder City, the intensity of the impact would be less than for Alternative B.

Because Alternative C is located north of U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard, the mobile home development south of existing U.S. 93 would not be affected by construction activities. However, Alternative C would be constructed directly adjacent to residential and RV developments east of the planned interchange with Canyon Road. During construction activities, ingress and egress from existing U.S. 93 would be maintained. At a minimum, sufficient emergency access would be provided at all times, which would ensure access for local residents. Any possible construction detours would be designed to accommodate the passage of large trucks; therefore, negligible conflict with these residential land uses would result.

Alternative D (Preferred Alternative)

As with Alternatives B and C, construction of Alternative D would have the potential to affect the existing hotel and casino land uses near the eastern and western project limits. Any restriction of access to these uses would represent a short-term impact. However, Alternative D is located south of developed lands within Boulder City. No impact to commercial or residential land uses in the city would occur during construction.

Construction of Alternative D would occur in proximity to several large institutional and industrial land uses. Both the airport and sewage treatment plant are anticipated to be unaffected by construction activities. Access to the Mead Substation could be affected by construction of the Alternative D alignment along the southernmost section, south of Buchanan Boulevard. However, construction planning would ensure that employees of the substation and large service vehicles are able to maintain access at all times. Therefore, negligible impact would be anticipated.

4.9.2 Operational Impacts

Alternative A

Alternative A would result in no change to the existing configuration of the U.S. 93 alignment. Therefore, no direct impacts to existing or planned land uses would result from this alternative. Given the increased traffic volume forecast for U.S. 93 over the next 20 years, indirect land use compatibility impacts related to noise, air quality, and traffic congestion would result.

Alternative B

Direct Impacts. Seven commercial structures and a church along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard would lose some parking and/or frontage and signage. This is not anticipated to interfere with the continuation of current activities at these establishments. This is a potentially adverse impact of project implementation.

Improvement of the existing U.S. 93 alignment would expand the existing roadway west of Buchanan Boulevard by approximately 6 m (20 ft). The roadway widening would result in the partial loss of landscaping along the north and south side of the roadway for approximately 0.8 km (0.5 mile) between Gingerwood Street and Juniper Way. These areas are located within the existing right-of-way of U.S. 93 and do not represent a direct loss of land to adjacent landowners. Upon completion, U.S. 93 would be improved in this area with new sidewalks, landscaping would be replaced per NDOT policy, and no conflict would result with adjacent land uses.

No direct conflicts between Alternative B and existing residential land uses would be expected. However, a short retaining wall would be installed along the rear property line of several single-family residential units adjacent to Pacifica Way. Because the roadway would be elevated relative to these homes, the wall would be visible from within each residence, resulting in some loss of views of Lake Mead.

Approximately 8 acres of right-of-way will be required within the historic BCBRR. The right-of-way will provide additional “backside” access to businesses north of U.S. 93.

Approximately 48 acres of recreational land within the LMNRA would be required for use south of the Hacienda Hotel and Casino. Constituting use of about 0.0031 percent of the recreation area, the LMNRA would not be substantially impacted by this loss of open space/recreation area; however, the impact is inconsistent with existing land use plans for the LMNRA. Portions of the River Mountains Loop Trail in the Hemenway Wash and a section of trail west of Lake Mountain Road would be in direct conflict with this alternative. This unavoidable impact would constitute a use of about 2 acres of this recreational resource, with the LMNRA also subject to provisions of Section 4(f) of the Department of Transportation Act of 1966, as amended (see Chapter 7).

Because no existing or planned agricultural areas occur within the project vicinity, no impact to farmlands would result from project implementation.

Land Use Plans and Policies. Realignment of U.S. 93 within Clark County and the City of Henderson would have the potential to conflict with planned land uses in this area. These include residential, commercial, and industrial land use designations. However, this would not represent a substantial loss of future land uses in this area.

Expansion and partial realignment of the existing U.S. 93 corridor would conflict with a portion of the designated land uses on the Boulder City Future Land Use Map. Specifically, realignment west of the intersection with Buchanan Boulevard would preclude the development of approximately 6 acres of designated commercial and manufacturing land uses within an area approximately several hundred acres in size. Given the availability of adjacent or nearby land, the loss of 6 acres would not cause an adverse land use impact. Additionally, the proposed alignment would provide better access to these commercial and manufacturing areas.

The proposed improvements under Alternative B otherwise would not preclude the development of planned land uses along U.S. 93. Further, implementation of this alternative is not anticipated to shift existing or planned land use patterns. The proposed alignment would traverse portions of the designated redevelopment area (Figure 3-15). With the exception of the displaced businesses near Buchanan Boulevard, potential changes to existing land use patterns are anticipated to be minimal. Therefore, future redevelopment plans are not expected to be adversely impacted.

Alternative B would, however, be inconsistent with both the Vision Statement and several key Guiding Principles contained in the adopted Boulder City Master Plan (Section 3.9.3). The vision statement emphasizes the goal of preserving a small-town atmosphere while enhancing quality of life, and a major through-town transportation corridor would be inconsistent with these objectives. The Guiding Principles of the Master Plan that would not be supported by construction of Alternative B include those directed at historic preservation, enhancing the natural resources of the community, promoting a strong community identity, maintaining sustainable growth management that would minimize negative impacts on residential areas, and promoting a multi-modal transportation system including safe and efficient facilities for bicycles and pedestrians. These conflicts with the Master Plan Guiding Principles are considered to be a non-mitigatable adverse impact.

The affect to the use of recreational lands within the LMNRA resulting from the construction of Alternative B would be minimal, and not conflict with existing NPS land use plans for the area because it would occupy the existing U.S. 93 corridor. Therefore, no adverse land-use impact within the LMNRA would be expected.

Indirect Impacts. Driveways off of U.S. 93 providing direct access to adjacent commercial land uses would be maintained. However, proposed median islands along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard would alter existing access, such that ingress and egress would be limited primarily to right turns only. Access would be available only at designated left- and U-turn areas. By implementing NDOT's Access Control Policy through the installation of raised medians, traffic and pedestrian safety in the area is expected to improve. This change is not anticipated to substantially affect the level of business activity along U.S. 93; the viability of existing businesses would be maintained, and no adverse effects to commercial land use patterns are anticipated.

Although it is not one of the proposed project's improvements, the planned extension of Elm Street is expected to moderately improve access to downtown Boulder City from the residential development south of U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard. This extension would allow local residents to partly avoid traffic along U.S. 93. Several Alternative B improvements along the Hemenway Wash are anticipated to enhance local circulation in this area. Grade-separated crossings of U.S. 93 would reduce conflicts with traffic along U.S. 93 for residents of Hemenway Wash traveling to and from downtown Boulder City. In addition, a frontage road between Industrial Road and Pacifica Way would provide improved local east-west circulation, while avoiding travel on U.S. 93. Regional access would be maintained, and a reduction in conflicts with through-traffic on U.S. 93 would be a beneficial effect of this alternative.

Negative impacts resulting from incompatibility with the adopted Boulder City Master Plan/Land Use Plan would be indirect as well as direct. Indirect effects would include the deleterious impacts to community land use plans resulting from the presence of a major transportation corridor through the center of town. The community's goals of maintaining an attractive, small town ambience and a favorable environmental setting within the town would be compromised, and negative impacts on its ability to further these goals after construction of Alternative B would be substantial.

Alternative C

Direct Impacts. If Alternative C were implemented, the Railroad Pass Hotel and Casino would maintain access to U.S. 93 and would not be affected by new right-of-way acquisition. However, the alignment would intersect the BCBRR tracks in two places. The project design would include grade separations so that no conflict would occur.

North of existing U.S. 93, the alignment would directly affect the Boulder Ridge Golf Course and, while it would not conflict with the continued use of this facility, the total acreage available for recreational use would be reduced. Immediately east of the planned intersection with Canyon Road, the alignment would be located between an RV park to the west and a residential development to the east but would not physically encroach onto these areas. Therefore, no direct conflict with these existing uses would result. West of Lake Mountain Drive, Alternative C would conflict with the River Mountains Loop Trail, affecting about 2 acres, an impact similar to Alternative B. East of Lake Mountain Drive to the eastern terminus of the project, other impacts would be much the same as those described for Alternative B above, including use of about 41 acres, or about 0.0027 percent, of LMNRA land.

Because no existing or planned agricultural areas occur within the project vicinity, no impact to farmlands would result from project implementation.

Land Use Plans and Policies. Similar to Alternative B, Alternative C would not be entirely consistent with the land use plans set forth by the City of Henderson and Clark County. However, as noted for Alternative B, the relative acreage affected would not be substantial.

The proposed realignment of U.S. 93 north of the existing highway and adjacent commercial land uses is not consistent with the future land use plans of Boulder City. Land designated for Public Recreational and Public/Quasi-Public uses would be dedicated to the alignment right-of-way. The land use effects for Alternative C would extend to the portion of the Boulder Ridge Golf Course that would be isolated south of the alignment, therefore rendering approximately 37 acres of Public Recreational Land unusable for that purpose. This would result in a potential unavoidable adverse impact to planned public Boulder Ridge Golf Course. The alternative would also potentially affect a future phase of the planned private membership Park Place Golf Course. Further to the west, as Alternative C enters Hemenway Wash impacts to land designated for medium density residential development would be greater than those resulting from Alternative B in the area west of Pacifica Way (Figure 3-16).

Similar to Alternative B, impacts related to the goals, objectives, and policies of the Boulder City Master Plan would be largely adverse for Alternative C. As noted in the DEIS, however, this alternative would be consistent with the promotion of bicycle routes. Specifically, Alternative C would facilitate bicycle use along existing U.S. 93 west of Buchanan Boulevard by reducing existing traffic levels along this section and through incorporation of grade-separated pedestrian and bicycle access points. Because Alternative C would function as a full access-controlled freeway, bicycles would not be allowed access to this new facility.

Alternative C would traverse the established redevelopment boundaries in Boulder City. As noted previously for Alternative B, no specific redevelopment plans have been adopted so potential impacts cannot be precisely identified. Given the substantial acreage within the redevelopment area relative to the proposed alignment, sufficient flexibility should be provided to future development plans such that adverse impacts would not result from project implementation.

Indirect Impacts. Due to an anticipated decrease in through-traffic related business activity along existing U.S. 93 west of Buchanan Boulevard, future land use development patterns within Boulder City may be affected by construction of Alternative C. Under this alternative, it is likely that the retail district along U.S. 93 between Veterans Memorial Drive and Canyon Road would experience lower sales, employment, and tax revenue than would be the case under Alternative A or B. However, there would be potential for redevelopment that could offset some of those losses at the new U.S. 93 interchange at the Canyon Road extension. The course of future development would rest with Boulder City and leases of city-owned land for development at the new interchange or between the interchange and the Buchanan Boulevard/U.S. 93 intersection. Therefore, west of Buchanan Boulevard traffic-dependent land uses along existing U.S. 93 may be replaced by locally oriented commercial land uses. To the extent this occurs, it would not result in an adverse land use impact.

Commercial development dependent on through-traffic may shift geographically toward the new alignment. Because Alternative C would not provide direct access to adjacent land uses, future development along the alignment would be limited to the area zoned for manufacturing in the vicinity of the proposed interchange at Canyon Road. Additionally, because Boulder City owns the land in this area, any transfer of land greater than 1 acre would require approval through a citywide vote (Susan Danielewicz, pers. comm., 2001).

Residential uses located south of the existing U.S. 93 alignment between Veterans Memorial Drive and Buchanan Boulevard, as well as within the Hemenway Wash area, would generally benefit from improved local circulation provided by Alternative C. The increased accessibility to surrounding areas is also considered a beneficial effect of this alternative, although these generally neutral or beneficial impacts would be restricted to lands west of Buchanan Boulevard.

Implementation of Alternative C would require the relocation of several electrical utility towers and lines within the existing utility corridor located near the planned interchange with an extension of Buchanan Boulevard. While a utility realignment plan has not been established, there is potential that electrical towers could be placed closer to existing residential uses within the existing RV development and/or residential development along Lakeview Drive. While this change is not anticipated to result in a direct land use conflict, an adverse visual impact may occur from these land uses. It is not anticipated that these high-voltage utilities could be buried to avoid this impact.

As for Alternative B, negative impacts resulting from the incompatibility of Alternative C with the adopted Boulder City Master Plan/Land Use Plan would be indirect as well as direct. Indirect effects would include the deleterious effect to community land use management resulting from the presence of a major transportation corridor near (and, west of Buchanan Boulevard) through the center of town. The community's goals of maintaining an attractive, small town ambience and a favorable environmental setting within the town would be compromised, negatively affecting its ability to further these goals after construction of Alternative C.

Alternative D (Preferred Alternative)

Direct Impacts. Alternative D, the preferred alternative, would only provide interchanges near the hotel and casino developments located at the eastern and western project limits, and at U.S. 95, with the exception of a restricted access ramp at Buchanan Boulevard for emergency vehicles, and for use by construction vehicles bound for WAPA's Mead Substation. Access to the hotel and casino developments located at the eastern and western project limits would be maintained or enhanced, and no physical conflict between the proposed project and these land uses would result. No impacts to the developed portion of the City of Boulder City would result from implementation of this, the preferred alternative.

Operation of the proposed alignment would bypass the majority of land uses within Boulder City. The project alignment would traverse undeveloped open space located south and east of the developed portion of the city. Toward the southernmost portion, the alignment would operate directly south of the municipal sewage treatment facility and north of the Mead Substation. Sufficient buffer space has been provided between these facilities and the project alignment, such that no impact would result. Alternative D is located 0.8 km (0.5 mile) south of the Boulder City Municipal Airport. Based on the vertical profile of the proposed alignment, no potential exists for conflicts with existing air traffic. The alignment would also cross several roads used as recreational and equestrian trails with access to the LMNRA east of Boulder City. These roads are anticipated to be unaffected or realigned, such that recreational use would not be impacted.

The southeast portion of the alignment would operate directly north of the Boulder City Rifle and Pistol Club range and east of a municipal landfill. The proposed alignment would not encroach onto the existing or future landfill operations area. Further, existing access to the landfill facility would be maintained. Therefore, the landfill would not be affected by project operations.

Subsequent to the release of the DEIS to the public in March 2002, the Boulder City Rifle and Pistol Club contacted NDOT regarding the proximity of Alternative D to their leasehold with the City of Boulder City (see letters in Volume II). NDOT met with members of the Rifle and Pistol Club and a member of the National Rifle Association (NRA) during the comment period to address their concerns, which included:

- Concern that the proposed Alternative D would close the operations of the range.
- Concern that Alternative D would be a safety hazard to the private and public shooting range. The NRA prepared a safety assessment of the range compared to similar ranges across the nation (see letter, Volume II).
- Concern that Alternative D would encroach on future construction of this private shooting facility within the leasehold.

The PMT considered the concerns of the Boulder City Rifle and Pistol Club, as well as the report of the NRA. It was determined by FHWA that the portion of the leasehold that Alternative D traverses through is not Section 4(f) land because it is being using by private club members and not open to the public. Negotiations with the lease holders for the Boulder City Rifle and Pistol Club are on-going.

Implementation of the preferred alternative would require the use of an estimated 59 acres of NPS (Section 4[f]) land near the eastern project limits within the LMNRA. This represents approximately 0.0039 percent of the LMNRA. Impacts to land use in the LMNRA resulting from the preferred alternative are addressed in more detail in Chapter 7 and Appendix D. Land use impacts would be greater than those resulting from Alternative A (no build) or from the implementation of the other two build alternatives. However, and impairment analysis prepared by the NPS finds that much of the LMNRA acreage that would be utilized by Alternative D has been previously impacted by existing utility corridor and the value of the lands is low from a perspective of LMNRA goals and objectives. Therefore "the impacts associated with alternative D (sic) would not likely constitute an impairment to land use" (Appendix D).

Because no existing or planned agricultural areas occur within the project vicinity, no impact to farmlands would result from Alternative D implementation.

Land Use Plans and Policies. Similar to Alternatives B and C, Alternative D would not be completely consistent with existing land use plans set forth by the City of Henderson, Clark County, NPS, or BLM. In contrast to Alternatives B and C, the effect of Alternative D on the relevant goals, objectives, and policies of the Boulder City Master Plan would be negligible, rather than largely adverse. Alternative D also provides a higher level of support for the establishment of bicycle routes than both Alternatives B and C, due to the predicted substantial diversion of through-traffic away from Boulder City, which would reduce traffic levels and the potential for conflict with bicyclists in central Boulder City.

Alternative D would traverse primarily open space within Boulder City and the LMNRA. The loss of open space relative to remaining open space in Boulder City, including approximately 435 km^2 (168 square miles) within the Eldorado Valley Transfer Area, would be relatively minor and would not represent an adverse impact. The use of recreational lands within the LMNRA resulting from the implementation of this, the preferred alternative, represents a conflict with NPS land use plans for this area, but is unlikely to constitute an impairment of land use, as discussed in Chapter 7 and Appendix D. Therefore, construction of the preferred alternative would not represent an adverse land-use impact within the LMNRA.

Indirect Impacts. Alternative D would traverse predominantly undeveloped open space within Boulder City. Because the city is the adjoining landowner, Boulder City has full control over whether adjoining development would occur. WAPA owns and maintains the Buchanan Boulevard access from Georgia Avenue to the Mead substation, which would be perpetuated with a grade separation.

Residential development within Boulder City would generally benefit from implementation of Alternative D. The diversion of traffic away from developed land uses within Boulder City would facilitate improved local access and public safety along existing roadways. The reduction in traffic conflicts among land uses within Boulder City is considered a beneficial project effect.

Existing commercial land uses along the U.S. 93 corridor would be affected by implementation of the preferred alternative. The large reduction in traffic volume in this area, due to diversion to the new highway, is likely to have an adverse impact on the existing land uses along the corridor that are highly dependent on drive-through traffic (e.g., fast-food establishments, gas stations, and motels). The land uses along the corridor and elsewhere in Boulder City would be expected to change over time, depending on the business climate, toward more service-oriented establishments, destination tourism, or small-scale manufacturing (see Section 4.11). However, because no local access would be available along Alternative D, a shift in traffic-related commercial development would not be anticipated. Construction of Alternative D would also be consistent with the Guiding Principles of the Boulder City Master Plan/Land Use Plan that address historic preservation, quality of life, community identity, multi-modal transportation, and environmental quality of the community. Therefore, land use impacts to Boulder City resulting from Alternative D are expected to be largely beneficial.

4.9.3 Mitigation

Construction Mitigation

To reduce the potential adverse impacts associated with the temporary change or restriction of access to commercial land uses along the existing U.S. 93 corridor, a Traffic Control Plan will be prepared prior to commencement of construction activity. Features of this plan may include, but would not be limited to, a public awareness campaign and the use of flagmen, signage, detours, alternative access points, and phasing of construction activities to reduce conflicts with existing land uses. Implementation of this plan will serve to ensure that potential adverse impacts are minimized.

Operational Mitigation

Implementation of Alternative B would require the acquisition of approximately five commercial properties to provide the required right-of-way. Fair market value will be provided to the property/business owners. In addition, relocation support services will be provided to assist displaced businesses in finding other suitable locations, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. This form of compensation is described in the NDOT brochure, *Relocation Assistance in Nevada* (NDOT, no date). Relocation resources will be made available to all residential (if any) and business relocatees without discrimination.

Several other businesses would be partially affected by implementation of Alternative B, resulting in a loss of signage, landscaping features, or parking area. If right-of-way is needed, the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 will govern the acquisition of any right-of-way necessary for this project.

Implementation of Alternative C would have the potential to adversely impact the planned golf courses north of existing U.S. 93. Purchase of the affected property at fair market value or replacement of land in kind would serve to reduce the severity of this impact.

Mitigation of the potential conflict with the Mitigation relating to public parklands within the LMNRA is addressed separately in the Section 4(f) analysis of the EIS (Chapter 7).

4.9.4 Agency Permits and Reviews

The Land and Water Conservation Fund Act (16 U.S.C. 4601-4608, Section 6[f] Requirements) prohibits the conversion of property acquired or developed with grants obtained from this Act to a nonrecreational purpose without the approval of the DOI NPS. Section 6(f) directs DOI to assure that replacement lands of equal value, location, and usefulness are provided as conditions to such conversions. Consequently, where conversions of Section 6(f) lands are proposed for highway projects, replacement lands will be necessary.

None of the hiking or bicycle trails in the project area, such as the Hemenway Wash trail, were purchased or improved using Land and Water Conservation Fund monies (see Appendix A). However, should there be any impacts to these trails during the construction of a build alternative, the trails will be replaced in-kind during the design and construction phase of the project. These lands will not be converted away from their original intended use.

As discussed in Section 1.3.6, consent of the Boulder City Council will be required prior to the implementation of any of the build alternatives per NRS 408.397. Section 1.3.5 describes the initiative passed by the voters of Boulder City charging the Council with approval should the build alternative bear the salient characteristics of Alternative D.

4.10 Visual Impacts

The visual impact assessment addresses the short-term impacts from constructing the three build alternatives and the long-term impacts expected as a result of operation of the three build alternatives. In addition, visual impacts of Alternative A, No Build Alternative, are discussed.

4.10.1 Construction Impacts

Impacts Common to all Build Alternatives

The visual impacts from constructing any of the three build alternatives depend on the degree of change to the visual resource and the viewers' response to that change. Impacts on visual resources during construction of the proposed action that are common to the three build alternatives include the following:

- The dust that would be generated – Dust would be emitted from earthmoving activities, construction vehicles and equipment, construction worker vehicles, materials delivery vehicles, and from areas within the construction zone that have been disturbed or where excavated material is stockpiled. Fugitive dust, if emitted in sufficient quantities and if adverse weather conditions persist, could impair or degrade existing views.
- The presence of the construction equipment – Depending on their values, interests, and preconceived notions and expectations, for some residents viewing the area, the presence of the construction equipment and its associated activities would detract from the views currently experienced. This could be particularly true of Alternative D, where most of the alignment is in an undeveloped area, or along Alternative C near the Boulder Oaks RV Park, where the new alignment would be elevated.
- Increased light emitted from construction areas if nighttime construction is conducted – Depending on their values and expectations, residents may not like the visual intrusion caused by construction night lighting. This would be applicable to residential locations along Alternatives B and C. Tourists' views at the Alan Bible Visitors Center would not be affected by nighttime construction lighting of any of the build alternatives because the visitors' center closes before dark and because of the distance between the construction area and the visitors' center.

Impacts specific to the three build alternatives and the No Build Alternative are described below.

No Build Alternative

Because Alternative A would result in the proposed action not being constructed, no construction-related impacts on existing visual resources are expected.

Alternative B

Less dust would likely be generated from the construction of Alternative B than the other two build alternatives because Alternative B is mostly composed of improvements to an already developed and paved area when near residences.

Construction work along the portion of the alignment that follows existing U.S. 93 would consist of minor earthmoving; roadway widening and restriping; and installation of new medians, curbs, gutters, sidewalks, retaining walls, and noise barriers. These activities would generate some dust, but to a lesser degree than that expected for Alternatives C and D. The exceptions include the following areas where more dust is expected to be generated: (1) from the western terminus to approximately 0.6 km (0.4 mile) east of the U.S. 93/95 interchange because the alignment would deviate from the existing roadway and would require cuts and fills through hilly terrain; (2) where up to five buildings would be demolished west of Buchanan Boulevard to allow for roadway realignment; (3) where larger cuts and fills would be required between Buchanan Boulevard and Pacifica Way; and (4) where Pacifica Way would be elevated over U.S. 93. However, there are not sensitive receptors in all of these areas, so they would not experience view degradation.

Roadway widening of Lake Mountain Drive and construction of a frontage road in that area that would be closer to the residences than existing U.S. 93 would generate dust at the single- and multi-family residences along both sides of this street. Near the Hacienda Hotel and Casino, construction work would also generate dust. However, similar to that for the Railroad Pass Hotel and Casino, because Alternative B would not pass directly in front of the Hacienda Hotel and Casino, patrons at that establishment would not experience view degradation.

In addition to the generation of fugitive dust during the construction period for this alternative, the landscape along the alignment would change as improvements to the roadway are being installed. Changes to the visual environment along the alternative would be noticeable during construction and when complete, but they would not adversely impact the overall visual experience of the Boulder City area. The changes to the landscape from construction activities may be offensive to some viewers, but they would be interesting to others. Because the improvements could be spread over an 11-year period, the total change to the landscape from the project would also be spread over that period, so the area would reflect gradual changes.

Alternative C

More dust would likely be generated from the construction of Alternative C than Alternative B, but implementation of Alternative C would likely generate less dust during construction than Alternative D due to the amount of undeveloped area along each alignment.

Similar to that for Alternative B, construction of Alternative C would generate dust from the western terminus to approximately 0.6 km (0.4 mile) east of the U.S. 95 intersection with U.S. 93 because the alignment would deviate from the existing U.S. 93 to the south and would require cuts and fills through hilly terrain. However, there are not sensitive receptors (residences) in this area, and Alternative C would not pass directly in front of the Railroad Pass Hotel and Casino, so those patrons would not experience view degradation.

Construction of Alternative C would also generate dust where it would deviate from existing U.S. 93 to the north (approximately 0.6 km [0.4 mile] east of the U.S. 95 intersection to Lakeview Drive) because the alignment would cross some undeveloped hilly areas, such as north of the new State Veterans Home and between the Boulder Oaks RV Park and the residential subdivision that includes Lakeview Drive, Valley View Lane, and Ridge Road. The alignment in these areas would require cut and fill. Because the construction activities associated with this alignment would be near residences, an adverse short-term impact on these residents' views would occur.

Similar to that for Alternative B, Alternative C roadway widening of Lake Mountain Drive and construction of a frontage road in that area that would be closer to the residences than existing U.S. 93 would generate dust at the single- and multi-family residences along both sides of this street. Residents along Temple Rock Road would also experience a short-term impact on the views from their back yards due to construction dust.

Near the Hacienda Hotel and Casino, construction work would also generate dust. However, as for Alternative B, because Alternative C would not pass directly in front of the Hacienda Hotel and Casino, patrons at that establishment would not experience view degradation.

In addition to the generation of fugitive dust during the construction period for this alternative, the landscape along the alignment would change as improvements to the roadway are being installed. Changes to the visual environment along the alternative would be noticeable while in progress and when complete, but would not adversely impact the overall visual experience of the Boulder City area. The changes to the landscape from construction activities may be offensive to some viewers, but they would be interesting to others. Because the improvements could be spread over an 11-year period, the total change to the landscape from the project would also be spread over that period, so the area would reflect gradual changes.

Alternative D (Preferred Alternative)

Construction of Alternative D would likely generate the most dust of the three build alternatives due to the amount of undeveloped area along this alignment. Although it would generate more dust, there are far fewer sensitive receptors along the Alternative D alignment that could have their views affected, relative to the other two build alternatives. The nearest residential receptors are approximately 2.5 km (1.5 miles) from the Alternative D alignment, in the residential subdivision on this hill that includes San Felipe Drive.

Similar to that for Alternatives B and C, construction of Alternative D would generate dust along the western portion of the alignment in the area near the Railroad Pass Hotel and Casino due to the cuts and fills through the hilly terrain. However, there are not sensitive receptors (residences) in this area, and Alternative D would not pass directly in front of the Railroad Pass Hotel and Casino, so those patrons would not experience view degradation.

Construction of the alignment between the U.S. 93/95 interchange and the Hacienda Hotel and Casino would route the alignment across undeveloped land approximately 0.4 km (0.25 mile) north of the Mead Substation and the Reclamation Lower Colorado Region Office.

Near the Hacienda Hotel and Casino, construction work for the preferred alternative would also generate dust. However, similar to that for Alternatives B and C, because Alternative D would not pass directly in front of the Hacienda Hotel and Casino, patrons at that establishment would not experience view degradation.

In addition to the generation of fugitive dust during the construction period for this alternative, the landscape along the alignment of Alternative D would change as improvements to the roadway are being installed. Changes to the visual environment along the alternative would be noticeable while in progress and when complete, but they would not likely degrade the overall visual experience of the Boulder City area. The changes to the landscape from construction activities may be offensive to some viewers, but they would be interesting to others. Because the improvements could be spread over an 11-year period, the total change to the landscape from the project would also be spread over that period, so the area would reflect gradual changes.

4.10.2 Operational Impacts

Assessment Methodology

The visual impact from implementing any of the three build alternatives depends on the degree of change to the visual resource and the viewers' response to that change. The visual character of the build alternatives includes the pattern elements (form, line, color, and texture) and pattern character (dominance, scale, diversity, and continuity) of the area. The quality of the visual environment is demonstrated by its vividness, intactness, and unity. The visible structural features of the three build alternatives have been assessed and compared with the pattern elements and character, and its vividness, intactness, and unity to determine the compatibility of the proposed features with the existing landscape.

Field observations were made in August 2001 to determine the locations of the sensitive residential and tourist receptors and to document their existing views of U.S. 93 and the areas where the build alternatives would be aligned. In addition, "views from the road" were identified and documented in photos. To show what is currently seen from the five viewpoints in the study area, a photograph was taken at each of the five locations. These photographs serve as the "existing condition view" and provide the basis for comparing the various roadway alignments that are being considered. To show what would be seen from those same five viewpoints, the alternative roadway designs or their resulting cut and fill have been superimposed onto the photographs in visual simulations. Figure 3-17 shows the locations where these five viewpoint photos were taken and indicates the direction that the camera was focused.

The viewpoints selected are:

- Looking south along U.S. 95 from the U.S. 93/95 interchange—this is a "view from the road" (i.e., from the driver's perspective) (Viewpoint 1) (Figure 4-8)
- Looking east along U.S. 93 toward the commercial corridor from near the Madrone Street intersection—this is a "view from the road" (Viewpoint 2) (Figure 4-9)
- Looking northwest toward the Boulder Oaks RV Park vicinity from atop a hill to the southeast of the park (Viewpoint 3) (Figure 4-10)
- Looking south toward the Eldorado Mountains from the Alan Bible Visitors Center (Viewpoint 4) (Figure 4-11)

- Looking south toward Alternative D from a residence near the Buchanan Boulevard/ Georgia Avenue intersection (Viewpoint 5) (Figure 4-12)

Viewpoint 1 was selected to show the expected change to the landscape from the elevated U.S. 93 as part of Alternative D. Viewpoint 2 was selected to show a driver's view from the road and shows the landscape change from widening the road to six lanes. Viewpoint 3 was selected to show the elevated roadway (Alternative C) aligned between the Boulder Oaks RV Park and the Lakeview Drive residential subdivision. Viewpoint 4 was selected because it shows a tourist view from a locally well known tourist attraction (LMNRA visitor center). Viewpoint 5 shows the view of Alternative D from residences at the south end of Boulder City.

Impacts on Residents' Existing Views

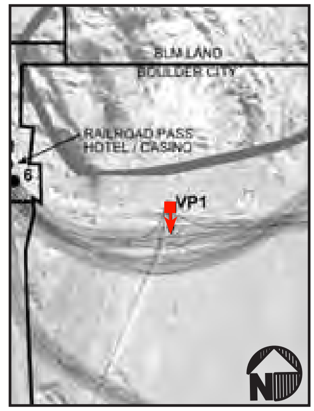
Alternative A. Implementation of Alternative A would result in no additional or new roadway being constructed, and it would result in no physical changes to the existing roadway. Therefore, Alternative A would not directly alter any visual resources. Future traffic increases will, however, make it more difficult for drivers to enjoy the views currently experienced.

Alternative B. Views of Alternative B are available from several residential areas. Table 4-22 identifies the residential areas and discusses what the expected changes to the landscape would be with implementation of this alternative.

Alternative C. As shown in Table 4-23, views of Alternative C are available from several residential areas. Table 4-23 identifies the residential areas and discusses what the expected changes to the landscape would be with implementation of this alternative.

The simulation of Viewpoint 3 (Figure 4-10) shows the elevated Alternative C highway passing between the Boulder Oaks RV Park and the Lakeview Drive residential subdivision. As shown in the existing condition photo, the residences in the Lakeview Drive subdivision would not have a clear view of Alternative C because of the hill between the subdivision and the RV park. Alternative C would become visible to the Lakeview Drive residents when it passes east of the hill and nears existing U.S. 93. Residents in this area are likely accustomed to seeing a highway nearby (existing U.S. 93), but the view looking east would be changed because of the elevated roadway. For some viewers, this change would detract from the existing view. This viewer group expects the views to be unchanged from existing conditions, or expects the changes to be unnoticeable or unobtrusive. For others, the elevated roadway would be acknowledged as serving a utilitarian purpose (improve traffic circulation); thus, it would add variety to the existing view. This viewer group would notice the visual change, but they would not be offended by the change to the view.

Existing condition view looking south toward U.S. 95 near its intersection with U.S. 93.



Simulated view looking south toward U.S. 95 near its intersection with U.S. 93. As shown, U.S. 93 would be an elevated crossing over U.S. 95.

FIGURE 4-8
ALTERNATIVE D: VIEWPOINT 1 EXISTING CONDITION AND VISUAL SIMULATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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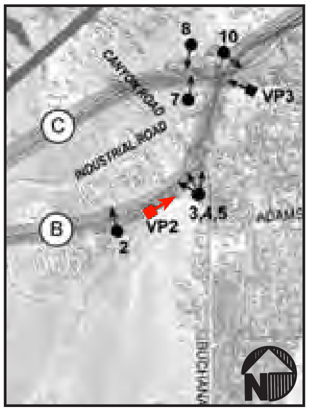

Existing condition view of the commercial corridor looking east along U.S. 93 near the Madrone Street intersection. This is a “view from the road”, (i.e., from the driver’s perspective).

Simulated view of the commercial corridor looking east along U.S. 93 near the Madrone Street intersection. As shown, the roadway would be widened from its current four lanes to six lanes.

FIGURE 4-9
ALTERNATIVE B: VIEWPOINT 2 EXISTING CONDITION AND VISUAL SIMULATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Existing condition view of the Boulder Oaks RV Park vicinity from atop a hill to the southeast of the resort. The RV Park is located to the left of photo center, and the Lakeview Drive residential subdivision is located to the right of photo center.

Simulated view of Alternative C and the Boulder Oaks RV Park vicinity from atop a hill to the southeast of the park. As shown, the elevated highway would alter views from both sides of the road.

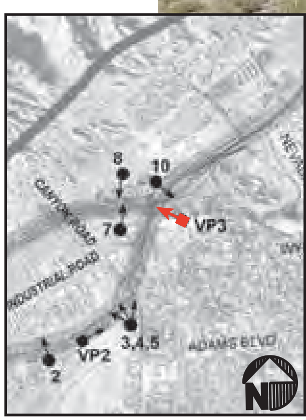

FIGURE 4-10
ALTERNATIVE C: VIEWPOINT 3 EXISTING CONDITION AND VISUAL SIMULATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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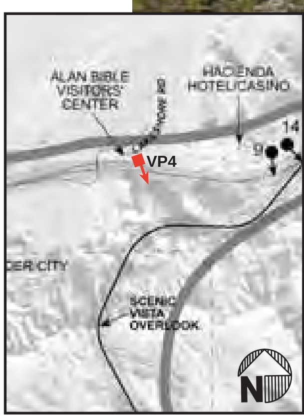
Existing conditions view of the Eldorado Mountains from the Alan Bible Visitors Center.



Simulated view of the Alternative D Eldorado Mountains cuts (see arrows pointing to them) from the Alan Bible Visitors Center.

FIGURE 4-11
ALTERNATIVE D: VIEWPOINT 4 EXISTING CONDITION AND VISUAL SIMULATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Existing condition view of Alternative D from a residence located approximately 45 to 60 m (150-200 ft) east of the Buchanan Boulevard/Georgia Avenue intersection.

Simulated view of Alternative D from a residence located approximately45 to 60 m (150 to 200 ft) east of the Buchanan Boulevard/Georgia Avenue intersection (see arrow pointing to semi truck on the Alternative D alignment).

FIGURE 4-12
ALTERNATIVE D: VIEWPOINT 5 EXISTING CONDITION AND VISUAL SIMULATION
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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TABLE 4-22
Potentially Sensitive Residential Receptors along Alternative B

Gingerwood Mobile Home Senior Park – Mobile homes within the Gingerwood Mobile Home Senior Park located south of U.S. 93 off of Gingerwood Street currently have a view of U.S. 93. They would continue to have a view of U.S. 93.
Boulder City Trailer Park – Trailers within the Boulder City Trailer Park, located south of U.S. 93 east of Yucca Street, currently have a view of U.S. 93. The vegetation that buffers the trailer park from U.S. 93 would be removed, and a 2-m-high (8-ft-high) noise barrier would be installed adjacent to the widened roadway. Alternative B would change the view from these trailers.
Valley View Lane and Forest Lane – Residences on Valley View Lane and Forest Lane off of Lakeview Drive currently have a view of U.S. 93. Alternative B would move U.S. 93 away from these residences, but it would add a frontage road along the same alignment as existing U.S. 93 in this area.
St. Jude's Ranch for Children – The St. Jude's Ranch for Children, located between Lakeview Drive and Lake Mountain Drive, currently has a view of U.S. 93. Alternative B would move U.S. 93 away from these residences, but it would add a frontage road closer than the existing U.S. 93 alignment in this area.
Lake Mountain Drive Area – Single- and multi-family residences on both sides of Lake Mountain Drive currently have a view of U.S. 93. Alternative B would move U.S. 93 away from these residences and would elevate U.S. 93 over Lake Mountain Drive. It would also add a frontage road along the same alignment as existing U.S. 93 in this area. In addition, Lake Mountain Drive would be widened as part of Alternative B. Adding an elevated highway in this area would change the views from the residences on Lake Mountain Drive.
Temple Rock Road Area – Single-family residences located on Temple Rock Road, Lava Court, Temple Rock Court, and Red Rock Road have a view of U.S. 93. Realigning U.S. 93 to the south would move the roadway closer to these residences. A 2-m-high (8-ft-high) noise barrier would be installed adjacent to the new roadway on its north side. Alternative B would change the view from these residences.
Ville Drive – Multi-family residences located on Ville Drive have a view of U.S. 93. Realigning U.S. 93 to the south would move the roadway away from these residences, but it would add a frontage road along the same alignment as existing U.S. 93 in this area.
Laguna Lane Area – Single-family residences on the north side of Laguna Lane south of and overlooking Pacifica Way have a partially obstructed view of Lake Mead and U.S. 93 from their back yards (due to a wrought iron fence). These residences are at a higher elevation than Pacifica Way, and views from the back yards of these residences do not include the road. Alternative B would elevate Pacifica Way over U.S. 93 so that the view of the lake would be blocked. This would be an unavoidable impact of implementing this alternative. Alternative B would also move U.S. 93 away from these residences, but it would add a frontage road closer than the existing U.S. 93 in this area. Certain single-family residences on the south side of Laguna Lane, on both sides of Sea Breeze Lane, and on both sides of Ocean Mist Lane have a view of U.S. 93 and would have a view of Alternative B, which would be moved away from these residences. This alternative would add a frontage road closer to the residences than the existing U.S. 93 in this area.

TABLE 4-23
Potentially Sensitive Residential Receptors along Alternative C

Boulder Oaks RV Park – Certain RV residences within the Boulder Oaks RV Park located west of U.S. 93 off of Industrial Road have a view of existing U.S. 93. Alternative C would be aligned immediately north of this community. A 3-m-high (10-ft-high) noise barrier would be installed adjacent to the new roadway on its south side. Alternative C would change the view from these RVs.
Ridge Road – Residences on Ridge Road do not have a clear view of U.S. 93. Alternative C would be aligned immediately south of this street. A 3- to 4-m-high (10- to 14-ft-high) noise barrier would be installed adjacent to the new roadway on its north side. Alternative C would change the view from these residences.
Valley View Lane and Forest Lane – Residences on Valley View Lane and Forest Lane off of Lakeview Drive currently have a view of U.S. 93. Alternative C would align U.S. 93 closer to Valley View Lane and away from Forest Lane.
St. Jude's Ranch for Children – The St. Jude's Ranch for Children, located between Lakeview Drive and Lake Mountain Drive, currently has a view of U.S. 93. Alternative C would move U.S. 93 away from these residences. Existing U.S. 93 would become a frontage road in this area.
Lake Mountain Drive Area – Single- and multi-family residences on both sides of Lake Mountain Drive currently have a view of U.S. 93. Alternative C would move U.S. 93 away from these residences and would elevate U.S. 93 over Lake Mountain Drive. It would also add a frontage road along the same alignment as existing U.S. 93 in this area. In addition, Lake Mountain Drive would be widened, as part of Alternative C. Adding an elevated highway in this area would change the views from the residences on Lake Mountain Drive.
Temple Rock Road Area – Single-family residences located on Temple Rock Road, Lava Court, Temple Rock Court, and Red Rock Road have a view of U.S. 93. Realigning U.S. 93 to the south would move the roadway closer to these residences. A 2-m-high (8-ft-high) noise barrier would be installed adjacent to the new roadway on its north side. Alternative C would change the view from these residences.
Ville Drive – Multi-family residences located on Ville Drive have a view of U.S. 93. Realigning U.S. 93 to the south would move the roadway away from these residences, but it would add a frontage road along the same alignment as existing U.S. 93 in this area.
Laguna Lane Area – Single-family residences on the north side of Laguna Lane south of and overlooking Pacifica Way have a partially obstructed view of Lake Mead and U.S. 93 from their back yards (due to a wrought iron fence). These residences are at a higher elevation than Pacifica Way, and views from the back yards of these residences do not include the road. Alternative C would elevate Pacifica Way over U.S. 93 so that the view of the lake would be blocked. This would be an unavoidable impact of implementing this alternative. Alternative C would also move U.S. 93 away from these residences, but it would add a frontage road closer than the existing U.S. 93 in this area. Certain single-family residences on the south side of Laguna Lane, on both sides of Sea Breeze Lane, and on both sides of Ocean Mist Lane have a view of U.S. 93 and would have a view of Alternative C, which would be moved away from these residences. This alternative would add a frontage road closer to the residences than the existing U.S. 93 in this area.

Alternative D (Preferred Alternative). Views of Alternative D are available from certain residential areas located to the north of the Alternative D alignment. Table 4-24 discusses what the expected changes to the landscape would be with implementation of this alternative.

TABLE 4-24
Potentially Sensitive Residential Receptors along Alternative D (Preferred Alternative)

Buchanan Boulevard/Georgia Avenue Area – Single-family residences are located near the Buchanan Boulevard/Georgia Avenue intersection. Looking south, these residences have a view of the valley and the mountains in the distance. Also in the distance are several transmission line towers and the Mead Substation. These residences would have a distant view of Alternative D, located 1.3 km (0.8 mile) to the south.
San Felipe Drive Area – Single-family residences located on a hill that includes San Felipe Drive. Looking southeast, these residences have a view of the valley, the Boulder City Horsemen's Association, transmission lines, and the mountains in the distance. These residences would have a distant view of Alternative D, located 2.5 km (1.5 miles) to the east.

The simulation of Viewpoint 5 (Figure 4-12) shows the view of Alternative D from residences about 45 to 60 m (150 to 200 ft) east of the Buchanan Boulevard/Georgia Avenue intersection. As shown in the existing condition photo, the residences in this area have an unobstructed foreground view of Georgia Avenue and its associated street landscaping. They also have an unobstructed distant view of several transmission line towers, the WAPA substation, and the mountains. As shown in the visual simulation, Alternative D would become visible to these residences, but the view would be very distant. This photo shows that the view from these residences would not substantially change with implementation of Alternative D. An arrow placed on the visual simulation makes the highway and vehicles traveling on it more visible by pointing to a semi-truck. Viewers may notice the change to the visual landscape but would not likely be adversely affected.

Affected Residential Views Identified by Historic Structures Survey

In addition to the potentially sensitive receptors identified in Tables 4-22 to 4-24 above, the *Boulder City/U.S. 93 Corridor Study Historic Structures Survey* (ACRE, 2001) identified several historic residences that would experience visual impacts as a result of implementing the project. Table 4-25 lists the residences identified by that report that would be affected by each alternative, the degree of potential impact, and the recommended mitigation. As shown in Table 4-25, these residences would not experience visual impacts from implementation of Alternative D. No other sensitive visual receptors were identified for Alternative D by the historic structures report.

TABLE 4-25
Residences Identified by the Historic Structures Survey as Expected to Experience Visual Impacts

Residence	Alternative B	Alternative C	Alternative D
12 Valley View Lane	Minor visual potential impact; no mitigation recommended	Damage or destruction; mitigate by relocating house and documenting local history	No impact
14 Valley View Lane	Minor visual potential impact; no mitigation recommended	Major visual potential impact; mitigate by documenting local history	No impact
200 Donner Way	Minor visual potential impact; no mitigation recommended	Minor visual potential impact; mitigate by documenting local history	No impact
205 Donner Way	Minor visual potential impact; no mitigation recommended	Minor visual potential impact; mitigate by documenting local history	No impact
305 Lakeview Drive	Minor visual potential impact; no mitigation recommended	Minor visual potential impact; mitigate by documenting local history	No impact

Source: ACRE, 2001.

These residences were reviewed in the field for this analysis. The Valley View residences would experience the greatest visual impact of those listed in Table 4-25. As indicated in Table 4-25, Alternative C would result not only in effects on views from 12 Valley View Lane, but it would result in damage or destruction to it due to the proximity of the elevated roadway to the residence. The Donner Way residences would be subject to very minor visual impacts. In the field, it did not appear that the 305 Lakeview Drive residence would experience visual impacts from implementation of Alternative C due to certain residences and the hill behind it that would obstruct the view from this residence.

Impacts on Tourists' Existing Views

Alternative A. Implementation of Alternative A would result in no additional or new roadway being constructed, and it would result in no physical changes to the existing roadway. Therefore, no change to the views currently experienced by tourists is expected with implementation of this alternative.

Alternative B. Views of existing U.S. 93 are currently available from the tourist areas along Alternative B. Table 4-26 discusses what the expected changes to the landscape would be with implementation of Alternative B.

TABLE 4-26
Potentially Sensitive Tourist Receptors along Alternative B

Railroad Pass Hotel/Casino – The Railroad Pass Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative B would be less direct than from the existing U.S. 93. The Alternative B alignment may change hotel patrons' view of the mountains to the southwest.
Alan Bible Visitors Center – The Alan Bible Visitors Center is a tourist attraction that currently provides a view of U.S. 93. It would not have a view of Alternative B. This alternative would add a frontage road in the same alignment as the existing U.S. 93 in this area.
Hacienda Hotel and Casino – The Hacienda Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative B would be less direct than from the existing U.S. 93. The Alternative B alignment may change hotel patrons' view of the mountains to the south and southeast.

Alternative C. Views of existing U.S. 93 are currently available from the tourist areas along Alternative C. Table 4-27 discusses what the expected changes to the landscape would be with implementation of Alternative C.

TABLE 4-27
Potentially Sensitive Tourist Receptors along Alternative C

Railroad Pass Hotel and Casino – The Railroad Pass Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative C would be less direct than from the existing U.S. 93. The Alternative C alignment may change hotel patrons' view of the mountains to the southwest.
Alan Bible Visitors Center – The Alan Bible Visitors Center is a tourist attraction that currently provides a view of U.S. 93. It would not have a view of Alternative C. This alternative would add a frontage road in the same alignment as the existing U.S. 93 in this area.

TABLE 4-27
Potentially Sensitive Tourist Receptors along Alternative C

Hacienda Hotel and Casino – The Hacienda Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative C would be less direct than from the existing U.S. 93. The Alternative C alignment may change hotel patrons' view of the mountains to the south and southeast.

Alternative D (Preferred Alternative)

Views of existing U.S. 93 are currently available from the tourist areas identified in the proposed study area. Table 4-28 discusses what the expected changes to the landscape would be with implementation of Alternative D.

TABLE 4-28
Potentially Sensitive Tourist Receptors along Alternative D (Preferred Alternative)

Railroad Pass Hotel and Casino – The Railroad Pass Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative D would be less direct than from the existing U.S. 93. The Alternative D alignment may change hotel patrons' view of the mountains to the southwest.
Alan Bible Visitors Center – The Alan Bible Visitors Center is a tourist attraction that currently provides a view of U.S. 93. Alternative D would not be visible from the Alan Bible Visitors Center. Cuts in the Eldorado Mountains for Alternative D would be visible from the visitors' center but would not be noticeable to a viewer who is not very familiar with the terrain to the south.
Hacienda Hotel and Casino – The Hacienda Hotel and Casino fronts on U.S. 93, and an entrance to it is provided from U.S. 93. Its visibility from the roadway and direct access provide drive-by visitors the opportunity to make a decision to turn in to its parking lot. Access to the hotel/casino from Alternative D would be less direct than from the existing U.S. 93. The Alternative D alignment may change hotel patrons' view of the mountains to the south and southeast.
LMNRA – Recreationists hiking in the mountains to the east of the project have views of the Eldorado Valley when looking west and Lake Mead looking north. These views vary and range from clear views to partially obstructed, depending on the location of the viewer, the vegetation, and the intervening topography. These views would not be obstructed by the Alternative D alignment. However, the existing views would be altered by the introduction of a new highway and bridges through the valley and descending the ridge toward U.S. 93 near the Hacienda Hotel and Casino. Nonetheless, the overall visual quality would not be compromised.

The simulation of Viewpoint 4 (Figure 4-11) shows the view from the Alan Bible Visitors Center looking south toward the Eldorado Mountains. The simulation shows the cuts in the mountains that would be required for the construction of Alternative D. To the casual viewer, the change in landscape from construction of Alternative D would not be noticeable. To the viewer who is very familiar with the terrain and this view, the cuts may be noticed, but they would not be considered offensive. The simulated view shows that the view from this location would not be degraded.

Impacts on Drivers' and Passengers' Existing Views

Alternative A. Implementation of Alternative A would result in no additional or new roadway being constructed, and it would result in no physical changes to the existing roadway. Therefore, no change to the views from the road currently experienced by drivers and passengers is expected with implementation of this alternative.

Alternative B. The simulation of Viewpoint 2 (Figure 4-9) shows the view of a widened U.S. 93 looking east from near the Madrone Street intersection. As shown, the roadway would change from four lanes to six lanes, and a raised median and street lighting would be installed. The streetscape would not change appreciably. This roadway view is not particularly sensitive, but it is typical of an urban street.

Currently, motorists traveling on U.S. 93 pass in front of the Railroad Pass Hotel and Casino near the western end of the project and the Hacienda Hotel and Casino near the eastern end of the project. The proposed realigned U.S. 93 would move the highway away from the Hotels/Casinos. Traveling westbound on U.S. 93, views of the Railroad Pass Hotel and Casino are expected to improve, when compared to existing conditions. Traveling eastbound on U.S. 93, views of the Railroad Pass Hotel and Casino signs would still be visible to motorists.

In addition, views along the realigned U.S. 93 would change in areas where the alignments would deviate from the existing U.S. 93. Most of the deviations would route the road through undeveloped areas.

Other improvements to surface streets, as part of this alternative, would result in minor changes to the landscape. The exceptions include the new road that would intersect with Yucca Street on the north side of U.S. 93, the extension of Adams Boulevard/Veterans Memorial Drive, and the realignment of U.S. 93 to the north just west of Buchanan Boulevard. These improvements would result in major modifications to the local landscape, the most notable being the demolition of up to five commercial buildings to the west of Buchanan Boulevard on the north side of existing U.S. 93. Implementation of this alternative would change the view by demolishing the building and creating an “island” between the existing U.S. 93 and the realigned U.S. 93. Within the island, the Boulder City Assembly of God Church could remain.

Other changes to views from the road include the altered view from the realigned U.S. 93 where it would cross over Lake Mountain Drive, which is currently an at-grade intersection. Motorists traveling on both U.S. 93 in that area and on Lake Mountain Drive would have their views modified.

Pacifica Way is currently an at-grade intersection with U.S. 93. Its proposed overcrossing of realigned U.S. 93 would change the view from both Pacifica Way and U.S. 93 in this area. Motorists traveling on U.S. 93 toward Lake Mead, when west of the proposed overcrossing, would have lake views blocked. East of the proposed overcrossing, views of the lake would remain. The proposed Lakeshore Road overcrossing of U.S. 93 would also change the view from both roadways.

No adverse impacts on existing views from the road are expected from implementation of Alternative B; however, the expected changes in views are acknowledged as different views provided to drivers and passengers.

Alternative C. Similar to Alternative B, motorists currently traveling on U.S. 93 pass in front of the Railroad Pass Hotel and Casino near the western end of the project and the

Hacienda Hotel and Casino near the eastern end of the project. The proposed realigned U.S. 93 would move the highway away from the hotels/casinos. Traveling westbound on U.S. 93, views of the Railroad Pass Hotel and Casino are expected to improve, when compared to existing conditions. Traveling eastbound on U.S. 93, views of the Railroad Pass Hotel and Casino signs would still be visible to motorists.

In addition, views along the realigned U.S. 93 would change in areas where the alignments would deviate from the existing U.S. 93. Most of the deviations would route the road through undeveloped areas.

Alternative C, between the Boulder Oaks RV Park and the Lakeview Drive subdivision, would provide an elevated view from a road in an area where a roadway does not currently exist. The elevated portion of the roadway may provide views of Lake Mead that currently do not exist.

Other changes to views from the road include the altered view from the realigned U.S. 93 where it would cross over Lake Mountain Drive, which is currently an at-grade intersection. Motorists traveling on both U.S. 93 in that area and on Lake Mountain Drive would have their views modified.

Pacifica Way is currently an at-grade intersection with U.S. 93. Its proposed overcrossing of realigned U.S. 93 would change the view from both Pacifica Way and U.S. 93 in this area. Motorists traveling on U.S. 93 toward Lake Mead, when west of the proposed overcrossing, would have lake views blocked. East of the proposed overcrossing, views of the lake would remain. The proposed Lakeshore Road overcrossing of U.S. 93 would also change the view from both roadways. Implementation of Alternative C would not result in adverse impacts on views from the road. However, the expected changes in views are acknowledged as different views provided to drivers and passengers.

Alternative D (Preferred Alternative). The simulation of Viewpoint 1 (Figure 4-8) shows the view from the U.S. 93/95 interchange looking south along U.S. 95. Also seen is the simulated grade-separated crossing of U.S. 95 by an elevated U.S. 93, as part of Alternative D. Due to the proposed architectural treatment of the overcrossing, it blends well with the landscape. This "view from the road" is not considered a sensitive view, and implementation of Alternative D would likely not be considered offensive. The simulated view shows that the view from this location would not be degraded.

Most of Alternative D would pass through undeveloped land south of Boulder City. This would be a substantial change in the views afforded to drivers and passengers who currently travel on U.S. 93.

Similar to Alternatives B and C, motorists currently traveling on U.S. 93 pass in front of the Railroad Pass Hotel and Casino near the western end of the project and the Hacienda Hotel and Casino near the eastern end of the project. The realigned U.S. 93, proposed as part of Alternative D, would move the highway away from the Hotels/Casinos.

Alternative D would also provide a view of Lake Mead from the roadway from atop Eldorado Ridge. This view is not currently available, and it is considered a benefit to motorists.

These changes in views are not considered adverse, but they are acknowledged as different views provided to drivers and passengers.

4.10.3 Mitigation

Construction Mitigation

Regardless of the alternative selected, certain views during the construction period would be altered by the presence of construction vehicles, equipment, personnel, and activities. This impact is expected to be important to some viewers and is an unavoidable consequence of project construction.

Dust emissions during project construction, and the associated impact on views would vary from day to day, depending on the level of activity, the specific operation being conducted, and the prevailing meteorological conditions. The impacts on visual resources are not considered adverse because (1) construction activities could occur intermittently over an 11-year construction period; (2) dust suppression techniques, such as watering and applying chemicals, would be used during project construction to prevent (or suppress) the dust; and (3) a dust mitigation plan would be implemented. Other dust suppression mitigation identified in the *Air Quality Technical Study* for this project (NDOT, July 2001c) would also reduce impacts on views from fugitive dust emissions.

If nighttime construction occurs, construction night lighting may encroach on nearby sensitive receptors. If nighttime construction is necessary, lighting should be directed away from residences and should be shielded so that light is not emitted from the construction site.

Operational Mitigation

Alternatives B and C would result in an unavoidable adverse impact on the existing view of Lake Mead from the Laguna Lane residences. No other adverse impacts on views would be expected from implementation of Alternatives B and C. Impacts on adjacent residences from new freeway lighting sources at interchange areas will be mitigated by installing glare shields around the light element to direct the glare away from the residences.

No adverse impact to the viewshed of sensitive receptors in the Eldorado Valley and Hemenway Wash areas is expected from implementation of Alternative D. However, as discussed in Chapter 7 and in Appendix D, adverse visual impacts would result from its implementation within the LMNRA based on the conflict with NPS land management plans for that area.

To mitigate the potential visual impact on businesses from loss of drive-by patrons due to reduced visibility from the realigned U.S. 93, signage will be provided prior to each highway off-ramp alerting drivers to the availability of food, gas, and lodging services.

In areas where noise barriers would be installed, the barriers should be designed to provide an aesthetically pleasing appearance. In addition, the color of the noise barriers should blend with the surrounding environment.

In areas where bridges would be constructed, the embankments will be treated to minimize erosion and planted, as appropriate, with suitable xeriscape vegetation.

Regardless of the alternative selected, the proposed project would directly alter the landscape within and south of Boulder City. Alternative D would result in the most new roadway development through undeveloped area, resulting in the greatest landscape modification. Alternative B would result in the least amount of landscape alteration. As part of the design process, corridor landscaping will be addressed, and the desires of the stakeholders will be considered. NDOT is developing a landscape policy that, when in place, will outline a cost allocation (as a percentage of total construction estimate), a treatment method depending on the project setting (urban, rural, new construction, or reconstruction), and type of roadway (freeway, arterial, collector, or local). This policy is planned to be in place mid 2002. This policy will describe a landscaping minimum. The local agency (city, county, or RTC) may enhance the landscape design at any time, while staying within the policy guidelines, including the plant list and safety standards. The local entity will be expected to fund and maintain any enhancements.

Where the new motorists' view of Lake Mead is created atop Eldorado Ridge, as part of Alternative D, a roadway pull-out and vista point lookout will be developed within the planned right-of-way to (1) provide views of longer duration of the lake, and (2) mitigate the potential public safety impact caused by drivers viewing scenery while attempting to maneuver vehicles at a safe speed.

A secondary impact on visual resources along the new or realigned highway that could be expected is the trash and other highway-related debris that accumulates along highway margins. This would result in a visual impact and would be mitigated by implementing a periodic, but regular, trash collection program along the highway.

4.11 Economic Impacts

4.11.1 Construction Impacts

The construction phase of any of the build alternatives would have a positive impact on employment, sales tax revenues, and overall economic activity in the project area. While it is likely that many construction jobs would be filled by residents from places other than Boulder City, new jobs could be created within Boulder City limits in businesses and industries that provide goods and services used during construction and in businesses that sell goods and services to workers on the project. The actual impact would be a function of where equipment and material needed for construction would be purchased.

Construction Employment and Material Purchase Impacts. For the purposes of this analysis of construction impacts, "the region" refers to Clark County, Nevada. As a result of construction of the proposed Boulder City/U.S. 93 Corridor build alternatives, economic impacts in the region would be generated by material purchases, construction payrolls, and related indirect and induced spending, or "multiplier impacts." In assessing the economic impacts of the project, it is important to recognize that economic benefits associated with the construction phase would occur only during the construction period.

Methodology. An input-output model developed by the Minnesota IMPLAN Group has been used to quantify the economic effects of the proposed project. The model provides the basic methodology for the assessment of the potential economic impacts, with modifications to produce multipliers specific to Clark County. Quantification of the effects of material purchases, during both the construction and operational phases of the project, relies upon the following:

- Projected material expenditures are derived from the preliminary engineering estimates.
- The particular goods and services needed for construction of the proposed roadway improvements are evaluated through analysis of "use" vectors for roadway improvements in the region.
- The degree to which materials are likely to be purchased in the region is projected using a location quotient analysis, which measures the concentration of local activity in each major industrial sector. The location quotients are calculated to reflect the degree to which particular goods are likely to be available within a given region.
- Output multipliers derived from the model are used to evaluate indirect and induced impacts on the local economy. These output multipliers indicate the total increase in output that would occur in the local economy with each dollar of project expenditures, including respending of income derived by local businesses and individuals from direct project-related purchases. Similar employment multipliers are applied to analyze total job creation in the region resulting from project-related expenditures.
- Quantification of the effects of payroll-related impacts relies upon the following:
  - Estimates of the payroll expenditures are based on payroll multipliers that convert output to payroll, based on estimates for the road construction industry in Clark County. Estimates reflect current wage rates and may be different when construction commences.
  - Adjustments for Fringe Benefits, Taxes, and Other Payroll Deductions for road construction workers in the project area are determined by using Bureau of Labor Statistics data.
  - The percentage of construction employees likely to be hired in the region is estimated based on an analysis of journey to work data. It is assumed that only construction employees living permanently in the region would contribute to the local economy. Construction workers temporarily relocated into the region are assumed to continue making their major purchases in their home communities. Although they would make contributions to the local community through expenditures for temporary housing, meals, and other related living expenses, these expenditures are relatively small and are anticipated to be short-lived.
- As discussed, multipliers applied in this aspect of the analysis are derived from the IMPLAN model. They have been modified to generate regional multipliers relevant to Clark County. Direct impacts represent expenditures related to the construction project itself. Indirect and induced impacts are combined to make up the local multiplier effects. The sum of the direct impacts and the local multiplier effects is equal to the total impact.

Impact Area. The impacts of material purchases and payrolls would occur primarily within Clark County. Payroll impacts, in particular, are likely to be centered within Clark County, given the county's size and the proposed project's location within the county. It is likely that some materials would be purchased within Boulder City. For example, there are several local borrow pits that might be used as a material source by the contractor during project construction.

Employment and Output Impacts. In determining the economic impacts of the proposed project's construction budget, the following assumptions were made:

- The model was run for three U.S. 93 alternative alignments (Alternatives B, C, and D). It considered the differences in the amount of labor and materials purchased connected with the construction of each alternative.
- A construction budget of approximately $189.1 million for Alternative B, $195.7 million for Alternative C and $312.3 million for Alternative D, excluding right-of-way acquisition, expended over a multiyear period. This assumption is based on comparative, preliminary engineering estimates.

The rapid growth of the Las Vegas economy has necessitated the development of a sophisticated building industry and a labor market that has the managerial, supervisory, and technical experience required for a construction project of the proposed project's size and complexity. Accordingly, nearly all of the labor necessary, including high-level management, is expected to be recruited locally. Ninety-five percent of workers are assumed to be local (i.e., Clark County residents) given the size of the local construction industry and the journey-to-work patterns of Clark County employees. The high percentage will mean that most of the positive employment and purchase impacts from the proposed project will benefit the county. These benefits are described below.

Alternative B. Application of the appropriate multipliers to both the direct labor and direct project costs for Alternative B results in multiplier impacts of just under $87.9 million in sales in the region. Of this total, an estimated $78.2 million of the impact would be for intermediate materials purchases. The remaining $9.7 million would be the result of direct labor expenditures in the county after taxes, benefits, and savings.

In addition, construction of the proposed project would require approximately 2,721 person-years of direct, indirect, and induced employment, generating $112.9 million in earnings. The total impact includes 1,599 person-years of employment directly required for construction of the road improvements, as well as 1,122 person-years of employment generated by the consumer expenditures resulting from direct employment and from material expenditures (the direct as well as intermediate purchase of goods) for the proposed project. Table 4-29 presents the economic impacts associated with Alternative B.

Alternative C. Construction of the proposed project under Alternative C would result in similar sales, employment, and earnings impacts. The local multiplier impact of this construction alternative is expected to be approximately $90.7 million. This multiplier impact consists of $10.0 million in purchases generated from $38.7 million in take-home wages paid to construction employees (after taxes, benefits, and savings); and $80.7 million in intermediate material purchases generated from the direct purchases of materials required for the proposed project.

This alternative is expected to generate total employment impacts of approximately 2,810 person-years and $116.6 million in earnings paid to these workers. The total employment impacts consist of approximately 1,653 person-years of employment hired to construct the proposed project and an additional 1,157 person-years of employment generated from the respending of $38.7 million in spendable earnings paid to employees hired for construction; and $35.6 million in gross wages paid to other employees hired to produce intermediate and final products required for construction. The economic impacts of Alternative C are presented in Table 4-29.

Alternative D (Preferred Alternative). Construction of the proposed project under the preferred Alternative D would result in a higher level of sales, employment, and earnings impacts due to the larger amount of direct construction expenditures. The local multiplier impact of this construction alternative is expected to be approximately $144.7 million. This multiplier impact consists of $15.9 million in purchases generated from $61.9 million in take-home wages paid to construction employees (after taxes, benefits, and savings); and $128.8 million in intermediate material purchases generated from the direct purchases of materials required for the proposed project.

This alternative is expected to generate total employment impacts of approximately 4,481 person-years and $186.3 million in earnings paid to these workers. The total employment impacts consist of approximately 2,635 person-years of employment hired to construct the proposed project, and an additional 1,846 person-years of employment generated from the respending of $61.9 million in spendable earnings paid to employees hired for construction; and $56.9 million in gross wages paid to other employees hired to produce intermediate and final products required for construction. The economic impacts of Alternative D are presented in Table 4-29.

TABLE 4-29
Construction, Employment, and Income Generation Associated with the Construction of the Boulder City/U.S. 93 Corridor

	Alternative B	Alternative C	Alternative D
Direct Impacts			
Total Project Budget (excluding ROW acquisition)	$189,117,968	$195,746,810	$312,315,946
Direct Payroll Expenditures	$78,398,410	$81,031,071	$129,425,626
Local Net Take-Home Wages	$37,474,440	$38,732,852	$61,865,449
Direct Employment (person-years)	1,599	1,653	2,635
Local Employment Capture (person-years)	1,519	1,570	2,504
Local Multiplier Impacts (Indirect and Induced Impacts)			
Sales (Output) Multiplier Impacts	$87,857,266	$90,656,139	$144,697,203
Labor Spending Impacts	$9,664,299	$9,972,175	$15,916,692
Material Purchase Sales Impacts	$78,192,967	$80,683,964	$128,780,511
Employment Multiplier Impacts (person years)	1,122	1,157	1,846
Payroll Expenditure Multiplier Impacts	$34,490,186	$35,594,185	$56,875,196
Total Impacts (Direct, Indirect and Induced Impacts)			
Total Sales (Output) Impacts	$276,975,234	$286,402,949	$457,013,149
Total Employment (person years)	2,721	2,810	4,481
Total Payroll Expenditures	$112,888,597	$116,625,256	$186,300,822

Estimates prepared by Applied Economics, 2001.
Note: Alternative A is the no-build scenario and would have no economic impact.

Local Business Impacts. Construction activities would be likely to result in reductions in revenue for some local businesses. Local business impacts may include one or more of the following:

- Real or perceived loss of access or substantial changes in access
- Increased traffic congestion
- Reduced or eliminated adjacent parking
- Reduced visibility of businesses from the street
- The creation of a disruptive and/or unpleasant environment (noise, dust, vibration)
- Disrupted utility services

Alternative A. Alternative A would not have any construction activity or related impacts.

Alternative B. Impacts to businesses along U.S. 93 during construction of Alternative B may include temporarily increased congestion, noise, dust, and possibly interrupted or reduced access. Real or perceived loss of access or substantial changes in access can result in reductions in revenue for local businesses. Small businesses and businesses depending on location or drive-by customers are the most likely to be adversely impacted.

The most substantial impacts are likely to occur along U.S. 93 west of Canyon Road. A retail-oriented stretch of businesses is located along both sides of the highway, and approximately 50 percent of Boulder City's retail sales and 15 percent of its total sales are generated from this area. Thus, construction along this section of the alignment has the potential to impact many retail businesses that depend on good visibility and access. Temporary detours and access points would be established during construction to allow customer access to these businesses. It is estimated that the duration of construction impacts on these businesses could be from 12 to 18 months.

Two major employers, the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino, located at the western and eastern project limits, may experience decreased access during construction of Alternative B. The construction impacts are expected to be short-term. The separate Hoover Dam Bypass bridge crossing (see Section 2.1), being developed by FHWA, terminates east of the Hacienda Hotel and Casino and could have no impact on the Hacienda Hotel and Casino, as there would be no change to the existing U.S. 93 alignment or access along the hotel frontage.

Commercial truck and automobile traffic would experience delays during the construction of Alternative B. The improvement of the existing highway, construction of overpasses at Lakeshore Road and Pacifica Way, and completion of the frontage road would cause intermittent delays to traffic traveling on the existing roadways. Businesses that rely on the existing roadways for the delivery of goods and services may experience a temporary increase in transportation costs due to the traffic delays. The costs associated with the increased travel time are expected to be minor.

The current engineering plans for Alternative B would expand the existing highway by approximately 6 m (20 ft) west of Buchanan Boulevard and would require full displacement of approximately five businesses along U.S. 93. The five businesses combined employ between 10 and 20 employees and generate annual sales of $1.0 to $1.5 million, which represents about 0.4 percent of the estimated $337 million in total sales in Boulder City. The number of businesses and employees displaced by Alternative B would represent less than one percent of the total businesses and employees in Boulder City. The displaced businesses may be able relocate to another site along U.S. 93 or to another location within Boulder City limits. Thus, the impact to the local economy of the displacement of five businesses is expected to be negligible.

Approximately seven additional businesses are located on property within the planned right-of-way limits and could experience partial displacements but remain open for business. Some of the businesses could lose parking stalls and/or property used for displaying products and signage.

Alternative C. The current design plan for Alternative C would not result in any business displacements along the existing or proposed roadways. Because this alignment is located north of U.S. 93 west of Buchanan Boulevard, construction is not likely to have much effect on the businesses located along existing U.S. 93.

The hotel and casino establishments at either project terminus may experience similar accessibility issues as Alternative B. The impacts, however, are expected to be short-term.

Commercial truck and automobile traffic would experience delays during the construction of Alternative C. The improvement to the existing highway east of Buchanan Boulevard and construction of the interchange at Lakeshore Road, the overpass at Pacifica Way and Railroad Pass, and the frontage road would cause intermittent delays to traffic traveling on the existing roadways.

The current alignment for Alternative C could also impact the planned Park Place and Boulder Ridge golf courses. If this alternative were chosen, construction of the highway would pass through part of the land planned for the Boulder Ridge Golf Course and along the boundary of the planned Park Place Golf Course.

Alternative D (Preferred Alternative). Alternative D would have the fewest construction impacts of all of the build alternatives because the alignment is south of the developed portion of Boulder City and would not impact businesses or residents along the existing highway. Commercial trucks and vehicular traffic may experience delays during the construction of the interchanges at the western and eastern project limits. Existing hotel and casino establishments located near the interchanges may experience short-term access limitations; however, the impacts are expected to be negligible.

4.11.2 Operational Impacts

There are three main types of operational impacts that may result from the project:

- Permanent changes in access to businesses along U.S. 93
- Long-term effects to the overall economy of Boulder City from changes in travel patterns, including changes in travel times and accident rates
- Potential fiscal impacts to Boulder City

Alternative A. Under Alternative A, no businesses would be displaced by right-of-way acquisition, and there would be no resulting decrease in property or sales tax revenues or jobs lost. Compared to the build alternatives, Alternative A would likely result in increased congestion, an overall reduction in mobility in the project area, and increased risk of accidents. Some businesses may experience a reduction in sales revenues as local residents avoid shopping in the congested business district. At the same time, other businesses may experience an increase in sales if their businesses depend on impulse purchases.

Alternative B. For Alternative B, the proposed median islands between Veterans Memorial Drive and Buchanan Boulevard would make access to some businesses more difficult than currently exists. This could result in lower revenues for affected businesses whose customers choose to avoid the additional driving time and shop elsewhere. However, the impacts are not likely to be substantial because left turns are currently difficult to make at many times of day, and U-turns would be possible at median openings. In fact, the improved mobility from this alternative would probably result in overall improved sales for many businesses above what might be expected under Alternative A.

Compared to the other build alternatives, this alternative would have very little impact to the existing retail district along U.S. 93 west of Buchanan Boulevard, but it would not provide a measurable boost to Boulder City's prospects for improving tourism-related business.

Revenues at the hotel/casino properties at either end of the project area would be likely to change, depending on the extent to which the visibility and ease of access to the properties is changed. For all of the build alternatives, the visibility of the Railroad Pass Hotel and Casino will change minimally; there may be a slight reduction in the visibility of the establishment for eastbound traffic and maybe a slight improvement in visibility for westbound traffic. There is not likely to be any change in the visibility of the Railroad Pass Hotel and Casino property's large, lit sign in any of the alternatives. In all build alternatives, the decision to exit the freeway to U.S. 93 and enter the property would have to be made sooner than is currently the case. There are no substantial differences between the build alternatives in terms of the visibility or ease of access to the property. Overall, the build alternatives for the project may result in a negative effect on revenues for the Railroad Pass Hotel and Casino establishment.

For the Hacienda Hotel and Casino, eastbound traffic in Alternatives B and C would need to exit the freeway at Lakeshore Road in order to access the property. The decision to exit would need to be made prior to the property being visible to the driver. This would have a negative effect on the hotel's revenues compared to Alternative A. Good signage to the property may help reduce any impacts. For westbound traffic, the property would be visible for some time prior to the decision point to exit the freeway; however, the decision point would be sooner than it would be under Alternative A. Thus, it is likely that visibility and access changes would also result in a negative effect on revenues from westbound traffic.

Like the other build alternatives, the interchanges at the western and eastern ends of the project would improve access to U.S. 93 and to Lake Mead, and they would be a positive impact compared to Alternative A.

Alternative C. Under this alternative, it is likely that the retail district along U.S. 93 between Veterans Memorial Drive and Canyon Road would experience lower sales, employment, and tax revenue than would be the case under Alternatives A or B. However, there would be potential for redevelopment that could offset some of those losses at the new U.S. 93

interchange at the Canyon Road extension. The land in the vicinity of this interchange is zoned BC and S. Based on conversations with Boulder City planning staff, commercial development would be allowed in the BC zone, and development in the S zone would require a zone change (Susan Danielewicz, pers. comm., 2001).

Ultimately, the course of any future development would rest with the city or its voters and the degree to which they are interested in allowing sales or leases of Boulder City-owned land for development at the new interchange or between the interchange and the Buchanan Boulevard/U.S. 93 intersection. In Boulder City, all city-owned land sales of more than 1 acre must be approved by the city's registered voters in an election, and any leases must be approved by the Council based on a recommendation by the Planning Commission (Boulder City Charter, Section XV).

Compared to the impacts expected for Alternative D, discussed below, this alternative would have less potential for impact on the retail sector associated with bypassing existing retail establishments, because the interchange at Canyon Road would provide better access to these establishments. With Alternative C, the presence of the freeway going through town could detract somewhat from the desirability of the town as a tourist destination (relative to Alternative D).

Changes in access and visibility to the Railroad Pass Hotel and Casino with Alternative C are expected to be similar to those of Alternative B.

For the Hacienda Hotel and Casino, the impacts would also be similar to those of Alternative B.

Like the other build alternatives, the interchanges at the western and eastern ends of the project would improve access to U.S. 93 and to Lake Mead, and they would be a positive impact compared to Alternative A.

Alternative D (Preferred Alternative). This analysis assumes that most through-traffic (autos and trucks) would use the bypass. The long-term operational impact of Alternative D to the Boulder City economy could be either positive or negative depending on the course of future events, Boulder City land use and development policies, and the perspective used for evaluation. This study analyzes the likelihood of various impacts by evaluating data developed for this project, as well as a recent review of 190 studies of bypass impacts based totally, or in part, on business sales (Liff et al., 1996). Most of these studies found that a highway bypass has a net positive impact on the local community (Table 4-30). Not surprisingly, that finding does not apply to traffic-serving businesses along the old route, for which about half of the studies found that the bypass had a negative impact on traffic-dependent businesses.

TABLE 4-30
Effects of Highway Bypasses on Communities

	% Positive	% No Impact	% Negative	% Total	Number of Studies
Overall community	89	4	7	100	141
Traffic-serving businesses along old route	30	22	49	100	88

Other conclusions from the 190 studies of bypass effects include:

- Bypasses generally result in decreased retail sales, gasoline service receipts, restaurant sales, and service receipts. The initial decreases are often counteracted by reorientation and refocusing of local stores. The economic impact of highway bypasses on small cities in a rural setting is not uniform across cities. Some factors that determine those impacts include:
  - The size of the city: smaller cities are typically impacted more severely than larger cities.
  - Average daily traffic (ADT) of the highway: the greater the traffic flow, the more beneficial the long-term prospects for through-traffic-dependent local businesses.
  - The economic base of an area: the more inflows of funds to the local economy are affected by the highway, the more the bypass will affect local businesses.
  - A highway bypass may cause a decrease in business volumes in small cities. However, other factors such as increases or decreases in economic base industries (e.g., tourism) or in the local and regional economy appear to be more important overall in determining the overall level of business sales and employment.
- Bypasses typically seem to have a favorable impact on rural communities and small urban areas, but evidence in these studies is often weak. Interviews and survey of residents and businesses indicate that bypasses increase development potential along the fringe areas served by the new route, and at the same time relieve congestion, safety hazards, and other undesirable conditions in the central areas from which traffic is diverted. The studies of bypass effects summarized by Liff et al. (1996) include bypasses that have interchanges, and it is likely that these interchanges are the features that enhance the development potential of outlying areas. For the preferred alternative there will be no interchanges east of U.S. 95; therefore, it is unlikely that this project will enhance the development potential of fringe areas.
- A potential impact of a bypass is that a downtown business district will suffer a decline in retail sales due to lower main street traffic volumes. In some instances, this decline was offset by increased sales at new developments near freeway interchanges. Many bypassed communities that suffered a reduction in retail sales experienced a transformation of the downtown area from a center of retail activity to a center supporting more professional and service businesses.

A study of the likely impacts of a southern bypass on Boulder City's local economy was recently commissioned by the Boulder Dam Credit Union (BDCU) (Borden and Fletcher, 2000). Some of the conclusions of that study include:

1. Total business activity in the local economy as a result of tourism is $36 million ($21 million direct and $15 secondary).
2. The most likely result from a southern bypass is a 50 percent reduction in tourism expenditures, which would be an $18 million reduction in sales (direct and secondary) and a reduction of about 200 jobs.

3. An estimated 30 to 40 Boulder City businesses would close.
4. Boulder City's retail and service sectors should experience increases in sales during construction of the Hoover Dam Bypass and the Boulder City/U.S. 93 Corridor project (Alternative D), which could lead to an expansion of existing businesses and new entrants in the market. When the construction is complete and this spending ceases, this could result in a "double-barreled" impact on the economy (when combined with the likely decline in tourism expenditures).
5. Continued growth in Henderson and Las Vegas, the construction of proposed new golf courses, and the renovation of the downtown business district are all factors that will draw more visitors to the area. If these sources of new income materialize, some people will conclude the bypass had no negative impact on the Boulder City economy.

To provide further perspective, the potential for lost sales and employment estimated in the BDCU study represents about 5 percent of total sales and 4 percent of total employment in Boulder City. It is estimated that about 50 percent of Boulder City's retail sales and 15 percent of its total sales are generated along U.S. 93 west of Canyon Road. Many of the businesses in this area, such as grocery stores, gas stations, and fast food restaurants, require high visibility locations with easy access to attract impulse purchases.

The estimates of lost jobs and sales stated in the BDCU study are reasonable estimates of one aspect of economic impact of this alternative, but they do not account for the positive influence of increased mobility and reduced truck traffic in town. It is difficult to estimate the extent of this positive impact, but it would probably serve to somewhat counteract the negative impact of reduced spending by through-traffic customers. Overall, however, Alternative D is likely to result initially in a noticeable negative economic impact to the town; and Boulder City would experience a short-term reduction in sales and property tax revenues.

The potential negative impacts of this alternative should also be weighed against other positive factors not directly related to this project that could ultimately lead to Boulder City's continued economic health, such as:

- The proposed new golf course developments
- Ongoing redevelopment in the historic downtown
- Boulder City's proximity to the fast-growing areas of Henderson and Las Vegas

Each of these factors has the potential to spur increased economic development in and around Boulder City, again dependent somewhat on the extent to which the City chooses to lease land for development or propose sales of land for approval by city voters.

In the long run, removal of most of the through-traffic would present a much more attractive environment for many businesses not dependent on significant numbers of through-traffic customers. Thus, Boulder City's economy might transition into one dependent more on services, destination tourism, or possibly even small-scale manufacturing. Any such transition would probably be a relatively lengthy process. Ultimately, it is uncertain if Boulder City would experience more or less long-term economic growth under this alternative versus another. However, assuming no other currently unforeseen economic events, it is likely that the overall economy of Boulder City would remain reasonably healthy in the mid- to long-term if this alternative were implemented.

Boulder City's response to the project would play an important role in determining the response of the local economy to implementation of this alternative. Boulder City has an unusual amount of control over development by virtue of its ownership of large parcels of land. The ongoing debate in the town over allowing long-term leases or sales of land for development will ultimately have as great or a greater impact on Boulder City's economic future than the choice of transportation alternative for this project. Also, the extent to which Boulder City is successful in promoting the town, with its proximity to Hoover Dam and Lake Mead, as a destination through various media will affect how the local economy would fare after implementation of this alternative.

Changes in access and visibility to the Railroad Pass Hotel and Casino with Alternative D are expected to be similar to those of Alternative B.

For the Hacienda Hotel and Casino, eastbound traffic would be descending a long grade with a spectacular view of Lake Mead as it approaches the decision point to exit to the property. The property would not be readily visible prior to reaching that decision point. This would have a negative effect on the revenues of the hotel compared to Alternative A, and the impact would be similar to that of Alternatives B and C. For westbound traffic, the impacts to this property would be similar to the other build alternatives.

4.11.3 Mitigation

Construction Mitigation

To reduce the potential adverse impacts associated with the temporary change or restriction of access to businesses along the existing U.S. 93 corridor, a Traffic Construction Plan will be prepared prior to commencement of construction activity. Features of the Traffic Control Plan may include, but will not be limited to, the following:

- Using flaggers, detours, and temporary signage to inform drivers that access to businesses during construction is temporarily changed or restricted.
- Development of alternative access points for affected businesses.
- Coordinating with affected business owners to develop strategies to maintain access to businesses during construction.

Operational Mitigation

Implementation of Alternative B could require the acquisition of approximately five commercial properties to provide the required right-of-way for widening U.S. 93. Fair market value will be provided to the property/business owners. In addition, relocation support services will be provided to assist displaced businesses in finding other suitable locations in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. This form of compensation is described in the NDOT brochure, *Relocation Assistance in Nevada* (NDOT, no date).

Several additional businesses may be partially affected by implementation of Alternative B based on the conceptual alignment, potentially resulting in a loss of signage, landscaping features, or parking area. If right-of-way is needed, the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 will govern the acquisition of any right-of-way necessary for this project.

Under Alternative B, noise barriers would have to be considered to reduce project-related traffic noise to acceptable levels at the recreational vehicle (RV)/mobile home park at Yucca Street and U.S. 93, for the first few homes along Forest Lane and north of Lakeview Drive, and the single-family homes south of the proposed U.S. 93 alignment east of Nevada Way. For Alternative C, noise barriers would have to be considered for the Boulder Oaks RV Park, the single-family homes north of U.S. 93 east of the proposed Canyon Road interchange, and the single-family homes south of the proposed U.S. 93 alignment east of Nevada Way. Potential adverse environmental and economic impacts on residences from traffic noise will thus be mitigated with installation of noise barriers (NDOT, August 2001b).

Implementation of Alternative C would have the potential to adversely impact the planned golf courses north of existing U.S. 93. Purchase of the required right-of-way at fair market value or replacement of land in kind will serve to reduce the severity of this impact. Directional signs consistent with NDOT's sign program indicating the destination connection to Hoover Dam, Lake Mead, and the historic downtown of Boulder City, and the availability of food, gas, and lodging services will be placed prior to each new interchange.

For both Alternatives C and D, good signage would help local businesses counteract the effects of a decline in drive-through traffic. NDOT's business logo sign program would allow signs on the west end of the project, which would most likely be designated as Interstate roadway, as well as the east end of the project. This would be done through an arrangement between NDOT, the logo sign program vendor, and the Boulder City businesses; and if there were enough businesses interested in logos to make a sign feasible from a cost standpoint then it would be implemented. Any special roadway signing for tourist destinations and the downtown business district would also have to be consistent with the FHWA Manual on Uniform Traffic Control Devices (MUTCD).

As with Alternative C, signs indicating the destination connection to Hoover Dam, Lake Mead, and the historic downtown of Boulder City, and the availability of food, gas, and lodging services may be placed prior to each new interchange.

4.12 Social Impacts

4.12.1 Construction Impacts

Alternative A

The No Build Alternative (Alternative A) would not involve any construction activity and, consequently, would not result in any construction impacts.

Alternative B

Alternative B would be constructed through the existing commercial district between Veterans Memorial Drive and Buchanan Boulevard. This district is part of a redevelopment area that generally includes those lands north of U.S. 93 between the city limits to the west and Buchanan Boulevard to the east, and the area south of U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard. Existing residential uses and the State Veterans Home are excluded from the redevelopment zone. Retail businesses in the affected commercial district would be impacted during construction activities due to reduced accessibility. Similarly, access to these businesses by local residents of Boulder City would be affected by construction.

Five businesses along U.S. 93 would require relocation for the construction of Alternative B, with the buildings being demolished. An additional seven businesses and a church would also be partially impacted by construction. These impacts are discussed further under Section 4.12.2, Operational Impacts. No business relocations would occur within the major retail shopping centers at the southwest and northeast intersection with Buchanan Boulevard. Access to these areas would be maintained at all times during construction.

Residents within the mobile home community south of U.S. 93 in the vicinity of Gingerwood Street would be subject to increased noise and dust resulting from construction, along with the addition of construction-related traffic along nearby roadways and changes to the visual environment. Residential neighborhoods adjacent to U.S. 93 in Hemenway Wash would experience similar effects.

Common to all the build alternatives would be the increase in construction-related jobs that would occur during the construction phase of the project (Section 4.11).

During construction, the demand for emergency services has the potential to increase due to possible construction-related accidents. The Boulder City Fire and Police Departments and Nevada Highway Patrol (NHP) would maintain first-response emergency services in case of accidents. While the potential demand for these services is difficult to predict, no expansion of existing facilities or additional personnel is anticipated to be required.

Pedestrians and bicyclists using existing U.S. 93 may experience short-term impacts during construction, as these activities will temporarily affect access and connectivity of the transportation system.

Alternative C

With the exception of the Railroad Pass Hotel and Casino, Alternative C would bypass existing development from the project's western terminus to the planned interchange with Canyon Road. Therefore, construction activities along this portion of the alignment would not result in any socially disruptive effects. Between the Canyon Road interchange and the existing U.S. 93 alignment, construction activities would occur directly adjacent to the Boulder Oaks RV Park and the residential neighborhood off Lakeview Drive. These neighborhoods would experience temporary impacts from noise, dust, construction traffic, and visual impacts associated with construction activity.

Similar to Alternative B, Alternative C would have the potential to increase demand for emergency services during construction activity but would not require an expansion of existing emergency facilities or additional personnel. In addition, Alternative C would provide similar benefits as Alternative B due to increased construction-related jobs.

Alternative D (Preferred Alternative)

Because Alternative D would bypass the developed portion of Boulder City, no neighborhoods or community facilities, with the exception of some recreational trails, would be impacted by construction activity. As discussed under Alternatives B and C, construction activity may increase the demand for emergency services due to the potential for construction-related accidents; response times may be longer due to the greater distances and remoteness of this alignment. However, no expansion of emergency facilities or additional personnel is anticipated to be required. Further, construction of Alternative D would provide the greatest benefits in terms of increased construction-related employment (see Section 4.11).

4.12.2 Operational Impacts

Alternative A

The No Build Alternative (Alternative A) would not result in any changes to the existing U.S. 93 alignment. As traffic volumes continue to increase, further congestion problems would result along the alignment, as well as indirect impacts related to air quality and noise. The increased traffic volumes would also exacerbate the barrier effect created by the U.S. 93 corridor, particularly between residents within Hemenway Wash to the north and downtown Boulder City to the south. This would impede safe access for pedestrians and bicyclists, as well as local traffic trips, between the two parts of the community. In addition, the high crash rates along U.S. 93 can be expected to remain the same or worsen over the long term. These adverse impacts would not be mitigated without some change to the physical configuration of U.S. 93.

Alternative B

Implementation of Alternative B would require an expanded right-of-way near the intersection with Buchanan Boulevard. Five existing businesses would be removed west of the intersection in order to accommodate the realigned intersection configuration. This expansion would eliminate the goods and services provided by these establishments and slightly reduce employment opportunities for residents of Boulder City.

Seven businesses and a church would be partially impacted by the expanded right-of-way, resulting in a loss of parking space, signage, and/or display areas. This change would not be anticipated to substantially alter the continuing viability of these establishments. Therefore, the goods, services, and employment provided by these establishments to the residents of Boulder City would not be impacted.

Changes to the configuration of U.S. 93 would potentially impact the commercial district between Veterans Memorial Drive and Buchanan Boulevard. Specifically, the installation of raised medians would limit ingress and egress to right turns only. This could limit accessibility from opposite lane traffic, such that the existing volume of business would be reduced. However, relative to the existing configuration, in which accessibility is often limited by high traffic volumes, the change would not be adverse. Furthermore, access from opposite traffic lanes would be available at designated left-turn and U-turn areas.

Residences within the mobile home community south of U.S. 93 would not be directly affected by project improvements. However, residents would be required to use an alternate route to downtown Boulder City via the planned extension of Elm Street. This would allow for the partial avoidance of U.S. 93 and should result in an improvement to local circulation. The enhanced connectivity to businesses, public services, and other facilities is a beneficial project effect.

East of Buchanan Boulevard, the project would result in changes to local circulation for residents of the Hemenway Wash area. The provision of a local frontage road north of U.S. 93, as well as two grade-separated crossings of the alignment would improve local circulation and diminish the barrier effect to the downtown area created by the existing U.S. 93 corridor. In addition, these improvements would be anticipated to reduce crash rates in this area and benefit public safety. However, the raised profile of Pacifica Way, for the proposed new bridge crossing over U.S. 93, would impede the existing views of Lake Mead from some of the residences immediately northwest of this intersection, potentially adversely impacting property values. With mitigation, Alternative B would not impact pedestrian and bicycle circulation along the existing wash trail.

East of Hemenway Wash, the alignment traverses primarily vacant federal land, with the exception of the Hacienda Hotel and Casino near the eastern project terminus. Access would be maintained or enhanced at this facility, and no direct or indirect impacts to the local community would result along this section of the alignment.

Through implementation of this alternative, improvements would be made to existing pedestrian and bicycle routes, and new bike lanes and access points would be constructed. This would allow pedestrians and bicyclists to more safely navigate through the city.

Alternative C

Alternative C would avoid developed neighborhoods and business districts west of the planned interchange with Canyon Road. Therefore, no direct impacts are anticipated along this portion of the alignment. Because a substantial portion of traffic on U.S. 93 would be diverted to the new alignment, residents of the mobile home community south of existing U.S. 93 would experience indirect benefits resulting from reduced traffic congestion and noise.

The reduced level of through-traffic along the existing alignment may adversely impact traffic-dependent businesses located between Veterans Memorial Drive and Buchanan Boulevard. Based on the results of the economic analysis prepared for the project (see Section 4.11), the viability of some businesses in this area may be jeopardized. This would result in a reduction of employment opportunities within Boulder City. However, these adverse impacts may be offset by increased local patronage resulting from reduced congestion levels along U.S. 93, which would enhance the accessibility and attractiveness of this area for local residents. In addition, a potential shift in traffic-related businesses to the planned interchange at Canyon Road would create new employment opportunities, thereby offsetting potential employment impacts.

Between Canyon Road and U.S. 93 to the east, the alignment would be located adjacent to the Boulder Oaks RV Park to the southwest and an established residential community to the northeast. No residences would be displaced by project implementation. Anticipated operational impacts would include increased noise levels and adverse visual impacts. Because a wall and a vacant strip of land currently separate these two residential areas, the project would not have the effect of dividing the residents or creating a barrier. However, depending on the intensity of anticipated noise and visual impacts, there is the potential that property values within these two communities could be adversely impacted. These impacts would be lessened by the construction of noise barriers. This area is not included in Boulder City's "Clean and Green" landscaping plans.

Impacts within the Hemenway Wash area would be nearly identical to those described for Alternative B. These include beneficial effects on local circulation, public safety, and reduction of the barrier effect created by the existing alignment. Also similar to Alternative B, improvements will be made to pedestrian and bicycle routes, thereby benefiting pedestrian and bicycle circulation throughout the city.

Alternative D (Preferred Alternative)

Alternative D would divert most nonlocal traffic away from developed areas in Boulder City. This would substantially alleviate the ongoing congestion, noise, and traffic safety impacts. In addition, the barrier effect created by the existing U.S. 93 alignment would be substantially diminished due to decreased traffic volumes.

Similar to Alternative C, the decreased volume of traffic within Boulder City would have an adverse effect on businesses located between Veterans Memorial Drive and Buchanan Boulevard from loss of through-traffic. With less through-traffic, certain businesses would be anticipated to experience decreased revenue and may no longer remain viable. In turn, this would result in a loss of employment opportunities in Boulder City. This impact would be greater than that resulting from Alternative C. However, as with Alternative C, the impact may be offset by a general increase in local patronage resulting from decreased congestion levels that would enhance accessibility and attractiveness of this area.

Implementation of Alternative D would not affect pedestrian and bicycle circulation in the area south of Boulder City. However, safety, accessibility, and connectivity would improve for pedestrians and bicyclists along the existing U.S. 93 through Boulder City due to the reduction in traffic volumes.

4.12.3 Mitigation

Construction Mitigation

Implementation of a Traffic Control Plan will reduce short-term impacts associated with the change or restriction of access to businesses and residences near the proposed construction. The Traffic Control Plan will include, but not be limited to, detours, flagmen, signage, and phasing of construction activities to limit impacts.

Operational Mitigation

Alternative B would result in the loss of five businesses along U.S. 93. Mitigation will be in accordance with the Uniform Relocation Act. In addition, relocation support services will be provided to assist displaced businesses in finding alternative locations. The seven additional businesses and a church partially impacted by the expansion of U.S. 93 will be similarly mitigated.

4.13 Environmental Justice

4.13.1 Environmental Impacts

Using the methodology described in Section 3.13.1, it can be shown that there are no classifiable minority populations and only one low-income population within the project area. This latter group is located in the mobile home park south of U.S. 93 and west of Buchanan Boulevard. As a result, the only further environmental justice analysis necessary is for the low-income population within census tract 55.01, block group 2. The discussion below shall only focus on impacts to this area.

Construction Impacts

Construction of the proposed project would not result in environmental justice impacts for Alternatives A, C, or D, because there are no classifiable minority populations within the project area, and the only low-income population is located well away from these alternatives. Impacts resulting from the construction of Alternative B are discussed below. The discussion of impacts resulting from the construction of Alternative B is further limited because some do not occur near enough to the low-income neighborhood to result in environmental justice impacts. As a result, the discussion below does not include impacts relating to floodplains, water quality, hazardous waste, historic structures, archaeological/cultural resources, or biological resources.

Alternative B – Improvements to the Existing U.S. 93 Alignment. Construction of improvements to the existing alignment of U.S. 93 would result in noise, social, economic, air quality, and visual impacts. An evaluation of whether or not these project effects would result in environmental justice impacts follows.

Noise Impacts. As discussed in Section 4.3, noise from construction activities would add to the noise environment in the immediate project area. Activities involved in construction would generate noise levels ranging from 88 to 92 dBA at a distance of 15 m (50 ft). Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Noise would also be generated by increased truck traffic associated with transport of heavy materials and equipment on area roadways. This noise increase would be of short duration and would probably also occur primarily during daytime hours.

The low-income area that would be affected by this noise would be the mobile home park located south of U.S. 93 with access from Gingerwood Street. Commercial buildings along U.S. 93 would provide a buffer to the mobile homes from some of the construction-related noise and would lessen the impact of the construction noise on the low-income population within this area. Because the construction noise impact would be short-term in nature, would mainly occur during the daytime, and would be buffered by commercial structures between the residences and the highway, this impact would not be adverse. As a result, the construction noise would not result in an environmental justice impact.

Land Use Impacts. As discussed in Section 4.9, the mobile home park west of Buchanan Boulevard and south of U.S. 93, in addition to other residential areas within Boulder City, may be subject to detours during construction of Alternative B. Despite potential detours, access to all residential neighborhoods would be maintained at all times, and special accommodation would be made for emergency vehicle access. As a result, no environmental justice impacts would occur.

Social Impacts. As discussed in Section 4.12, construction of Alternative B would result in decreased accessibility to retail businesses along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard. Boulder City residents, including the residents off Gingerwood Street, would experience these impacts. However, implementation of a Traffic Control Plan will reduce these short-term impacts and avoid environmental justice impacts.

Economic Impacts. As discussed in Section 4.11, construction of Alternative B has the potential to impact retail businesses that depend on good visibility and access to through-traffic. Temporary detours and access points, lasting approximately 12 to 18 months, would be established during construction to allow customer access to these businesses. Businesses relying on U.S. 93 for the delivery of goods and services may also experience a temporary increase in transportation costs due to traffic delays. However, these costs are expected to be minor and short term, and they would not result in environmental justice impacts for nearby low-income residents.

The displacement of five businesses, which generate sales and property tax revenue for Boulder City and Clark County, could also result in the loss of employment opportunities. These businesses account for an estimated 0.4 percent of the total sales in Boulder City. Because their contribution is negligible and there is also a possibility that these businesses would relocate somewhere else in Boulder City, the overall economic impact from displacement of these businesses is negligible. There would be no resulting environmental justice impact.

Air Quality Impacts. As discussed in Section 4.2, construction activities would cause short-term impacts to localized air quality. These impacts would result from fugitive dust generated by clearing and grading activities and from tailpipe emissions generated from the use of diesel-powered construction equipment and vehicles.

Areas near the construction site, particularly the senior mobile home park and neighborhood off of Gingerwood Street, would be impacted. Fugitive dust may adversely affect those people who are susceptible to air pollutants, such as the elderly, young children, and those with respiratory disorders. If left unmitigated, the impacts resulting from construction emissions would be temporary but adverse. In order to mitigate the negative effects of these impacts, several measures would be employed. Wet dust suppression techniques, such as watering and chemical stabilization, would be used to prevent or suppress dust from becoming airborne. Trucks would also be washed or cleaned before leaving the construction site and covered when transferring materials. Unnecessary vehicular and machinery activities (e.g., excessive idling) would be minimized to reduce tailpipe emissions. After mitigation, construction emissions would not be adverse and would not result in an environmental justice impact.

Visual Impacts. As discussed in Section 4.10, construction activities would cause short-term impacts to the area's views. Impacts common to all alternatives include dust generated by construction activities, the presence of construction equipment, and increased light emitted during possible nighttime construction. These impacts would largely affect residents living along the built alternatives.

Residents are regarded as a sensitive viewer group due to the prolonged nature of the proposed construction, as well as their increased sensitivity to their place of residence. Therefore, the residents of the mobile home park can be considered a sensitive viewer group, despite the low quality of their present view of U.S. 93, and would be particularly vulnerable to visual impacts. If emitted in sufficient quantities, fugitive dust generated by construction activities in conjunction with adverse weather conditions could degrade existing views. However, such an impact would vary depending on the activity performed on a specific day and would not be considered an adverse visual impact due to the intermittent nature of the construction period and the application of appropriate mitigation measures. Dust suppression techniques, like those used to mitigate air quality impacts, would also mitigate impacts to views.

The presence of construction equipment would be a temporary unavoidable impact that could not be mitigated. However, should construction activities be performed during nighttime hours, the light emanating from the floodlights would be directed away from residences and shielded so as not to be intrusive and cause an adverse impact. With the implementation of mitigation measures, construction effects on views would not result in environmental justice impacts.

Operational Impacts

Operation of the proposed project would not result in environmental justice impacts for Alternatives A, C, or D, because there are no classifiable minority populations within the project area, and the only low-income population is located away from these alternatives. Impacts resulting from the operation of Alternative B are discussed below.

The discussion of impacts resulting from the operation of Alternative B is further limited because some impacts do not occur near enough to the low-income neighborhood to result in environmental justice impacts. As a result, the discussion below does not include noise, floodplain, water quality, land use, hazardous waste, historic structures, archaeological/cultural resources, visual, or biological resource impacts.

Alternative B – Improvements to the Existing U.S. 93 Alignment. Operation of the proposed improvements to the existing alignment of U.S. 93 would result in land use, social, economic, and air quality impacts. An evaluation of whether or not these project effects would result in environmental justice impacts follows.

Social Impacts. As discussed in Section 4.12, Alternative B would require an expanded right-of-way near the intersection of U.S. 93 and Buchanan Boulevard. Five businesses would be removed west of that intersection, thereby eliminating the goods and services provided by these establishments and slightly reducing employment opportunities for Boulder City residents. Additionally, seven businesses and a church would be partially affected by the expanded right-of-way. This loss of right-of-way would result in a loss of parking space, signage, and/or display areas.

The expansion of right-of-way near the intersection of U.S. 93 and Buchanan Boulevard would require the residents living south of U.S. 93 to use an alternate route to downtown Boulder City via the extension of Elm Street. While this change in circulation would be a minor annoyance for long-time residents, the change would also allow for the partial avoidance of U.S. 93 and would result in an improvement to local circulation and a beneficial project impact.

Alternative B would also result in the installation of raised medians in the commercial district between Veterans Memorial Drive and Buchanan Boulevard. These medians would restrict ingress and egress to right turns only, limiting accessibility from the opposite traffic lane. However, the raised medians would not substantially limit traffic access as left-turn and U-turn pockets would be provided. The raised medians would also serve as pedestrian refuges at designated crossings, benefiting the elderly, who may walk to the U.S. 93 businesses. Consequently, the operation of Alternative B would not produce social environmental justice impacts.

Economic Impacts. As discussed in Section 4.11, Alternative B would result in the installation of raised medians along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard. In addition to limiting access (discussed above), these medians could result in lower revenues for affected businesses whose customers choose to avoid the additional driving time. However, the impacts are not likely to be substantial, and the improved mobility from this alternative would probably result in overall improved sales. As a result, Alternative B would not result in environmental justice impacts resulting from economic impacts.

Air Quality Impacts. As discussed in Section 4.2, Alternative B would produce the highest CO concentrations of all the build alternatives, yet it would still be well below the federal standards. As for PM_{10} emissions, because Alternative B is comparable to existing Flamingo Road in Las Vegas, which is not a major source of emissions in Clark County, it can be deemed that this alternative would not have an adverse PM_{10} impact. Therefore, Alternative B would not result in environmental justice impacts resulting from air quality effects.

4.13.2 Mitigation

Construction Mitigation

Because none of the effects from construction of the proposed project would result in environmental justice impacts, no mitigation is necessary. However, to prevent future problems and accommodate access for the area's disabled residents, it is recommended that the construction management plan for Alternative B address transit locations, crosswalks, and street ramps.

Operational Mitigation

Because none of the effects from operation of the proposed project would result in environmental justice impacts, no mitigation is necessary. However, to prevent future problems and accommodate access for the area's disabled residents, it is recommended that the design of Alternative B ensure that transit stop locations, crosswalks, and street ramps are included and conform to Americans with Disabilities Act (ADA) specifications for elderly, handicapped, and those with disabilities.

4.14 Bicycles/Pedestrians

4.14.1 Environmental Impacts

Construction Impacts

During construction, short-term impacts to pedestrians and bicycle facilities for each of the build alignments would occur. A description of the construction impacts expected for each of the project alternatives follows.

Alternative A. Because Alternative A would not require any construction activities, there would be no impacts to pedestrians or bicycle facilities.

Alternative B. The construction of Alternative B would have the greatest effect on access and connectivity of the existing bicycle and pedestrian transportation system because this alternative impacts the largest area of the existing U.S. 93 corridor. Impacts resulting from construction of this alternative would include detouring bicyclists and pedestrians along the entire portion of U.S. 93 within Boulder City (i.e., Veterans Memorial Drive to Pacifica Way). Furthermore, the widening of U.S. 93 in Hemenway Wash would likely cause the temporary closing of the multiuse drainage/pedestrian crossings of U.S. 93, potentially resulting in pedestrians crossing the busy roadway, as well as a section of the River Mountains Loop Trail.

Rerouting of traffic would also reduce the available travel area for bicyclists and pedestrians where they use the shoulder of U.S. 93. Without a strong presence of signage and temporary facilities, safety could be compromised along U.S. 93 within Boulder City.

Alternative C. Because more of Alternative C would be located away from the congested traffic areas of U.S. 93 than Alternative B, Alternative C would produce less of an impact to existing bicycle and pedestrian facilities during construction than Alternative B. For example, between Veterans Memorial Drive and Buchanan Boulevard, construction impacts would be minimal.

However, construction of Alternative C would result in some of the same impacts within the Hemenway Wash area that would occur for Alternative B. These impacts would include the possible redirection of traffic into temporary roadway shoulders and the potential closure of the multiuse tunnels and trail. In addition, some construction staging areas would impact the southern portions of the Bootleg Canyon mountain bike trails.

Alternative D (Preferred Alternative). The construction of Alternative D would result in the least amount of impact to existing bicycle and pedestrian facilities of any of the build alternatives because the only areas of existing U.S. 93 included in this alternative are the very western and eastern portions of the alignment. However, access points for NPS backcountry roads and other recreational (hiking, equestrian, etc.) trails would be cut off temporarily during construction. Bicycle traffic in the Railroad Pass area would be directed to a connector roadway to Foothills Road in Henderson, Nevada.

Operational Impacts

This section evaluates impacts to pedestrians and bicycle facilities, the mass transit system, and recreational trails resulting from the operation of each of the alternatives for the proposed project.

Alternative A. Noise, dirt, dust, speed of traffic, and the type of traffic along U.S. 93 discourage the use of bicycle and pedestrian facilities within Boulder City. The existing roadway has a considerable amount of through truck traffic that crowds roadways, and traffic volumes for Alternative A are projected to increase substantially in the future. As a result, current unsafe conditions for bicyclists would be exacerbated in the future. Planned new bus routes in Henderson and Boulder City, and a possible new transit transfer terminal, will increase the number of pedestrians and bicyclists becoming part of the transit system in the Boulder City area. Implementation of Alternative A would not result in adverse impacts to the transit system, the NPS backcountry road system, or any hiking or recreational trail.

Alternative B. Construction of Alternative B would change traffic patterns within Boulder City, resulting in impacts to pedestrians and bicycle facilities. Within Boulder City and west of the River Mountains Trailhead, the new roadway would be widened and improved. In Hemenway Wash, the new roadway would parallel a frontage road, for which pedestrian and bicycle facilities would be needed.

U.S. 93 has a considerable amount of through truck traffic that crowds roadways, and traffic volumes for Alternative B are projected to increase substantially for most portions of the study area in the future, especially those areas west of the River Mountains Trailhead. Because these existing traffic conditions already discourage the use of U.S. 93 by pedestrians or bicyclists, increased future volumes would perpetuate these unsafe conditions.

At the western study limits, Alternative B would also prevent bicyclists and pedestrians from traveling along U.S. 93 from Railroad Pass to Henderson (Figure 4-13). Because the new highway would overlap the existing road at the western limits and the new highway would not permit pedestrian or bicycle travel, bicyclists and pedestrians would no longer be able to use the shoulder of the road for travel. In essence, Alternative B would cut off the existing route to Henderson along the shoulder of the road.

An increase in traffic within the Boulder City commercial corridor would continue to restrict bicycle and pedestrian facilities for Alternative B. Along this section of the alignment, without a signal the widened roadway would result in pedestrians jaywalking across U.S. 93 to access the westbound bus. Because of the current and future projected high traffic volumes, jaywalking across any portion of U.S. 93 is unsafe.

Alternative B would result in an improved intersection at U.S. 93 and Buchanan Boulevard. However, safe pedestrian access to the Albertson's shopping center on the west side of U.S. 93 near the Boulder Oaks RV Park would be reduced. Without mitigation measures, existing bicycle and pedestrian facilities in the Hemenway Wash area would also be impacted by the operation of Alternative B. Possible impacts include closing the multiuse tunnels under U.S. 93, displacement of a section of the River Mountains Loop Trail, as well as reduced access to recreational areas and trails.

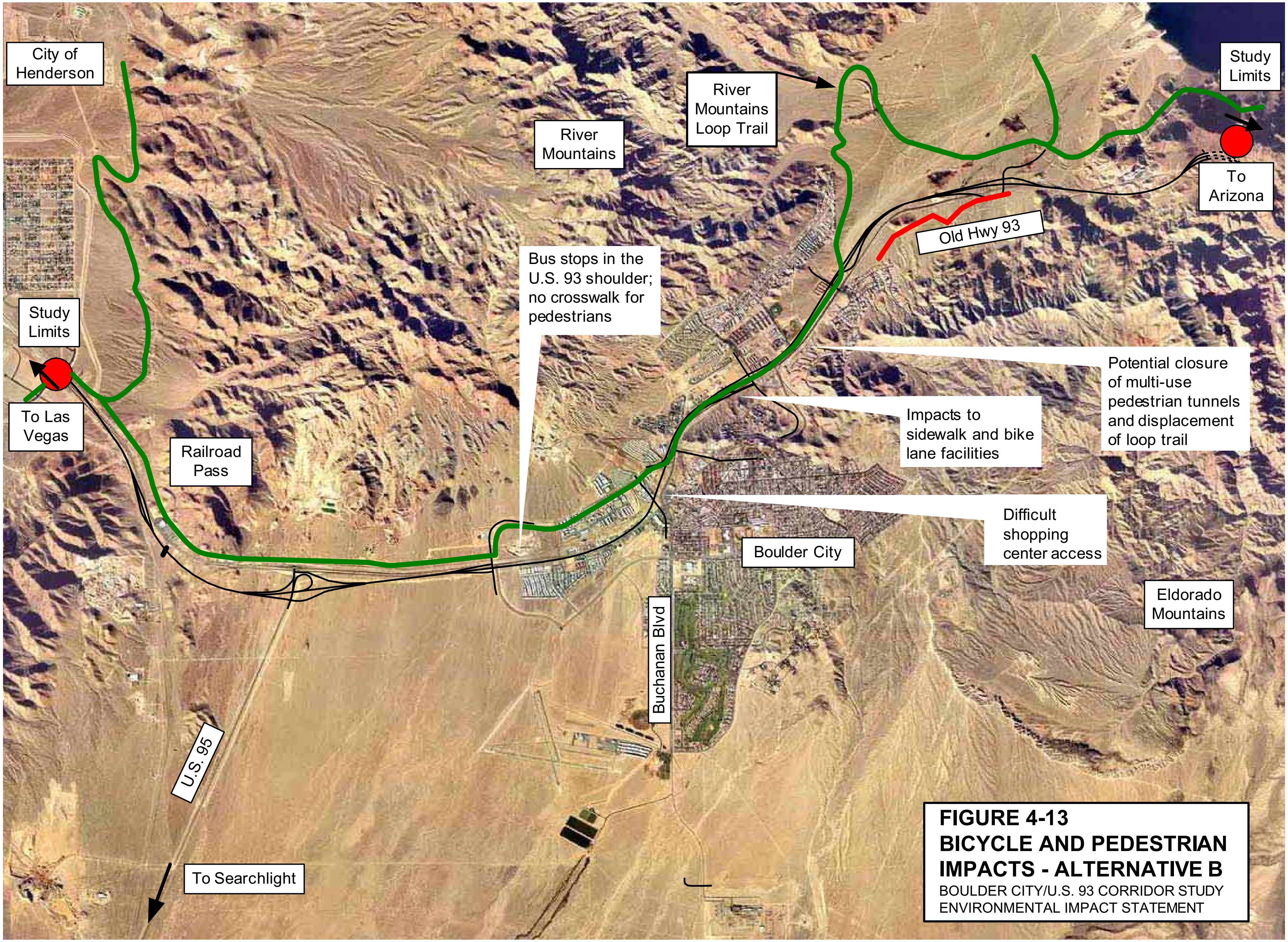

FIGURE 4-13
BICYCLE AND PEDESTRIAN IMPACTS - ALTERNATIVE B
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Alternative C. Alternative C would be located away from the existing U.S. 93 alignment throughout most of its western portion. As a result, Alternative C would have less of an impact to existing and proposed pedestrian and bicycle facilities within town. However, the alignment outside of Boulder City results in a larger impact to recreational facilities and the trails that lead to in-town bicycle/pedestrian facilities (Figure 4-14). For example, Alternative B crosses both access roads for the Bootleg Canyon mountain bike trails (e.g., Red Mountain Road and a dirt road that extends from Canyon Road).

The operation of Alternative C would result in similar impacts to Alternative B, most notably the lack of a bicycle/pedestrian link from Railroad Pass to the City of Henderson at the western study limits. Alternative C also crosses the River Mountains Loop Trail in the vicinity of Industrial Road.

Alternative D (Preferred Alternative). The operation of Alternative D would reduce traffic volumes on existing U.S. 93 through Boulder City. However, because some motorists would continue to travel on existing U.S. 93 rather than the proposed Alternative D, traffic volumes would continue to increase within Boulder City, but at a slower rate. Therefore, the current problems of safety, accessibility, and connectivity would only be partially resolved for pedestrians and bicyclists along existing U.S. 93 for this alternative. Although Alternative D would not directly impact existing U.S. 93 (except to divert traffic away from it), it would affect recreational trails and NPS backcountry roads in the eastern portion of the alignment through the Eldorado Mountains (Figure 4-15). The area around the Mead Substation in the southern part of the project area is a popular location for parking and beginning recreational excursions for equestrian and four-wheeler enthusiasts. As a result, maintaining access to this location and the desert region south of the project area is very important. Furthermore, Alternative D crosses several NPS backcountry roads, including Canyon Point Road, Boy Scout Canyon Road, and various WAPA powerline access roads. The Goldstrike Canyon Trailhead is located near the Hoover Dam Bypass Nevada Interchange.

The spectacular view of Lake Mead and the LMNRA afforded to motorists near the crest of Eldorado Ridge (Figure 4-3) is expected to create a safety hazard as vehicles pull-off the road to take pictures and enjoy that view.

4.14.2 Mitigation

Construction Mitigation

During construction, provisions for safe pedestrian and bicycle access throughout the corridor shall be designed and developed as part of a construction management plan for all build alternatives. In particular, the plan shall address how pedestrians will be accommodated during construction along existing U.S. 93. Other specific issues that shall be addressed include pedestrian/bicycle access across U.S. 93 and detour plans for pedestrians and bicyclists. Appropriate and well marked signage and striping shall be included to allow for safe transport. Where new roadways cross existing recreational trails, access shall be maintained by detouring users around the construction.

Operational Mitigation

Alternative A. No mitigation measures are needed for Alternative A, which would have no construction impacts.

Alternative B. Mitigation measures to reduce the adverse impacts of this alternative include the following:

- Construct or expand sidewalks along U.S. 93 between Veterans Memorial Drive and Buchanan Boulevard, construct or expand sidewalks to permit pedestrians to use sidewalks safely, and create facilities and signs to distinguish space for bicyclists.
- Work with RTC to relocate the CAT bus stop, located west of the signalized Yucca Street intersection with U.S. 93, and construct a crosswalk to permit safer pedestrian crossing to the westbound bus. Construct bus turnouts at the CAT stops on both sides of U.S. 93 and provide better lighting around the bus stops.
- Install crossing facilities at the new U.S. 93/Buchanan Boulevard intersection; investigate the feasibility of a signal-activated crosswalk with raised median/pedestrian refuge area or construct a pedestrian bridge with wheelchair access at the crossing.
- Construct pedestrian bridges with wheelchair access at the U.S. 93/Industrial Road intersection to accommodate residents of the Boulder Oaks RV Park. Install pedestrian bridges at existing locations of multiuse tunnels if the tunnels cannot be maintained for pedestrian access.
- Construct or relocate bicycle routes along the corridor within Boulder City that adhere to the locations of the planned facilities for Boulder City shown in the RTC "Summary of Bicycle Travelways."
- Provide appropriate pedestrian and bicycle route signage.
- Replace impacted sections of the River Mountains Loop Trail.

Alternative C. In this alternative, mitigation measures would be necessary only where the new alignment crosses existing facilities, rather than along stretches of the corridor through Boulder City, as with Alternative B. Mitigation measures to reduce the adverse impacts of this alternative include the following:

- Provide for a crossing facility of the River Mountains Loop Trail at the new facility east of the U.S. 95 interchange.
- Work with RTC to relocate the CAT bus stop, located east of the signalized Veterans Memorial Drive intersection with U.S. 93, and construct a crosswalk to permit safer crossing to the westbound bus. Construct bus turnouts at the CAT stops on both sides of the road and provide better lighting of the area around the bus stops.
- Construct a crossing at Red Mountain Road (a gravel road extension of Yucca Street to the north leading into the Bootleg Canyon mountain bike trails).
- Maintain the River Mountains Loop Trail alignment in the vicinity of Industrial Road as Alternative C approaches Hemenway Wash.
- Construct pedestrian bridges within Hemenway Wash at existing locations of multiuse tunnels if the tunnels cannot be maintained for pedestrian access.

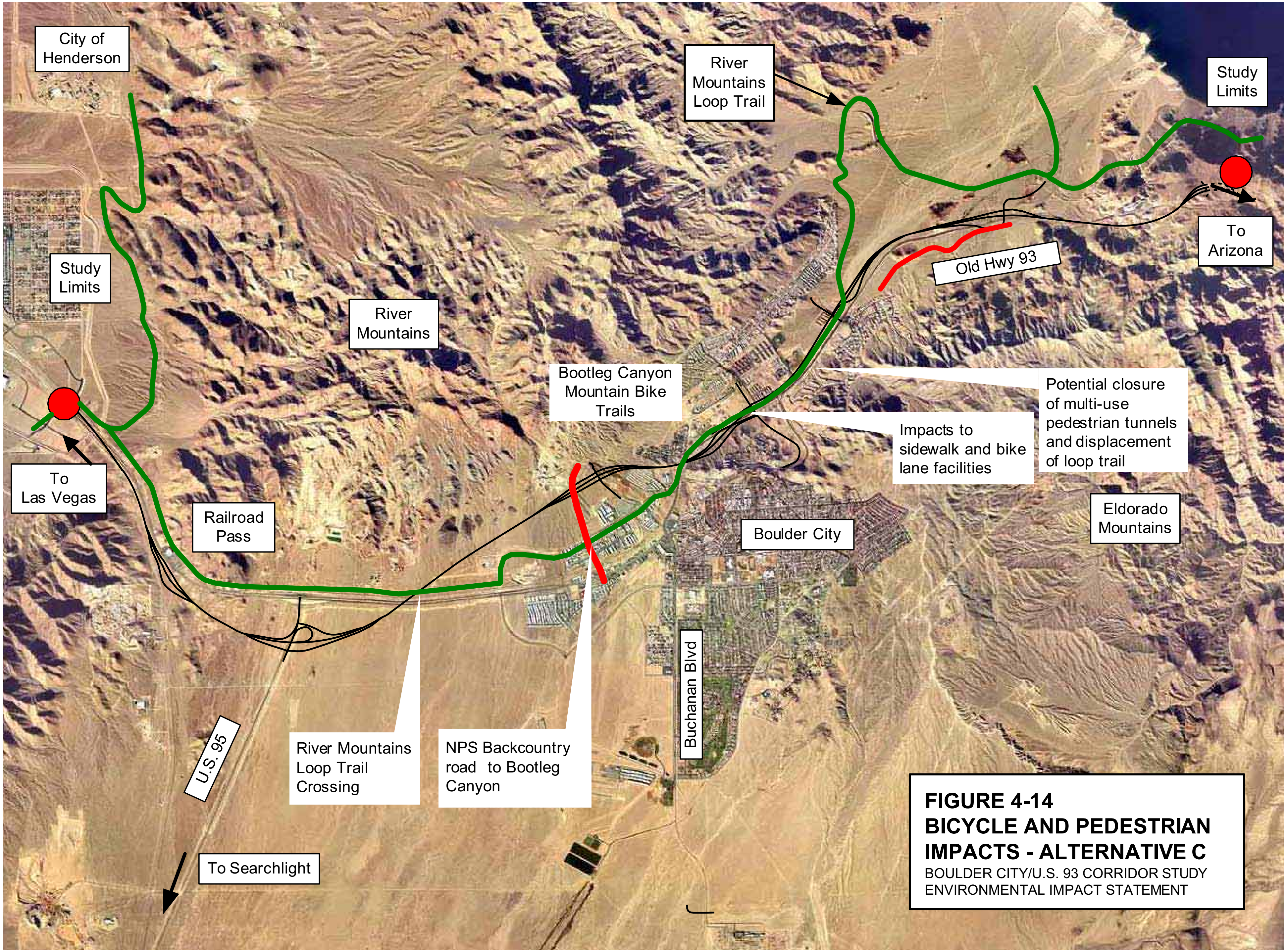

FIGURE 4-14
BICYCLE AND PEDESTRIAN IMPACTS - ALTERNATIVE C
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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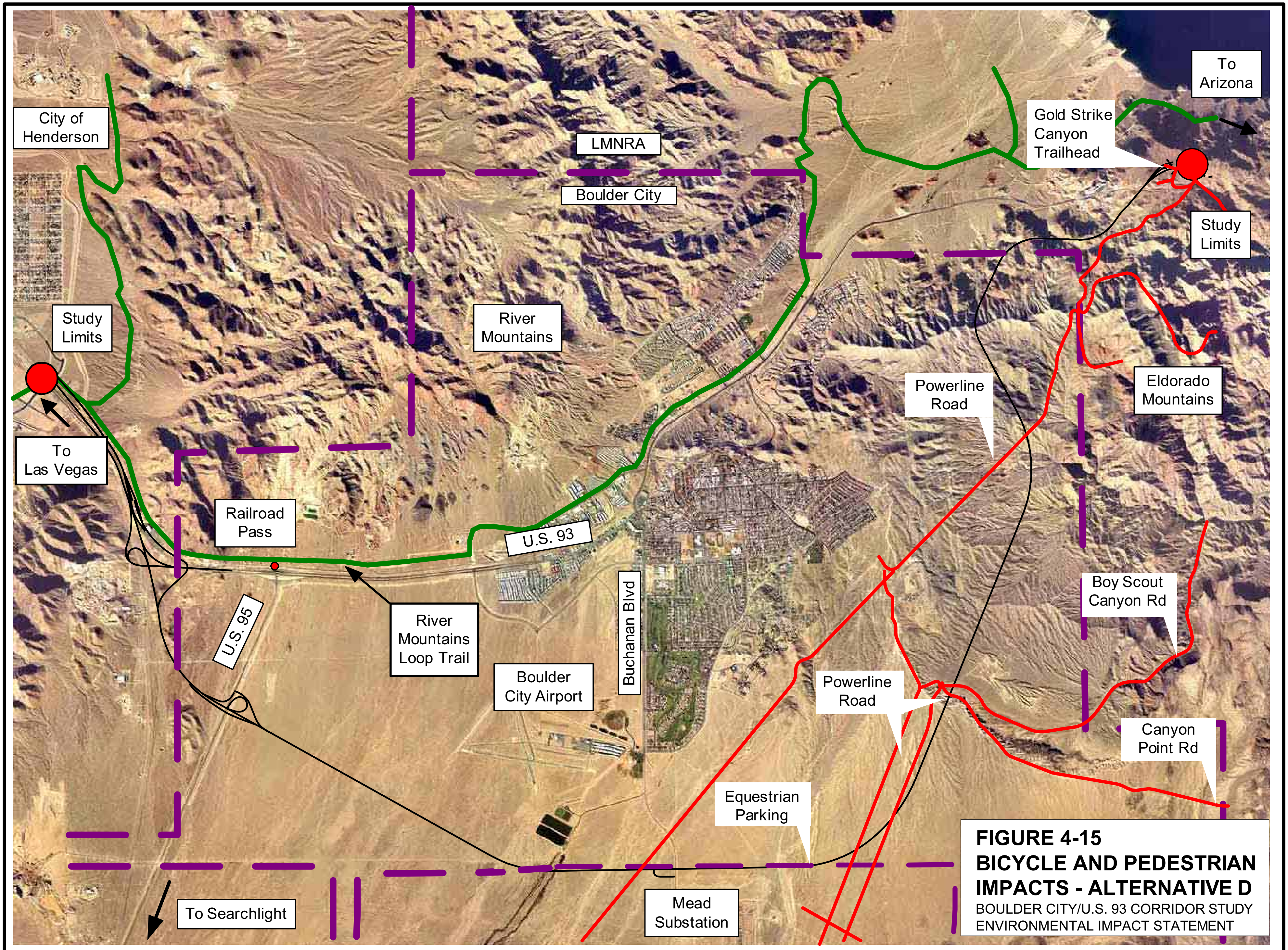

FIGURE 4-15
BICYCLE AND PEDESTRIAN IMPACTS - ALTERNATIVE D
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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- Construct or relocate bicycle routes along the corridor within Boulder City that adhere to the locations of the planned facilities for Boulder City shown in the RTC "Summary of Bicycle Travelways."
- Maintain the integrity and access to Old Highway 93, an NPS backcountry road.
- Provide appropriate pedestrian and bicycle route signage.
- Replace impacted sections of the River Mountains Loop Trail.

Alternative D (Preferred Alternative). Appropriate measures to mitigate impacts along the southern alignment include the following:

- Provide a local access connector from the Railroad Pass area using existing U.S. 93 and connecting to Foothills Road.
- Construct a grade separation for continued access from Boulder City to Mead Substation.
- Construct a crossing to the east of Mead Substation to allow for equestrian and four-wheel drive access to recreational areas south of Boulder City.
- Construct crossings at the following NPS backcountry roads: Canyon Point Road, Boy Scout Canyon Road. Measures to ensure access to pre-existing power line roads will also be implemented, including a dual-use culvert crossing in the vicinity of the Intertie Substation (Figure 4-3).
- Provide appropriate pedestrian and bicycle route signage.

In addition to the above, a scenic overlook will be constructed near the crest of the Eldorado Ridge with vehicle pull-outs and a parking area to afford visitors with a safe means of stopping to enjoy the view of Lake Mead and the LMNRA from this point.

4.15 Hazardous Waste

4.15.1 Construction Impacts

Hazardous wastes encountered during construction of any of the corridor alternatives would result in unavoidable adverse impacts if the wastes are not managed properly and/or releases to the environment occur without appropriate cleanup. However, existing federal and state laws and regulations described in Section 3.15.2 provide stringent control over hazardous waste management, as well as prevention and response to spills and releases. Construction of any corridor alternative would be required to comply with all existing hazardous waste laws and regulations.

The following sections evaluate potential impacts related to the hazardous waste and material sites identified in Section 3.15.3 from the construction of the project alternatives. Planning-level plan and profile drawings of the corridor alternatives were used to locate the sites with respect to the potential areas of construction.

Alternative A – No Build Alternative

Alternative A would leave existing conditions as they are, so no construction would occur. Therefore, no construction impacts would occur.

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

GTE Government Systems, 301 Conestoga Way. This site would be a significant distance (approximately 1 km [0.6 miles]) from the construction footprint of the corridor. No contamination was reported during the removal of USTs at this site. Therefore, this site would not result in hazardous waste impacts during construction.

NDOT, U.S. 95 and Wagonwheel. This site would be a significant distance west (almost 1 km [0.6 mile]) of the construction footprint of the corridor. The reported diesel spill at this site was cleaned up, and contaminated soil was removed as part of the cleanup effort. Although confirmation samples were not taken, there is little likelihood that significant contamination remains. This is supported by the regulatory agency decision to close the case without the confirmation samples. The site does not fall within the area that would undergo construction, so even if low-level contamination was to still exist at the site, it would not pose an exposure concern during construction or operation of this alternative. Therefore, this site would not result in hazardous waste impacts during construction.

Boulder Highway Diesel Spill. This site would be a significant distance west (almost 1 km [0.6 mile]) of the construction footprint of the corridor. The Vista database entry indicated that the site involved diesel fuel and was closed in 1994. No agency file was found at NDEP or DAQEM. No indication of this site was observed during the March 26, 2001, reconnaissance. With the lack of agency records on the site, assessment of potential impacts relied on the Vista database entry and inferences from other sites in the area with similar conditions. The database entry does not refer to a UST or AST, so the release was likely a surface spill of diesel fuel. In other reports of fuel spills reviewed, contaminated soil was removed and disposed of prior to the issuance of an NFA letter. It is reasonable to assume appropriate action such as soil removal would have taken place, if necessary, in order for the site to be closed in 1994. Therefore, this site would not result in hazardous waste impacts during construction.

Goudie Industrial Plaza, 1581 Foothill Drive. This site would be approximately 200 m (650 ft) north of the construction footprint for the corridor. One UST was removed from this site and there was no soil contamination reported. Therefore, this site would not result in hazardous waste impacts during construction.

Veltman Property, 1553 and 1559 Industrial Road. This site would be approximately 250 m (800 ft) north of the construction footprint for the corridor. Site closure, with the reported residual TPH and trace amounts of PCE and TCE in soil, would not likely result in significant offsite contamination or exposure risk. Therefore, there would be no hazardous waste impacts during construction.

LADWP, 690 Wells Road. This site would be approximately 200 m (650 ft) north of the construction footprint for the corridor, so there would be no impacts to existing USTs at this site. No hazardous waste issues were identified in documents reviewed for this site. Therefore, there would be no hazardous waste impacts during construction.

Reclamation, 500 Date Street. This site would be approximately 100 m (328 ft) southeast of the construction footprint of the corridor. The case was closed in 1993, and there was no information reviewed that suggested an existing hazardous waste issue at the site. Therefore, there would be no hazardous waste impacts during construction.

Boulder City Transformer Site, 500 Date Street. This site would be approximately 150 m (500 ft) southeast of the construction footprint of the corridor. The case was closed, and residual contamination was below detection limits, except for one sample. Residual soil contamination would likely not extend beyond the immediate vicinity of the spill. Therefore, this site would not result in hazardous waste impacts during construction.

Reclamation, 400 Railroad Avenue. This site would be approximately 100 m (328 ft) east of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact an area over 100 m (328 ft) long to extend to the corridor. That does not appear to be the situation here. The UST case at this site was closed with no further action required. Residual soil contamination would not likely extend significantly beyond the excavation area. Therefore, this site would not result in significant hazardous waste impacts during construction.

Boulder City Maintenance Yard, 500 Railroad Avenue. This site would be approximately 100 m (328 ft) east of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact an area over 100 m (328 ft) long to extend to the corridor. That does not appear to be the situation here. The UST case at this site was closed with no further action required. Residual soil contamination would not likely extend significantly beyond the excavation area. Therefore, this site would not result in significant hazardous waste impacts during construction.

Public Works Department Yard, 500 Railroad Avenue. This site would be approximately 100 m (328 ft) east of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact a relatively large area to extend to the corridor. That does not appear to be the situation here. The case at this site was eventually closed with no further action required. Although residual soil contamination was higher than reported at other sites, it probably does not extend significantly beyond the disposal areas. Therefore, this site would not result in significant hazardous waste impacts during construction.

LADWP, 600 Nevada Way. This site would be approximately 150 m (500 ft) east of the construction footprint of the corridor. The UST case at this site was closed, and residual soil contamination was below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

Central Telephone Company, 503 Ash Street. This site would be approximately 150 m (500 ft) east of the construction footprint of the corridor. The UST case at this site was closed, and residual soil contamination was below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

FAA, Red Mountain VORTAC. This site is located on the top of a mountain, over 2 km (1.25 miles) from any anticipated corridor construction. The cleanup at this site was very limited (3 cubic yards of soil removed) and resulted in an NFA letter. Therefore, this site would not result in hazardous waste impacts during construction.

Water Treatment Facilities, 243 Lakeshore Road. This site would be located over 8 km (5 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

Lake Mead Fish Hatchery, 245 Lakeshore Road. This site would be located almost 10 km (6.2 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

D. H. Blatner Sons, Lakeshore Road. The precise location of this site was not identified in available records. However, the spill was quite small (10 to 20 gallons of diesel fuel), and the case was resolved very quickly (3 days). No information was found to suggest that there is a hazardous waste concern at this site. Therefore, this site would likely not result in hazardous waste impacts during construction.

First Stop/Last Stop, 100 Ville Drive. This site would be 60 m (200 ft) north of the construction footprint for the corridor, so there would be no impacts to existing USTs at this site. The USTs passed tightness testing, and there were no reported releases at the time of this study. No hazardous waste issues were identified in documents reviewed for this site. Therefore, there would be no hazardous waste impacts during construction.

Lakeview Station, U.S. 93. This site would be located approximately 30 m (100 ft) north of the construction footprint of the corridor. After multiple tests, the UST case at this site was eventually closed with no further action required. It is not known whether residual soil contamination extends significantly beyond the excavation area. However, there is only a slight potential that it would extend into the corridor. Therefore, this site would not likely result in hazardous waste impacts during construction.

Lowe North Construction, Nelson Road. The location of this site could not be determined from agency records. However, the diesel spill case at this site was closed with no further action required, and residual soil contamination was reported as below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

Service Station, 3715 South Industrial. This site is located in Las Vegas, not Boulder City. Therefore, there would be no hazardous waste impacts during construction.

Omega Recycling, Nevada and California. Although the Vista database entry referenced this site to Boulder City, there was no file for this site at NDEP or DAQEM, and no information to indicate a Boulder City location. No information was found that would suggest a hazardous waste impact during construction.

Alternative C – Through Town Alignment

GTE Government Systems, 301 Conestoga Way. This site would be a significant distance (approximately 1 km [0.6 miles]) from the construction footprint of the corridor. No contamination was reported during the removal of USTs at this site. Therefore, this site would not result in hazardous waste impacts during construction.

NDOT, U.S. 95 and Wagonwheel. This site would be a significant distance (almost 1 km [0.6 mile]) from the construction footprint of the corridor. The reported diesel spill at this site was cleaned up, and contaminated soil was removed as part of the cleanup effort. Although confirmation samples were not taken, there is little likelihood that significant contamination remains. This is supported by the regulatory agency decision to close the case without the confirmation samples. The site does not fall within the area that would undergo construction, so even if low-level contamination was to still exist at the site, it would not pose an exposure concern during construction or operation of this alternative. Therefore, this site would not result in hazardous waste impacts during construction.

Boulder Highway Diesel Spill. This site would be a significant distance (almost 1 km [0.6 mile]) from the construction footprint of the corridor. The Vista database entry indicated that the site involved diesel fuel and was closed in 1994. No agency file was found at NDEP or DAQEM. No indication of this site was observed during the March 26, 2001, reconnaissance. With the lack of agency records on the site, assessment of potential impacts relied on the Vista database entry and inferences from other sites in the area with similar conditions. The database entry does not refer to a UST or AST, so the release was likely a surface spill of diesel fuel. In other reports of fuel spills reviewed, contaminated soil was removed and disposed of prior to the issuance of an NFA letter. It is reasonable to assume appropriate action such as soil removal would have taken place, if necessary, in order for the site to be closed in 1994. Therefore, this site would not result in hazardous waste impacts during construction.

Goudie Industrial Plaza, 1581 Foothill Drive. This site would be approximately 100 m (328 ft) south of the construction footprint for the corridor. One UST was removed from this site, and there was no soil contamination reported. Therefore, this site would not result in hazardous waste impacts during construction.

Veltman Property, 1553 and 1559 Industrial Road. This site would be approximately 60 m (200 ft) south of the construction footprint for the corridor. Site closure, with the reported residual TPH and trace amounts of PCE and TCE in soil, would not likely result in significant offsite contamination or exposure risk. Therefore, there would be no hazardous waste impacts during construction.

LADWP, 690 Wells Road. This site would be approximately 100 m (200 ft) south of the construction footprint for the corridor, so there would be no impacts to the USTs at this site. No hazardous waste issues were identified in documents reviewed for this site. Therefore, there would be no hazardous waste impacts during construction.

Reclamation, 500 Date Street. This site would be approximately 700 m (2,300 ft) southeast of the construction footprint of the corridor. The case was closed in 1993, and there was no information reviewed that suggested an existing hazardous waste issue at the site. Therefore, there would be no hazardous waste impacts during construction.

Boulder City Transformer Site, 500 Date Street. This site would be approximately 700 m (2,300 ft) southeast of the construction footprint of the corridor. The case was closed, and residual contamination was below detection limits, except for one sample. Residual soil contamination would likely not extend beyond the immediate vicinity of the spill. Therefore, this site would not result in hazardous waste impacts during construction.

Reclamation, 400 Railroad Avenue. This site would be approximately 500 m (1,600 ft) south of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact a relatively large area to extend to the corridor. That is not the situation here. The UST case at this site was closed with no further action required. Residual soil contamination would not likely extend significantly beyond the excavation area. Therefore, this site would not result in hazardous waste impacts during construction.

Boulder City Maintenance Yard, 500 Railroad Avenue. This site would be approximately 500 m (1,600 ft) south of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact a relatively large area to extend to the corridor. That is not the situation here. The UST case at this site was closed with no further action required. Residual soil contamination would not likely extend significantly beyond the excavation area. Therefore, this site would not result in hazardous waste impacts during construction.

Public Works Department Yard, 500 Railroad Avenue. This site would be approximately 500 m (1,600 ft) south of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact a relatively large area to extend to the corridor. That is not the situation here. The case at this site was eventually closed with no further action required. Although residual soil contamination was higher than reported at other sites, it probably does not extend significantly beyond the disposal areas. Therefore, this site would not result in hazardous waste impacts during construction.

LADWP, 600 Nevada Way. This site would be approximately 500 m (1,600 ft) south of the construction footprint of the corridor. The UST case at this site was closed, and residual soil contamination was below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

Central Telephone Company, 503 Ash Street. This site would be approximately 0.4 km (0.25 mile) south of the construction footprint of the corridor. The UST case at this site was closed, and residual soil contamination was below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

FAA, Red Mountain VORTAC. This site is located on the top of a mountain, over 2 km (1.25 miles) from any anticipated corridor construction. The cleanup at this site was very limited (3 cubic yards of soil removed) and did result in an NFA letter. Therefore, this site would not result in hazardous waste impacts during construction.

Water Treatment Facilities, 243 Lakeshore Road. This site would be located over 8 km (5 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

Lake Mead Fish Hatchery, 245 Lakeshore Road. This site would be located almost 10 km (6.2 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

D. H. Blatner Sons, Lakeshore Road. The precise location of this site was not identified in available records. However, the spill was quite small (10 to 20 gallons of diesel fuel), and the case was resolved very quickly (3 days). No information was found to suggest that there is a hazardous waste concern at this site. Therefore, this site would likely not result in hazardous waste impacts during construction.

First Stop/Last Stop, 100 Ville Drive. This site would be 60 m (200 ft) north of the construction footprint for the corridor, so there would be no impacts to existing USTs at this site. The USTs passed tightness testing, and there were no reported releases at the time of this study. No hazardous waste issues were identified in documents reviewed for this site. Therefore, there would be no hazardous waste impacts during construction.

Lakeview Station, U.S. 93. This site would be located approximately 30 m (100 ft) north of the construction footprint of the corridor. After multiple tests, the UST case at this site was eventually closed with no further action required. It is not known whether residual soil contamination extends significantly beyond the excavation area. However, there is only a slight potential that it would extend into the corridor. Therefore, this site would not likely result in hazardous waste impacts during construction.

Lowe North Construction, Nelson Road. The location of this site could not be determined from agency records. However, the diesel spill case at this site was closed with no further action required, and residual soil contamination was reported as below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

Service Station, 3715 South Industrial. This site is located in Las Vegas, not Boulder City. Therefore, there would be no hazardous waste impacts during construction.

Omega Recycling, Nevada and California. Although the Vista database entry referenced this site to Boulder City, there was no file for this site at NDEP or DAQEM and no information to indicate a Boulder City location. No information was found that would suggest a hazardous waste impact during construction.

Alternative D – Southern Alignment (Preferred Alternative)

Public Works Department Yard, 500 Railroad Avenue. This site would be located over 4 km (2.5 miles) north of the corridor. A hazardous waste concern at this site would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was eventually closed with no further action required. Although residual soil contamination was higher than reported at other sites, it probably does not extend significantly beyond the disposal areas. Therefore, this site would not result in hazardous waste impacts during construction.

DOE, Mead Substation. This site would be located approximately 500 m (1,600 ft) south of the construction footprint of the corridor. A hazardous waste concern at this site would have to impact a very large area to extend to the corridor. That is not the situation here. The reported hazardous waste case was closed in 1992. No information was found to suggest that there is a significant hazardous waste concern at this site. Therefore, this site would likely not result in hazardous waste impacts during construction.

DOE Westermead, Buchanan Boulevard. The location of this site along Buchanan Boulevard was not specified in the agency file. However, the UST case at this site was closed with no further action required and very little residual soil contamination. Therefore, this site would not be expected to result in hazardous waste impacts during construction.

Boulder City Landfill. This landfill would be located approximately 1 km (0.6 miles) west of the construction footprint of the corridor. Available information reviewed for this study did not indicate any hazardous waste issues with this facility. Therefore, this site would not result in hazardous waste impacts during construction.

FAA, Red Mountain VORTAC. This site is located on the top of a mountain, over 6 km (3.7 miles) from any anticipated corridor construction. The cleanup at this site was very limited (3 cubic yards of soil removed) and did result in an NFA letter. Therefore, this site would not result in hazardous waste impacts during construction.

Water Treatment Facilities, 243 Lakeshore Road. This site would be located over 8 km (5 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

Lake Mead Fish Hatchery, 245 Lakeshore Road. This site would be located almost 10 km (6.2 miles) north of the construction footprint of the corridor. A hazardous waste concern would have to impact a vast area to extend to the corridor. That is not the situation here. The case at this site was closed with no further action required. Therefore, this site would not result in hazardous waste impacts during construction.

D. H. Blatner Sons, Lakeshore Road. The precise location of this site was not identified in available records. However, the spill was quite small (10 to 20 gallons of diesel fuel), and the case was resolved very quickly (3 days). No information was found to suggest that there is a hazardous waste concern at this site. Therefore, this site would likely not result in hazardous waste impacts during construction.

Lakeview Station, U.S. 93. This site would be located approximately 300 m (1,000 ft) north of the construction footprint of the corridor. After multiple tests, the UST case at this site was eventually closed with no further action required. It is not known whether residual soil contamination extends significantly beyond the excavation area; however, there is only a slight potential that it would extend into the corridor. Therefore, this site would not likely result in hazardous waste impacts during construction.

Lowe North Construction, Nelson Road. The location of this site could not be determined from agency records. However, the diesel spill case at this site was closed with no further action required, and residual soil contamination was reported as below detection limits. Therefore, this site would not result in hazardous waste impacts during construction.

4.15.2 Operational Impacts

Once roadway improvements are constructed, traffic operations on these roadways would not normally result in the generation of hazardous wastes that would impact the corridor. Likewise, the highway traffic would not impact the existing hazardous waste sites in the vicinity of the roadways simply by driving through the area. There would be no difference among the alternatives.

Occasional incidents, such as truck crashes, may result in the release of hazardous waste or materials. These releases would be expected to be cleaned up as part of the response to each vehicle crash. All of the build alternatives (B, C, and D) are intended to satisfy the need for reducing the frequency of vehicle crashes in comparison to No Build (Alternative A).

In addition to hazardous wastes, the public has expressed a concern related to potential impacts from possible future transportation of radioactive wastes through the Boulder City area in the event the Yucca Mountain Nuclear Fuel and High-Level Radioactive Waste Repository is built and operated. While nuclear wastes do not fall under the definition of "hazardous wastes," the issue is evaluated in this section of the EIS. An FEIS for the Yucca Mountain Repository was published in February 2002. As part of the evaluation of the project, the FEIS analyzed potential transportation impacts within the State of Nevada and throughout the U.S. The FEIS evaluated potential truck routes and rail routes that might serve the Yucca Mountain facility. No roadways in the vicinity of Boulder City were identified as a potential truck route for the Yucca Mountain project. The closest potential truck route would be I-15, including a planned beltway to the west of Las Vegas. However, according to the FEIS, the State of Nevada could designate alternative and additional preferred routes as specified in 49 CFR 397.103. Therefore, impacts from the Yucca Mountain project could occur in the Boulder City/U.S. 93 Corridor project area, but they cannot be effectively evaluated at this time because the routes have not been finalized.

4.15.3 Mitigation

This study did not include a Phase I Environmental Site Assessment of commercial real estate parcels in accordance with American Society for Testing and Materials (ASTM) Standard E 1527-93. Once a preferred alternative is selected and right-of-way parcels are identified for property transfer, a Phase I Environmental Site Assessment will be performed in accordance with ASTM Standard E 1527-93 for all parcels subject to property transfer.

4.15.4 Construction Mitigation

Disposal of the minimal hazardous wastes expected to be generated during construction (i.e., wastes from onsite minor maintenance and repair of construction vehicles) would require the generator to have an EPA generator identification (ID) number. Hazardous wastes would have to be managed and disposed of at EPA-permitted treatment, storage, and disposal facilities in accordance with applicable laws and regulations. Transporters and disposal sites would have to have valid permits, but these permits would be expected to already be in place by the owner/operators and would not be a direct action or requirement of this project.

Because no sites with potential environmental concerns were identified within the planned construction areas in the hazardous waste assessment, no specific mitigation measures would be required for any of the alternatives presently under consideration.

4.15.5 Operational Mitigation

No specific mitigation measures would be required for any of the alternatives currently under consideration.

4.16 Energy Use

4.16.1 Construction Impacts

This section discusses the energy used to construct the build alternatives, including the preferred alternative. Construction of each of the build alternatives would require similar fuel commitments. This fuel usage is considered a short-term project impact, and the largest portion of all energy consumed for the proposed project would occur during the construction period. The No Build Alternative would not require fuel for construction.

Construction of the proposed project would require energy in a variety of forms. Various types of petroleum would be used during the construction period, with diesel and gasoline fuel being used to operate construction equipment and vehicles. Electrical energy would be used for the onsite maintenance trailers. Fossil fuels and electrical energy to manufacture the materials and products associated with roadway construction would also be used.

The energy consumed to construct the proposed project can be estimated by making assumptions about the following variables:

- Construction cost of the alternative
- Construction duration of the alternative
- Number of construction workers traveling to and from the construction site
- Number of trucks and pieces of equipment used
- Efficiency of trucks and equipment (e.g., miles per gallon)
- Length of time trucks and equipment would be used

For this analysis, the energy consumed would be the fuel used for project trucks, construction equipment, and workers' personal vehicles (Table 4-31). Based on construction cost and estimated duration, the estimated number is 100 full-time-equivalent workers throughout the construction duration of each of the build alternatives.

TABLE 4-31
Estimated Fuel Consumption[1]

Alternative	Gallons Per Day	
	10 Miles-Per-Gallon Usage Rate	5 Miles-Per-Gallon Usage Rate
Alternative B[1]	334	548
Alternative C[1]	322	523
Alternative D (Preferred Alternative)[2]	340	560

[1] Over a 3-year construction duration.
[2] Over a 3.3-year construction duration.

4.16.2 Operational Impacts

This section discusses the energy used to operate the build alternatives, including the preferred alternative. The primary energy usage during operation of the proposed highway would be fuel for vehicles traveling over the roadway. Because roadway inspection and maintenance would require regular, but infrequent, trips to the area, energy usage for this phase would be lower than for the construction phase, and it is not considered substantial.

In general, postconstruction operational energy requirements would be expected to be less for the three build alternatives than for the No Build Alternative, because the existing traffic congestion on U.S. 93 is expected to worsen as traffic volumes increase and speeds decrease. This condition would result in increasingly lower fuel efficiency of vehicles traveling on U.S. 93 through the Boulder City area.

Estimated fuel consumption requirements for each of the project alternatives were calculated using the methodology discussed in Section 3.16 (Table 4-32). A discussion of the energy requirements of each alternative as they compare to the No Build Alternative follows.

Alternative B would convert much of the existing U.S. 93 into an expressway. As shown in Table 4-32, the operation of Alternative B would result in a decrease in fuel consumption when compared to the No Build Alternative, resulting in a substantial decrease in the total number of gallons of gasoline used. The operational decrease for this alternative would be the result of increased speed and fewer delays due to traffic congestion.

Alternative C would be a freeway. It would result in both an increase in peak-hour vehicle miles and a decrease in peak-hour vehicle hours when compared to the No Build Alternative. The increased speed of the vehicles and decrease in delay time would allow for a more efficient flow of traffic, resulting in substantially decreased energy consumption.

The preferred alternative (Alternative D) would also be a freeway west of U.S. 95, and a highway east of the U.S. 95 interchange. It would result in a substantial increase in the number of peak-hour VMT due to the increased length of the alignment. The longer length would increase the amount of energy used, but the reduction in delay time provided by the alternative would help offset that increase.

Overall, Alternatives B and C would result in a reduction of energy usage, while Alternative D would result in an increase in energy usage compared to the No Build Alternative. All of the project build alternatives would have a positive influence on the total operational energy consumption for the entire Boulder City road network. The decrease in traffic delays on U.S. 93 would allow traffic from local streets to use the existing U.S. 93, which would create a more efficient roadway system.

4.16.3 Mitigation

Alternatives B and C would result in an overall operational energy consumption savings compared to the No Build Alternative. While Alternative D would result in an increase of operational energy, when compared to the No Build Alternative, it would provide indirect traffic and circulation benefits to the entire Boulder City traffic network. These benefits would offset the increase in energy consumption requirements. The net result would be an overall savings in energy usage.

TABLE 4-32
Year 2027 Estimated Peak-Hour Fuel Consumption Requirements

Alternative	Total Peak-Hour Vehicle Miles	Total Peak-Hour Vehicle Hours	Peak-Hour Average Speed (mph)	Normal Operating Fuel Consumption (gallons)	Idling Time (hours)	Fuel Consumption at Idle (gallons/hour)	Total Estimated Peak-Hour Fuel Consumption (gallons)
Alternative A - No Build	484,969	13,021	37	15,644	3,295	1,911	**17,555**
Alternative B - Expressway Alternative	502,400	8,760	57	15,545	267	155	**15,700**
Alternative C - Through-Town Alternative	522,705	8,773	60	16,631	50	29	**16,660**
Alternative D - Southern Alternative	577,731	10,354	56	18,355	257	150	**18,504**

The proposed build alternatives would complement local and regional efforts to conserve energy resources and would promote more direct and efficient travel through the project area and region. Additionally, these alternatives would ease traffic congestion on existing U.S. 93 and reduce peak-hour traffic volumes. The proposed build alternatives will decrease the traffic congestion, thereby allowing vehicles to travel at an increased LOS. The improved LOS would subsequently result in a more efficient consumption of energy; as a result, no mitigation measures are needed.

4.17 Construction Impacts

The following section details the impacts that may be anticipated during construction of a build alternative. Activities that are considered in this analysis include the use of staging areas, temporary haul and access roads, and other actions that would require additional land area or traffic rerouting. Construction impacts have been grouped into those that affect sensitive environmental conditions and traffic conditions, and those that could result from the concurrent construction of the Hoover Dam Bypass with a build alternative for the Boulder City/U.S. 93 Corridor Study.

The exact degree of impact from construction is dependent upon the number of workers, number and types of heavy-duty vehicles and equipment, and length of time over which these activities would occur. Typical construction activities must be assumed due to the lack of a specific construction schedule and equipment information. It is assumed that a mixture of loaders, haulers, scrapers, backhoes, water trucks, pavers, compactors, generators, bulldozers, and other miscellaneous equipment would be used during construction. For the purpose of this analysis, impacts are determined based on general assumptions concerning access points, length of roadway, and cross-sectional cuts and fills.

4.17.1 Environmental Resources

In this section, potential adverse environmental impacts that might occur during construction of a build alternative are discussed. The following environmental impacts are summarized in this section and presented in more detail in the DEIS sections (Chapters 3 and 4): Air Quality, Noise, Water Quality, and Visual Resources.

Air Quality

Construction of any of the build alternatives, including the preferred alternative, would temporarily degrade the air quality of the immediate project area. Fugitive dust would be generated by clearing and grading earthwork and by construction and haul vehicles traveling on paved and unpaved surfaces. Fugitive dust may adversely impact sensitive people, such as the elderly, young children, and those individuals suffering from respiratory disorders, as well as hikers and other users of LMNRA resources.

Tailpipe emissions from construction equipment and vehicles would also contribute to increased particulate matter and other primary pollutants. The degree of degradation at any given time would be dependent upon the intensity of construction activity in that period.

However, areas near the construction site would be the most susceptible to this nuisance. Therefore, Alternatives B and C would have adverse impacts, as they both are located close to residential and commercial facilities. Alternative D, which predominantly runs through vacant open desert land, would not have this impact.

Noise

Construction activities would add to the noise environment in the immediate project area in the form of two general sources:

- Construction noise ranging from 88 to 92 dBA at a distance of 15 m (50 ft). These noise levels could result in annoyance or sleep disruption if nighttime operations occur or if unusually noisy equipment is used. Because of this, construction activities in developed areas rarely occur during nighttime periods.
- Increased truck traffic associated with transport of heavy materials and equipment on area roadways. This noise increase would be of short duration and would probably occur primarily during daytime hours.

Construction activities could take place for Alternative D at night, as the nearest receptors are over 1 mile away and would not be able to hear the activity. However, Alternatives B and C are near residential neighborhoods, which precludes nighttime activity. By limiting activities in these areas to daylight hours, all build alternatives would avoid adverse noise impacts during construction.

Water Quality

Construction activities would temporarily impact the quality of surface runoff that is conveyed through desert washes into receiving waters. The accidental discharge of waste products and fluids used for equipment cleaning during construction are of primary concern. Alternative B crosses six washes that lead to navigable waters (Lake Mead or the Colorado River), while Alternative C crosses seven washes and Alternative D crosses six washes. Staging areas would be located in the general vicinity of all crossings, creating the potential for accidental discharge into a receiving water.

Erosional effects of construction of the build alternatives also degrade water quality and are primarily caused by construction of channels and access roads and site grading. In general, steeper grades of constructed channels and temporary access roads lead to greater erosion potential. Of the three build alternatives, Alternative D has the steepest grades, largest cuts and fills, and the most temporary access roads. Therefore, Alternative D would have the most negative water quality impact with respect to erosion potential.

Visual Resources

Construction activity in the vicinity of residential and commercial areas will temporarily degrade the visual landscape for all three build alternatives. Alternatives B and C have similar visual resources construction impacts, as construction would take place in the vicinity of Boulder City residential areas with views of Lake Mead. Alternative D, however, passes south of Boulder City and only approaches Lake Mead at the east end of the project area.

During construction of the build alternatives, dust emitted from earthwork activities would move throughout the surrounding airspace. For the construction of Alternatives B and C, this could potentially hamper views of surrounding mountains, valleys, and Lake Mead for residents and tourists in Hemenway Valley. This is most probable under high wind conditions.

Some naturalists visiting the LMNRA could find the presence of construction equipment and associated construction activities detracts from the views currently experienced within the area. For Alternative D, in particular, cuts in the Eldorado Mountains as deep as 60 m (200 ft) will be visible to hikers and other naturalists traveling within the LMNRA.

Nighttime lighting of the construction area is another potential construction impact on visual resources. This impact is greater for Alternatives B and C, since both alternatives are close to several residential areas in Boulder City. However, Alternative B could take advantage of existing lighting along U.S. 93. The impact is less for Alternative D, as any lighting used for construction will be over 1 mile away from the nearest residential area.

4.17.2 Traffic and Circulation

Construction of a build alternative will have an effect on the routing, congestion, and overall safety of the traffic network within already busy roads in the project area. This assessment of traffic impacts takes into consideration the locations of new access roads to the facility; delivering gravel, equipment, and vehicles to the site; and the number of heavy truck and personnel vehicle trips associated with construction of the facility. Because of the preliminary nature of engineering at this time, the assessment of impacts to traffic is presented in a general, order-of-magnitude manner in this section.

Vehicle Routing and Access

For each of the build alternatives, temporary access roads and detours would be used to allow for passage of construction traffic on U.S. 93 and side roads. This action is by far the most intensive for Alternative B, which makes improvements to existing U.S. 93 while maintaining existing traffic flows to the maximum extent feasible. Detailed signage, lane restrictions, and detours will likely be required during the staged construction of Alternative B, especially within the Boulder City limits.

Construction will require access roads to deliver material, equipment, and workers to the project site. These access roads will consist of both temporary gravel roads and existing roads that are currently used by vehicle traffic. It is those access roads and, in particular, the existing intersections with U.S. 93 that will have the greatest impact on traffic movement. Table 4-33 shows the major access roads that are most likely to be utilized for each build alternative.

TABLE 4-33
Major Access Roads for the New Facility Construction - Boulder City / U.S. 93 Corridor Study Build Alternatives

Alternative B	Alternative C	Alternative D (Preferred Alternative)
U.S. 93	U.S. 93	U.S. 93
U.S. 95	U.S. 95	U.S. 95
	Veterans Memorial Drive	Power line road (Utah Street extension)
	Buchanan Boulevard	Buchanan Boulevard

Construction vehicles for Alternative B will use only the two existing facilities during construction, because the alternative is located on the existing alignment. This indicates that more construction-related traffic would be on existing U.S. 93 for Alternative B than for Alternatives C and D. Additionally, because the construction would be within the existing right-of-way of U.S. 93, a series of detours and lane-shifts would be necessary throughout construction of the facility. This would tend to minimize access to businesses along the commercial corridor between Veterans Memorial Drive and Buchanan Boulevard, and make residential access more difficult in Hemenway Wash.

Because Alternative C passes south and then north of the existing alignment in the western portion of the project area, construction traffic can avoid continuous movement along existing U.S. 93 and access the new facility at Veterans Memorial Drive. This would keep construction traffic from being routed through the commercial corridor and the Buchanan Boulevard intersection. However, through the Hemenway Wash residential area, construction impacts on traffic routing and the required detours would be nearly identical to those for Alternative B.

Construction of Alternative D would produce the least amount of construction-related traffic through town and, specifically, on existing U.S. 93 of all the build alternatives in the study. Gravel haul trucks and trucks carrying raw materials would be able to use U.S. 95 and construct temporary access roads in the relatively flat alluvial fan area west of the airport. In the areas east of the Mead Substation, however, the more efficient routes for construction vehicles would be to travel through town and access the new facility using Buchanan Boulevard and the extension of Utah Street that leads to gravel powerline roads near the Boulder City landfill.

Traffic Congestion

The use and transport of construction vehicles, heavy equipment, and materials equipment would vary throughout the construction period of a build alternative. Some of the heavy equipment would be transported on flatbed trucks. Heavy equipment associated with several construction spreads could be on the site at any given time. The teams would be working simultaneously in different areas of the project site for all build alternatives, and the majority of all equipment would be left onsite for the duration of construction.

For the purpose of this EIS, it is assumed that there would be 100 construction workers, each making three trips per day, on average. An additional 100 construction vehicles of other types, per day, would travel within the project area, for a total of 400 construction-related trips per day. Since these would likely be trucks and other heavy vehicles, an adjustment factor was introduced to account for the additional impact of heavy vehicles. West of Buchanan Boulevard, a factor of 1.2 was used for the additional construction trips. East of Buchanan Boulevard, where grades are steep, a factor of 1.5 was used. This resulted in 480 daily trips west of Buchanan Boulevard and 600 daily trips east of Buchanan Boulevard.

Table 4-34 shows the impact of these added trips to the existing traffic volumes and V/C ratios for construction of Alternative B, the worst-case scenario for construction traffic. To be conservative, the construction trips are added to each link for the project 2016 volumes, and a corresponding adjusted V/C is calculated. While it is likely that the corridor would be constructed before 2016, using the (readily available) 2016 traffic forecasts should provide a conservative estimate of the construction impacts.

TABLE 4-34
Average Annual Daily Traffic (AADT) Volumes and V/C Ratios along U.S. 93
Build Alternative B – Temporary Impacts during Construction

Location on U.S. 93	NDOT Counting Station	1999		2016		2016 + Construction[2]	
		AADT[1]	V/C	AADT	V/C	AADT	V/C
West study limit to U.S. 93/95	230	38,300	0.63	56,300	0.92	56,780	0.93
U.S. 93/95 to Veterans Memorial Drive	331509	32,000	0.53	47,200	0.78	47,680	0.79
Veterans Memorial Drive to Buchanan Boulevard	1087	31,200	0.94	35,900	1.08	36,380	1.09
Buchanan Boulevard to Pacifica Way	228	16,000	0.79	31,500	1.48	32,100	1.51
Pacifica Way to Lakeshore Road	225	15,000	0.91	24,800	1.49	25,400	1.53
Lakeshore Road to east study limit	222	13,000	0.79	21,500	1.30	22,100	1.34

[1] The ADT volumes have been adjusted for seasonal changes, per NDOT factoring procedures.
[2] An additional 720 trips per day is estimated to be added to each trip for construction traffic.

Due to the minimal construction traffic compared to the overall traffic volumes, none of the proposed build alternatives is anticipated to result in a substantial adverse impact to traffic congestion within the project area. As is depicted in Table 4-35, the largest increase in V/C ratio is 0.04, which occurs east of Boulder City in the Hemenway Wash area. Overall, the additional construction vehicles do not decrease the LOS to a substantial degree in any of the links. However, travel time is expected to increase along U.S. 93 for Alternative B throughout Boulder City and for Alternative C through Hemenway Wash, as restricted lanes, detours, and slower posted speeds would be required.

Pedestrian and Traffic Safety

Large construction trucks traveling in the project area may result in safety hazards for through and turning traffic on U.S. 93. Additionally, approximately 10 percent of all existing vehicles travelling on U.S. 93 are medium to large trucks, which would further decrease vision for other motorists with construction traffic added to the mix. Safety concerns would be greatest for Alternative B, less severe for Alternative C, and minimal for Alternative D.

It is anticipated that the greatest impact on public safety would occur in the commercial corridor and Hemenway Wash residential areas. This is in part due to the additional pedestrian and bicyclist presence in these areas, using facilities provided within the existing U.S. 93 right-of-way. Lane restrictions and the detouring of traffic to temporary routes would present a potential concern for pedestrians and bicyclists, and adequate signage and public outreach would be necessary to prevent collisions and other conflicts during construction.

Another safety concern during construction is the maintenance of an adequate emergency vehicle route. Emergency vehicles currently utilize U.S. 93 in conjunction with Buchanan Boulevard to travel from west to east and north to south within the Boulder City area. This includes emergency vehicles that must travel to Hoover Dam. The proposed build alternatives are not anticipated to result in the closure of any existing emergency access roads during construction, and an emergency vehicle traffic flow plan would be required prior to construction. Because of this, the proposed build alternatives are not anticipated to result in an unavoidable adverse impact on emergency access.

4.17.3 Overall Construction Impacts

Table 4-35 summarizes the overall construction impacts for environmental and traffic-related aspects of the project area, rated at either low (slight), medium, or high (severe):

TABLE 4-35
Construction Impact Analysis
Boulder City / U.S. 93 Corridor Study Build Alternatives

Construction Impact on:	Alternative B	Alternative C	Alternative D (Preferred Alternative)
Air Quality	Medium	Medium	Low
Noise	Low	Low	Low
Water Quality	Medium	Medium	High
Visual Resources	High	High	Medium
Routing and Access	High	High	Medium
Congestion	High	High	Low
Safety	Medium	Medium	Low

4.17.4 Mitigation

Mitigation of adverse construction-related impacts will be required for constructing any of the build alternatives in the Boulder City/U.S. 93 Corridor Study. The following is a breakdown of mitigation measures addressing the environmental and traffic impacts.

Environmental Resources

To minimize air quality impacts during construction, wet dust suppression techniques, such as watering and applying chemical stabilization, shall be used to prevent (or suppress) the fine particulate from leaving the surface and becoming airborne through the action of mechanical disturbance or wind. This mitigation measure shall be applied for the construction of any of the build alternatives.

Construction mitigation for water quality impacts shall require the adoption of BMPs, as outlined in the Water Quality Impacts section of the DEIS (Section 4.5). This includes cleaning and inspecting construction equipment, designating locations away from washes for equipment servicing, and constructing spill containment systems. Additional mitigation measures are necessary for containment of eroded material from side slopes, especially for Alternative D, whose cuts and fills are the largest of all the build alternatives.

Visual resources impacts, in part, are covered by mitigation for air quality impacts, as the dust suppression methods to maintain reasonably healthy air during construction also serve to avoid impairment of existing views. Additionally, during construction in the LMNRA, all vehicles and equipment not in use shall be relocated to staging areas outside the park area. This will help to maintain the views of Lake Mead and the Eldorado Mountains to which park naturalists are accustomed.

Traffic and Circulation

Prior to construction of the preferred alternative, the contractor shall determine the appropriate traffic control and safety devices to be installed and maintained on U.S. 93 and U.S. 95, as well as any other major streets to be utilized as construction routes to ensure traffic safety. Some examples of typical traffic safety devices include the installation of warning lights, signs, traffic cones, and signals. Required traffic safety devices will warn oncoming motorists that there may be large, slow-moving trucks ahead. Locations where these devices are necessary would include, but are not necessarily limited to, the following:

- Construction of the new interchange at Railroad Pass Hotel and Casino
- Construction of the new east end interchange in the vicinity of the Hacienda Hotel and Casino

The contractor and NDOT shall review the need for requiring flag persons and temporary traffic signage and signals during peak traffic periods at specific locations, especially in the commercial corridor and Hemenway Wash. Traffic safety devices shall be installed prior to use of the major roads of travel within the project limits for gravel hauling or other heavy truck trips, such as the delivery of heavy equipment and construction vehicles to the site.

For construction of crossings of the new highway with existing roads, such as U.S. 95 and the historic railroad, the contractor shall prepare and implement a traffic detour plan outlining the flow of vehicles around the work zone. This plan shall be in accordance with all NDOT and FHWA safety standards, and provide adequate speeds and sight distances for drivers. The plan shall also address the routing of bicyclists and pedestrians through the work zone, and account for adequate signage to allow for safe passage into residential, commercial, government, and recreational areas.

To reduce the potential adverse impacts associated with the temporary loss of access to commercial areas along the existing U.S. 93 corridor, a Traffic Control Plan shall be prepared prior to commencement of construction activity. Features of the Traffic Control Plan may include, but not be limited to, a public awareness campaign and the use of alternative access points, and phasing of construction activities to reduce conflicts with existing land uses.

The contractor shall also repair any roads that are damaged by construction activities and shall return these damaged roads to preconstruction conditions. All road repairs shall be scheduled and conducted to ensure that safe operating conditions are maintained.

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5. Other Environmental Consequences

5.1 Unavoidable Adverse Impacts

Impacts to the following environmental resources were evaluated for Alternative D, the preferred alternative, to determine if they would result in unavoidable adverse impacts.

Constructing and operating Alternative D would irreversibly and irretrievably commit environmental resources to the project. An irreversible commitment is the permanent loss of the resource.

5.1.1 Air Quality

After the implementation of construction mitigation measures, there will be no further adverse impacts to air quality. Operation of the preferred Alternative D will result in a decrease of CO concentrations along present U.S. 93, as compared to the No Build Alternative, which is a beneficial impact.

5.1.2 Noise

Construction of the preferred Alternative D will result in a short-term increase in noise that, due to a lack of receptors, will not require mitigation. An increase in noise levels will also occur during the operation of Alternative D. In accordance with FHWA's guidelines for noise increases in unpopulated areas, operation of Alternative D does not require mitigation.

5.1.3 Biology/Threatened Species

Construction and operation of the preferred Alternative D would result in disturbance of 679 acres of habitat and impacts to associated vegetation and wildlife. Alternative D would result in the most adverse impact to protected and sensitive species of the build alternatives. South of Eldorado Ridge (Figure 4-3) it traverses primarily low-density desert tortoise habitat. North of the divide between the Eldorado Basin and the Colorado River drainage it crosses bighorn sheep habitat, particularly from Eldorado Ridge into Goldstrike Canyon.

As described in Chapters 4 and 6, any of the build alternatives would result in enhancing barriers to bighorn sheep population exchange between the River Mountains and the Eldorado Mountains herds. In addition, Alternative D would fragment the high-use bighorn habitat in the vicinity of Eldorado Ridge (Figure 3-4B). In addition to the mitigation measures identified in Section 4.4.3, and those measures taken to address potential cumulative impacts to bighorn and other wildlife discussed in Chapter 6, a Biological Assessment of the implementation of Alternative D will be developed in consultation with the USFWS and NDOW. The USFWS will issue a Biological Opinion specifying these and potential additional mitigation measures to offset the impacts to desert tortoise and other protected or sensitive species. Formal consultations with USFWS to initiate this process will take place once detailed design of the roadway is completed.

5.1.4 Water Quality

Implementation of the preferred Alternative D will result in short- and long-term impacts to water quality. Degradation of water quality in desert washes from stormwater runoff and erosion will contribute to local impacts and also impacts to the Colorado River and Lake Mead. However, as described in Chapter 4, implementation of the measures outlined in the SWPPP, in accordance with the NPDES Construction General Permit, coupled with the application of BMPs, is expected to reduce impacts to water quality to acceptable levels.

5.1.5 Wetlands/Waters of the U.S.

No impacts to USACE jurisdictional wetlands would occur from implementation of the preferred Alternative D. Impacts to aquatic ecosystems downstream in either Lake Mead or the Colorado River would be as a result of floodwaters reaching those bodies, and are not expected except during extreme flood events. The preferred Alternative D will permanently impact 3.12 acres of jurisdictional waters of the U.S. consisting of ephemeral desert wash. There continue to be discussions between the FHWA, NDOT, EPA, and the ACOE on whether this impact is adverse because the "seriousness of the potential for adverse impacts on the aquatic ecosystems" (40CFR230.10) is open to question given the arid climate, lack of actual water in these drainages at most times, and distance to Lake Mead or the Colorado River. Mitigation measures, such as installing temporary barriers to restrict debris from entering adjacent washes, restricting construction activities during rainfall, the application of design criteria to minimize erosional effects, and implementing BMPs established by NDOT, will be employed to minimize the effects of fill material on these waters.

5.1.6 Floodplains

Construction impacts to floodplains resulting from the preferred Alternative D impact 6.3 acres. Operational impacts to floodplains resulting from Alternative D, impact 4.1 acres. As discussed in Chapter 4, construction impacts will be mitigated through the application of appropriate design criteria and the use of BMPs. The preferred alternative will be engineered to use retaining walls to minimize encroachment, relocate drainages in the designated floodplain, and redraw the resulting flood zone under FEMA approval.

5.1.7 Cultural Resources

Implementation of the PA (Appendix E) prior to the construction of the preferred Alternative D will include an assessment of effects, and then the implementation of mitigation measures, after further development of the project footprint and prior to construction. The present evaluations indicate that Alternative D may impact seven historic transmission towers that are components of three NRHP-eligible transmission lines, and a portion of the BCBRR.

Impacts may occur to three NRHP archaeological sites: Squatters' Camp (26CK1169/3024/5413), a prehistoric lithic reduction site (26CK6270), and a historic mining camp (26CK6277). As noted in Section 4.8, mitigation measures for the Squatters' Camp are specified in an MOA between Reclamation, BLM, NDOT, FHWA, and SHPO. Also as noted in Section 4.8, mitigation measures for the other archaeological sites and the historic structures will be developed subsequent to an assessment of effects, as stipulated in the PA for implementation of Alternative D (Appendix E). As discussed in Chapters 4 and 7, these measures will include photographic recording, controlled collection and artifact analysis, curation, and exhaustive archive research. Native American consultation will also be ongoing through the development of mitigation and data recovery.

5.1.8 Land Use/Section 4(f)

Because Alternative D passes primarily through undeveloped lands, impacts to current and planned land uses are less than that of the other build alternatives. Permanent impacts on current and future land uses are described Chapter 4, and they are not expected to result in unavoidable adverse impacts.

The preferred Alternative D would use more Section 4(f) lands associated with the LMNRA than the other build alternatives. Approximately 59 acres of LMNRA land will need to be used for implementation of the preferred alternative. Measures to minimize harm to these lands are described in Chapters 4 and 7, and will be implemented in consultation with the appropriate management agencies.

5.1.9 Visual Resources

Altered views would result from the construction and operation of the preferred Alternative D, and would include those in a portion of the LMNRA where there is currently a major roadway, and multiple transmission lines and their access roads. In addition, altered views from the Buchanan Boulevard/George Avenue and San Filipe Drive areas would result from the construction and operation of Alternative D. However, current views would not change substantially.

5.1.10 Economic Conditions

Operation of the preferred Alternative D is likely to result in a noticeable, short-term negative economic impact to the certain businesses in Boulder City that rely on doing business with through-travelers. In the long-term, it is uncertain if Boulder City would experience more or less economic growth than it would under the other alternatives, but an unavoidable adverse long-term impact is unlikely.

5.1.11 Social Context/Environmental Justice

As described in Chapter 4, adverse social impacts associated with the preferred Alternative D would be minimal. Long-term impacts are likely to be beneficial and result from the diversion of through-traffic away from the developed portion of Boulder City. No unavoidable adverse impacts on population, employment, income, social conditions, and minority or low-income populations are identified.

5.1.12 Hazardous Waste

No unavoidable adverse impacts would occur from the implementation of the preferred Alternative D.

5.1.13 Energy Use

No unavoidable adverse impacts would occur from the implementation of the preferred Alternative D as they will result in a beneficial impact in terms of energy usage savings.

5.2 Local Short-Term Uses Versus Long-Term Productivity

This section discusses short-term impacts, resource use, and maintenance and enhancement of long-term productivity of the proposed project. Construction and operation of the preferred Alternative D would result in short- and long-term impacts and benefits, as discussed below.

5.2.1 Short-Term Uses of Man's Environment

Short-term project costs include the commitment of considerable financial and material resources for the construction of the preferred alternative. Short-term uses of the human environment are less for Alternative D than for the other build alternatives. These impacts include construction effects on local air quality; on noise levels; effects on biological resources, such as disturbance of wildlife habitat and special-status species; water quality; increased erosion; potential transportation and circulation impacts; energy usage; and effects on Section 4(f) resources, cultural resources, and visual resources. Many of these impacts are mitigated.

Construction impacts associated with the preferred Alternative D are described in further detail in Chapter 4. A benefit during the construction phase would be the creation of construction-related employment.

5.2.2 Long-Term Effects of the Proposed Project

Dedication of land for the proposed project would preclude opportunities for alternate land uses. Long-term effects of the proposed project include an increase in ambient noise levels; loss of vegetation and wildlife habitat, including fragmentation of wildlife habitat; impacts to localized hydrology, cultural resources, and visual resources; and loss of recreational lands. About 59 acres of land within the LMNRA would be required, but Alternative D construction would occur in a part of the Recreation Area that already supports transportation and utility infrastructure including powerlines and maintenance roads.

Long-term benefits would include a reduction in traffic along U.S. 93 through Boulder City, thus improving safety for residents and other motorists; a reduction in noise, air emissions, and traffic within Boulder City proper, enhancing the quality of life there; an increase in travel speed for through traffic; a reduction in energy usage; and improvement of air quality from reduced CO emissions. Of all alternatives, including the no-build alternative, only construction of Alternative D would be consistent with and promote the objectives of the Boulder City Master Plan.

Current traffic demands on U.S. 93 have exceeded available capacity. If the No Build Alternative is implemented, most key segments and intersections will reach an LOS F within the next 10 years. Implementation of any of the build alternatives would improve LOS.

5.2.3 Conclusion

The proposed project, implementation of the preferred alternative, meets long-term transportation needs identified in Statewide Transportation Improvement Plan and the

RTC's Regional Transportation Plan. The project would provide long-term improvements that would reduce traffic congestion and crashes, it would enhance regional mobility as well as local circulation within Boulder City. It is anticipated that there would be an improvement in the quality of life in the developed portion of the City of Boulder City as a consequence of these effects. The local short-term construction impacts, after the implementation of mitigation measures, would be acceptable in view of long-term benefits of the project. These long-term benefits would also outweigh the long-term impacts of operating the facility.

5.3 Irreversible and Irretrievable Commitment of Resources

Implementation of Alternative D, the preferred alternative, would require a commitment of natural, physical, human, and fiscal resources. The irreversible and irretrievable commitment of these resources is discussed in this section, with a focus on the following issues:

- The proposed project's use of nonrenewable resources during construction and operation, including fossil fuels, highway construction materials, electricity, water, and labor.
- The changes that are expected to occur as a result of the proposed project include the commitment of land, physical changes in the environment and a reduction of wildlife habitat, effects on human populations, and fiscal changes.

5.3.1 Use of Nonrenewable Resources

As discussed in Section 4.16, construction of the preferred Alternative D would require the use of fossil fuels for construction vehicles, construction equipment, and construction personnel vehicles. Electrical energy would also be used onsite to power maintenance trailers and other equipment. During operation, vehicles traveling along the constructed alternative would use fossil fuels.

Fossil fuels and electrical energy would be expended to manufacture the materials and products associated with roadway construction. In addition to those materials, other materials such as concrete, sand, aggregate, and steel would be used. These resources are not retrievable; however, the proposed project would not have an adverse effect on their continued availability. Operation of the preferred Alternative D would result in greater fuel efficiency of vehicles traveling along the alternative versus those traveling at slower speeds along existing U.S. 93.

5.3.2 Expected Changes as a Result of the Proposed Project

Land has been committed along existing U.S. 93 for use as a transportation corridor. Implementation of the preferred Alternative D would require the commitment of additional land, which would result in the loss of vegetation and wildlife habitat, public recreation areas, and it would affect special-status species as well as the movement of wildlife.

Land used for the proposed project is considered an irreversible commitment during the time it is used for a transportation facility. Should a greater need arise for use of the land, or if the highway facility is no longer needed, the land could be converted to other use(s) or left under the present use. However, once the proposed project is constructed, such a conversion would not likely happen or be necessary.

Alteration of the landscape by the proposed project would also be considered an irreversible change. If the project area were converted in the future, it would not be likely that the landscape would return to its original pre-project condition.

Labor would be needed to build the project and to fabricate the construction materials. Long-term maintenance of the project would also generate jobs.

Construction of the preferred alternative would require a considerable expenditure of state and federal funds, which are not considered retrievable. Long-term maintenance costs would also be considered irretrievable.

5.3.3 Conclusion

The proposed project and construction of the preferred alternative would be beneficial to tourists, interstate travel, residents of Boulder City, and the trucking industry by reducing traffic congestion, improving safety, enhancing regional mobility and local circulation, and improving the quality of life in the City of Boulder City. Traffic speeds are expected to increase, resulting in timesavings and a reduction in transit costs. These long-term benefits are anticipated to outweigh the commitment of the above-listed natural and fiscal resources and there are no non-mitigatable adverse impacts with the preferred Alternative D.

6. Cumulative Impacts[1]

6.1 Introduction

This chapter addresses potential cumulative impacts to the environment that could be associated with implementation of the build alternatives for the Boulder City/U.S. 93 Corridor Study in concert with one or more other past, present, or reasonably foreseeable future actions or projects. Specifically, this chapter is prepared in accordance with the requirements of NEPA and guidance from the federal CEQ, *Considering Cumulative Effects under the National Environmental Policy Act*. The CEQ regulations define a "cumulative impact" for purposes of NEPA as follows:

> Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR §1508.7).

This cumulative impacts chapter gives emphasis to the actions or projects that are likely to cause adverse cumulative impacts (i.e., projects that would occur relatively close to the project site). For other transportation projects in the region, this analysis focuses primarily on the potential impacts of reasonably foreseeable future actions. The impacts of past and present actions are also discussed but in less detail and in a more qualitative manner.

6.2 Cumulative Impacts Analysis

6.2.1 Other Actions/Projects Included in the Cumulative Impacts Analysis

The following criteria were considered in identifying those past, present, or reasonably foreseeable projects that could result in cumulative impacts to the area's resources:

- Projects that have an application for construction and/or operation pending before an agency with permit authority
- Projects that are listed on the Nevada STIP
- Projects that have the potential to generate environmental impacts that, when addressed collectively with the proposed project, could result in cumulative impacts to the environment
- Projects that are of a similar character, could affect similar environmental resources (resource base), or are located in geographic proximity to the proposed project

[1] Major portions of this chapter were excerpted and modified from *U.S. 93 Hoover Dam Bypass Final Environmental Impact Statement* (FHWA, January 2001).

6.2.2 Scope of the Cumulative Impacts Analysis

The geographic limits and range addressed in this analysis vary according to the nature and characteristics of each environmental resource. Two geographic areas are defined to categorize this analysis. A description of each follows:

1. The first area is the vicinity of the proposed project and includes the northern portion of Boulder City, covering approximately 85 km^2 (33 square miles), the City of Henderson, and adjacent federal lands and mountainous terrain forming the northern limit of the Eldorado Valley.
2. A second area encompasses the remaining portion of Boulder City land to the south (a total of 344 km^2 [133 square miles]), as well as the surrounding unincorporated desert region of the Eldorado Valley within Clark County, Nevada. This geographic area is used to include a broader range of other projects and environmental resources well beyond the immediate vicinity of the proposed project.

6.2.3 Timing and Duration of Other Actions/Projects

For each of the projects addressed in this analysis, the time period in which it would be implemented, including construction and operational phasing, is defined. Information on the timing and duration for the other projects was obtained from applicant proposals, when available. When this information was not available and could not otherwise be obtained through reasonable efforts (e.g., direct contact with applicants), professional judgment was used to estimate a reasonable time frame to complete the regulatory review and permit issuance processes needed for implementation of the other projects.

6.2.4 Future Time Horizon of the Proposed Project

Two time horizons are used to discuss potential cumulative impacts of the proposed traffic improvements to U.S. 93 and other reasonably foreseeable projects. The time horizon consists of: (1) Years 1 through 5 and (2) Years 6 through 20.

These time horizons were selected because they reflect the two distinct periods in which different cumulative effects or project interactions could occur. The period of Year 1 through 5 corresponds to the initial construction and operation of the proposed traffic improvements to U.S. 93. Based on professional judgment and understanding of the engineering design and construction process, it is not expected that the proposed project would be completed for at least 5 years (and would possibly take up to 10 years, depending on funding). Years 6 through 20 correspond to the continued operation of the proposed traffic improvements through its approximate 20-year design life.

At this time, it is anticipated that project construction could begin in 2007. With a 20-year project horizon, the proposed project should reach its design life expectancy in 2027.

6.2.5 Cumulative Projects Data and Information

Each of the projects addressed in this cumulative effects analysis is supported by different levels of information, depending upon the current status of the particular project. For future projects, this information ranges from a simple project description, identifying its goals and objectives, to a comprehensive environmental review for project approval. For past projects, appropriate government agencies were interviewed for documentation on the history of the project, including past project impacts. A primary source for the Boulder City/U.S. 93 Corridor Study EIS cumulative impacts analysis is the *U.S. 93 Hoover Dam Bypass Final EIS* (FHWA, January 2001).

This analysis uses the level of information available at the time this EIS was prepared to describe these other projects and their respective potential impacts on the environment. If sufficient data or information on specific aspects of the proposed project were not available to complete an analysis comparable to the evaluation of other projects, and reasonable efforts to obtain that information were unsuccessful (as in the case of the U.S. 95 widening in Nevada), professional judgment was used to estimate the potential impacts.

6.2.6 Reasonable Forecast Analysis

In accordance with CEQ guidance, this analysis assesses future cumulative effects for projects that can be reasonably forecast. This includes those projects that are currently funded or for which other NEPA analysis is being prepared, and those that are being considered but have not reached a funding or environmental document stage.

6.3 Methods Used for Identifying Other Past, Present, and Reasonably Foreseeable Actions/Projects

Several methods were used to identify other past, present, and reasonably foreseeable projects that could, in concert with the proposed Boulder City/U.S. 93 Corridor Study, contribute to cumulative impacts on the environment. For actions or projects occurring on lands administered by federal agencies, the agency with primary land management authority identified projects that could potentially contribute to cumulative environmental effects.

Surveying other land management agencies within the southeast Nevada region identified other projects. These surveys consisted of informal inquiries designed to acquire existing available environmental documentation and project descriptions. Concerning other projects located on private properties in the vicinity of the proposed project, the Clark County Planning Department determined that there are no applications or proposals for specific plans.

6.4 Past, Present, and Reasonably Foreseeable Actions/Projects and Respective Environmental Impacts

The actions or projects that could result in changes to the local environment (and result in cumulative impacts when combined with the proposed project) would include any actions proposed by NPS, NDOW, ACOE and Reclamation, and highway projects proposed by NDOT and FHWA, regional agencies such as RTC, or local jurisdictions such as Clark County, the City of Henderson, or Boulder City.

Past and present activities, in addition to future planned projects, have and will continue to have a variety of impacts on the environment in the vicinity of Boulder City. These projects, shown in Figure 6-1, are described below in chronological order from past to future.

6.4.1 Past Actions near and within the Project Vicinity

The overall ecosystem of the lower Colorado River today is quite different from that which existed prior to modern-day use and development. During historic times, the area surrounding Boulder City was used for a wide variety of purposes. Past activities in the project area and vicinity included cattle grazing, hunting, and mining for turquoise, gold, and silver. Mining occurred in the late 1800s and early 1900s in several areas within the Eldorado Valley. Turquoise mining occurred near the location of the Hacienda Hotel and Casino; gold and silver mining occurred in locations on the Arizona side of Hoover Dam. Cattle grazing and hunting historically occurred in the project vicinity (FHWA, January 2001).

Development of Boulder City, Hoover Dam, and Associated Transportation Infrastructure

In 1928, Congress passed the Boulder Canyon Project Act authorizing construction of Hoover Dam. Construction began in 1931, and the last concrete was poured in 1935. As part of the necessary infrastructure for the construction of the dam, the Boulder Canyon Project Federal Reservation was created. This 373-km² (144-square-mile) area in the Eldorado Valley included the dam site, the lower portion of the future reservoir, the site of Boulder City, and vast stretches of open territory around the town. This area was under federal control and, unlike the surrounding jurisdictions, gambling, the sale of liquor, and other practices deemed injurious to the workers and the orderly progress of work were strictly prohibited. The town, named Boulder City, included eight 172-man dormitories, one 53-man office dormitory, more than 600 family cottages, a mess hall and recreation hall, an office building, company store, laundry, and a 20-bed hospital. Sewer and waterlines were laid out and hooked up, and nearly 32 km (20 miles) of streets were paved. Reclamation spent well over a million dollars constructing the administration building, government residences, and landscaping for streets and parks. Privately financed structures housing various independent businesses sprung up along Nevada Way, the main street in town. The key to this transformation of the Eldorado Valley was a network of elaborate, expensive pumps and pipes that carried water from the Colorado River out of Black Canyon to the town (Stevens, 1988).

Associated with the construction effort at Hoover Dam was the establishment or improvement of a number of roadways and rail facilities to bring equipment and labor to the construction area. On the Nevada side of the river these included the improvement of U.S. 95 and U.S. 93, and the construction of the Boulder City Branch Railroad (see Section 3.8).

After the construction of Hoover Dam was completed, a large portion of Boulder City was razed, as required by the government contract. This included hundreds of cottages, half a dozen dormitories, the mess hall, the recreation hall, and many other structures. The southern half of the city was returned to a state closely resembling its pre-dam condition.

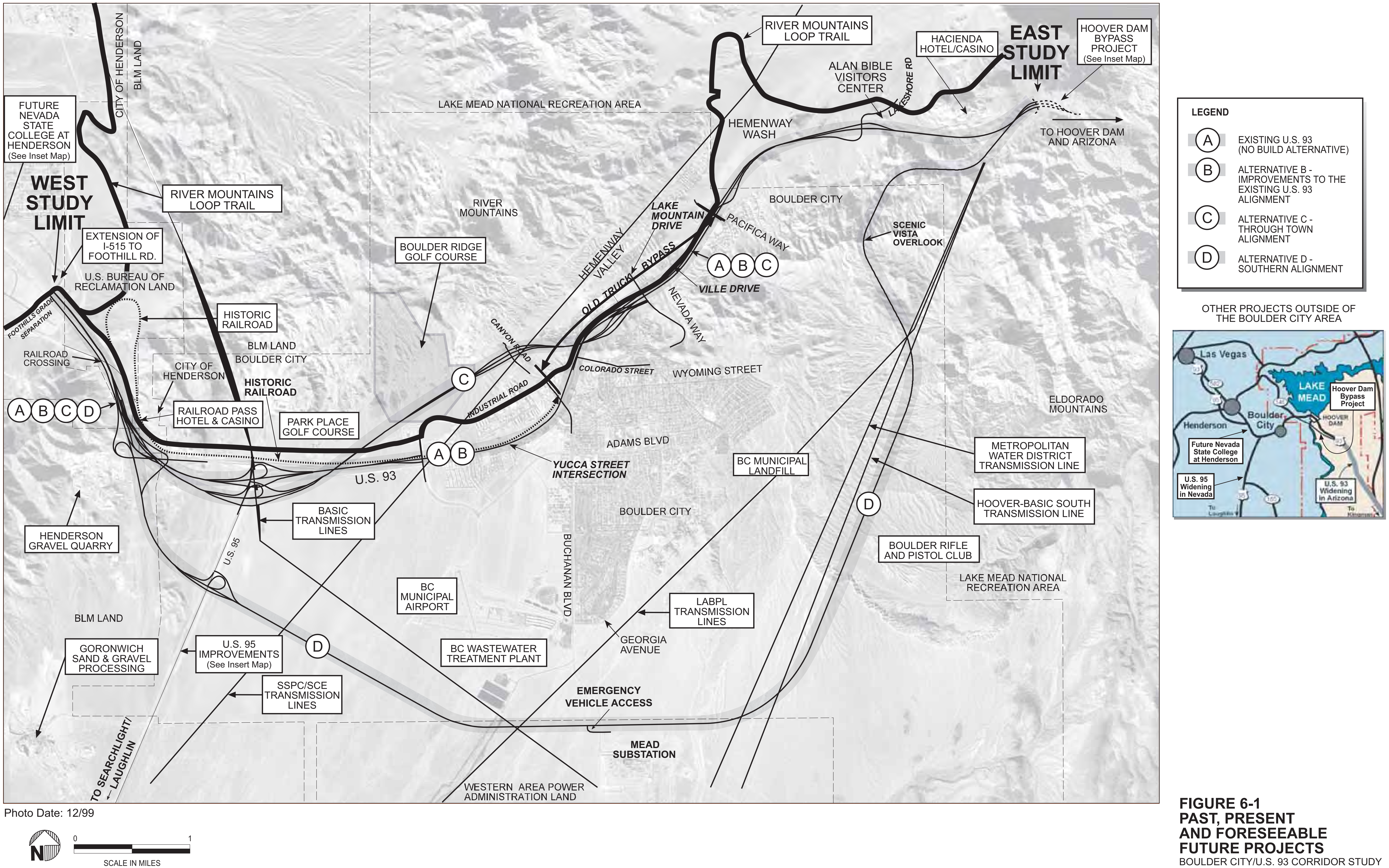

FIGURE 6-1
PAST, PRESENT AND FORESEEABLE FUTURE PROJECTS
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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Two dormitories were set aside to house CCC workers building the Boulder Dam National Recreation Area, and a number of cottages were resold and hauled offsite for other uses. However, the landscaping remained and some of the original buildings are still standing, including the hospital, Grace Community Church, the Boulder Dam Hotel, and a number of enlarged and renovated cottages (Stevens, 1988; see also, Schweigert and Labrum, 2001). Roadways in the vicinity of the dam were either abandoned or, as in the case of U.S. 93, adopted into the federal highway system with the new link across the river.

Impacts from the Development of Boulder City, Hoover Dam, and Transportation Infrastructure. In general, the development of Boulder City, Hoover Dam, and the associated transportation facilities involved construction activities that likely resulted in temporary localized impacts on air quality, ambient noise levels, biological resources, water quality, recreation resources, and aesthetic and visual resources. Impacts on local air quality would have likely occurred from construction equipment and vehicles traveling on dirt roads and during earthmoving activities. The impacts from increases in ambient noise levels would have resulted from the construction equipment, vehicles, and personnel constructing the various projects. Construction of Boulder City likely affected local plant and wildlife species, including the now federally listed and state-protected desert tortoise and bighorn sheep, and habitats by altering desert communities in the construction zone and destroying the natural habitat. Impacts to local water quality and riparian ecosystems could be expected to have occurred where construction activities were conducted near any of the washes in the project vicinity (NDOT, July 2001d). The impacts to aesthetic resources would have occurred from the presence of the construction vehicles, equipment, and personnel, the dust and noise generated, and the change to the landscape that resulted. All of these impacts are construction related and specific to the projects' locations. Once the projects were completed, the impacts ceased; and natural systems (air, water, vegetation, and wildlife) adapted and stabilized.

Furthermore, prior to the development of Boulder City, there were no permanent human receptors or habitations sensitive to noise, air, and aesthetic impacts. Long-term impacts to cultural resources probably occurred during project construction because of both the disturbance to the cultural resource sites and the development imposition of new facilities changing the setting and accessibility of cultural resource sites.

Long-term impacts to protected and sensitive wildlife species, including the desert tortoise and bighorn sheep affected by the proposed project, occurred through fragmentation of habitat and resultant adverse effects on species movement and reproductive viability (Heindl, 2001). The improved roadway corridors in the vicinity of Railroad Pass, Hemenway Wash, and Goldstrike Canyon interfered, and continue to interfere with, the exchange of bighorn sheep between populations in the River, Eldorado, and McCullough Mountains. This is thought to adversely affect the genetic diversity of these populations which, in turn, affects their fitness (Cummings, personal communication). Growth of Boulder City in terms of increasing development and population, albeit at a relatively slow and controlled pace, continues to expand both the area of direct impact on natural desert habitat, as well as the adverse effects of human contact on plants and wildlife. In particular, development in the Hemenway Wash area since the 1980, and continuing to the present, has resulted in a further impediment to the exchange of bighorn sheep individuals between the River Mountains and the Eldorado Mountains.

Substantial long-term visual effects on the environment occurred despite the razing of portions of Boulder City. After construction of the town was completed, the change to the landscape was dramatic (NDOT, September 2001), and it was unlikely to revert to its development conditions.

In contrast, the development of Boulder City contributed in a beneficial manner to the local and regional economy, local recreation resources, transportation and circulation in the area, and public utilities across the southwestern U.S. Hoover Dam and Boulder City, constructed during the Great Depression, employed a large number of previously unemployed workers. This work and the paycheck it provided enabled employees and their families to move from the tents and shacks north of Las Vegas to Boulder City and to forego the soup kitchens in Las Vegas. Beneficial economic effects were realized regionally during construction from the purchase of materials, goods, and services in the local area and region. Construction personnel working on these projects contributed to secondary spending by their individual purchases of goods and services. Additionally, some workers made a large impact to the economy of Las Vegas by gambling away the majority of their paychecks during their days off.

Benefits to recreationists occurred by the development of additional recreation facilities and opportunities in the area. Benefits to commuters, tourists, commercial truck traffic, and local and regional consumers accrued by the development of the local roadway and interstate highway system in the area and construction of Hoover Dam, a major tourist attraction. The development of U.S. 93 provides a more direct route between Las Vegas and Kingman, improving interstate commerce and access to numerous recreation facilities.

Potential Cumulative Impacts. The construction of Boulder City, Hoover Dam, and associated transportation corridors has resulted in long-term impacts to the immediate vicinity and surrounding region. The Boulder City/U.S. 93 Corridor EIS build alternatives will have long-term impacts to terrestrial wildlife, desert washes, cultural resources, public parklands, and aesthetics of the Eldorado Valley; therefore, the proposed project will contribute to cumulative impacts in the project area. In the vicinity of Railroad Pass, the additional impacts to bighorn sheep attempting crossings between the McCullough and River Mountains would be much the same among all the build alternatives. For the Hemenway Wash area and the crossing between the River and Eldorado Mountains, Alternatives B and C would have similar impacts, but construction of Alternative D would create a new roadway corridor further to the east. With mitigation, however, cumulative impacts from Alternative D would be lessened due to the reduced traffic flow along the current U.S. 93 corridor.

Existing Power Generation, Substation, and Transmission Facilities in Eldorado Valley

In 1939, Hoover Dam became the largest hydroelectric generating complex in the world. In order to transfer power to its nearest major markets that were hundreds of miles away, construction of transmission lines and switching yards became necessary. Six major switchyards were constructed near the Nevada rim of Black Canyon between 1935 and 1953, while 18 high-voltage transmission lines were constructed to and from Hoover Dam from 1930 to 1961.

The transmission lines were constructed with either steel towers or wood poles, and they follow four major corridors within the vicinity of Boulder City. The first, Southern Sierras Power Company (SSPC)/SCE corridor, ascends the Eldorado Valley, passes to the north of Boulder City, descends Hemenway Wash, and approaches Hoover Dam from the north. The second corridor, established by three lines of the LABPL, traverses 3 km (2 miles) east of the SSPC/SCE corridor through the Eldorado Valley, runs coincident with the southeasterly limits of Boulder City, and then extends through the Eldorado Mountains to U.S. 93. The Basic South transmission line also uses this corridor to a point 4 km (2.5 miles) southwest of Boulder City, where it then turns northwest to Railroad Pass and connects to the Basic Magnesium Plant in Henderson. A third corridor, established by the Metropolitan Water District of Southern California (MWD), travels along the same route as the LABPL corridor from Hoover Dam to a point 3 km (2 miles) east of Boulder City. From this point the corridor trends southward. Finally, the fourth corridor, which is known as the Pioche corridor, generally follows the SSPC/SCE corridor from Hoover Dam to the eastern edge of Hemenway Wash. It then trends west running parallel and 1.2 km (0.75 mile) from existing U.S. 93 and then crosses the River Mountains.

In 1967, the Mead Substation was constructed 5 km (3 miles) southwest of Boulder City in order to interconnect additional power sources from Davis and Parker Dams. Additionally, the substation took over switching and control functions that were previously performed at six substations near Hoover Dam. It has subsequently become one of the largest electrical substations in the world.

Existing power generation facilities in Eldorado Valley include Saguaro Power, which is a 90 megawatt (MW) power generation facility, and Eldorado Energy, which is a 480-MW power generation facility, both within City of Boulder City lands, approximately 48 km (30 miles) southwest of downtown Boulder City.

Figure 6-2 shows the approximate location of existing power generation facilities, substations, and transmission lines that are located outside the limits of the cumulative impact analysis of the project study area to provide a comprehensive picture of the existing power infrastructure in Clark County. However, because these facilities are outside the project study area for the purposes of this cumulative impact analysis, as defined in Section 6.2.2, they are not considered in this analysis.

Potential Cumulative Impacts. Construction of the various power generation facilities, transmission lines, switchyards, and the substation occurred over a period of roughly 40 years, resulting in intermittent short-term impacts to air quality, biological, and visual resources. Possible long-term impacts to vegetation and wildlife can be attributed to numerous maintenance access roads used to service the transmission lines and towers. The prominence of the transmission lines has been a long-term visual impact on the desert landscape, contributing to cumulative impacts.

Railroad Pass Hotel and Casino and Hacienda Hotel and Casino

Boulder City's prohibition of gambling led to the construction of the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino, just outside of the city limits along U.S. 93. Like its name implies, the Railroad Pass Hotel and Casino is located in the Railroad Pass area. Constructed in 1931, it offered a place for Hoover Dam workers to socialize and included a gaming hall, bar, and a dance floor. This locale is still in operation today and offers 120 hotel rooms, 21,000 square ft of casino space, 3 restaurants, a pool, and an arcade.

The present day Hacienda Hotel and Casino sits on land that was originally a mining claim owned by P.J. Sullivan near the head of Gold Strike Canyon. The land was later sold in 1954 to three investors who built a small snack bar, gift shop, and bar with slot machines. After a failed attempt at leasing the site to a development company, the property was sold to and jointly owned by three executives with the Mandalay Bay Group (dba Circus Circus Enterprises) and two of the original investors' sons. They managed to expand the property into what is now the Hacienda Hotel and Casino. The Hacienda Hotel and Casino offers 17 stories of hotel rooms, a casino, movie theatre, helicopter rides, and various dining establishments. Currently, there are ongoing discussions between the Hacienda Hotel Owners and the NPS to sell the property to the NPS for park use.

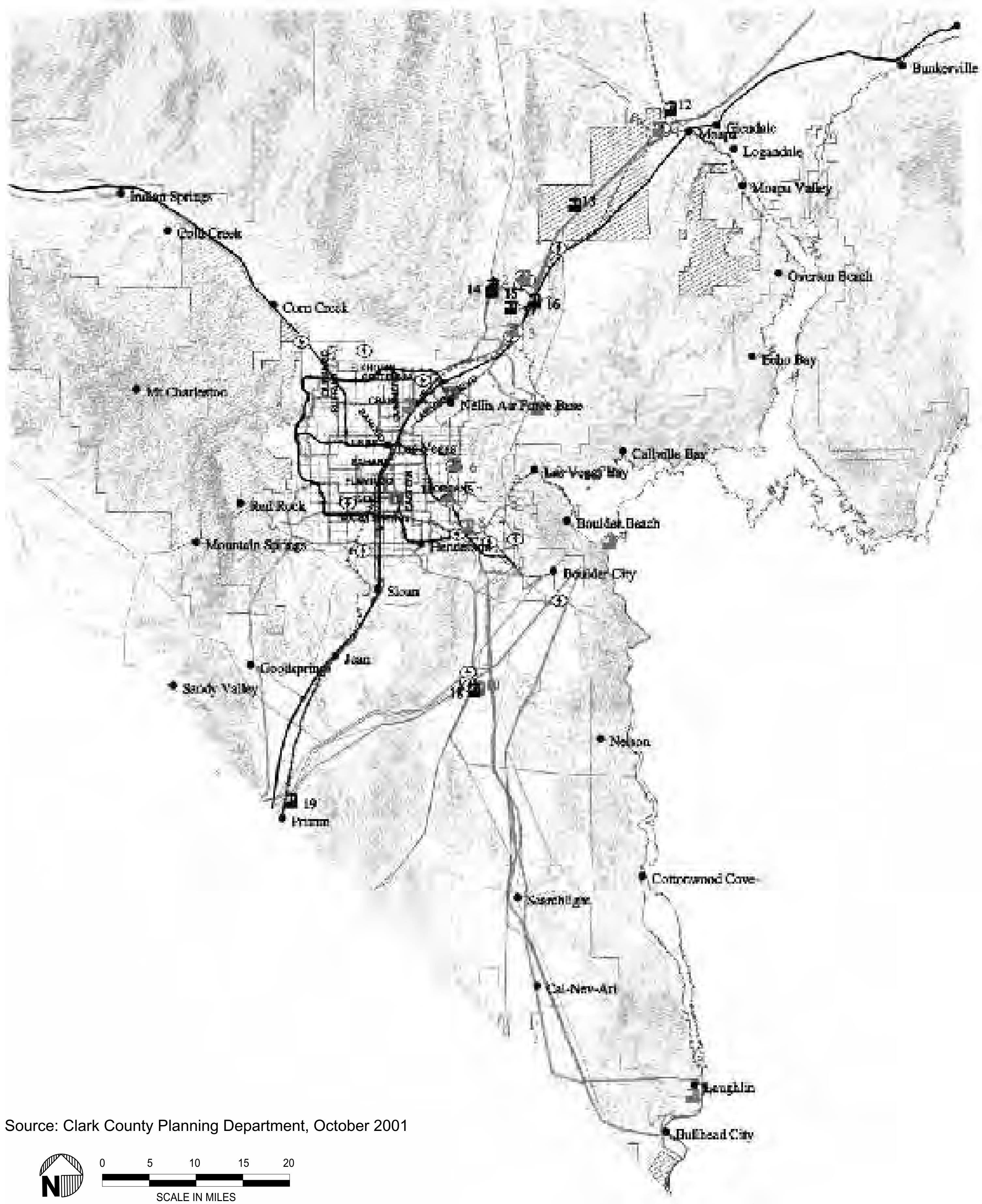
Potential Cumulative Impacts. The development of both the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino contributed to beneficial economic impacts in the area. Cumulative impacts resulting from these projects in conjunction with the Boulder City/ U.S. 93 Corridor project include a continued increase in the developed character of the areas in the vicinity of Railroad Pass and Gold Strike Canyon, with consequent impacts to visual resources, noise, air quality, and aesthetics. These impacts in the vicinity of the Hacienda Hotel and Casino lie within the LMNRA.

Boulder City Rifle and Pistol Club Range

The Boulder City Rifle and Pistol Club is nationally chartered and opened in spring 1933. At that time, various other locations were also used as ranges by the club, such as one in McKeeversville at the base of Red Mountain, another in Hemenway Wash, and a third in the basement of a home on Denver Street. In 1941, the range was taken over by the army in order to train those responsible for safeguarding Hoover Dam from attack. The range was subsequently returned to the club at the end of the war. Twenty years later in 1961, the club asked the city if it could purchase the property. The city declined, but it did offer the club a 20-year lease at a dollar per year, which it accepted.

Currently, there is interest in moving the range to a quarry site on Boulder City land that is leased to a private company. The site is 6 km (4 miles) south of Railroad Pass just west of U.S. 95. As the company mines out land, it would gradually convert those mined-out areas to shooting ranges.

Potential Cumulative Impacts. The rifle range is approximately 2.5 km (1.5 miles) away from any development, precluding it from causing any noise impacts. It is located at the base of the Eldorado Mountains in both desert tortoise and bighorn sheep habitat. As described in Section 6.5.2, the rifle range could contribute to cumulative biological resource impacts. The Rifle and Pistol Club range, access road, and service facilities contribute to cumulative land use impacts in this area, as well as impacts to drainages that constitute Waters of the U.S. Continuous access will be required as part of the constructed highway.



Legend

- Existing Power Plants
- Proposed Power Plants
- Substations
- Kern River Pipeline
- SWG Natural Gas Pipeline (Major)
- CalNev Pipeline
- Transmission Lines (Major)
  (Does not include all Valley Electric, Boulder City, Overton power lines)
- Streets (Major)
- Highways
- Railroads

Existing Power Plants

1 Nevada Power Reid Gardner Plant
2 Nevada Power Harry Allen Plant
3 Nevada Cogen Assoc Georgia Pacific
4 Las Vegas Cogen Enron North America
5 Nevada Cogen Assoc Pabco Gypsum
6 Nevada Power Sunrise Plant
7 Nevada Power Clark Plant
8 Saguaro Power Saguaro BMI Complex
9 Hoover Dam
10 Eldorado Energy Eldorado Plant #1
11 S. California Edison Co. Mojave Power Plant

Proposed Power Plants

12 PG&E Power Meadow Valley
13 Calpine Power Crystal Power
14 Mirant Las Vegas LLC Mirant Energy
15 Genwest LLC
16 Reliant Power Republic Services
17 Duke Energy Moapa Kerr Mcgee
18 Sempra Energy Copper Mountain
19 Reliant Power Bighorn

Source: Clark County Planning Department, October 2001

0 5 10 15 20
SCALE IN MILES

FIGURE 6-2
EXISTING AND PROPOSED POWER INFRASTRUCTURE IN CLARK COUNTY
BOULDER CITY/U.S. 93 CORRIDOR STUDY
ENVIRONMENTAL IMPACT STATEMENT

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U.S. 93 Widening between Buchanan Boulevard and Pacifica Way

In 1982, NDOT completed an Environmental Assessment (EA) for the widening of U.S. 93, from Buchanan Boulevard to Pacifica Way. This section, commonly known as the "truck bypass," was originally constructed in 1956 by Reclamation to move truck traffic out of downtown Boulder City. Improvements to the 3.8-km (2.4-mile) portion of roadway were made due to the deteriorating condition of the roadway surface, high maintenance costs, and the safety problems it posed.

Potential Cumulative Impacts. The construction of the project contributed to short-term localized air quality, noise, and visual impacts. No long-term cumulative impacts are associated with this project.

Boulder City Municipal Landfill

The Boulder City Municipal Landfill is located 2.5 to 3 km (1.5 to 2 miles) east of town at the base of the Eldorado Mountains and serves Boulder City and the LMNRA. The landfill is owned by the city, which in turn contracts out the collection of refuse and operation of the landfill to Boulder City Disposal, Inc. In 1988, the landfill site was approved and 100 acres were designated to accept solid waste. Ten of the 100 acres were permitted as a solid waste disposal facility, which has an expected service life of 25 years.

On an annual basis, the landfill is estimated to receive 23,800 cubic yards of compacted refuse. This converts to approximately 17,850 tons (1 cubic yard = ¾ ton) of compacted refuse a year. Collection of commercial and demolition refuse is more stringent than the collection of residential refuse, as it is only accepted during normal operation hours, Monday through Saturday, 7:00 a.m. to 2:00 p.m. Residential refuse is accepted 24 hours a day via a transfer station just outside the main gate of the landfill. The institution of the transfer station has resulted in a decrease in illegal dumping in the desert.

In addition to solid waste, the landfill also accepts household hazardous waste, which includes paint, motor oil, insecticides, cleaning solvents, and batteries. No other forms of hazardous waste are accepted. All waste loads are checked for hazardous and recyclable materials.

Potential Cumulative Impacts. Operation of the Boulder City Municipal Landfill has the potential to impact water quality, as well as biological, cultural, and visual resources. These impacts and their potential to contribute to cumulative impacts are discussed further in Section 6.5.2.

Boulder City Municipal Airport

Construction of the Boulder City Municipal Airport was completed in 1991. The facility is located to the southwest of town, within city limits. It is a small airport, serving only 25,000 to 30,000 flights annually. There are two runways, one of which has a steep gradient with rising terrain and obstacles. Services offered at the airport include flying lessons, skydiving, charter services, helicopter operations, and tours of the Grand Canyon. While there is no restricted airspace, overflights of Boulder City are discouraged.

FAA has recently granted $1.2 million to Boulder City for airport improvements. Plans for improvements include expansion of the property, which is owned by the city, in order to build 70 to 80 new hangars (John Hoole, pers. comm., 2001).

Potential Cumulative Impacts. Airport construction most likely resulted in short-term localized impacts to air quality, noise, biological, and visual resources. Long-term noise impacts from the operation of the airport can also be expected. However, according to a city official, there have only been a minor degree of noise complaints from the community. These complaints are most often due to night flights in the canyons, which are not associated with the Boulder City Airport.

I-515 Extension

In 1995, construction was completed on the final segment of the extension of the freeway leading out of Henderson toward Boulder City and Arizona. The designation of this freeway was modified to I-515 upon completion of construction, and it is signed as I-515/U.S. 93/U.S. 95. The final leg of the project extended freeway status from Lake Mead Drive in Henderson to the Foothills Drive grade separation, which is the Boulder City/U.S. 93 Corridor Study western study limit.

Construction on this final leg of the freeway began in 1991, following 2 years of design by NDOT. The final leg was part of an overall project that constructed a freeway from downtown Las Vegas to Foothills Drive, a process that lasted approximately 20 years. The freeway serves as an alternate route to Boulder Highway, the original means of transportation from Boulder City to Henderson and Las Vegas.

Potential Cumulative Impacts. The construction of I-515 to Foothills Drive represents a cumulative impact on the Boulder City/U.S. 93 Corridor Study area, as the two projects share a common study limit at Foothills Drive. The freeway construction project from downtown Las Vegas to Foothills Drive was covered in an EIS that reached a ROD in 1977. In the EIS, noise, visual resource, and biological resource impacts are documented. Potential cumulative impacts in these resource areas are discussed further in Section 6.5.2.

Henderson Gravel Quarry

At the western end of the project area, there is a sand and gravel industrial operation that is large enough to be seen from existing U.S. 93. The operation is contained entirely within BLM land. There are two areas of operation: a 140-acre sand and gravel quarry just off U.S. 93 in the vicinity of Railroad Pass, and the 250-acre Goronwich Sand and Gravel processing site, located about 5 km (3 miles) south of the quarry.

Potential Cumulative Impacts. The sand and gravel quarry and operations facility have resulted in environmental impacts within the Boulder City/U.S. 93 Corridor Study project area, specifically to visual resources, biological resources, and water quality, and these are discussed in further detail in Section 6.5.2.

6.4.2 Present Actions near and within the Project Vicinity

This section focuses on federal, state, and local agency management plans and programs affecting the environmental resources in the project area. Detailed references for these plans and programs can be found in Chapter 11.

Lake Mead General Management Plan

NPS's Lake Mead General Management Plan (GMP), approved in 1986 for a 25-year or longer period, follows a strategy that centers on accommodating increasing visitor use while protecting the most outstanding natural and cultural resources of the area. It also addresses visitor use and flash flood safety problems that face most developed areas. Solving existing crowding/congestion problems and accommodating projected increases in visitation requires expansion and improvement of existing developed areas, circulation improvements, improvement of existing shoreline access points, and establishment of new developed areas.

The GMP establishes maximum levels of development that could accommodate increasing use in the future, while not exceeding reasonable capacity limits. These are maximum levels, not goals; development within the maximum levels would occur only when demand and economic feasibility justify the expansion (NPS, 1986).

Implementation of the GMP has resulted in, and will continue to result in, the following primary impacts during the 25-year projected life of the plan:

- Improvements in water quality in beach areas
- Limited destruction of or severe damage to soils, causing minor disruptions in drainage patterns that would temporarily increase erosion potential
- Seismic exploration for oil and gas leases would have the potential to cause adverse impacts to bighorn sheep herds, although proposed mitigation measures and the assumption that activity would remain sporadic, as in the past, reduces these impacts

Potential Cumulative Impacts. GMP impacts, when considered in conjunction with those from the Boulder City/U.S. 93 Corridor Study, may result in cumulative impacts to the bighorn sheep population. The plan will result in beneficial impacts to water quality, so the proposed project would not contribute to cumulative water quality impacts. Cumulative impacts to the bighorn sheep population are discussed in more detail in Section 6.5.2.

Boulder City Wastewater Treatment Plant

The Boulder City Wastewater Treatment Plant is located in the southern portion of the project area, closest to Alternative D, the preferred alternative. The facility currently treats approximately 1.1 million gallons per day (mgd) of wastewater and retains a capacity of 1.8 mgd. The plant provides secondary treatment of Boulder City wastewater, and its effluent is discharged south into the alluvial fan area. The original site of the plant was closer to the center of Boulder City, but it was relocated in the 1970s to its existing location.

The effluent from the treatment plant is split between two receptors, with approximately half the flow going to each. One pipe follows the treatment facility/WAPA border (Figure 2-7) and conveys the effluent to the Goronwich Sand and Gravel site, which uses the treated wastewater in their process units. The other effluent stream flows south and splits into two open channels that enter the WAPA property south of Boulder City. At the terminus of these channels, within the WAPA boundary and south of the Mead Substation, this water source and surrounding vegetation have created a treatment wetland area.

In 1996, a 6-acre constructed wetlands park was built northeast of the treatment plant, within Veterans Memorial Park. The park has been designed to handle up to 1.0 mgd of the effluent wastewater from the treatment plant and was constructed with a goal of irrigating the nearby Veterans Memorial Cemetery and providing a habitat for threatened and endangered species. A secondary objective is public education and research on improving water quality of wastewater effluent. The wetlands park receives Colorado River water blended with the treated wastewater. The blended wastewater flows through a wetland system consisting of a stream with shallow marshes and pools, followed by four deep-water ponds. The stream and ponds contain a variety of native and exotic wetland plants and are bordered by native riparian plantings. These wetlands are not considered jurisdictional wetlands because they are not self-sustaining, and rely on a continued flow of treated effluent.

Potential Cumulative Impacts. The construction of the Boulder City Wastewater Treatment Plant has beneficially impacted the water quality and the biological resources of the project area. The water quality, as well as quantity, of the discharge is dependent upon the diversion of effluent to the wetlands park. Ideally, to reduce suspended solids and biological oxygen demand, vegetation treats the effluent entering the park, thereby improving water quality.

Reclamation has devised a program of endangered species conservation as part of their ongoing operations and maintenance activities. This program is defined in the *Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River* (Reclamation, 1996). The program has been designed to result in a beneficial impact to the biological resources of the region, including the enhancement and restoration of wetlands, restoration of native riparian plant habitat, and the conservation of threatened and endangered species. Endangered native fish of the Colorado River (mostly bonytailed chub and razorback suckers) are stocked in the wetland ponds, then released back into the Colorado River when they are approximately 20 to 30 cm (8 to 12 inches) long. Therefore, there are no cumulative impacts to water quality or biological resources.

Clark County MSHCP

On November 5, 2000, USFWS approved the Clark County MSHCP. The MSHCP is an extension of the effort that began with the Clark County Desert Conservation Program (CCDCP). The MSHCP addresses the conservation needs of the entire range of biological resources in Clark County, and it supersedes the provisions of the previous CCDCP. The MSHCP and the resultant Section 10(a) Permit are designed to achieve key conservation and planning goals, including:

- Allowing the incidental take of covered species
- Reducing the likelihood of the listing of additional species located in Clark County as threatened or endangered
- Allowing private, local municipal, and state landowners relief from having to process future permits for take of species covered in the plan that are listed under the ESA or protected by the State of Nevada; provide federal agencies and public land users streamlined review under Section 7 of the ESA; and provide assurances that the take

of ESA-listed migratory birds named on the incidental take permit will not be in violation of the MBTA

- Providing substantial recovery and conservation benefits to species and ecosystems and maximizing flexibility in developing mitigation and conservation programs
- Providing comprehensive and coordinated mitigation for species and habitat impacts as a substitute for project-by-project evaluation and mitigation
- Providing for long-term protection of habitats and species on a regional basis with a focus on source population, reduction of threats and/or impacts on key conservation areas, and enhancement of connectivity between conservation areas
- Providing protection of long-term habitat carrying capacity for species by avoiding, minimizing, and mitigating impacts and by assuring that any take allowed will not appreciably reduce the likelihood of survival and recovery of species covered by the MSHCP
- Identification of equitable and effective funding mechanisms to achieve MSHCP goals
- Early involvement of interested agencies, landowners, managers, and other stakeholders prior to development of specific conservation strategies to minimize conflicts

The key purpose of the MSHCP is to achieve a balance between conservation of the natural habitats and native species of Clark County and the beneficial use of land to promote the economy, health, and well-being of the growing population of the county.

Potential Cumulative Impacts. Implementation of any of the project build alternatives would impact the federally listed (threatened) desert tortoise. Alternative D, the preferred alternative, would be located through desert tortoise habitat along its course south of Eldorado Ridge (Figures 3-2, 4-3). Alternative D does not encroach into lands covered by the MSHCP with the exception of that portion of the Eldorado Valley near the sewage treatment plant and through the steep Eldorado Mountain canyons northeast of Boulder City (see Section 3.4). Mitigation will include preconstruction surveys, relocation of affected tortoises, construction worker education regarding tortoises, and design and construction of crossings in consultation with appropriate agencies. Additional mitigation for cumulative impacts include those undertaken by NDOT as a responsible party to the MSHCP (see Section 4.4.3), and those described in Section 6.6.1). Refinement of these mitigation measures, and the potential development of additional measures, will occur during consultation with the USFWS and NDOW during preparation of the Biological Assessment for the implementation of Alternative D, and will be provided in the USFWS' Biological Opinion. With implementation of this mitigation, development of the proposed project would not contribute to cumulative impacts on the desert tortoise, nor would it conflict with the goals and objectives of the MSHCP.

6.4.3 Reasonably Foreseeable Future Actions

This section focuses on the reasonably foreseeable actions that are proposed or are in the planning stage that would occur near the project area. Provided below is a brief description of each of these projects and their anticipated short-term and long-term adverse impacts on the environment.

River Mountains Loop Trail

The River Mountains Loop Trail is a planned 58-km (35-mile) trail encompassing the River Mountains area, which includes the LMNRA, Boulder City, and Henderson. The trail is being developed by a coalition of public agencies, community groups, businesses, and individuals called the River Mountains Trail Partnership Advisory Council. It is the goal of the Advisory Council to provide a recreational trail that links neighboring communities, recreation areas, and multiuse local and regional trail networks. By creating a link, the trail would encourage the use of alternative methods of transportation, such as hiking and biking. This would help alleviate traffic on busy roads and improve air quality. Currently, the trail is only partially complete and is expected to be finished, including trailheads and signage, by fall 2004.

Within the Boulder City/U.S. 93 Corridor project area, the trail will travel through Railroad Pass along BCBRR right-of-way that is to the north of U.S. 93. It will proceed to the railroad maintenance building, where it will then follow Yucca Street and Industrial Road to U.S. 93. From this point, a completed segment of the trail leads to the River Mountains Trail trailhead and continues through the Hemenway Wash, where it ends at Pacifica Way. The trail is planned to continue through LMNRA land and lead to the Hoover Dam parking structure (River Mountains Loop Trail, 2001).

Potential Cumulative Impacts. Construction of the River Mountains Loop Trail will result in minor short-term impacts to biological resources due to clearing and grading of the trail. More long-term impacts from the operation of the trail could occur from the introduction of recreationists into wilderness areas. Signage prohibiting rockhounding and the collection of plants and animals, as well as advising users to stay on designated trails, will be placed along the trail route in an effort to keep impacts to a minimum. Interpretive signs educating trail users on the flora and fauna and the history of the River Mountains area will also be placed along the trails, and they should aid in preventing misuse of the trail and its surrounding environment. Potential cumulative impacts to biological resources are not expected from the development of this project.

Hoover Dam Bypass Project

FHWA prepared and approved the U.S. 93 Hoover Dam Bypass EIS for a new bridge crossing of the Colorado River near the dam. The purpose of this project is to (1) minimize the potential for pedestrian-vehicle accidents on the dam crest and approaches; (2) reduce traffic congestion and accidents on a segment of a major commercial route; (3) replace an inadequate highway river crossing with one that meets current roadway design criteria; (4) reduce travel time in the dam vicinity; and (5) protect Hoover Dam employees, visitors, equipment, power generation capabilities, and Colorado River waters while enhancing the visitors' experience at Hoover Dam.

In March 2001, FHWA released a ROD for the U.S. 93 Hoover Dam Bypass Project, identifying the Sugarloaf Mountain alignment as the selected alternative. This alternative will take approximately 5 years to construct and is scheduled to be completed in 2007. The new bridge will cross the Colorado River about 457 m (1,500 ft) downstream of Hoover Dam and includes construction of approximately 3.5 km (2.2 miles) of highway approach in Nevada, a 579-m-long (1,900-ft-long) bridge, and approximately 1.7 km (1.1 miles) of highway approach in Arizona.

The preferred alternative was selected on the basis of (1) collectively minimizing environmental impacts, (2) engineering and operational advantages, (3) minimizing harm to Section 4 (f) properties, (4) slightly lower construction costs, and (5) agency and public comments received during the environmental process.

The new highway will begin on the west side of the dam near the Hacienda Hotel and Casino, where it connects with the eastern terminus of the Boulder City/U.S. 93 Corridor project (see Section 2.1). Although adjacent, the two projects are separate with independent utility; each conceived to meet separate needs. The highway will run just south of existing U.S. 93 and cross it in the vicinity of the Reclamation warehouse. The highway will then pass through a gap in the high rock ridge that parallels the river and descend southeasterly to the long span bridge over the Colorado River. From the east end of the proposed bridge, the highway will traverse the northern base of Sugarloaf Mountain and then turn south, crossing a wide ravine, and reconnect to existing U.S. 93 in Arizona, approximately 1.7 km (1.1 miles) from the dam.

Traffic analyses conducted for the Hoover Dam Bypass concluded that the new bridge crossing would result in no appreciable increase in year 2027 forecast traffic volumes west of the dam toward Boulder City. Thus, the project will have no operational effect on Boulder City in terms of traffic and related economics impacts.

Potential Cumulative Impacts. Depending on the timing of project development, construction activities associated with the Hoover Dam Bypass Project could overlap with those of the Boulder City/U.S. 93 Corridor project should a build alternative be selected, resulting in cumulative short-term air quality, traffic, noise, visual, or water quality impacts. If this overlap occurs, the logistics of construction for the two projects will be reviewed and mitigated.

If this scenario were to be realized, the cumulative impact of construction would be minor and essentially equivalent to the individual project occurrences. This is partly due to stipulations in the Hoover Dam Bypass ROD (FHWA, March 2001) indicating that:

- FHWA must attempt to attain a balance between cut-and-fill quantities on the Nevada and Arizona approaches so that no waste disposal area will be required.
- All material excavated from the Arizona approach is to be used to build roadway embankments on the Arizona approach.
- No new material sources (borrow sites) will be utilized or required for construction. It is anticipated that the native rock within the right-of-way will be adequate to produce some or all of the aggregate needed for the project. However, other aggregates may

come from readily available commercial sources in Boulder City, Las Vegas, and Kingman, Arizona.

Therefore, construction traffic for the Hoover Dam Bypass would not increase to the level at which traffic volumes would be inordinately affected in Boulder City. However, construction of the bypass would result in short-term cumulative impacts to portions of the environmental resource base also impacted by the Boulder City Corridor project build alternatives, consisting of biological resources, including desert bighorn sheep and desert tortoise habitat; archaeological and historic properties; Section 4(f) lands; water quality; and visual resources in the U.S. 93 corridor.

Long-term impacts on bighorn sheep and desert tortoise, species also affected by the proposed Boulder City project build alternatives, can be expected. However, NDOT and FHWA are committed to continuing consultation with NDOW relative to the mitigation of the long-term impacts to the bighorn sheep habitat in the McCullough, River and Eldorado Mountains. The Hoover Dam Bypass Project is also expected to impact cultural, visual, and Section 4(f) resources; contributing to cumulative impacts in these resource areas, as discussed in more detail in Section 6.5.2.

U.S. 93 Widening in Arizona

In August 2001, ADOT commenced work on an EA for the U.S. 93 widening project. The U.S. 93 corridor from Phoenix to Nevada has been identified by the Arizona STIP (ADOT, 1994) as one of the top-priority corridors within Arizona. ADOT is programming and constructing various improvements along U.S. 93 in Arizona, from south of Wickenburg to near Hoover Dam. Improvements will be phased consistent with funding levels and highway safety and capacity priorities. Ultimately, U.S. 93 will be widened to a continuous four-lane divided highway from Wickenburg to near Hoover Dam.

ADOT will widen U.S. 93 to four lanes south from the new Hoover Dam Bypass interchange to the improved four-lane divided section 20.9 km (13 miles) to the south at the LMNRA boundary. This segment of roadway is the final link between I-40 near Kingman and the Arizona terminus of the Hoover Dam Bypass Project.

Potential Cumulative Impact. The widening of U.S. 93 in Arizona could occur concurrently with the Boulder City/U.S. 93 Corridor Project, potentially resulting in cumulative short-term impacts on air quality, traffic, and water quality. In addition, long-term impacts to biological, cultural, and parkland resources may occur, depending on site-specific conditions. However, these could be reduced by reuse of some of the old highway alignment, which is already disturbed; there are several sections where this is a possibility. Nonetheless, the ADOT U.S. 93 widening project has the potential for cumulative impacts to biological, cultural, and Section 4(f) resources. These impacts are discussed in more detail in Section 6.5.2.

U.S. 95 Widening in Nevada

Potential Cumulative Impacts. No cumulative traffic operational impacts are foreseen because the highway users are different; most of the traffic on U.S. 95 is traveling to and from Las Vegas with no intention or need to go through Boulder City. Long-term impacts to biological and cultural resources will occur; however, impacts will be small because all of the work will be within previously disturbed right-of-way. Therefore, the NDOT U.S. 95 widening project has little potential for cumulative impacts to biological and cultural resources.

Future Golf Course Development

There are plans for the construction of two golf courses within Boulder City. The first is an expansion of the privately owned and operated Cascata Golf Course, located just north and east of the U.S. 95/U.S. 93 interchange. The second is the development of the planned 240-acre public Boulder Ridge Golf Course, located north of the Industrial Road and Veterans Memorial Drive intersection. Both course sites will be situated on what is currently open space and undeveloped land that has been zoned Special Recreation by the city. Enough land for the 18-hole Boulder Ridge Golf Course has been leased by the Red Ridge Golf Company from Boulder City, with possible plans for expansion at a later date (John Hoole, pers. comm., 2002).

Potential Cumulative Impacts. The golf courses are expected to have some biological, water quality, and possibly cultural resource impacts. These impacts, in conjunction with those associated with the Boulder City/U.S. 93 Corridor project, will contribute to cumulative impacts in these resources areas, as discussed further in Section 6.5.2.

Nevada State College at Henderson

A new state college named the Nevada State College at Henderson (NSCH) is in the planning stages to be constructed in Henderson, Nevada. In February 2000, the Henderson City Council voted to accept a site recommendation for the college of about 260 acres of land behind the Wagon Wheel Industrial Park, about 0.8 km (0.5 mile) away from existing U.S. 93. This location is just southwest of the Boulder City/U.S. 93 Corridor Study western project limits, and the construction of the facility will affect all alternatives considered in this EIS. The college will be a 4-year institution, and it will offer undergraduate degrees in arts, sciences, education, public administration, and medical fields.

Potential Cumulative Impacts. The construction of NSCH will impact the project area predominantly in relation to overall traffic and noise. The proposed project is not likely to affect biological resources, as the site is already disturbed. Potential cumulative impacts associated with traffic and noise are further evaluated in Section 6.5.2.

Historic Railroad Reopening at U.S. 93

The Nevada State Railroad Museum is interested in extending the operation of the historic BCBRR west through Railroad Pass. The plans for the railroad have been outlined in the "Operation Plan for the Nevada State Railroad Museum/Boulder City" (April 2000). The State of Nevada Division of Museums and History (DMHNSR) owns the BCBRR along the 6-km (4-mile) segment between Railroad Pass and the central portion of Boulder City, along with 40 acres of rail yards near the Yucca Street intersection. An excursion train planned for the BCBRR would eventually run three to five times per day, and 6 days a week, paralleling U.S. 93 in the eastern portion and looping around just within the Henderson city limits. Passengers would likely board in downtown Boulder City or at the Railroad Pass Hotel and Casino.

Potential Cumulative Impacts. The major impact of this project is the beneficial economic impact to Boulder City. The Operation Plan created by DMHNSR estimates a range, depending on capacity of the trains and cost of tickets, of $723,341 to $1,853,779 that would be generated by the excursion tours on a yearly basis. Additionally, the museum complex would generate tourist revenue in the form of gift shops and as an additional tourist destination in Boulder City.

The DMHNSR Operation Plan indicates that an additional segment of railroad would be added to the BCBRR upon construction of the new excursion loop. Environmental impacts of this construction would be minimal, as the segment is within existing railroad right-of-way. The loop portion of the new facility, however, would enter into uninhabited desert land and would have some environmental impacts on biological and visual resources. Noise impacts could also be a concern for the new line, as the intended course of the excursion train passes parallel to existing U.S. 93 and crosses it just west of Railroad Pass. These impacts are evaluated further in Section 6.5.2.

Water Infrastructure

The water infrastructure serving Boulder City and Henderson will be expanded in the future and could produce cumulative impacts. A new potable water line is in the process of being constructed from the River Mountains Water Treatment Facility in Henderson to Boulder City. This line will pass behind the Railroad Pass Hotel and Casino and travel along the eastern and northern portion of U.S. 93 into Hemenway Valley. The line lies within the right-of-way of a segment of the future River Mountains Loop Trail, which will be constructed upon completion of the water line. As of fall 2001, this water line is 50 percent complete.

Potential Cumulative Impacts. The water infrastructure development within the project area is expected to contribute to cumulative impacts on biological and cultural resources, as discussed in more detail in Section 6.5.2.

Power Infrastructure

Components of the power infrastructure in the project study area will be expanded or rebuilt in the future and could produce cumulative impacts. Among the proposed power infrastructure is the Copper Mountain facility, which is a 500-MW power generation facility currently proposed by Sempra Energy. If approved, it will be constructed approximately 56 km (35 miles) southeast of downtown Boulder City (see Figure 6-2).

Proposed linear facility projects in the study area include:

- Modifications and additions to the WAPA transmission line system from Hoover Dam to the Mead Substation to accommodate the Hoover Bypass Project
- Harry Allen Substation to Mead Substation 500-kV Transmission Line

Proposed power facilities that are located outside the project study area are shown in Figure 6-2 to provide a comprehensive picture of the proposed power infrastructure in Clark County. However, because these facilities are outside the cumulative impact analysis of the project study area, as defined in Section 6.2.2, they are not considered in this analysis.

Potential Cumulative Impacts. The power infrastructure development within the project area is expected to contribute to cumulative impacts on biological, visual, and cultural resources, as discussed in more detail in Section 6.5.2.

Future Development in Boulder City and Hemenway Valley

The location and the restrictive growth control and zoning ordinances of the city dictate the future development of Boulder City. As discussed in Section 3.9, Boulder City's zoning ordinances regulate growth by placing restrictions on the number of residential units and hotel rooms that are developed each year. Additionally, there is an ordinance requiring the vote of Boulder City residences when one or more acres of land are to be sold for development.

Current plans for future development of Boulder City are minimal. In the Hemenway Valley area, construction of planned subdivisions will continue. However, upon completion of these subdivisions, no other development in this area is forecasted (John Hoole, pers. comm., 2001).

Potential Cumulative Impacts. Due to its restrictive growth-control policies, Boulder City is not likely to suffer from impacts associated with induced growth. Future development will likely cause short-term impacts associated with construction activities. Continued construction in the Hemenway Valley may result in biological and cultural resource impacts. Evaluation of these impacts can be found in Section 6.5.2.

6.5 Cumulative Environmental Impacts

Certain impacts associated with the proposed Boulder City/U.S. 93 Corridor Study project could arise that, in conjunction with impacts attributable to other projects (either in the immediate vicinity or with similar characteristics), could have the potential to result in collectively adverse effects to the environment that are of greater significance than those generated individually by the proposed project. Cumulative impacts could include those effects considered to be less than significant individually but which could become significant when evaluated in relation to impacts from other projects.

6.5.1 Criteria for Determining Cumulative Impact Significance

NEPA regulations do not provide a specific list of elements that the cumulative impacts analysis must contain. Instead, the courts have adopted a general standard for determining the sufficiency of a cumulative impacts analysis. That is, an EIS must provide a "reasonably thorough discussion" of cumulative impacts to satisfy NEPA (*Resources Ltd. v. Robertson*, 35 F. 3d 1300, 1306, 9th Cir. 1994).

6.5.2 Potential Cumulative Impacts

This section describes the cumulative impacts to environmental resources that could potentially arise with implementation of a Boulder City/U.S. 93 Corridor Study alternative in association with the other projects and programs described in this chapter. This discussion is presented by environmental resource areas. The cumulative effect analysis focuses on the major improvements that are planned to occur in the immediate vicinity of the proposed project and could result in environmental impacts that, when combined with those of the proposed project, have the potential to result in cumulative impacts. A potential project-related effect is determined to be cumulatively significant if, when considered collectively with the impacts of other projects identified, it adversely impacts a particular individual environmental resource area, as defined and described in Chapter 4.

Biological Resources and Threatened and Endangered Species

Biological surveys of the Boulder City/ U.S. 93 Corridor Study project area were conducted to characterize the biological resources of the area, and to determine if the build alternatives would impact any federally listed species, or other species of concern. Upon the completion of more detailed engineering design, detailed studies will be performed to develop a Biological Assessment in consultation with the USFWS and NDOW. As discussed in this EIS, Alternative B would impose the least disturbance on local biological resources because work would occur primarily in disturbed right-of-way. Alternative C would cross desert tortoise habitat from Railroad Pass to where it intersects with U.S. 93. This alternative would also cross bighorn sheep habitat in the vicinity of Railroad Pass and at the base of the River Mountains. The preferred Alternative D would impact the largest area of wildlife habitat. It would traverse through desert tortoise habitat and bighorn sheep habitat in the northern Eldorado Mountains. Based on a 120-m-wide (400-ft-wide) construction zone, Alternative B would disturb a total of approximately 327 acres of new habitat; Alternative C would impact 460 acres; and Alternative D would impact 679 acres.

Implementation of any of the project alternatives would contribute to the barrier that the existing roadway corridor poses to the free movement of bighorns between mountain ranges to the north and south of the project area, contributing to cumulative impacts to this big game species. With mitigation in the form of bighorn sheep and other wildlife crossings, as well as other measures described in Section 6.6, and with the operational reduction of traffic along the current U.S. 93 corridor, cumulative impacts from the construction of Alternative D would be lessened, although they would remain adverse. Expansion of residential and public facilities within the Hemenway Valley can be expected to continue, and to contribute to the cumulative effects of the barrier to bighorn migration between the River and the Eldorado Mountains.

The Boulder City Rifle and Pistol Club range is located at the base of the Eldorado Mountains in desert tortoise and bighorn sheep habitat. The site cannot be used by these species due to its dangerous nature. Although unlikely, should these species find themselves within or near the vicinity of the range, they may accidentally be shot, resulting in mortality and possible cumulative impacts on the species.

Nearby, the Boulder City Municipal Landfill has also been developed within desert tortoise habitat. The landfill has also attracted large numbers of ravens, which feed upon desert tortoise hatchlings. In order to control the influx of ravens, the U.S. Department of Agriculture has been trapping and removing the birds from the site. The landfill, in conjunction with the Boulder City/ U.S. 93 Corridor, contributes to cumulative impacts on the desert tortoise due to the loss of individuals and their habitat, as well as increased raven predation. The project also contributes to cumulative impacts on bighorn sheep due to the loss of habitat and the disruption of sheep movement, especially in the Eldorado Ridge area.

Existing and proposed power infrastructure in Eldorado Valley has, in the past and is proposed to be, developed within desert tortoise and gila monster habitat. Power infrastructure, in conjunction with the Boulder City/ U.S. 93 Corridor, contributes to cumulative impacts on the desert tortoise and the gila monster due to the loss of individuals and their habitat.

The gravel quarry and processing sites west of Boulder City are both located within concentrated desert tortoise habitat. Past and current operations of the quarry have impacted tortoise habitat, likely causing migration and mortality, and thereby contributing to cumulative biological impacts on the desert tortoise. I-515 also runs through desert tortoise habitat, likely resulting in direct impacts and contributing to cumulative impacts on the desert tortoise.

On June 3, 1999, USFWS issued its Biological Opinion for the Hoover Dam Bypass Project. This document represents the opinion of USFWS on the potential effects of the proposed bypass project on federally listed species under the *Endangered Species Act of 1973.* The Biological Opinion concluded that construction of the Sugarloaf Mountain Alternative may result in the direct loss of five individuals of the federally listed Mojave Desert tortoise and 80 acres of desert tortoise habitat in Nevada. However, USFWS found that the project is not likely to jeopardize the continued existence of the desert tortoise or adversely impact designated critical habitat. USFWS stipulated "reasonable and prudent" measures to minimize project effects on the desert tortoise, including payment of $46,960 to Clark County for offsite mitigation for the loss of 80 acres of desert tortoise habitat. The Hoover Dam Bypass EIS also concluded that the Sugarloaf Mountain Alternative will impact 20 acres of known habitat of desert bighorn sheep, which is a USFWS species of concern, as well as a State of Nevada protected species. The Boulder City/ U.S. 93 Corridor project, in conjunction with the Hoover Dam Bypass, is expected to have cumulative biological impacts on desert tortoise and bighorn sheep.

The future U.S. 93 and U.S. 95 highway improvement projects will also contribute to cumulative impacts on endangered, threatened, or protected species also affected by the Boulder City/U.S. 93 Corridor project. However, since these two future projects will primarily involve widening of existing highways, it is assumed that additional adverse impacts can usually be avoided with environmentally sensitive design, including continued use of protected game crossing structures, right-of-way fencing to minimize animal mortality, and other measures, including roadside signing for wildlife areas. Lands immediately adjacent to major highways are generally low-value biological habitats because of their disturbed nature.

Development of the Park Place and Boulder Ridge Golf Courses will occur along the base of the River Mountains to the north of existing U.S. 93. This area is habitat for desert tortoise and bighorn sheep; both are special-status species impacted by the Boulder City/U.S. 93 Corridor project. Similarly, continued construction in the Hemenway Valley area will impact desert tortoise and bighorn sheep habitat. Any impacts from these projects would contribute to cumulative impacts on these species.

The reopening of the remainder of the historic BCBRR is unlikely to impact the threatened desert tortoise. A majority of the operation of the railroad will occur within existing railroad right-of-way. However, an additional segment will be constructed on currently undeveloped land. Construction and operation of this segment would disrupt this habitat, thereby contributing to cumulative impacts on the desert tortoise. Reopening of the BCBRR is likely to contribute further to the barriers preventing exchange of individuals between bighorn sheep populations in the McCullough Range in the south, and the River Mountains in the north. However, given that trains are expected to pass only periodically, and that they are highly visible, the contribution to cumulative impacts to bighorn sheep from this action is expected to be minor.

Excavation required for the completion of the new potable water line serving both Henderson and Boulder City will adversely affect biological resources during construction. Habitat would be disturbed causing species to relocate. However, once the pipe is buried and construction is complete, species would be able to reinhabit the area. Therefore, the project is not expected to contribute to long-term cumulative impacts.

Cultural Resources

Archaeological and historic site surveys were conducted within the APE of the Boulder City/ U.S. 93 Corridor Study project, resulting in the identification of both archaeological sites and historic structures eligible for inclusion in the NRHP. Of the archaeological and historic structures eligible for the NRHP, Alternative B could impact a total of three archaeological sites and 26 historic structures or groups of structures, Alternative C could affect five archaeological sites and 25 historic structures or groups of structures, and the preferred Alternative D could impact 3 archaeological sites and 9 historic structures. Impacts to the power transmission lines eligible for the NRHP are due to their association with Hoover Dam. It would result in cumulative impacts on the Hoover Dam National Historic Landmark (HDNHL) (see Sections 4.9 and 4.10).

A Native American consultation plan has been implemented between FHWA and appropriate Native American representatives to determine if there are TCPs of significance within any of the proposed alignments.

The U.S. 93 Hoover Dam Bypass will not impact significant prehistoric archaeological resources. However, it was determined to have an adverse effect on the HDNHL, eight related historic properties primarily associated with construction and operation of Hoover Dam, and the Gold Strike Canyon and Sugarloaf Mountain TCP.

There is also potential for additional NRHP-eligible properties that may exist along the portions of U.S. 95 and U.S. 93 (in Arizona) to be impacted by future widening. There are no presently known NRHP-eligible properties along U.S. 95 or U.S. 93 in Arizona that would result in cumulative impacts from these projects. However, until cultural resource surveys are completed, detailed information regarding such resources will not be known.

The reopening of the Boulder City Branch Railroad, an NRHP-eligible structure, may impact cultural resources. While a majority of the operation would occur on existing railroad right-of-way, the loop portion would be constructed on currently undeveloped land. This area, specifically along the railroad, is known to be rich in archaeological and historic resources. Any impacts to cultural resources by this project would contribute to cumulative impacts.

The Eldorado and Las Vegas Valleys contain prehistoric and historic artifacts and sites. Any past or future development, such as the landfill, the golf course developments in

Boulder City, the housing developments in Hemenway Valley, and the development of water and power infrastructure, runs the risk of impacting cultural resources, especially if excavation is required.

Section 4(f) Resources

The Boulder City/U.S. 93 Corridor Study alternatives may impact three designated public park and recreation lands, consisting of the LMNRA, the historic Boulder Branch Railroad, Old Highway 41, historic transmission lines, River Mountains Loop Trail, and the planned Boulder Ridge public golf course. Alternatives B and C would permanently use approximately 58 and 93 acres of Section 4(f) land, respectively. This estimate is based on an assumed 100-m (328-ft) right-of-way width. Using the same right-of-way assumptions, it is estimated that the preferred Alternative D would require the use of approximately 59 acres of Section 4(f) lands. Alternative C would permanently require 47.8 acres from the proposed Boulder Ridge Golf Course development and approximately 1.9 acres from the planned segment of the River Mountains Loop Trail where it crosses east of the existing U.S. 93/ U.S. 95 interchange. In addition to park and recreation lands, the three proposed alternatives also have the potential to impact historic structures (see Chapter 7).

The Hoover Dam Bypass will permanently use approximately 92 acres of Section 4(f) lands from the LMNRA and the HDNHL. It was determined that there are no feasible and prudent alternatives to the use of Section 4(f) land and that the proposed action includes all possible planning to minimize harm to the Section 4(f) lands resulting from their use.

Widening of the 21-km (13-mile) two-lane segment of U.S. 93 in Arizona, from the future Hoover Dam Bypass interchange to the boundary of the LMNRA, would use Section 4(f) recreation land administered by NPS. In some areas, ADOT has 120 m (400 ft) of existing highway right-of-way; however, at this predesign stage, it is unknown what portions of the widening would be on LMNRA or ADOT land. If ADOT did the widening on the existing alignment of U.S. 93, it is estimated that an additional 15 m (50 ft) of right-of-way would be required. Assuming all the new highway right-of-way would be on LMNRA land, this ADOT project could result in the permanent use of approximately 80 acres of Section 4(f) land.

Although the precise location of the new transmission line has not been determined, the relocation of the WAPA transmission line from Hoover Dam to Mead Substation will likely affect LMNRA lands. Thus, these two projects, in conjunction with the Hoover Dam Bypass, could result in a cumulative impact to public recreation and historic lands.

Due to the location of existing U.S. 93 through the LMNRA, it is assumed that there will be no feasible and prudent alternative to the use of Section 4(f)-protected land for either the proposed Boulder City Corridor or the U.S. 93 widening in Arizona. Thus, these two projects, in conjunction with the Hoover Dam Bypass, could result in a cumulative impact to public recreation and historic lands.

Visual Resources

All of the Boulder City Corridor alternatives, including the preferred alternative, are expected to contribute to short-term as well as long-term visual impacts to the local landscape. Construction activities associated with each build alternative will result in common short-term visual impacts, such as the generation of fugitive dust from earthmoving activities and construction vehicles, view degradation from the presence of construction equipment, and the emission of light from construction sites due to possible nighttime construction. Because of the close proximity of sensitive receptor sites, Alternatives B and C would be greater contributors of visual impacts than Alternative D. In addition to short-term impacts, long-term impacts on sensitive receptor sites by the two alternatives include adverse impacts on views of Lake Mead from residences along Laguna Lane in Hemenway Valley. Further, the two alternatives would also visually impact several historic residences along Valley View Lane, Donner Way, and Lakeview Drive. Unlike the other alternatives, the preferred Alternative D would not adversely impact any visual resources. However, because it would result in the most new development in an undeveloped area, it would contribute to the greatest landscape modification. Cumulative impacts on visual resources would vary from minor to adverse, depending on the alternative that is selected.

Existing power facilities, including the Mead Substation and transmission towers and lines have become prominent features in the Eldorado Valley. These massive structures dominate the landscape, adversely impacting views of the surrounding desert environment. Some may find the structures interesting and consider them visual resources; however, their presence still impacts the desert landscape and contributes to cumulative impacts. Proposed power facilities will further impact views of the desert landscape; however, the Copper Mountain Power facility will be located adjacent to an existing power generation plant. Therefore, it is not likely to significantly disturb the visual setting of the desert area. Furthermore, the relocation of transmission lines from Hoover Dam to Mead Substation would result in minimal visual impacts given the prominence of existing transmission lines in the area.

While not as prominent as the transmission towers, construction of I-515 has contributed to long-term visual impacts on the desert environment by converting undeveloped land to a six-lane freeway. Visual impacts associated with this project would contribute to cumulative impacts.

Operation of the Boulder City Municipal Landfill has increased the visual contrast of the site with the existing landscape. Impacts on the views from fugitive dust are minimal, as dirt roads and other work areas are watered daily.

The mining activity occurring in the Railroad Pass area has produced a scarring effect on the foothills of the River Mountains. Additionally, industrial machinery and vehicles are regularly present on the site contributing to visual impacts on the landscape. The Goronwich Sand and Gravel processing site is further away from existing U.S. 93 and is nearly 3 km (2 miles) from Alternative D, but the facility does have a visual impact on the U.S. 95 corridor and also contributes to the cumulative visual impact on the landscape of the area.

The Hoover Dam Bypass will be located approximately 457 m (1,500 ft) downstream from Hoover Dam and about 77 m (254 ft) higher than the crest of the dam. This new bridge crossing over Black Canyon will be in full view from the dam. Consequently, it was found that the bridge would have an adverse effect on the historic landmark owing to the introduction of visual elements that diminish the integrity of the property's significant historic features. It has been determined that other visual effects of the Hoover Dam Bypass on the surrounding environment could be mitigated.

NDOT's planned U.S. 95 highway improvements and ADOT's planned U.S. 93 widening will likely have both short-term and long-term visual impacts on the surrounding desert environment. However, the planned U.S. 93 and U.S. 95 improvements will all be within existing highway corridors, which have been a part of the desert landscape for many decades; therefore, they may not have adverse visual impacts. Therefore, cumulative effects from these projects would be minimal.

The reopening of the Boulder City Branch Railroad will occur primarily on existing railroad right-of-way and would not result in visual impacts. However, a small loop portion of track will be laid on undeveloped land resulting in some minor visual impacts on the desert landscape.

Air Quality

Construction of the Boulder City/ U.S. 93 Corridor project would contribute to short-term localized air quality impacts. These impacts can be attributed to the construction vehicles and equipment used during construction activities. Most are powered by diesel fuel, which emits more NO_X, SO_X, and PM_{10} than gasoline-powered equipment. Activities, such as grading, are a source of fugitive dust emissions that can also impact local air quality. In order to control the impacts created by construction, these activities would be regulated under DAQEM air pollution permit requirements. As part of the requirements, in order to avoid adverse impacts, mitigation measures would be adhered to.

Construction activities associated with the Copper Mountain Power facility, the WAPA relocation of transmission lines from Hoover Dam to Mead Substation, Hoover Dam Bypass, the NDOT U.S. 95 improvements, and the ADOT U.S. 93 widening are also expected to contribute to short-term localized air quality impacts. Should these projects undergo construction during the same time period as the Boulder City Corridor project, short-term cumulative impacts to air quality can be expected. No long-term air quality impacts have been identified for any of these projects.

Because of their location largely within the City of Boulder City, localized cumulative, long-term air quality impacts would result from the implementation of Alternative A (the no-build alternative) or Alternative B (the through-town alternative) as a result of the increase in regional traffic within the city combined with increases in local traffic and other emissions over time. This cumulative effect would be less for Alternative C, and negligible for Alternative D because it avoids the City.

Noise

The Boulder City/U.S. 93 Corridor project and construction of the preferred Alternative D are expected to contribute to noise impacts due to the proximity of sensitive receptor sites to the proposed build alternatives (NDOT, August 2001b). Because Alternative D is not located near any noise-sensitive land uses, no adverse noise effects are expected. In fact, noise-sensitive receptor areas along the existing U.S. 93 would experience a decrease in traffic noise levels upon construction of the roadway. Construction of Alternatives B and C would result in short-term noise impacts due to construction activities, which would be regulated by local noise control rules, regulations, and ordinances. Under Alternative A (No Build), long-term adverse impacts from an increase in traffic noise would result; traffic noise levels would approach or exceed NAC levels and would not be mitigated. Construction of Alternative B, on the other hand, would result in decreased noise levels at some locations and increased levels at others. Similar to Alternative B, future traffic noise levels associated with Alternative C would decrease near the Railroad Pass Hotel and Casino and the Hacienda Hotel and Casino, and would increase for the Boulder Oaks RV Park and residences south of Lakeview Drive and Ridge Road. Adverse noise impacts associated with the construction of Alternative B or C would be mitigated by the construction of noise barriers, which would reduce peak-hour noise levels to below the NAC.

Operation of I-515 has produced increased noise levels in the U.S. 93/95 corridor. To mitigate these effects on nearby sensitive receptor sites, NDOT recently constructed soundwalls. This project, in conjunction with the Boulder City/U.S. 93 Corridor project, would not contribute to cumulative noise impacts on nearby sensitive receptor sites.

Noise associated with the operation of the Boulder City Municipal Airport has impacted the city very little. Infrequent complaints about noise from the community are usually associated with aircraft overflights not affiliated with the Boulder City Airport. Cumulative impacts due to an increase in noise levels are not expected with the construction of the preferred alternative.

The Hoover Dam Bypass project will result in short-term noise impacts due to construction activities. However, there will be no long-term noise impacts associated with the operation of the new bridge over the Colorado River. Construction of the project will not affect sensitive receptor sites associated with the Boulder City Corridor project. At this predesign stage, it is unknown if the Nevada U.S. 95 or the Arizona U.S. 93 improvement projects will contribute to cumulative long-term noise impacts along these highway corridors.

The construction and operation of the NSCH is expected to generate increased noise. This is due, in most part, to the elevated traffic levels that are anticipated for this area.

Operation of the Boulder City Branch Railroad will mostly occur on existing railroad right-of-way running along U.S. 93. A majority of this area, as well as the loop portion, do not have nearby sensitive receptor sites. However, roughly 1.6 km (1 mile) of the rail runs through the commercial district of Boulder City, terminating at Buchanan Boulevard. Train travel is only anticipated to occur up to five times a day and is not expected to cause adverse noise impacts. Alternatives B or C would contribute to cumulative noise impacts with the reopening of the railroad.

Water Resources

Development of the Boulder City/U.S. 93 Corridor is expected to result in impacts to surface water quality in the receiving waters of Lake Mead and the Colorado River. Degradation would occur during construction of the project, as well as during its operation, due to stormwater runoff and erosion. Because of shorter drainages, Alternatives B and C would retain runoff from receiving waters for a shorter period of time, resulting in greater negative impacts than Alternative D. As for erosion impacts, Alternative D would pose greater impacts due to the continuous steep slopes associated with the roadway profile.

Implementation of mitigation measures outlined in the SWPPP and NPDES permit would work to reduce long-term impacts to water quality.

Groundwater contamination from landfill leachate is a common concern, usually mitigated by the use of a landfill liner system. However, because the Boulder City Municipal landfill is located in an arid climate with a deep groundwater table (180 m [600 ft] below the surface) and contamination of groundwater is very unlikely, the current landfill site was not required to have a liner. Specific guidelines, such as not watering the refuse, are adhered to by landfill staff. No groundwater contamination has resulted from the operation of the landfill.

The operations of the sand and gravel quarry and processing area have altered the drainage and water quality of the project area. In the quarry near Railroad Pass, cuts in the terrain have disturbed the natural desert wash formation, and channels have been formed to direct surface runoff away from the site. This runoff, both in the quarry and in the processing site, is likely to be high in suspended and dissolved solids. The surface runoff, however, is conveyed to the Dry Lake Basin, which is not a navigable water body. Therefore, no water quality standards are adversely impacted.

Relocation of the transmission lines from Hoover Dam to Mead Substation and the Hoover Dam Bypass project will have impacts on water quality in the Colorado River due to potential stormwater runoff and erosion. Mitigation measures, such as the construction of roadway channels that resist erosion, construction of energy dissipating structures at all culverts whose discharge velocity will cause downstream erosion, and building sediment trapping basins that also act as chemical spill containment structures, will aid in making those impacts minimal.

Despite limited information, the U.S. 95 project in Nevada and the U.S. 93 project in Arizona may also affect desert washes, thereby resulting in localized water quality impacts and contributing to cumulative water quality impacts. However, the cumulative effects from these projects would be minimal.

Operation of the Park Place and Boulder Ridge Golf Courses may result in localized water quality impacts. Runoff, possibly containing pesticides, from irrigation of the golf course greens may contaminate desert washes and contribute to cumulative water quality impacts.

Wetlands/Waters of the U.S.

There are no wetland resources within or adjacent to the Boulder City/U.S. 93 Corridor project area; therefore, construction of any of the build alternatives would not contribute to cumulative impacts on these resources.

However, the Boulder City/U.S. 93 Corridor project would have construction, as well as operational, impacts on waters of the U.S., as defined in 33 CFR 328.3. Total waters of the U.S. impacted by construction of the various alternatives are 3.58 acres with Alternative B, 3.82 acres with Alternative C, and 5.68 acres with Alternative D. Impacts resulting from the operation of the alternatives to jurisdictional waters would be less. Alternative B would impact a total of 1.70 acres, while Alternative C would impact 1.72 acres and Alternative D would impact a total of 3.12 acres. Temporary impacts will be avoided or minimized by designating construction staging areas and materials stockpiling outside of the limits of waters of the U.S. Permanent impacts will be minimized through the use of sound bridge and culvert design at the wash crossings.

The Hoover Dam Bypass project will have minimal effects on waters of the U.S.: 0.66 acres will be impacted temporarily, while 0.11 acre will be permanently affected by the project.

Depending on site-specific conditions, the U.S. 95 project in Nevada and the U.S. 93 project in Arizona may affect waters of the U.S. Such impacts will not be known until sufficient environmental and engineering information becomes available.

Community Resources

Land Use and Population. Cumulative land use impacts in Boulder City due to the Boulder City/U.S. 93 Corridor project and all other related projects are expected to be limited. This is due in part to the city's distance from other areas in the region and established growth controls. Because Boulder City is situated amid federal lands, it is buffered from induced growth by surrounding communities. Strict growth control measures within the city act to limit the number of housing units, keeping the population low.

Although the Copper Mountain power facility would improve electricity services to Boulder City, as stated above, it is anticipated that the Boulder City strict growth control measures will prevent impacts associated with induced growth. Due to the nature of the remaining surrounding projects, none would promote development or conflict with the land uses within Boulder City; therefore, they would not contribute to cumulative impacts in those areas.

Socioeconomics. Similar to land use impacts, cumulative social and economic impacts would also be limited due to the location of Boulder City and its growth control measures. Although some of the projects in the cumulative impact analysis, including the proposed Copper Mountain power facility, ongoing redevelopment in the historic downtown, and the Boulder City proximity to the fast-growing areas of Henderson and Las Vegas, have the potential to spur increased economic development in and around Boulder City, the net socioeconomic impact is dependent on the extent to which the City chooses to lease land for development or proposes sales of land for approval by city voters. The preferred alternative (Alternative D) would have both positive and negative socioeconomic impacts (see Section 4.11); therefore, it would not contribute to cumulative socioeconomic impacts. No cumulative socioeconomic impacts are expected from the Boulder City/U.S. 93 Corridor project in conjunction with related projects in the area.

Traffic. Indirect cumulative impacts associated with traffic growth from related projects could potentially affect the project area by degrading local circulation, exacerbating the barrier effect created by U.S. 93, and impacting public safety. Such an impact would be worse under the No Build Alternative, as it provides no relief to the continuing increase in traffic congestion.

Construction of the NSCH will produce a greater traffic demand at the Boulder City/U.S. 93 Corridor western limits, especially during peak hours. Therefore, in order to alleviate the anticipated congestion, the founders of the NSCH and the Henderson City Council would like to preserve the option for construction of an interchange at Foothills Drive in Henderson. A new interchange at this location, as well as an upgraded Wagon Wheel interchange to the north, would provide greater access to the college and relieve anticipated traffic congestion, thereby not contributing to cumulative impacts.

6.6 Mitigation Measures for Cumulative Impacts

6.6.1 Biological Resources and Threatened and Endangered Species

The mitigation proposed in this EIS for biological resources impacts includes, but is not limited to, monitoring construction activities, scheduling construction activities to avoid nesting and brooding seasons, constructing barriers to prevent species mortality, and including bridges and/or culverts in the highway design to allow cross-highway species migration. These are described in more detail in Section 4.4.3, and include NDOT mitigation measures under the MSHCP. Implementation of these measures would reduce the contribution of the build alternatives to adverse cumulative effects on biological resources. NDOT and FHWA will continue coordinating with state and federal resource agencies and Clark County representatives to ensure reduction of cumulative impacts during construction and operation activities as described below.

Additional Support to Bighorn Sheep Management Efforts

The FHWA and NDOT will support NDOW, NPS, and other affected agencies in their efforts to assure the continued viability of bighorn sheep populations in southern Nevada. FHWA and NDOT will coordinate with NPS, ACOE, NDOW and affected agencies and municipalities during the design phase to support the refinement of avoidance, minimization, and mitigation commitments related to Alternative D. If FHWA and NDOT determine during the course of design that deviations from the agreed upon refinements are necessary, then the affected agencies will be consulted to confirm the avoidance, minimization, or mitigation measures remain adequate. FHWA and NDOT will confirm the avoidance, minimization, and mitigation measures with the affected agencies prior to application to the ACOE for a permit pursuant to Sections 401 and 404 of the Clean Water Act (CWA).

NDOT and FHWA will coordinate with the NPS and NDOW in the development and implementation of a bighorn sheep management plan as it relates to existing U.S. 93. This plan will be intended to facilitate interconnection of bighorn populations in the River and Eldorado Mountains.

NDOT commits to assisting the NPS and NDOW, to the extent feasible, should those agencies identify substantive safety concerns along U.S. 93 involving vehicle/bighorn collisions. NDOT will focus on human safety concerns through minimizing existing and future automobile-bighorn accidents, should the need be identified, and will seek to implement remedies consistent with the management objectives of the LMNRA and the objectives of a future bighorn sheep management plan.

Bighorn Sheep Monitoring

NDOT will provide funding for monitoring of bighorn sheep during the design phase of Alternative D to include the most up-to-date information on bighorn demography and habitat-use patterns into the design of bighorn sheep crossing features. This monitoring will be extended through the construction phase and 1 year beyond to provide NDOW and NPS information for their management of bighorn sheep populations in the area.

One year prior to the termination of the bighorn monitoring program currently being conducted for the Hoover Dam Bypass project, NDOT, FHWA, NDOW, NPS, and any other affected agency will determine whether or not the timeframe for the Boulder City/U.S. 93 Corridor design and construction will allow for a seamless continuation of bighorn monitoring. If it is determined that NDOT and FHWA will not be able to proceed with the monitoring program such that there will be no lapse in data collection, then all parties will discuss options for continued monitoring until NDOT and FHWA can commit to fully funding the monitoring program more proximate to the construction of Alternative D.

Wildlife Preserve

As discussed above, infrastructure and facilities associated with Hoover Dam, the Lake Mead National Recreation Area (LMNRA), Boulder City, the present U.S. 93 corridor, among others, have already contributed to cumulative impacts in part through the fragmentation of bighorn habitat. Construction of Alternative D would lead to further bighorn habitat fragmentation. To reduce this long-term trend, the FHWA and NDOT have entered into discussions with the City of Boulder City for the City to establish a Wildlife Preserve in the Eldorado Ridge area (Figure 4-3) where recent demographic data show a high degree of utilization by bighorn sheep (Figure 3-4B). The Wildlife Preserve will be established through the City zoning process in consultation with NDOW and NPS, and will encompass an area of approximately 500 acres. Its long axis will be generally parallel to the crest of Eldorado Ridge, and it will encompass the rugged terrain currently frequented by bighorns from about 310 m (1,000 feet) east of the current limits of the City's developed residential area in Hemenway Wash, to the boundary east/west boundary line of LMNRA land and east of the proposed Alternative D route (Figure 4-3). The establishment of this Wildlife Preserve will preclude development by the City, and provide a buffer to help maintain continuity of bighorn sheep utilization in this area that extends along the Eldorado Ridge west from the northern Eldorado Mountains and Black Canyon Wilderness Area. In a letter dated February 15, 2005 (Appendix A), the City indicated that it is prepared to take this step in support of the development of the preferred Alternative D.

6.6.2 Cultural Resources

As stated in Section 4.8, measures to mitigate impacts to historic properties will include documentation. Other specific measures will be developed in consultation with the affected agencies and SHPO as part of the effects assessment performed subsequent to the completion of the 30 percent design of the preferred alternative. These could include excavation, artifact analysis and curation, and additional archival research. It is anticipated that some towers that are components of a historic transmission line will need to be relocated after full recordation in consultation with the SHPO. Development of the effects assessment itself is one of the specific measures included in the PA. Consultation with appropriate Native American groups and other interested parties will continue when the effects assessment is complete; and this consultation will provide additional guidance regarding the mitigation of effects to historic properties, including any that may be of particular Native American concern. Implementation of these measures would avoid and/or minimize any contribution to adverse cumulative effects on cultural resources from any of the build alternatives.

6.6.3 Section 4(f) Resources

As stated in Section 6.5.2, the build alternatives would contribute to a cumulative impact on LMNRA lands. The measures proposed in this EIS for mitigating this project-related impact include, but are not limited to, scheduling construction activities in cooperation with NPS; ongoing public information; and special design of cuts, fills, and other land modification to minimize impact to scenic values. These and other measures appropriate for this project, including topsoil and plant salvage, revegetation with native species, preconstruction surveys for species of concern, and biological and archaeological fieldwork during construction, will be incorporated into the design and construction of the project. (Cumulative impacts to cultural resources that are considered Section 4(f) resources are discussed above under Section 6.6.2. Cumulative impacts to biological resources are discussed above under Section 6.6.1.)

Although implementation of these measures would minimize adverse cumulative effects on Section 4(f) lands contributed by the build alternatives, NDOT and FHWA will continue coordinating with the public agencies that have jurisdiction over Section 4(f) lands crossed by the build alternatives, including NPS, City of Boulder City, Nevada State Railroad Museum, Reclamation, WAPA, and the City of Los Angeles Department of Water and Power, to further minimize and/or avoid cumulative impacts to Section 4(f) resources during construction and operation activities.

6.6.4 Visual Resources

As stated in Section 6.5.2, all build alternatives would contribute to short- and long-term cumulative visual impacts. Alternative D would have fewer visual impacts than Alternatives B and C; however, implementation of Alternative D would contribute to the greatest cumulative visual impact on the landscape in the project area.

Implementation of any of the build alternatives will include mitigation measures to minimize visual impacts during construction and operation activities. Proposed mitigation measures include, but are not limited to, dust suppression and installation of glare shields to direct night lighting fixtures away from residences and ensure that light is not emitted from the site during construction, corridor landscaping, trash collection, and construction of a roadway pull-out to provide scenic views of Lake Mead (Alternative D only). Although implementation of these measures would minimize adverse cumulative effects contributed by the build alternatives on visual resources, project-related and cumulative visual impacts are adverse and unavoidable.

6.6.5 Air Quality

Although implementation of any of the build alternatives would result in a minimal contribution to cumulative short-term air quality impacts, mitigation measures to reduce severity of such impacts will be implemented in accordance with DAQM permit requirements; and the project will comply with all applicable air quality regulations. Similarly, other construction activities in the project area will be required by DAQM to implement mitigation measures to avoid and/or minimize short-term air quality impacts.

Therefore, no adverse cumulative air quality impacts will occur with implementation of the project and other concurrent construction activities in the project area.

6.6.6 Noise

As stated in Section 6.5.2, Alternatives A, B, and C would contribute to short- and long-term cumulative noise impacts. It is assumed that Alternative D would result in reduced traffic noise levels at all noise-sensitive receptors located along the current U.S. 93 alignment (see Section 4.3). Implementation of Alternative B or C will include mitigation measures to minimize and/or avoid noise impacts during construction activities. (For example, during the construction phase, all equipment will be required to comply with applicable noise standards; stationary equipment will be located as far from noise-sensitive receptors as possible; and temporary noise barriers will be installed around stationary noise sources. During operation, noise impacts will be avoided by installing noise barriers near noise-sensitive receptors. Additional mitigation measures are discussed in Section 4.3. Implementation of these measures would avoid a contribution to adverse cumulative noise effects that could result from implementation of Alternative B or C.

6.6.7 Water Resources

As stated in Section 6.5.2, all build alternatives would contribute to short- and long-term cumulative water resources impacts due to stormwater runoff and erosion. Because of shorter drainages, Alternatives B and C would retain runoff from receiving waters for a shorter period of time, resulting in greater negative impacts than Alternative D. As for erosion impacts, Alternative D would pose greater impacts due to the continuous steep slopes associated with the roadway profile.

Implementation of mitigation measures outlined in the SWPPP and NPDES permit would work to reduce short- and long-term impacts to water quality. Proposed mitigation measures include installation of soil stabilization measures, treatment of surface runoff contamination, and installation of sediment basins along the proposed alignment. Additional mitigation measures are discussed in Section 4.5. Although implementation of these measures would minimize adverse cumulative effects contributed by the build alternatives on water resources, project-related and cumulative visual impacts are adverse and unavoidable.

6.6.8 Wetlands/Waters of the U.S.

As stated in Section 6.5.2, temporary construction impacts to waters of the U.S. shall be minimized and/or avoided through the implementation of mitigation measures (see Sections 4.5.2 and 4.6.3) to the extent feasible and practicable. Aquatic resources associated with jurisdictional waters of the U.S. are not present within the vicinity of any of the build alternatives, and the potential for measurable downstream impacts is negligible. Given this, and given the limited area of impact this project will have a negligible contribution to adverse cumulative impacts to waters of the U.S. during construction and operation.

During operation, all build alternatives will result in fill to waters of the U.S. Alternatives B and C would permanently fill 1.70 and 1.72 acres of waters of the U.S., respectively, while the preferred Alternative D would result in 3.12 acres of fill. Under Section 404 (b)(1) guidelines, a Section 404 permit will require justification that the proposed fill into the Waters of the U.S. is unavoidable (see Section 4.6.4). For unavoidable impacts, the guidelines also require appropriate and practicable mitigation subsequent to measures to avoid impacts. Avoidance of some waters is provided by bridges spanning deep arroyos to the north of Eldorado Ridge (wash crossings D-12 and D-13; Figure 4-3). Prior to submittal of an application under Section 404 of the CWA for a permit, NDOT will compensate for any remaining unavoidable impacts to waters of the U.S. at a ratio of 1:1. The Section 404 permit application will require review of a number of regulatory agencies, including EPA, USFWS, NDEP, NDOW, Nevada SHPO, and the Nevada Division of State Lands. Coordination and consultation with the appropriate agencies will ensure that the project is mitigated to the maximum extent practicable such that project contributions to cumulative impacts remain minimal.

Mitigation measures that will be implemented include using bridge designs at the crossings that will minimize the erosional and hydrological effects of structures on the washes. Structural piers and retaining walls shall be protected to prevent erosion and deposition of material into the washes. Energy dissipaters may be installed at the bridge crossings to reduce the energy of floodwaters at the crossings and minimize natural deposition into the wash crossings throughout the life of the facility. Related operational water quality mitigation measures are described in Section 4.5.2.

6.6.9 Community Resources

As stated in Section 6.5.2, none of the projects listed in Section 6.4 would cause the project to contribute to cumulative impacts on community resources, with the exception of the traffic impacts due to NSCH construction. However, implementation of the mitigation measure described in Section 6.5.2 will provide greater access to the college and relieve anticipated traffic congestion, thereby avoiding project contributions to an adverse cumulative impact on community resources.

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7. Section 4(f) Evaluation

7.1 Purpose of Section 4(f) Evaluation

Section 4(f) of the U.S. Department of Transportation (U.S. DOT) Act of 1966, codified in Federal law at 49 U.S.C. § 303, declares that, "it is the policy of the United States government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation land, wildlife and waterfowl refuges, and historic sites." Section 4(f) specifies that, "the Secretary [of Transportation] may approve a transportation program or project... requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of an historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site), only if —

1. There is no feasible and prudent alternative to using that land; and
2. The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

The use of Section 4(f) resources occurs when: (1) land from a Section 4(f) site is permanently acquired for a transportation project, (2) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose, or (3) when the proximity impacts of the transportation project on the Section 4(f) site, without acquisition of land, are so great that the purposes for which the Section 4(f) site exists are substantially impaired. The latter type of use is also known as a "constructive use."

Section 4(f) is applicable to historic structures, archaeological resources, and Traditional Cultural Properties (TCPs) when the resource is included on, or eligible for, the NRHP (23 CFR 771.135[e]). However, Section 4(f) does not apply to archaeological resources when it is determined after consultation with the SHPO that the resource is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place. If compliance with Section 106 of the NHPA (16 U.S.C. § 470) and related regulations can be achieved through data recovery, resulting in a finding of "no effect" or "no adverse effect" (36 CFR 800.5), then Section 4(f) is not applicable. Section 4(f) requires consultation with appropriate Department of Interior (DOI) offices, and involved offices of the Departments of Agriculture and Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). Further, 23 CFR 771.135(d) notes that where public lands are managed for multiple uses, Section 4(f) applies only to those portions that function for "significant park, recreation, or wildlife and waterfowl purposes. The determination of which lands so function," and their significance, is made by the agency having jurisdiction over those lands and is reviewable by the U.S. DOT.

Because the Boulder City/U.S. 93 Corridor would use Section 4(f) lands, this evaluation identifies Section 4(f) resources in the project area, describes the nature and extent of the use of these properties, evaluates alternatives that would avoid the use of Section 4(f) resources, and describes measures to minimize harm to the affected resources.

7.2 Proposed Project

Traffic on U.S. 93 in Boulder City has doubled over the last 15 years from 17,200 ADT in 1985 to approximately 30,000 ADT in 1999. This traffic increase in the vicinity of Henderson, Boulder City, and Hoover Dam has created congestion. The traffic growth is due to increased local traffic on U.S. 93 in Boulder City and Hemenway Valley, an increased stream of recreational traffic to Lake Mead, an increased flow of traffic to Hoover Dam with the completion of the new visitor's center, and increased interstate traffic. Increased truck traffic is expected with the development of the CANAMEX Trade Corridor, which extends from Mexico to Canada. This high-priority corridor is being developed chiefly to facilitate transportation distribution, commerce, and tourism throughout North America.

Corridor alternatives connecting the western and eastern study limits were developed from comments received as a result of the project's public outreach and scoping program, which includes public open forum and scoping meetings, and Project Management Team (PMT) meetings. The PMT included representatives of all agencies having jurisdiction over lands affected by this project. Initial alignments identified were reduced to viable corridor alternatives, which were evaluated and then reduced to three build alternatives plus a "no-build" alternative for future study in the preparation of this EIS.

The proposed project involves improvements to U.S. 93 in the Boulder City area, referred to as the U.S. 93 Corridor. The project limits are between a western boundary on U.S. 95 in Henderson, approximately 1.6 km (1 mile) north of the Railroad Pass Hotel and Casino where the present freeway ends at U.S. 95 MP 59, and an eastern boundary on U.S. 93, approximately 7.5 km (4.7 miles) east of downtown Boulder City at U.S. 93 MP 1.8, just east of the Hacienda Hotel and Casino (refer to Figure 7-1). The eastern boundary is coincident with the planned western end of the U.S. 93 Hoover Dam Bypass project being developed by FHWA, Central Federal Lands Highway Division (see Section 2.1). The study covers a total distance of approximately 16.7 km (10.4 miles) on the present route of U.S. 93. Within the study corridor, U.S. 93 varies from a four-lane divided roadway to a two-lane roadway with numerous business driveways and cross streets.

The project seeks to provide transportation improvements in the corridor to reduce traffic congestion and crashes, and to improve regional mobility while maintaining or improving local circulation and access to Boulder City businesses. Chapter 2 of the EIS provides a complete description of the range of alternatives.

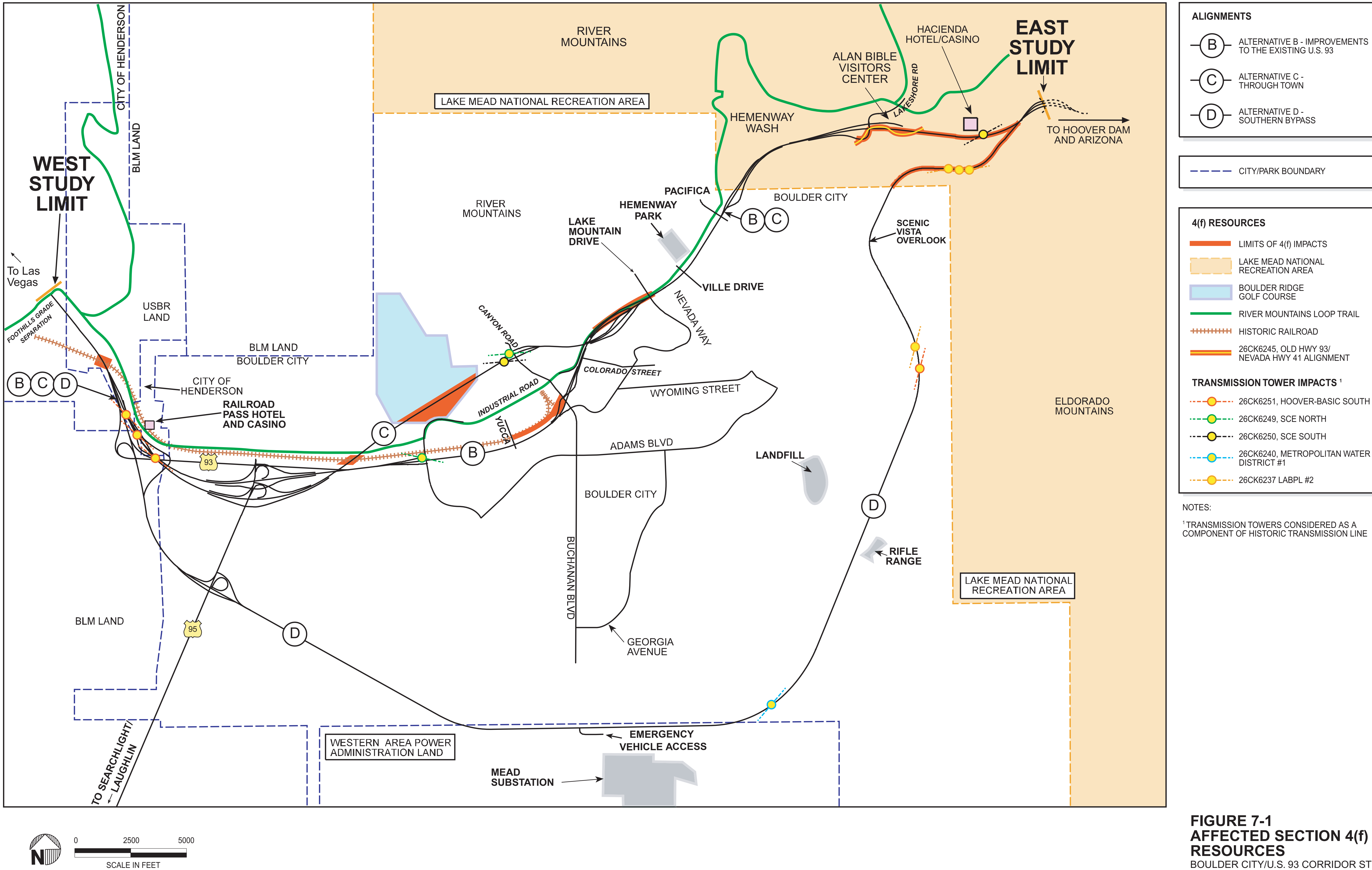

FIGURE 7-1
AFFECTED SECTION 4(f) RESOURCES
BOULDER CITY/U.S. 93 CORRIDOR STUDY

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7.3 Purpose and Need

A complete discussion of the purpose and need for the project is provided in Chapter 1 of this EIS and is incorporated herein by reference.

The purpose of the project is to provide overall transportation improvements in the corridor by reducing traffic congestion and crashes, and to improve regional mobility while maintaining or improving local circulation and access to Boulder City businesses. The proposed Boulder City/U.S. 93 transportation improvements will address:

- Resolving traffic problems in the vicinity of Boulder City
- Extending freeway status to the U.S. 93/95 interchange
- Improving operations at the junction of U.S. 93/95
- Creating a safer transportation corridor
- Accommodating future transportation demand
- Improving system linkage on U.S. 93 and maintaining route continuity

7.4 Project Alternatives Considered

A comprehensive review was done of a wide array (over 400 miles) of alternatives narrowed down to 16 build alternatives based on the evaluation process discussed in Sections 2.4 through 2.6 and incorporated herein by reference. Based on the evaluation process, all but four alternatives (three build alternatives plus Alternative A, the "no-build" alternative) were eliminated from further consideration during several workshop meetings between March and July 2000. The PMT concurred upon the following four alternatives to carry into detailed evaluation in the EIS:

- Alternative A – No Build
- Alternative B – Existing U.S. 93 Improved
- Alternative C – Through-Town Alignment, Corridor TA101
- Alternative D (preferred alternative) – Southern Alignment, Corridor SA101C (combination of SA101 and SA101A)

These alternatives as well as the Section 4(f) resources that would be affected by their construction are illustrated in Figure 7-1.

Alternative A

Alternative A is the No Build Alternative. Under this alternative, no Section 4(f) resources would be affected. As explained to some extent in other portions of this document, Alternative A fails to meet the purpose and need of this project.

Alternative B

This build alternative is proposed as a highway and arterial improvement combination that includes a general widening of existing U.S. 93 and other roadway improvements, including several new interchanges and grade separations, within the study limits.

The goal of the alternative is to make improvements to the present 17.7 km (11 miles) of roadway, mostly within the existing U.S. 93 corridor, in order to improve safety and capacity and to reduce congestion through Boulder City.

Alternative B would be essentially identical to Alternative C (below) east of the planned Lake Mountain Drive grade separation (Figure 7-1). This alternative would function as an urban arterial between Veteran's Memorial Drive and east of the proposed Buchanan Intersection. The development of Alternative B includes the features and improvements described in Table 2-3, and further displayed in the plan and profile drawings in Appendix A of the *Preliminary Engineering Report* (NDOT, March 2002).

Alternative C

Alternative C would be a new through-town highway connecting the western and eastern study limits of the project. It would consist of a continuous four-lane, limited-access divided roadway parallel to existing U.S. 93 (Figure 2-3). The current development of Alternative C includes the features and improvements described in Table 2-4, and further displayed in the plan and profile drawings in Appendix A of the *Preliminary Engineering Report* (NDOT, March, 2002). The alignment begins at the Foothills grade separation, continues through the Railroad Pass area, and crosses U.S. 95 approximately 0.8 km (0.5 mile) south of the overpass; the existing interchange would be replaced by a new, higher-capacity interchange; the alignment then turns north, crossing underneath U.S. 93 and runs parallel to and north of Industrial Road along the transmission line corridor. This alternative reconnects to existing U.S. 93 at the west end of Hemenway Wash. The highway would tie-in at the east end of the project to the Hoover Dam Bypass project's western study limits (see Section 2.1; Figure 7-1). The proposed highway would be approximately 17.7 km (11 miles) in length.

Alternative D (Preferred Alternative)

Alternative D is proposed as a southern bypass of Boulder City connecting the western and eastern study limits of the project. It would consist of a continuous four-lane, limited-access divided roadway bypassing the developed area of Boulder City to the south (Figures 2-4, 7-1). The alignment begins at the Foothills grade separation, crosses U.S. 95 approximately 1.9 km (1.2 miles) south of the existing U.S. 93/95 interchange, then the alignment continues south toward the Mead Substation. The new alignment, which would be developed as an undivided limited-access roadway, generally runs parallel to the transmission corridor between the landfill and the rifle range through the Eldorado Mountains east of Boulder City to the end of the project area just east of the Hacienda Hotel and Casino. The highway would tie-in at the east end of the project to the western study limits of the Hoover Dam Bypass project's Nevada Interchange (see Section 2.1; Figure 7-1). The proposed highway would be approximately 24 km (15 miles) in length.

Alternative D (the southern alternative) includes the features and improvements described in Table 2-5, and displayed in Appendix A of the *Engineering Report - Alternative D Southern Bypass (Preferred Alternative)* (NDOT, January 2003). Alternative D would remove through-traffic from the vicinity of Boulder City, and has the greatest capacity of the alternatives to resolve present and anticipated future traffic problems that impact Boulder City.

7.5 Description of Section 4(f) Properties

Comprehensive research, surveys, and expert analysis were used to identify existing and planned public parks and recreation areas, wildlife and waterfowl refuges, and historic sites potentially affected by the build alternatives. All build alternatives will result in impacts to Section 4(f) properties, as described below. No designated wildlife and waterfowl refuges were identified in the areas potentially affected by the build alternatives. The historic sites listed are only those determined to be eligible for the NRHP. Figure 7-1 depicts the three build alternatives and Section 4(f) properties in the study area. Table 7-1 provides a summary of impacts by property and alternative. There have been changes in impact estimates since the publication of the DEIS due to the continued refinement of resources affected and the alternative alignments, under the direction of the PMT. The following have led to the revision of estimates of Section 4(f) use for all build alternatives:

1) Update of the historic structures inventory report, and completion of the final report,
2) Completion of initial SHPO consultation, and receipt of SHPO determinations of eligibility,
3) Receipt of guidance from FHWA regarding which impacts constitute use under Section 4(f),
4) Receipt of guidance that existing right-of-way within the LMNRA is not considered part of that Section 4(f) resource, and
5) Refinement of alignment positions, their impacts to historic structures (including the Boulder City Branch Railroad), and cut and fill limits, of the alternatives.

In addition, Alternative D in the DEIS included acreage calculations for a swath of 328 feet from the LMNRA boundary to the east study limit. Additional acreage was included for a directional interchange with a large footprint at the east study limit. This original alignment and interchange footprint in the LMNRA totaled 85 acres. At the request of the PMT, the east limit of this alignment was modified to tie into the Hoover Dam Bypass diamond interchange. The acreage impacts were recalculated for each alternative to ensure greater accuracy of Section 4(f) use evaluations. These changes resulted in a net reduction in acreage impacts.

7.5.1 Public Park and Recreation Land

Lake Mead National Recreation Area

The LMNRA was established October 8, 1964, by Public Law 88-639 for "general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop, and enhance...the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area." The LMNRA includes a wide variety of scenic and recreational resources, and is administered by the NPS. Most of the LMNRA is desert; rugged mountains, expansive alluvial fans, and dry washes dominate the landscape. The 1,495,664 acre LMNRA encompasses two reservoirs formed by the Colorado River: (1) Lake Mead, 110 miles long and formed by Hoover Dam, has approximately 162,670 acres of water surface and more than 822 miles of shoreline; and (2) Lake Mohave, 67 miles long and formed by Davis Dam, has approximately 28,800 acres of water surface and more than

254 miles of shoreline. This scenic area is famous for Hoover Dam, Lake Mead, the Colorado River, recreational activities, and wildlife. The recreational activities available in the LMNRA include sightseeing, hiking, camping, picnicking, backpacking, fishing, hunting, boating, river rafting, and bicycling. The LMNRA and Hoover Dam are popular tourist destination areas, both nationally and internationally. In 1997, there were 9.7 million visitors to the LMNRA.

Those portions of the build alternatives within the recreation area are located within the Boulder Basin Zone of the LMNRA General Management Plan. The land adjacent to the existing U.S. 93 corridor is located in the NPS-designated Natural Environment subzone and, within this subzone, there is an emphasis on conservation of natural resources and provision of environmentally compatible recreational activities.

As it contains the largest fresh-water body in the American southwest, and because of its proximity to major urban centers, the LMNRA is used by millions of visitors annually. Use of the portion of the LMNRA affected by this project includes utility vehicles servicing the numerous transmission lines in this area, occasional off-road vehicles using the same service roads, and hikers accessing trailheads.

In the Impairment Analysis prepared by the NPS to address the impacts of Alternative D (Appendix D), it is noted that

> "Much of the acreage that would be utilized by implementing this alternative (Alternative D) has been previously impacted by the existing utility corridor and approved backcountry road…. The recreational use and value of the lands within and near the utility corridor is considered low." (parentheses added)

Further, the Impairment Analysis notes that interstate traffic flow would be improved within the LMNRA, and that reduction in the traffic volume at the corner of Lakeshore Road and present U.S. 93 would improve the performance of that intersection. These changes are likely to improve visitor access to the LMNRA.

Section 4(f) Use

Evaluations of the acreage of LMNRA land that would be subject to Section 4(f) use under the build alternatives have been refined as a result of updated engineering plans, as well as the receipt of guidance from FHWA that existing, disturbed right-of-way is not considered part of a Section 4(f) resource, and therefore differ from those presented earlier.

Alternative B:

Alternative B would permanently use approximately 46.4 acres of NPS land to provide the necessary right-of-way near the east end of the corridor, based on a 100-m (328-ft) basic right-of-way width. This represents approximately 0.0031 percent of the surface area of the LMNRA. The required property parallels the existing alignment of U.S. 93 (Figure 7-1). Lands within the existing NDOT right-of-way are not included in the Section 4(f) acreage calculations.

TABLE 7-1
Section 4(f) Use Summary

Alternatives	Section 4(f) Use							
	Historic Railroad 26CK5414	**Boulder Ridge Golf Course**	**River Mountains Loop Trail**	**Lake Mead National Recreation Area**	**Old Highway 41 26CK6245**	**Historic Transmission Lines**	**Summary**	
A No Build	None	None	None	None	None	None	No Section 4(f) resources affected	0 ac.
B Improve Existing U.S. 93	Use of 8.3 ac. at two locations- in Railroad Pass, and in between Yucca and the vicinity of Buchanan Interchange and Frontage Road (Figure 7-1).	None	Use of 1.9 ac. of trail.	Use of 46.4 ac. of Lake Mead National Recreation Area.	Use of 0.2 ac.	Use of 3 transmission lines, 4 historic towers. 26CK6251, 0.31 ac. 26CK6251, 0.31 ac. 26CK6250, 0.31 ac. 26CK6249, 0.31 ac.	Number of historic structures affected (transmission towers) Historic railroad Historic highway Park lands (Lake Mead National Recreation Area- 1,495,664 acres total area) Recreation lands (River Mountain Loop Trail)	4 (1.24 ac.) 8.3 ac. 0.2 ac. 46.4 ac. or 0.0031% of LMNRA 1.9 ac.
C Through-Town	Use of 0.6 ac. at two locations- in the Railroad Pass, and in the construction of a grade separation east of the U.S.93/95 Interchange (Figure 7-1).	Use of 47.8 ac. of recreation land.	Use of 1.9 ac. of trail.	Use of 41.0 ac. of Lake Mead National Recreation Area.	Use of 0.2 ac.	Use of 3 transmission lines, 6 historic towers. 26CK6251, 0.31 ac. 26CK6251, 0.31 ac. 26CK6251, 0.31 ac. 26CK6250, 0.31 ac. 26CK6250, 0.31 ac. 26CK6249, 0.31 ac.	Number of historic structures affected (transmission towers) Historic railroad Historic highway Park lands (Lake Mead National Recreation Area - 1,495,664 acres total area) Recreation lands (River Mountain Loop Trail, Golf Course)	6 (1.86 ac.) 0.6 ac. 0.2 ac. 41.0 ac. or 0.0027% of LMNRA 49.8 ac.
D Southern Bypass	Use of 0.3 ac. at one location, in the Railroad Pass.	None	None	Use of 58.9 ac. of Lake Mead National Recreation Area.	None	Use of 3 transmission lines, 7 historic towers. 26CK6251, 0.31 ac. 26CK6251, 0.31 ac. 26CK6240, 0.31 ac. 26CK6237, 0.31 ac. 26CK6237, 0.31 ac. 26CK6237, 0.31 ac. 26CK6237, 0.31 ac.	Number of historic structures affected (transmission towers) Historic railroad Park lands (Lake Mead National Recreation Area- 1,495,664 acres total area))	7 (2.17 ac.) 0.3 ac. 58.9 ac. or 0.0039% of LMNRA

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Alternative C:

Alternative C would permanently use approximately 41.0 acres of NPS land to provide the necessary right-of-way near the east end of the corridor. This represents approximately 0.0027 percent of the surface area of the LMNRA. Like Alternative B, the required property parallels the existing alignment of U.S. 93 (Figure 7-1), and lands within the existing NDOT right-of-way are not included in the Section 4(f) acreage calculations.

Alternative D:

Alternative D would permanently use approximately 58.9 acres of NPS land within the LMNRA, or 0.0039 percent of the surface area of the LMNRA. LMNRA land impacted by Alternative D is generally south of the Hacienda Hotel and Casino. The area contains several high-voltage transmission corridors from Hoover Dam, unpaved utility service roads, and the existing U.S. 93 corridor. (Figure 7-1).

The NPS, which administers the LMNRA, has prepared an independent Impairment Determination (Appendix D) evaluating effects of the Alternative D, pursuant to NPS Management Policies (2001). The findings of this impairment analysis included the following:

> "The effects of the Preferred Alternative (Alternative D) will not impair Park resources or values necessary to fulfill specific purposes identified in the Park's enabling legislation. Impacts documented in the EIS…. will not affect resources or values key to the natural and cultural integrity of the Park or alter opportunities for enjoyment of the Park. The Preferred Alternative will not impair Park resources and will not violate the NPS Organic Act." (parentheses added).

River Mountains Loop Trail

The 30-mile River Mountains Loop Trail is partially complete through the study area, and it is designed to encircle the River Mountains/LMNRA/Boulder City/Henderson area. The loop trail will serve as a link for communities within Boulder City and Henderson to recreational areas within LMNRA and Hoover Dam. Although the intent of the loop trail is a connection to recreational facilities, in certain areas (such as the western study limits), the trail could become an important link for pedestrian, bicyclist, and transit access.

The extent of the loop trail within the project limits is depicted in Figure 7-1. The planned trail corridor passes behind the Railroad Pass Hotel and Casino and parallels the railroad right-of-way on the north side of the railroad and existing U.S. 93 to the Railroad Museum and maintenance building on Yucca Street. From there the trail will follow Yucca Street and Industrial Road to existing U.S. 93. East of the intersection of Industrial Road and existing U.S. 93 the loop trail is open, where it proceeds to the River Mountains Trail trailhead as a 3.6-m (12-ft) asphalt multiuse trail parallel to U.S. 93. The trail through Hemenway Wash, from the River Mountains trailhead to Pacifica Way, is also complete, and it utilizes the concrete Hemenway Wash drainage channel paralleling U.S. 93 with numerous connections to side streets and to Hemenway Park. This trail segment was the first segment of the loop trail to be completed as part of a flood control project in 1993 (River Mountains Loop Trail, 2001). It is used for recreational purposes by Boulder City residents and visitors to the LMNRA on a daily basis.

Section 4(f) Use

Alternative B:

An approximately 1.2-km (0.75-mile) segment of the trail in this area would conflict with Alternatives B and C. Construction of the new four-lane divided highway alignment, a grade separation at Lake Mountain Drive, and a realigned frontage road would require relocation of the Hemenway drainage channel containing the loop trail. A dual-use box culvert, used for storm flows and a pedestrian crossing along the River Mountains Loop Trail,/pedestrian crossing to the River Mountains Loop Trail would also require modification/extension near Ville Drive. Alternative B would require use of approximately 1.9 acres of Section 4(f) land represented by the River Mountains Loop Trail.

Alternative C:

Alternative B and C are similar in this area, so Alternative C would require the same use of Section 4(f) land represented by the River Mountains Loop Trail as Alternative B.

Alternative D:

No use of this Section 4(f) resource would be required under Alternative D.

Boulder Ridge Golf Course

This proposed 370-acre public golf course was originally scheduled to be constructed by December 31, 2001 (October 17, 2000, letter from John Sullard, City Manager, to Michael Lasko, CH2M HILL). The project has been delayed; however, it is still the intent of the City to complete the golf course on this site. The proposed Boulder Ridge Golf Course site presently contains primarily undeveloped lands. It is located north of the intersection of Industrial Road and Veterans Memorial Drive (Figure 7-1), and just northeast of the State Veterans Home. The golf course site is also bounded to the north by the River Mountains and a recreational study area preserved by Boulder City for mountain biking and hiking. This planned public golf course will be accessed by Veterans Memorial Drive (Figure 7-1).

This site is city-owned land that will be leased to a developer/operator of the golf course. According to the lease agreement, the parcel is zoned SR for Special Recreation, and it is intended to serve the growing need and demand for additional golf facilities in Boulder City. The goal of the SR zone is to create a zoning district that will permit publicly owned and operated courses and privately owned and operated courses, as well as other limited recreational uses (SR Zone, Sec. 11-9-2). Uses permitted within the SR Zone are golf courses, along with accessory uses, as well as pedestrian/bicycle trails, outdoor theaters, and public utility facilities as required to serve the golf courses (SP Zone, Sec. 11-9-3).

As a facility planned for the future, the Boulder Ridge Golf Course currently receives no use. When it is completed, it is anticipated that it will be used on a daily basis by local residents and visitors.

Section 4(f) Use

Alternative B:

No use of this Section 4(f) resource would occur as a result of Alternative B.

Alternative C:

Alternative C would require use of 47.8 acres of the southern portion of the Boulder Ridge Golf Course development parcel (Figure 7-1). This impact would decrease the number of planned golf course holes from 36 to 27. Discussions with City staff indicate that the remnant parcel that would remain south of the roadway (Figure 7-1) would, in essence, be an isolated tract that would no longer be useful for this recreational facility. This impact would decrease the number of planned golf course holes from 36 to 27. The course developer's business plan is predicated on 36 holes, and the economic viability would be greatly reduced by limiting the number of holes that can be constructed, according to the City of Boulder City.

Alternative D:

No use of this Section 4(f) resource would result from Alternative D.

7.5.2 Historic Resources

Evaluation of the use of Section 4(f) historic resources is based on the archaeological and historical surveys of the Area of Potential Effect (APE) of Alternatives B, C and D, and on engineering design work.

In July of 2003 a Programmatic Agreement (PA) was executed between the FHWA, NDOT, other federal land management agencies, and the Nevada SHPO (Appendix E). Among other things, the PA calls for consultation among the appropriate agencies and the Nevada SHPO on a determination of effects, and the development of treatment plans to mitigate those impacts, under Section 106 of the NHPA (36 CFR 800.5). The formal determination of effects will occur once more detailed engineering design is completed. In accordance with Stipulation 1 of the PA, it is applicable to Alternative D, the Southern Alternative.

A description of the Section 4(f) historic resources affected by the build alternatives is presented below, and shown in Figure 7-1. As noted in Section 7.4, completion of the inventory of historic structures, receipt of SHPO determinations of eligibility, and refinement of engineering plans have in turn led to the refinement of the impacts analyses and Section 4(f) use, and these changes are reflected in the current document. These refinements include the assessment of Section 4(f) use of both historic linear resources (transmission lines, roadways) as well as structures.

For historic transmission lines, all transmission towers identified as being impacted are assumed to be (1) contributing elements to that historic resource, and (2) will be removed and replaced with a new tower. In consultation with WAPA it was determined that replacement is the most conservative assumption because transmission corridor realignments are likely to result in different structural requirements that would preclude original tower relocation.

Boulder City Branch Railroad (26CK5414)

The BCBRR is a standard gauge, single-track railroad that originally ran from Boulder Junction south of Las Vegas to Boulder City (Figure 7-1). The railroad includes some wood ties with original 1931-date rails, the original ballast, maintenance access roads paralleling both sides of the railroad, and V-shaped earthen drainage structures that direct runoff through culverts under the railroad grade. The railroad is owned and maintained by the Nevada State Railroad Museum. The BCBRR was recommended as eligible for the NRHP under criterion A because of its association with the construction and operation of Hoover Dam and the development of the Boulder City and Basic/Henderson townsites (White, 1996a:59-60). In 1996, the Nevada SHPO concurred that the railroad was eligible for the NRHP under criterion A (White, 1998:68). In 2000, the BCBRR was subject to further study (Schweigert, 2001). A conclusion of that study is that the BCBRR remains eligible for the NRHP under criterion A, but that it is also eligible under criterion C as an element of a Hoover Dam railroads noncontiguous historic district.

Within the limits of this study, the railroad is owned by the City of Henderson in the west; by NDOT and the Nevada State Railroad Museum jointly in Railroad Pass; and, to the east of Railroad Pass, by the Nevada State Railroad Museum solely. The portion of the BCBRR within the Las Vegas Valley is maintained for industrial and commercial purposes, and plans exist for commuter use as well. The BCBRR in Railroad Pass is currently paved over and not in use. That portion of the BCBRR to the east of the Railroad Pass U.S. 93/95 right-of-way is kept in operation for educational and tourism purposes. Uses include historic railroad engine runs, handcar races during community festivals, and other similar activities (see Volume 2, Appendix A, Letter A-1).

Section 4(f) Use

All build alternatives would impact the BCBRR as a result of crossing it in the vicinity of Railroad Pass (Table 7-1; Figure 7-1), where roadway placement is constrained by topography. However, all build alternatives also incorporate a grade separation at the Railroad Pass crossing (Feature No. 3 in Tables 2-3 through 2-5, Section 2.7) to allow for the Nevada State Railroad Museum's planned re-establishment of railroad service. Additional impacts would result from either Alternatives B or C, and would be from track and embankment removal and railroad overpass construction. Additional impacts would result from either Alternatives B or C, and would be from track and embankment removal and railroad overpass construction, as described below.

Alternative B:

The Alternative B highway alignment would intersect the BCBRR in the vicinity of Railroad Pass, and then farther east (Figure 7-1). Due to the proximity of the existing U.S. 93 alignment to the BCBRR between Yucca Street and Buchanan Boulevard (Figure 7-1), impacts to this Section 4(f) resource from Alternative B construction would be the greatest of the build alternatives. Excavations associated with embankment, and track removal, and right-of-way encroachment would result in a total use of approximately 8.3 acres of railroad right-of-way ((Table 7-1).

Alternative C:

Alternative C would intersect the BCBRR at Railroad Pass and again at a crossing farther east (Figure 7-1), resulting in the total use of about 0.6 acre of this resource from excavation, embankment and track removal, and from overpass construction of a grade separation (Table 7-1). In the vicinity of Veterans Memorial Drive grade separation, the Alternative C alignment would be below that of the BCBRR.

Alternative D:

The Alternative D highway alignment would intersect the BCBRR in the vicinity of Railroad Pass resulting in the use of about 0.3 acre of the BCBRR (Table 7-1). Impacts in this area would be much the same as those resulting from the construction of Alternatives B or C. Because the Alternative D alignment diverges to the south as soon as topography permits, and no further encroachment on or crossing of this Section 4(f) resource would occur (Figure 7-1), there would be no impacts to this resource farther east.

Los Angeles Bureau of Power and Light (LABPL) Transmission Line 2 (26CK6237)

Three lattice-steel tower transmission lines run parallel to each other from the Los Angeles Switchyard at Hoover Dam to a point near the eastern end of the study area, then southwest over mountains on their route to southern California. LABPL, now the Los Angeles Department of Water and Power (LADWP), began construction of the first two of these transmission lines in June 1933, and they were completed as a pair in 1936. The LABPL transmission lines between Hoover Dam and the Basic Tap/Boulder City Tap Substation were determined by the SHPO to be eligible for the NRHP in 1994 under criterion A for their association with Hoover Dam. LABPL Line 1 (26CK6238; not subject to Section 4(f) use) and LABPL Line 2 (26CK6237) were formally nominated to the NRHP in 2000 under criteria A and C (Van Wormer and Dolan, 1999). The design of the steel towers is a major factor in the historical significance of these transmission lines.

Section 4(f) Use

As noted above, it is assumed that affected transmission towers are contributing elements to that historic resource, and that they will be removed and replaced with a new tower. Transmission corridor realignments are likely to result in different structural requirements that would preclude original tower relocation.

Alternative B:

Alternative B would not result in the use of this resource.

Alternative C:

Alternative C would not result in the use of this resource.

Alternative D:

Alternative D would require the removal and replacement of four towers of LABPL Line 2, resulting in the use of approximately 1.2 acres of Section 4(f) land (Figure 7-1; Table 7-1).

Structures Associated with The McKeeversville Camp

A number of houses in upper Hemenway Valley are associated with the Depression-era McKeeversville squatters’ camp. The area became the Lakeview Subdivision after Boulder City was separated from federal ownership in 1960. McKeeversville is significant for its association with the construction of Hoover Dam and Boulder City. The community as a whole has lost integrity of setting, feeling, and association as a result of extensive post-1960 residential construction. However, the SHPO has indicated that a number of structures built during the late 1930s in this area are eligible for the NRHP, chiefly under criteria A and C.

McKeeversville structures, such as those at 12 Valley View Lane and 14 Valley View Lane, were initially evaluated as receiving Section 4(f) use under Alternative C in the DEIS but under further review they were determined to have no Section 4(f) use based on their location and their proximity to the alignment.

Metropolitan Water District Line 1 (26CK6240)

The Metropolitan Water District of Southern California (MWD) was one of the major contractors for Hoover Dam power, primarily for use in constructing and operating water delivery systems from the Colorado River to southern California. MWD constructed this 237-mile, 230-kV transmission line from December 1935 to July 1937. The MWD line employed familiar technology that had earlier been developed by SCE. Commercial delivery of electricity over the MWD line began on November 3, 1938 (Callister et al., 1983). From 1942 to 1944, the Basic Magnesium plant at Henderson, Nevada, absorbed some of MWD's excess capacity.

MWD Line 1 from Hoover Dam to the Mead Substation has been determined eligible for the NRHP under criterion A for its association with Hoover Dam.

Section 4(f) Use

Based on coordination with WAPA it is assumed that original tower relocations will not be feasible, and that the affected transmission towers will be replaced with new steel monopoles (see above).

Alternative B:

Alternative B would not result in any Section 4(f) use of this resource.

Alternative C:

Alternative C also would not result in any Section 4(f) use of this resource.

Alternative D:

Alternative D would require the removal and replacement of one transmission tower, and the use of approximately 0.3 acre of section 4(f) land (Figure 7-1; Table 7-1).

Old Nevada Highway 41/U.S. 93 Segment (26CK6245)

Nevada Highway 41 was a key element in the construction of Hoover Dam because it provided for the transportation of personnel and equipment from Boulder City to the dam construction site. This property is an approximately 2-mile-long segment of the historic roadway with intact drainage structures dating to its original construction in 1931-1932. The architectural features appurtenant to this roadway exhibit a construction style consistent with that employed by the enrollees to the Civilian Conservation Corps during the 1930s. This abandoned segment is the only portion of the roadway remaining that was part of the section known as the Black Canyon or Government Highway. It retains integrity of design and is therefore eligible for the NRHP under criteria A and C.

Section 4(f) Use

Alternative B:

Excavation for Alternative B would require removal through roadway excavation of the eastern portion of the road, and the use of approximately 0.2 acre of Section 4(f) land (Figure 7-1; Table 7-1).

Alternative C:

Alternative C would necessitate the use of the same portion of this Section 4(f) resource as Alternative B (Figure 7-1, Table 7-1).

Alternative D:

Alternative D would not affect this historic resource (Figure 7-1; Table 7-1).

SCE North and South Transmission Lines (26CK6249 and 26CK6250)

These two transmission lines were constructed with metal wedge A-frame and metal-waisted towers very similar to towers SCE had used in innovative high-voltage transmission in California. The two lines take different courses from the SCE switchyard at Hoover Dam to Hemenway Wash, but the lines then run parallel and near each other to the north of Boulder City and then to the southwest. SCE began constructing a 220-kV transmission line from Chino, California to Hoover Dam in 1936. The line was completed in May 1939 to the SCE switchyard on the south side of Black Canyon Highway. Hoover Dam generating units A-6 and A-7 were nearing completion at that time, and SCE began delivering power over the line on June 19, 1939. In response to anticipated growth in demand, SCE began construction of a second line before the first line was energized. The second 220-kV line was completed in November 1941, but not energized until near the end of 1942 (Reclamation, 1940:29, 71, 98; 1942:112-113; 1948a:106; Myers, 1983:190).

In addition to the direct association of these transmission lines with the early operation of Hoover Dam, the lines were extremely important for providing energy to war industries in California during World War II. The lines were also important in the post-war agricultural and municipal development in California. The significance of the SCE transmission lines is similar to that of the Hoover-Basic South, MWD, and LABPL transmission lines, which were determined to be eligible for the NRHP by the SHPO in 1994. The SCE transmission lines (26CK6249 and 26CK6250) were therefore recommended to be eligible for the NRHP under criterion A, for their association with events or broad patterns important in history, and the SHPO concurred with this recommendation.

Section 4(f) Use

For this as well as other historic transmission lines affected by one or more of the build alternatives, all affected transmission towers are assumed to be contributing elements to that historic resource. Their removal and replacement with a new tower is anticipated because transmission corridor realignments are likely to result in different structural requirements that would preclude tower relocation.

Alternative B:

Alternative B would require the removal and replacement of one transmission tower that is part of the SCE North Transmission Line (26CK6249), and one SCE South Transmission Line (26CK6250) tower, amounting to approximately 0.6 acre of Section 4(f) use (Table 7-1).

Alternative C:

Alternative C would require the removal and replacement of one transmission tower that is part of the SCE North Transmission Line (26CK6249), and two SCE South Transmission Line (26CK6250) towers, totaling approximately 0.9 acre of Section 4(f) use (Table 7-1).

Alternative D:

Alternative D would not require use of these Section 4(f) resources (Figure 7-1; Table 7-1).

Hoover-Basic South Transmission Line (26CK6251)

The Hoover-Basic South transmission line extends from the Arizona-Nevada Switchyard near Hoover Dam, to the Basic Substation at the Basic Magnesium plant in Henderson, Nevada. The conductors of this line are strung on metal wedge, A-frame-type steel towers. The Hoover-Basic South line is one of two transmission lines built to support the World War II defense industry. The two 230-kV transmission lines were constructed in 1941 to 1942 to carry power to the Basic Magnesium plant in Henderson, Nevada. The Hoover-Basic North line is outside the study area. The segment of the Hoover-Basic South line between Hoover Dam and the Basic Tap/Basic Substation was determined to be eligible for the NRHP by the SHPO in 1994 under criterion A for its association with Hoover Dam. The remainder of the line within the study area, excluding the1960s/1970s tie circuits, has nearly identical physical nature, integrity, and historical associations as the portion determined to be eligible in 1994. Both intact segments of the line are therefore recommended to be eligible for the NRHP under criterion A, for their association with the Basic Magnesium plant and Hoover Dam.

Section 4(f) Use

As noted above, it was determined that tower replacement is the most conservative approach because transmission corridor realignments are likely to result in different structural requirements that would preclude the relocation of the original tower.

Alternative B:

Alternative B would require the relocation of two transmission towers, and the Section 4(f) use of approximately 0.6 acre (Figure 7-1; Table 7-1).

Alternative C:

Alternative C would require the relocation of three transmission towers, and the Section 4(f) use of approximately 0.9 acres (Figure 7-1; Table 7-1).

Alternative D:

Alternative D would require the relocation of two transmission towers, and the Section 4(f) use of approximately 0.6 acre (Figure 7-1; Table 7-1).

7.6 Avoidance Alternatives

It is not possible to avoid Section 4(f) resources with any of the three reasonable build alternatives, including the preferred alternative for two reasons:

- The eastern project limit is located several miles within the LMNRA. This includes those alternatives previously eliminated (see Chapter 2) as well as those studied in detail in this EIS.
- The historic resources affected by the project include long linear structures (historic transmission lines, roadways, a railroad) that cross all of the alternative alignments.

7.6.1 No Build Alternative

The No Build Alternative (Alternative A) would consist of leaving the existing roadway facilities along U.S. 93 through Boulder City as they presently are and would take no action to address any traffic congestion, traffic circulation, or safety problems found on the existing corridor. The existing three-lane roadway section between Buchanan Boulevard and Lakeshore Road on U.S. 93 would remain, but it is assumed the third westbound lane would be extended easterly to the study limit to tie in to the Hoover Dam Bypass (see Section 2.1).

The traffic forecasts show congestion will increase substantially without roadway improvements. Traffic volumes in the Boulder City/U.S. 93 corridor will continue to increase in the future, and most segments and intersections will reach LOS F within the next 10 years. Vehicles will have increasing difficulty making turns at the unsignalized intersections due to the high volume of conflicting through-traffic on U.S. 93. It is expected that there will be severe congestion at the Buchanan Boulevard/U.S. 93 intersection, and drivers will divert to parallel routes, further impacting the community.

The No Build Alternative would not meet the purpose and need for the project, which includes the goals of reducing corridor traffic congestion and crash rates while enhancing regional mobility, because:

- The numerous access points to adjacent businesses and neighborhoods will not be eliminated.
- The variation of U.S. 93 from a full-freeway section in the west segment to a two-lane section in the east segment will not be resolved.
- The three high-crash areas located at the intersections of the Railroad Pass Hotel and Casino, Buchanan Boulevard, and Lakeshore Road will not be resolved.
- Segments of U.S. 93 experiencing fatal crash rates equal to or greater than the statewide rates for similar facility type would not be fixed. The worst segment, from the west study limit to the U.S. 93/95 interchange, has a fatal crash rate approximately five times the state average.
- The hazardous materials incident rates at Railroad Pass, being nearly five times as high as the average for the entire state of Nevada, and at other critical corridor locations would not be corrected.

- U.S. 93 through Boulder City would continue to act as a bottleneck to regional and interstate commerce.

7.7 Alternatives and Measures to Minimize Harm

Section 4(f) requires that once it is established that there are no prudent and feasible alternatives that avoid the use of resources protected by this regulation, the harm-minimizing alternative among the remaining prudent and feasible alternatives, must be selected.

This evaluation shows that there is no build alternative that clearly minimizes harm to Section 4(f) resources. The acres of Section 4(f) use are intentionally not totaled in Table 7-1, but are specified by resource, because there is no accepted methodology for comparing the relative impacts on one resource (e.g., a historic structure) compared to another (e.g., a recreational area). For example, as summarized in Table 7-1, Alternative B impacts 8.3 acres of the Boulder City Branch Railroad, but only 46.4 acres from the LMNRA. Alternative D only uses 0.3 acre of the BCBRR, but 58.9 acres from the LMNRA. Alternative C impacts 0.6 acre of the BCBRR and 41.0 acres of the LMNRA. All three build alternatives have Section 4(f) impacts that are of the same relative magnitude;, and, therefore because of this, there is no clear harm minimizing alternative that can be selected.

7.7.1 Measures to Minimize Harm

Measures to minimize harm resulting from the construction and operation of any of the build alternatives, including the preferred Alternative D, have been developed in consultation with the relevant resource management agencies, and will be incorporated as components of project design and construction.

Lake Mead National Recreation Area

During the initial alternatives screening (see Section 2.6) the LMNRA expressed concerns regarding impacts to lands within an “Outstanding Natural Feature Subzone” identified in LMNRA’s General Management Plan that would result from Alternatives SA102 and SA102A (Appendix A; letter dated June 2, 2000). In a response dated December 14, 2000, the FHWA indicated that these alternatives were dropped from further consideration. None of the alternatives carried forward for detailed analysis would use Section 4(f) lands within an Outstanding Natural Feature Subzone as designated by the LMNRA General Management Plan.

Alternatives B and C were developed to employ, to the maximum extent feasible, existing U.S. 93 right-of-way, therefore to minimize reducing the use of Section 4(f) acreage within the LMNRA. Alternative D impacts within the LMNRA would be largely within an area that receives a variety of uses, from the existing U.S. 93 corridor to disturbed areas where multiple transmission lines and access roads occur. In addition, the total area of the LMNRA subject to Section 4(f) use under any of the alternatives would be less than 0.004 percent of the total acreage of the LMNRA.

Construction and operation of Alternative D are expected to have negligible impact on the visitor use of, and access to the LMNRA. However, because construction of Alternatives B or C would take place largely within the existing U.S.93 corridor, these alternatives would be expected to interfere with visitor access to the LMNRA during the construction phase. During the construction period for this project, certain recreation activity areas identified by NPS would be designated as construction safety zones, and recreation would be limited or restricted. Specifically during blasting operations, short periods would occur when recreation access to affected areas must be prohibited for protection of the public. Trail-use regulations within the LMNRA may need to be adjusted to accommodate construction activities and to assure the safety of trail users. Scheduling of these activities would be closely coordinated with NPS, and there would be ongoing public information provided.

Cuts, fills, and other land modification would be designed and constructed to minimize impact to scenic values, especially in undeveloped areas. Mitigation techniques would include rough cuts, feathering cut/natural environment interfaces, use of artificial desert varnish on rock cuts to match adjacent natural colors, colored concrete, and other state-of-the-art methods. Care would be taken to remove all construction debris and other trash from the work area as soon as construction is completed. Excavated topsoil would be stored during construction and replaced on appropriate disturbed areas outside the highway shoulders after construction to aid in re-establishing desert vegetation. Cactus, yucca, and candidate plant species would be removed and replanted or reseeded in consultation with NPS. NPS has provided NDOT and FHWA with specific measures to minimize harm in a list of *Restoration Considerations for Construction Activities* (see Appendix A). These and other measures appropriate for this project, including topsoil and plant salvage, revegetation with native selected.

Boulder Ridge Golf Course

Alternatives B and D would avoid impacts to this planned recreational facility. Alternative C would pass through the southern portion of the planned Boulder Ridge Golf Course, and, as a consequence, would use 47.8 acres (Table 7-1). Discussions with City staff indicate that the creation of a remnant parcel south of the roadway (Figure 7-1) would create an isolated tract that would no longer be useful for this recreational facility. The consequent reduction in golf course holes proportionate to a 47.8-acre reduction in size is calculated to be from 36 to 27 holes. There are no reasonable means of minimizing this harm.

River Mountains Loop Trail

Potential opportunities for trail enhancements through Hemenway Wash would be incorporated into the final design if either Alternative B or C were identified as the selected alternative. Existing trail infrastructure and ancillary facilities will be maintained if one of these alternatives is constructed. To mitigate the impacts of construction, trail detours would be designated during construction, and there would be ongoing public information provided. Relocation of the trail, with design features accommodating its multiuse intent, through and along the new highway facilities would also contribute to minimizing harm to this resource. The preferred alternative has no impact on the River Mountains Loop Trail, and no trail enhancements would be necessary.

Historic Resources

The measures that will be taken to minimize harm to historic resources subject to Section 4(f) use resulting from the build alternatives include the construction of an overpass over the historic Boulder City Branch Railroad (in the case of Alternative C), recording structures that would receive use according to HAER standards, and consultations with management agencies, the SHPO, and other appropriate parties on measures to minimize harm.

The PA executed by the NPS, Reclamation, WAPA, the BLM, NDOT, FHWA, and the SHPO (Appendix E) stipulates the procedures that will be employed to mitigate the impacts of Alternative D, including the following:

- Consultation with relevant land management agencies and other appropriate parties
- Once engineering design is sufficiently developed, an assessment of effects to historic properties by qualified archaeologists and architectural historians
- Development of treatment plan(s) to mitigate potential impacts
- Implementation of the treatment plan(s)

Of the historic resources previously listed to which Section 4(f) applies and that would be used by at least one of the build alternatives, the following resources would *not* be used by Alternative D (see Table 7-1):

- SCE North Transmission Line (26CK6249)
- SCE South Transmission Line (26CK6250)
- Old Nevada Highway 41/U.S. 93 Segment (26CK6245)

Historic Transmission Lines

Impacts to the historic transmission lines that would result from the construction of the build alternatives have been discussed in Section 7.5, above, and summarized in Table 7-1. As noted there and in Figure 7-1, Section 4(f) use of these resources would result chiefly from the replacement of individual transmission towers that would conflict with roadway construction and operation. To minimize harm to the transmission lines, as well as other historic resources, the initial alignment of the alternatives included considerations of how the corridors might be oriented to minimize impacts at the of crossing linear features, or by avoiding them altogether. Documentation of historic electrical transmission line towers to HAER standards would be implemented to mitigate impacts to these Section 4(f) resources.

Old Nevada Highway 41/U.S. 93 Segment

Construction of either Alternatives B or C would require use of the same approximately 0.2 acres of this resource, through removal of the historic features and excavation for the new roadway. As noted above, documentation of contributing architectural features according to HAER standards would also be undertaken to mitigate impacts.

Boulder City Branch Railroad

Documentation according to HAER Standards will be undertaken to mitigate impacts to the BCBRR. Implementation of a new grade separation in the Railroad Pass area is a measure that will minimize harm incorporated in all build alternatives.

Alternative B

This alternative has the greatest impact to the BCBRR. The new grade separation in the vicinity of Railroad Pass would be a measure to minimize harm in that area. Further to the east, Alternative B encroaches into the existing railroad right-of-way between Yucca Street and Buchanan Boulevard, and there is no practicable means to minimize this harm.

Alternative C

Measures that would be taken to minimize harm to the BCBRR from Alternative C construction in the vicinity of Railroad Pass are the same as those for Alternatives B and D. Further east, construction of a grade separation in the vicinity of Veterans' Memorial Drive would allow for continued use of this section of the railroad (Figure 7-1).

Alternative D

Construction of Alternative D would result in the least impacts to the BCBRR of the build alternatives. In the Railroad Pass area, measures to allow for the future use of this railroad would be the same as for Alternatives B and C.

7.8 Coordination

Several public agencies, all represented on the project's PMT, have jurisdiction over Section 4(f) lands crossed by the Boulder City/U.S. 93 Corridor build alternatives. NPS administers the LMNRA lands. The City of Boulder City owns the planned Boulder Ridge Golf Course property and the portion of the River Mountains Loop Trail through Hemenway Wash (includes easements for trail use). The Nevada State Railroad Museum owns the right-of-way planned for the Railroad Pass to Yucca Street portion of the loop trail in Boulder City. Reclamation has jurisdiction over properties within the Boulder City Historic District. WAPA owns the historic Hoover-Basic South Transmission Line, and the City of Los Angeles Department of Water and Power owns LABPL Transmission Line 3.

As noted above, during the initial alternative development the NPS requested that Corridors SA102 and SA102A be eliminated from further consideration because they pass through LMNRA lands designated as "Natural Zones" and "Outstanding Natural Feature Subzones." FHWA and the PMT agreed to remove them from consideration because there are other reasonable and prudent alternatives with more moderate Section 4(f) impacts (see NPS letter dated June 2, 2000, and FHWA December 14, 2000, response, Appendix A).

As described elsewhere in this FEIS (see Chapter 2), after consideration of the impacts and benefits that would result from the construction and operation of the build alternatives, including impacts to the environment of the City of Boulder City, Alternative D was recommended by the PMT as the preferred alternative.

Subsequent to the release of the DEIS for this project, the LMNRA prepared an Impairment Determination (Appendix D) evaluating effects of the action alternatives, pursuant to NPS Management Policies (2001) requiring the analysis of potential effects of the alternatives to determine whether they would impair park resources. This Impairment Determination found that Alternative D (the preferred alternative) will not impair Park resources and will not violate the NPS Organic Act.

There has also been ongoing coordination with Reclamation, WAPA, Boulder City, and the Nevada State Railroad Museum concerning potential avoidance alternatives, impacts to the Section 4(f) properties under their jurisdiction, and measures to minimize harm. This coordination has included discussion of the significance and primary use of each property.

NPS, Reclamation, WAPA, and Boulder City are members of the PMT, which was established to oversee project planning, environmental studies, and engineering. The PMT is an interagency project team composed of NDOT, FHWA, NPS, Reclamation, BLM, WAPA, Boulder City, the City of Henderson, Clark County, and the RTC. Representatives from these agencies attend monthly meetings, which began in January 2000 and extended through to the selection of the preferred alternative. This team has participated in reviews of the project area, development and screening of alternatives, environmental studies, and the EIS throughout the planning process. NPS, Reclamation, WAPA, Boulder City, the City of Henderson, and the RTC are also serving as cooperating agencies on the Boulder City/ U.S. 93 Corridor Study EIS.

7.9 Determination

Based on the information presented in this chapter, and on consultation with the PMT and other agencies, the FHWA has determined the following.

The No Action Alternative fails to meet the purpose and need, and would result in substantial negative environmental impacts to the City of Boulder City.

There is no feasible and prudent build alternative that minimizes Section 4(f) use. Each of the build alternatives involves the use of Section 4(f) resources and, while measures have been taken to minimize the harm that would result from their construction, none clearly involves less use of Section 4(f) resources than the others.

The proposed action, construction of the preferred Alternative D, includes all possible planning to minimize harm to the LMNRA and other Section 4(f) resources, and uses no other public parks and recreation lands. The selection of Alternative D as the preferred alternative is supported by the social and environmental considerations described elsewhere in this FEIS. In particular, it has been determined that the construction of Alternative B or C would result in significant, adverse social and environmental impacts on Boulder City that would be avoided with Alternative D.

8. Coordination and Consultation

A Public Involvement Strategy was developed for this project. The strategy was prepared following interviews with 10 key stakeholders to assess information needs and appropriate tools for communicating information about the project and receiving input from the public. The stakeholders interviewed are listed below.

- Duncan McCoy, Boulder City Library
- Kevin Hill, City of Henderson
- John Sullard, City of Boulder City
- Cheryl Ferrence, Boulder City Chamber of Commerce
- Jolene Baurain, Assistant to Clark County Commissioner Bruce Woodbury
- Bill Ferrence, Boulder Dam Credit Union
- Kris Mills, Reclamation
- Chuck McEndree, WAPA
- Lieutenant Malloy, Nevada Highway Patrol
- Verna Tracy, Business Owner

A total of six project newsletters were distributed for public information. Public participation and comment on environmental and social concerns were encouraged through these newsletters, a speaker's bureau presentation for the community, two public open houses, a public hearing for the DEIS, and by providing project-dedicated voicemail and a project web site. A Community Working Group (CWG) made up of 10 community representatives was convened in August 2001 by NDOT and the Mayor of Boulder City to provide another method of community involvement in project planning and the development of the alternatives and the preferred alternative.

8.1 Public and Agency Scoping

Following publication of an NOI, which appeared in the *Federal Register* on February 2, 2000, NDOT initiated the EIS and began the scoping process. An agency scoping meeting was held on February 22, 2000, in Las Vegas, Nevada. Attendees were given an overview of the project and asked to present their agency's concerns, special requirements, and information pertinent to the corridor study EIS. Agencies were also encouraged to prepare written responses to NDOT and FHWA. A meeting summary was prepared and is included as Appendix B of this FEIS. Subsequent interviews with other community members and several meetings with interested members of the public, the Boulder City Chamber of Commerce, members of the Boulder City and Henderson City Councils, and other organizations also occurred during this scoping period.

8.1.1 Public Comment Meetings

NDOT conducted two public open houses to receive comments on the project and input to the alternatives development and analysis process. The public open houses were noticed in the first and second newsletter and in the following newspapers: *Boulder City News,* *Las Vegas Review Journal, Las Vegas Sun, El Mundo (Local Spanish Newspaper)* and *Henderson Home News*. A public hearing was conducted to receive public comment on the DEIS. The announcement of public release of the DEIS appeared in the Federal Register on March 15, 2002, and public notice was provided in the following newspapers: *Boulder City News, Las Vegas Review Journal, Las Vegas Sun, El Mundo (Local Spanish Newspaper),* and *Henderson Home News*. A subsequent announcement was run in the *Boulder City and Henderson Home News* and the *Las Vegas Review Journal* indicating availability of additional copies of the DEIS document at the Boulder City Public Library and Community College of Southern Nevada – Boulder City Campus.

January 26, 2000, Public Informational Meeting

A public meeting was held on January 26, 2000, at the Community College of Southern Nevada-Boulder City Campus, Boulder City, Nevada, to provide information to the public and receive their comments on the Boulder City/U.S. 93 Corridor Study. An open house format was used at the meeting allowing members of the public to learn more about the study goals and process, and to provide feedback on the study information provided. Attendees were encouraged to submit comments on the study using one of the following methods: completing a comment sheet, providing oral comments to a court reporter, mailing written comments, or sending comments via the project web site. Approximately 226 people attended the meeting.

The following presentation boards were on display at the open house:

- Meeting purpose
- Project objectives
- Aerial photograph of study area
- Southern bypass alignment review based on the June 1999 ballot initiative
- Project schedule
- Web site display

The intent of this meeting, and other public scoping efforts, was to communicate to the public the purpose and need of the project, solicit input on alternatives and present alternatives for the project, and receive other input from the public regarding the proposed action and alternatives. Strong opinions were expressed regarding the potential impacts to local businesses and employment resulting from the implementation of Alternative D in particular. Others stated that truck traffic through Boulder City has become a major safety concern and a source of noise and environmental hazard, and it must be addressed. Substantial input was also received regarding environmental impacts and hazards in the developed portions of Boulder City resulting from the implementation of Alternatives A, B or C, and concerns regarding impacts to the natural environment resulting from the implementation of Alternative D were also received.

February 29, 2000, Public and Agency Scoping Meeting

A scoping meeting with federal, state, and local agencies, including Native American Tribal governments, was conducted early in the project. This meeting was to discuss with these agencies their role as part of the PMT, and to develop a cooperative agreement on how the purpose and need for the project would be developed and the process for identified potential solutions. The meeting also resulted in a list of project issues for each agency involved and was the basis for the evaluation criteria that would be used to evaluate potential alternatives once developed.

April 26, 2000, Public Open House

The second public open house was held on April 26, 2000, at the Community College of Southern Nevada-Boulder City Campus, Boulder City, Nevada, regarding the Boulder City/U.S. 93 Corridor Study EIS. NDOT conducted this meeting in the same open house format to allow members of the public to learn more about the development of the project alternatives and provide feedback on the progress of the study. Attendees were encouraged to submit comments on the study using one of the following methods: completing a comment sheet, providing oral comments to a court reporter, mailing written comments, or sending comments via the project web site. Approximately 80 people attended the meeting. The following presentation boards were on display at the open house:

- Welcome
- Purpose and need for the project
- The study process
- Initial alternatives map
- Profile grade - Boulder City to Kingman via Hoover Dam Route and Laughlin Route
- Traffic profiles
- How the public input drives the process
- Business survey responses

Those in attendance provided detailed comments and concerns regarding the project alternatives. Several commented that an Adams Boulevard alignment alternative would not be acceptable. Additionally, there was continued concern expressed over truck traffic through town and through Hemenway Valley.

April 4, 2002, Public Hearing for the DEIS

A public hearing to formally introduce the Boulder City/U.S. 93 Corridor Study DEIS was held on April 4, 2002, at the Boulder City Parks and Recreation Center in Boulder City, Nevada. Members of the media were invited to attend 1 hour prior to the start of the public hearing to discuss the project with staff and to take photographs and video. A media briefing packet was provided to each media representative, which included an aerial map with the four alternatives, a copy of the project purpose and need, the Spring 2002 newsletter, and the summary of environmental considerations for each alternative.

Attendees were encouraged to submit comments on the study using one of the following methods: completing a comment sheet, providing oral comments to a court reporter, mailing written comments, or sending comments via e-mail through the project website. A total of 278 citizens attended the hearing staffed by members of the project team from every discipline. Representative comments received from the public at the hearing are included in this summary.

The following graphic displays were developed to summarize the content presented in the DEIS at the hearing:

- Project schedule and an overview of the study process.
- Federal environmental review process.

- Purpose of and need for the project.
- Summary of the environmental considerations to existing U.S. 93 through Boulder City for each of the environmental categories.
- Summary of the traffic analysis for existing and future traffic.
- Summary of the noise study.
- Map of the waterways and parks/open space affected by each build alignment.
- Map of the areas for wildlife habitat.
- Summary of impacts to bicycle and pedestrian trails/pathways.
- Posters of each of the build alignments. These plots indicate new roadway footprint, geometry, and the right-of-way needs with an aerial map as the base.
- Computer datashow station to show engineering files of the alignments.
- Computer datashow station displaying video animation of several alignment drive-throughs.
- Document station providing copies for review of the DEIS and all of the technical studies and appendixes.

The comments received covered a wide variety of issues related to the project. All four alternatives received positive support and negative comments; however, the majority of attendees expressed support for the southern alignment.

8.1.2 Cooperating Agencies

On February 11, 2000, FHWA, in cooperation with NDOT, mailed written invitations to key government agencies with a direct stake in the Boulder City/U.S. 93 Corridor Study EIS to participate as "cooperating agencies" in accordance with CEQ regulations (40 CFR 1501.6 and 1506.3). Participation of the cooperating agencies was sought throughout all stages of the EIS for technical information, resolution of issues, and identification of specific review and approval requirements. The coordination aided in defining the project's purpose and need and in identifying reasonable project alternatives, environmental impacts, and measures to mitigate adverse effects. An overriding goal of this interagency coordination was to preclude subsequent and duplicative efforts and to gain consensus. The agencies were also invited to participate on the interagency PMT and were requested to designate a staff representative as the project point of contact. The following agencies agreed to participate in development of the EIS as cooperating agencies (see Appendix A) and have been involved throughout the project development process:

- Reclamation
- NPS
- WAPA
- Clark County
- BLM
- RTC of Southern Nevada

- City of Boulder City
- City of Henderson

8.1.3 PMT Meetings

The PMT has been meeting once a month since initiation of the corridor study through to the selection of the preferred alternative to discuss the project, review interim work products, and provide guidance and direction for preparing the DEIS. The PMT has also provided input on the public outreach strategy and worked to develop cooperative agreement with each other as significant project issues surfaced and policy direction was required. PMT members consist of:

- Ted Bendure, FHWA
- Tom Greco, NDOT
- Daryl James, NDOT
- Daniel Nollsch, NDOT
- Joe Peltier, NDOT
- Kent Cooper, NDOT
- Phil Henry, Boulder City
- Kevin Hill, City of Henderson
- Dave Curtis, Reclamation
- Jim Holland, NPS
- Gary Johnson, RTC
- Robert Herr, Clark County Department of Public Works
- Chuck McEndree, WAPA
- CH2M HILL project team

In 2002, two PMT members left, Tom Greco/NDOT and Kevin Hill/City of Henderson, and were replaced with individuals from their respective agencies. The new members are:

- Scott Rawlins, NDOT
- Joe Damiani, City of Henderson

The PMT has continued to remain active through completion of the FEIS and meets when on-going agency consultations require PMT updates and further consultations. The PMT last met on January 5, 2005 to review the results of December 2004 consultations with the EPA, NDOW, and the ACOE . The PMT will meet as necessary through the approval of the ROD.

8.1.4 Public Outreach

A project presentation was developed to inform and educate stakeholders and members of the general public about the goals of the project and potential solutions. Presentations were made to local agencies and local community organizations. Approximately 45 organizations were contacted to schedule a presentation. Approximately 800 individuals were present at these presentations during the months of January through May 2001. Comments on the refined set of alternatives were recorded from each meeting and discussed at the PMT meetings. A summary of each meeting is included as Appendix C of this document.

Four tapings with the Boulder City Cable Television Program have been conducted. These tapings have included the Boulder City Manager, Public Information Officer, and various members of the PMT to discuss relevant issues surrounding the project.

A project web page was developed to provide project information, including a description of the project development process, details on alternatives, the EIS process, a project schedule, project newsletters, open house display material, and an interactive map of the project study limits. An e-mail address was also established for users to provide feedback and/or submit questions or requests for more information. The complete DEIS document and all of the appendixes were made available on the project website.

8.1.5 Community Working Group

A CWG was formed in August 2001 to serve as a venue to discuss the project. The intent of this CWG is to:

1. Provide improved public and community access to the project as it progresses through the environmental documentation process. The purpose for improved public access is to build support for the project development process and the alternatives under consideration.
2. Educate stakeholders about the problem definition, planning process, and the proposed alternatives defined to date. The goal is to help avoid any backtracking on project development progress.

The CWG will serve as a mechanism for collaborative problem solving among interest groups most likely to be affected by the project. The CWG is tasked to provide guidance on aspects of the alternatives and make recommendations to the PMT at each project milestone and to provide feedback to homeowner, business, and civic groups they represent in the community. This group will hear presentations and receive information from the PMT.

The make-up of this group includes 10 individuals that were selected to represent a broad spectrum of community interests and concerns, and assembled at the request of NDOT Director and under the guidance of the Mayor of Boulder City. The CWG met on a monthly basis through the release of the DEIS. Together, the CWG and the PMT decided that this group will meet on an as-needed basis during the FEIS and ROD process. E-mail updates will continue to be provided as necessary for CWG members to apprise them of any changes to schedule or to notify them of additional meeting needs.

8.2 Consultations Since Release of the DEIS

Since the release of the DEIS there have been consultations with a number of agencies and other groups regarding a range of issues and potential impacts from implementation of the alternatives presented in this EIS. These include the following:

- The Boulder City Rifle and Pistol Club and The National Rifle Association- On possible conflicts with the use of the Boulder City Rifle and Pistol Club range, and mitigation measures.

- Clark County Department of Public Works and the Regional Transportation Commission- On design and planning aspects of the alternatives.
- State Historic Preservation Office- On final determination of National Register eligibility of historic properties within the Area of Potential Effect of the project.
- National Park Service Lake Mead National Recreation Area- Consideration of the impacts of Alternative D on the purpose and function of the LMNRA, and on measures for the protection and conservation of bighorn sheep and cultural resources.
- Nevada Department of Wildlife- On desert bighorn sheep habitat, the potential impacts from implementation of Alternative D on bighorn sheep, and on avoidance and mitigation measures.
- Environmental Protection Agency- Selection of the Least Environmentally Damaging Practicable Alternative (LEDPA), environmental impacts to Boulder City as well as the natural environment, impacts to jurisdictional waters of the U.S., measures for avoidance, minimization, and mitigation, and review of prior alternative screening procedures and results.
- U.S. Army Corps of Engineers St. George Regulatory Office- Selection of the Least Environmentally Damaging Practicable Alternative, impacts to jurisdictional waters of the U.S.
- Federal Highway Administration- On the identification of Section 4(f) resources and the assessment of impacts resulting from the alternatives.

These consultations have led to the refinement and clarification of resource issues and impacts, and further understanding of agency concerns, and are described chiefly in Chapters 3 through 7.

8.2.1 Ongoing Agency Consultations

As noted above, consultations with resource and land management agencies have taken place since the release of the DEIS, and some continue to the present. Appendix A provides the correspondence that has been received on this study from local as well as federal agencies. In particular, since 2002 discussions and field reviews have continued with NDOW and the EPA regarding identification of the LEDPA. Evaluations of the effects of the four alternatives considered in detail shows that the most deleterious impacts to the human environment (chiefly within the limits of Boulder City) would result from Alternatives A, B, and C. These include segmentation of the city, noise, visual and air quality impacts, impacts to traffic and recreation lands, and impacts to cultural resources. In contrast, impacts from Alternative D would be greatest to elements of the natural environment (biological resources, waters of the U.S.). In weighing these factors together, FHWA in cooperation with NDOT determined Alternative D to be the LEDPA. This is also consistent with expressions of public concern received during scoping and the DEIS comment period.

Through February 2005 the EPA has withheld its concurrence on the determination of Alternative D as the LEDPA, citing concerns regarding impacts to bighorn sheep, as well as direct and indirect impacts to waters of the U.S. and aquatic ecosystems (Appendix A). Consultations on the determination of the LEDPA and appropriate avoidance, minimization, and mitigation measures, as well as on the Conceptual Mitigation Plan for its implementation, were carried into a field review by FHWA, NDOT, EPA, NDOW, and the ACOE on December 20, 2004. At a subsequent meeting NDOT and NDOW reached further agreement on the steps to address impacts to bighorn sheep, in particular. These measures are described in greater detail in Sections 4.4.3 and 6.6.1. Subsequent to additional consultations during early 2005, FHWA submitted to EPA an updated request for concurrence on the LEDPA (Appendix A). NDOT and FHWA anticipate continued coordination with NPS and NDOW, as well as EPA through to the completion of this project as described in greater detail in Sections 6.6.1 and 6.6.8 of this FEIS.

8.2.2 Consultation with Native American Groups

During the initial stages of project development, the HRC at the University of Nevada Las Vegas developed a plan for Native American Consultation on the project for implementation by FHWA and NDOT (Blair and Lawrence, November 2000). Based on that plan, FHWA initiated formal Government-to-Government consultation with Native American groups with history in 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 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).

As a result, four Native American tribes/groups had no response to FHWA's request for consultation, and three requested additional work and/or information. After review, FHWA is addressing these requests through the PA process.

9. List of Agencies, Organizations, and Persons to Whom Copies of the Environmental Impact Statement were Sent

DEIS Distribution (Prior to May 10, 2002, Close of Comment Period)

Federal Agencies

Bureau of Land Management
Las Vegas, NV

U.S. Fish and Wildlife Service
Reno, NV

Western Area Power Administration
Golden, CO

Advisory Council on Historic Preservation, Washington D.C.

Bureau of Indian Affairs, Carson City, NV

Department of Energy, Las Vegas, NV

Department of Interior Headquarters, Washington D.C.

EPA Headquarters, Washington D.C.

EPA Regional Office, San Francisco, CA

FAA, S.F. Airport District Office, Burlingame, CA

FEMA, Regional Director, Presidio of San Francisco, CA

NPS, Director, Washington D.C.

NPS, Lake Mead National Recreation Area, Boulder City, NV

Bureau of Reclamation, Regional Office, Boulder City, NV

U.S. Army Corps of Engineers,
St. George, UT

U.S. Geological Survey, Water Resources Division, Carson City, NV

U.S. Bureau of Mines, Western Field Operation Center, Spokane, WA

U.S. Department of Health and Human Services, San Francisco, CA

Colorado River Commission,
Las Vegas, NV

U.S. Senator John Ensign, Las Vegas, NV

U.S. Senator Harry Reid, Las Vegas, NV

U.S. Congresswoman Shelley Berkley,
Las Vegas, NV

U.S. Congressman Jim Gibbons, Reno, NV

U.S. Congressman Jon Porter,
Las Vegas, NV (previously State Senator)

Department of the Interior

FAA Western-Pacific Region

State Agencies

Nevada Department of Administration/
State Clearinghouse, Carson City, NV

Nevada Department of Human Resources, Health Div., Carson City, NV

Nevada State Railroad Museum
Boulder City, NV

Nevada Department of Conservation and Natural Resources, Carson City, NV

Nevada Division of Wildlife,
Las Vegas, NV

Nevada Division of Environmental Protection, Carson City, NV

Nevada Division of Natural Heritage,
Carson City, NV

Nevada Division of State Lands,
Carson City, NV

Nevada State Historic Preservation Office,
Carson City, NV

Nevada State Office of Community Services, Carson City, NV

Nevada Power Company

Local Agencies

Boulder City Manager, Boulder City, NV

Henderson City Manager, Henderson, NV

Regional Transportation Commission of Southern Nevada, Las Vegas, NV

Clark County Board of Commissioners,
Las Vegas, NV

Clark County Regional Flood Control District, Las Vegas, NV

Department of Air Quality Management,
Las Vegas, NV

Southern Nevada Water Authority,
Las Vegas, NV

City of Boulder City

City of Henderson

City of Boulder City, Public Works Division

Kirk, Steve, City of Henderson Councilman

Gibson, Jim, City of Henderson Mayor

Tobler, Roger, City of Boulder City

Nix, Bryan, Formerly City of Boulder City Councilman

Burton, Karla, City of Boulder City Council Woman

Hardy, Joe, Assemblyman (previously City of Boulder City Assistant Mayor)

Pacini, Mike, City of Boulder City Councilman

Hafen, Andy, City of Henderson Councilman

Anderson, Andrea, City of Boulder City Councilwoman

Cyphers, Amanda, City of Henderson Councilwoman

Ferraro, Robert, City of Boulder City Mayor

Clark, Jack, City of Henderson Councilman

Libraries

Boulder City Public Library,
Boulder City, NV

Clark County Public Library,
Las Vegas, NV

Green Valley Public Library,
City of Henderson, NV

Henderson Public Library,
City of Henderson, NV

Organizations

Boulder City Chamber of Commerce, Boulder City, NV

Southern California Edison, Victorville, CA

Sierra Pacific, Las Vegas, NV

AMEC

Lionel, Sawyer and Collins

HRC-WE

Universities/Colleges

University of Nevada, Las Vegas, NV

Community College of Southern Nevada – Boulder City Campus

Tribes

Anderson, Mr. Curtis, Chairperson, Las Vegas Paiute Colony, Las Vegas, NV

Arnold, Mr. Richard, Chairperson, Pahrump Paiute Tribe, Pahrump, NV

Butler, Ms. Elda, Director Aha Ma Kav Cultural Society, Mohave Valley, AZ

Chavez, Mr. David, Chairperson Chemehuevi Indian Tribe, Havasu Lake, CA

Eddy, Mr. Daniel, Colorado River Indian Tribes, Parker, AZ

Helton, Ms. Nora, Chairperson, Fort Mohave Indian Tribe, Needles, CA

Mike, Ms. Rosalyn, Chairperson, Moapa Business Council, Moapa, NV

Corporations

Division of Industrial Relations

Integrity Engineering

The Howard Hughes Corporation

Private Citizens

Pauley, John

Raulston, Barbara

Shanahan, Seth

Barlow, John

Blair, Chad

Booth, Cokie

Campbell, Dib

Compton, Gary

Faiss, Linda

Gibbons, W. Stewart

Merrell, Robert

DEIS Distribution

(After May 10, 2002, Close of Comment Period)

Federal Agencies

Federal Highway Administration

EPA Regional Office, San Francisco, CA

State Agencies

NDOT Environmental Services Division

Nevada Department of Wildlife

Organizations

Railroad Pass Hotel and Casino

Nevada Environmental Coalition

Administrative Draft FEIS Distribution

(including draft sections)

Federal Agencies

Federal Highway Administration

EPA Regional Office, San Francisco, CA

U.S. Army Corps of Engineers, Sacramento, CA

NPS, Lake Mead National Recreation Area, Boulder City, NV

State Agencies

Nevada Department of Transportation

Nevada Department of Wildlife

Local Agencies

Boulder City Manager, Boulder City, NV

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10. List of Preparers

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B.S., Mechanical Engineering

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A.A., Risk Management

U.S. Bureau of Reclamation

Dave Curtis
Realty Specialist
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B.S., Wildlife Biology

U.S. National Park Service

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City of Henderson

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Joe Damiani, P.E.
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Regional Transportation Commission of Southern Nevada

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Manager, Engineering
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CH2M HILL

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B.S., Applied Physics

Doug Landwehr
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6 years' experience
B.S., Atmospheric Science

Biological Resources/Wildlife

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Noise

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B.A., Political Science

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