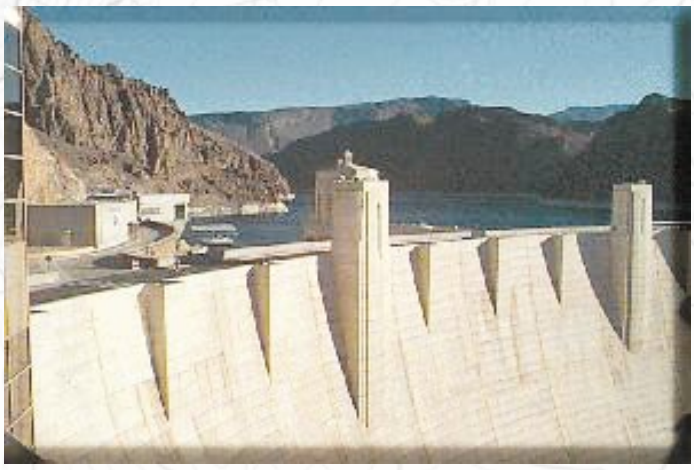
FHWA-AZNV-EIS-98-03-F

U.S. 93 Hoover Dam Bypass Project

Record of Decision



Federal Highway Administration

Central Federal Lands Highway Division

March
2001

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U.S. Department
of Transportation
Federal Highway Administration

Central Federal Lands
Highway Division

555 Zang Street, Room 259
Lakewood, CO 80228

In Reply Refer To:
HPD-16

Agencies, Organizations, and Citizens:

The enclosed Record of Decision (ROD) has been prepared for the Hoover Dam Bypass Project. The selected alternative is the Sugarloaf Mountain Alternative. This 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.

Copies of the ROD are also available for review at the following locations:

Boulder City Public Library, Boulder City, NV
Bullhead City Public Library; Bullhead City, AZ
Clark County Public Library, Las Vegas, NV
Green Valley Public Library, Henderson, NV
Henderson Public Library, Henderson, NV
Kingman Public Library, Kingman, AZ
Laughlin Library, Laughlin, NV.

Thank you for your input during this phase of project development. Please contact me 303.716.2157 with any questions regarding this project.

Sincerely yours,

F. Dave Zanetell, P.E.
Special Projects Manager

Enclosure

bc: G. Walton
Central File - Hoover Dam Bypass Project
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FHWA-AZNV-EIS-98-03-F

RECORD OF DECISION

U.S. 93 Hoover Dam Bypass

Clark County, Nevada and Mohave County, Arizona

March 2001

U.S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division
555 Zang Street, Room 259
Lakewood, CO 80228

Contents

Section Page

1. Introduction

The Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the United States Highway 93 (U.S. 93) Hoover Dam Bypass Project fully documents the social, environmental, and economic effects and considerations used to facilitate the National Environmental Policy Act (NEPA) decisionmaking process set forth in this Record of Decision (ROD).

1.1 Project Description

The proposed project involves construction of a new bridge and highway access across the Colorado River in the vicinity of Hoover Dam. The new bridge and highway will eliminate truck traffic and other through traffic over Hoover Dam. The project is located in Clark County, Nevada, and Mohave County, Arizona, and lies entirely on Federal Lands – Lake Mead National Recreation Area (LMNRA) and the Hoover Dam Reservation Area (HDRA). All three of the build alternatives use public recreation land and historic sites considered under Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966 (see Figure 1, page 2).

1.2 Purpose and Need

The purpose of the project is to accomplish the following objectives:

- Minimize the potential for pedestrian-vehicle accidents on the dam crest and on the Nevada and Arizona approaches to the dam
- Remove a major bottleneck to interstate and international commerce and travel in the west by reducing traffic congestion and accidents in this segment of the major commercial route between Phoenix and Las Vegas
- Replace an inadequate federally owned highway river crossing with a new crossing that meets current roadway design criteria, and improves through-vehicle and truck traffic capacity on U.S. 93 at the dam
- Reduce travel time in the dam vicinity
- Protect Hoover Dam employees, visitors, equipment, power generation capabilities, and Colorado River waters while enhancing the visitors' experience at Hoover Dam by:
  - Safeguarding dam and power plant facilities and the waters of Lake Mead and the Colorado River from hazardous spills or explosions
  - Protecting the dam and power plant facilities from interruptions in electricity and water delivery
  - Providing improved conditions for operating and maintaining Hoover Dam facilities

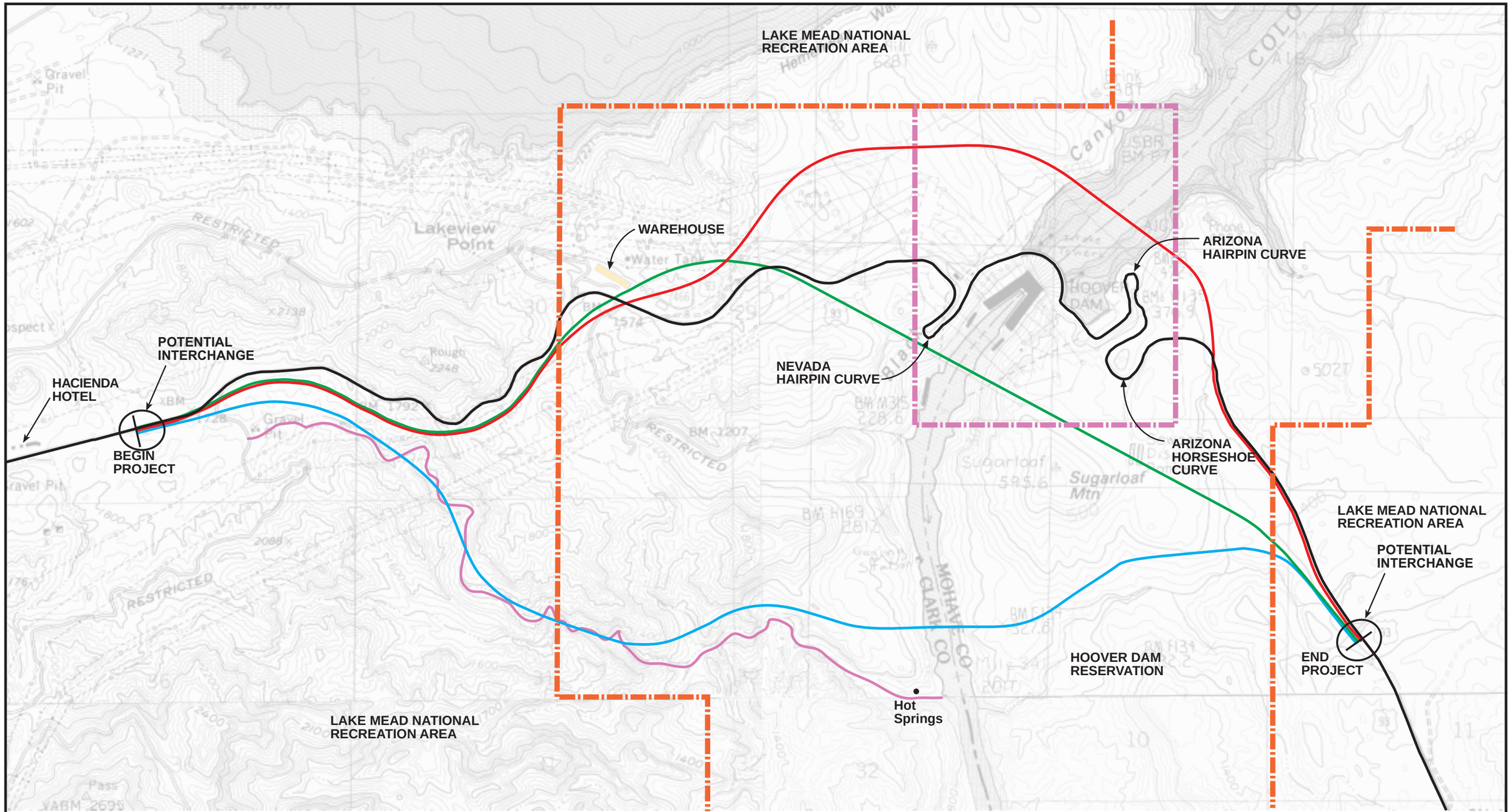

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FIGURE 1
ALTERNATIVES BEING EVALUATED IN DETAIL
HOOVER DAM BYPASS PROJECT
RECORD OF DECISION

The selected alternative fully addresses the following needs, which require rectification:

- Accident Rate – Since 1964, more than 500 accidents have occurred in the 3.4-mile stretch of highway approaching and crossing the dam. Commercial trucks were involved in 96 of the accidents. In every accident, the cause was partially due to the sharp curves, narrow highway width, insufficient shoulder width, poor sight distances, and slow travel speeds. U.S. 93 within 1 mile of the dam shows a much higher accident rate of 3.97 per million vehicle miles traveled. This rate is over three times the Nevada average for rural principal arterials.

- Inadequate Roadway Capacity – U.S. 93 over the dam has reached its capacity during peak periods and cannot provide additional capacity with the current roadway alignment. Considering the existing highway configuration, speed limit, pedestrians and vehicle mix, highway capacity is 1,200 vehicles per hour. Traffic counts taken in 1996 indicated peak volumes at or exceeding the total highway capacity. The 1997 average daily traffic (ADT) volume crossing the dam was 11,500 vehicles, corresponding to a Level of Service (LOS) F. If the proposed improvements are not made, the projected traffic volume crossing the dam in 2017 and 2027 will be 21,000 ADT (LOS F) and 26,000 ADT (LOS F), respectively.

- Highway Deficiencies – U.S. 93 approaches to Hoover Dam include numerous substandard geometric elements (including horizontal curves with radii too short to provide adequate turning room, rock walls limiting sight distance, inadequate roadway width for turning and for disabled and emergency vehicles); reduction of speed limit from 55 to 15 miles per hour (mph) before the dam from each direction due to the numerous hairpin curves and the steep grade; and, inadequate width for large trucks to smoothly pass in opposite directions on the extreme hairpin curves, as trucks traveling in each direction must cross the yellow line and use opposing lanes.

- Travel Times – In 2017 there will be a delay of greater than 30 minutes for 3 hours of each day and in 2027 a delay of 30 minutes or greater for 10 hours out of each day. If capacity is not improved, the projected traffic will result in over 1,170 hours of travel time delay during the 3 peak hours of each day in 2027.

- Protect Hoover Dam Facilities, Employees, and Visitors – Many commercial trucks currently crossing the dam carry volatile fuels, chemicals, and hazardous materials. Potential hazards resulting from these materials include ignition of combustible materials, contamination of Lake Mead or the Colorado River, and damage to the powerhouse and associated equipment. Of particular concern is the highway drainage system in the area near the dam on the Nevada side of the river, which directs flows off the edge of the road, down the canyon face, onto the Nevada powerhouse roof, and into the Colorado River.

2. Decision

The Sugarloaf Mountain Alternative has been selected for the proposed project. This alternative crosses the Colorado River about 1,500 feet downstream of Hoover Dam and includes construction of approximately 2.2 miles of highway approach in Nevada, a 1,900-foot long bridge, and approximately 1.1 miles of highway approach in Arizona. Existing U.S. 93 will continue to provide visitor and service access to Hoover Dam, Lakeview Point, and the United States (U.S.) Bureau of Reclamation (Reclamation) warehouse.

This 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 begins on the west side of the dam near the Hacienda Casino and follows a route just south of existing U.S. 93. It then crosses and re-crosses existing U.S. 93 in the vicinity of the Reclamation warehouse. The highway then passes through a gap in the high rock ridge that parallels the river and descends southeasterly to the long span bridge over the Colorado River. From the east end of the proposed bridge, the highway traverses the northern base of Sugarloaf Mountain and then turns south crossing a wide ravine and reconnects to existing U.S. 93 approximately 1.1 miles from the dam (see Figure 2, page 5).

2.1 Bridge Concepts

Bridge concepts for the Colorado River crossing that were developed during the environmental process for the Sugarloaf Mountain Alternative include: a concrete deck arch bridge, a steel deck arch bridge, and a concrete cable stayed bridge. All were determined to be feasible from an engineering standpoint. The final bridge type will be based on review of all potentially feasible bridge types, technical and economic considerations, public input, and input from the Design Advisory Panel (DAP) formed to provide input regarding corridor aesthetic treatments and visual concepts to minimize adverse effects to the Hoover Dam National Historic Landmark (HDNHL). The DAP will consist of representatives from the Federal Highway Administration (FHWA), Nevada Department of Transportation (NDOT), Arizona Department of Transportation (ADOT), the Nevada and Arizona State Historic Preservation Officers (SHPOs), the Advisory Council on Historic Preservation (ACHP), the National Historic Landmark (NHL) Coordinator, National Park Service (NPS), Reclamation, Western Area Power Administration (WAPA), and a Native American tribal representative, as well as an independent architectural historian and a registered landscape architect. The approximate elevation of the proposed bridge is about 1,490 feet above sea level, or approximately 840 feet above the Colorado River and 260 feet above the Hoover Dam crest.

2.2 Other Features

The Sugarloaf Mountain Alternative includes the following additional features:

- A 400-foot-long highway bridge near the head of Gold Strike Canyon

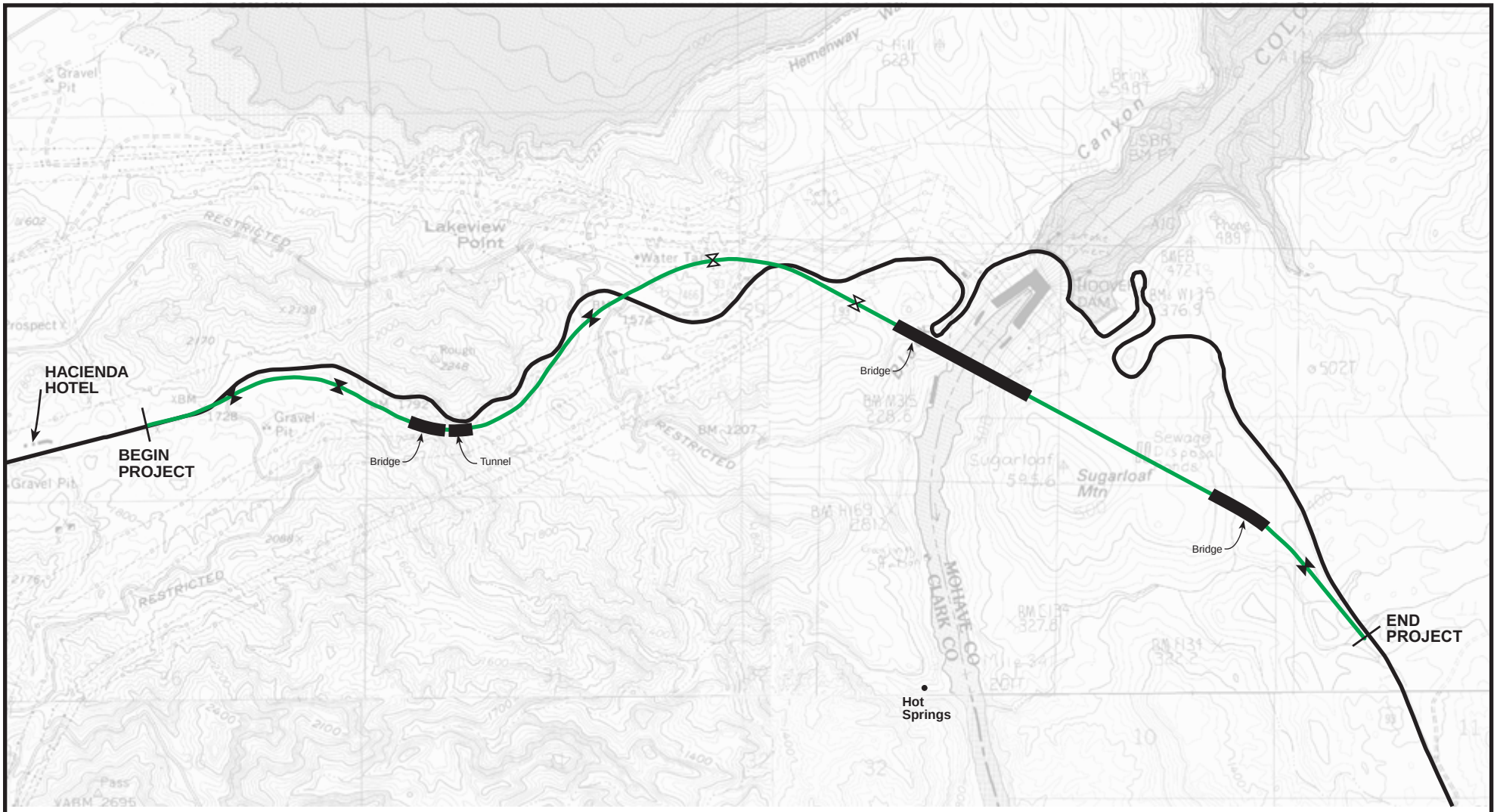

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FIGURE 2
SUGARLOAF MOUNTAIN PROJECT FEATURES
HOOVER DAM BYPASS PROJECT
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- A 300-foot-long tunnel passing through a high, narrow ridge separating the head of Gold Strike Canyon from the open valley to the northeast
- An 800-foot-long highway bridge crossing a large ravine on the Arizona highway approach
- Four wildlife underpasses, three wildlife overpasses, two additional wildlife underpasses provided by the two bridges outlined above, one additional wildlife overpass provided by the tunnel outlined above, fencing to guide wildlife to the crossing structures and approximately 2,400 feet beyond the interchange of the new highway with existing U.S. 93 in Arizona, and out-jumps to allow bighorn sheep to exit the fenced highway right-of-way
- Other major features, including interchanges with existing U.S. 93 in Nevada and Arizona and relocation of transmission towers

2.3 Project Construction

The Sugarloaf Mountain Alternative will require approximately 5 years to construct. Assuming the balance of funding becomes available, the project is scheduled to be completed in 2007. The estimated cost in base year 2002 dollars for design, construction and construction engineering of the alternative is $198 million.

Major detours, road closures, or traffic delays will not be required during construction of the bridge or highway approaches. Minor delays will be required during placement of girders at the two proposed highway overpasses in the vicinity of the Reclamation warehouse. Minor delays and detours will also be required during construction at the termini of the project.

2.4 Logical Termini

The termini of the Hoover Dam Bypass alternatives studied in detail are defined to be consistent with the purpose and need of the project. The selected alternative does not necessitate other improvements outside the termini. Further, the alternatives studied in detail can function independently over the project design life and do not require or preclude future adjacent highway projects. The logical termini selected for the project do not change current traffic compositions on regional routes. Thus, the proposed project does not generate traffic on the U.S. 93 corridor or other regional routes, nor does it predetermine an alternative selection on adjacent projects. Two such highway projects are in early planning stages: an NDOT study to address the traffic problems along U.S. 93 in Boulder City that is adjacent to the planned western terminus of the Hoover Dam Bypass alignments; and an ADOT project to widen the existing two-lane section of U.S. 93 south of Hoover Dam approximately 15 miles to the existing four-lane divided highway section.

Other alternative routes to U.S. 93 between Kingman and Las Vegas exist. All require substantial out-of-direction travel (see FEIS Table 2-1). The selected alternative will provide improved travel time benefits to regional traffic and freight movement among the Phoenix, Kingman, and Las Vegas areas over the design life of the project.

3. Other Alternatives Considered

A range of alternatives was considered (see Figure 3, page 8), and identification of the preferred alternative was not made until the alternatives' impacts and comments on the Draft Environmental Impact Statement (DEIS) and from the public hearings were fully evaluated. The four most reasonable alternatives fully evaluated (including the No Build Alternative) were developed to a comparable level of detail in the DEIS so that their comparative merits could be analyzed. The following subsections briefly describe the other alternatives.

3.1 Alternatives Studied in Detail

3.1.1 Promontory Point

This alternative crosses Lake Mead about 1,000 feet upstream from Hoover Dam and requires constructing approximately 2.7 miles of highway approach in Nevada, a 2,200-foot-long bridge, and a 0.9-mile highway approach in Arizona.

3.1.2 Gold Strike Canyon

This alternative crosses the Colorado River about 1 mile downstream from Hoover Dam and requires constructing approximately 2.2 miles of highway approach in Nevada, a 1,700-foot-long bridge, and a 1.1-mile highway approach in Arizona.

3.1.3 No Build

This alternative consists of no action being taken. No Hoover Dam Bypass would be developed, no change in the current highway configuration would occur, no traffic restrictions would be imposed, and no other structural or nonstructural improvements would be developed on U.S. 93 near Hoover Dam.

3.2 Alternatives Considered but Eliminated

3.2.1 Boulder City North

This alternative crosses the Colorado River about 2.5 miles downstream from Hoover Dam and requires constructing approximately 5.6 miles of highway approach in Nevada, a 2,200-foot-long bridge, and a 2.1-mile highway approach in Arizona.

3.2.2 Boulder City South

This alternative crosses the Colorado River about 2.5 miles downstream from Hoover Dam and requires constructing approximately 9.4 miles of highway approach in Nevada, a 2,200-foot-long bridge, and a 2.1-mile highway approach in Arizona.

3.2.3 Boulder City South Option

This alternative crosses the Colorado River about 2.5 miles downstream from Hoover Dam and requires constructing approximately 8.8 miles of highway approach in Nevada, a 2,200-foot-long bridge, and a 2.1-mile highway approach in Arizona.

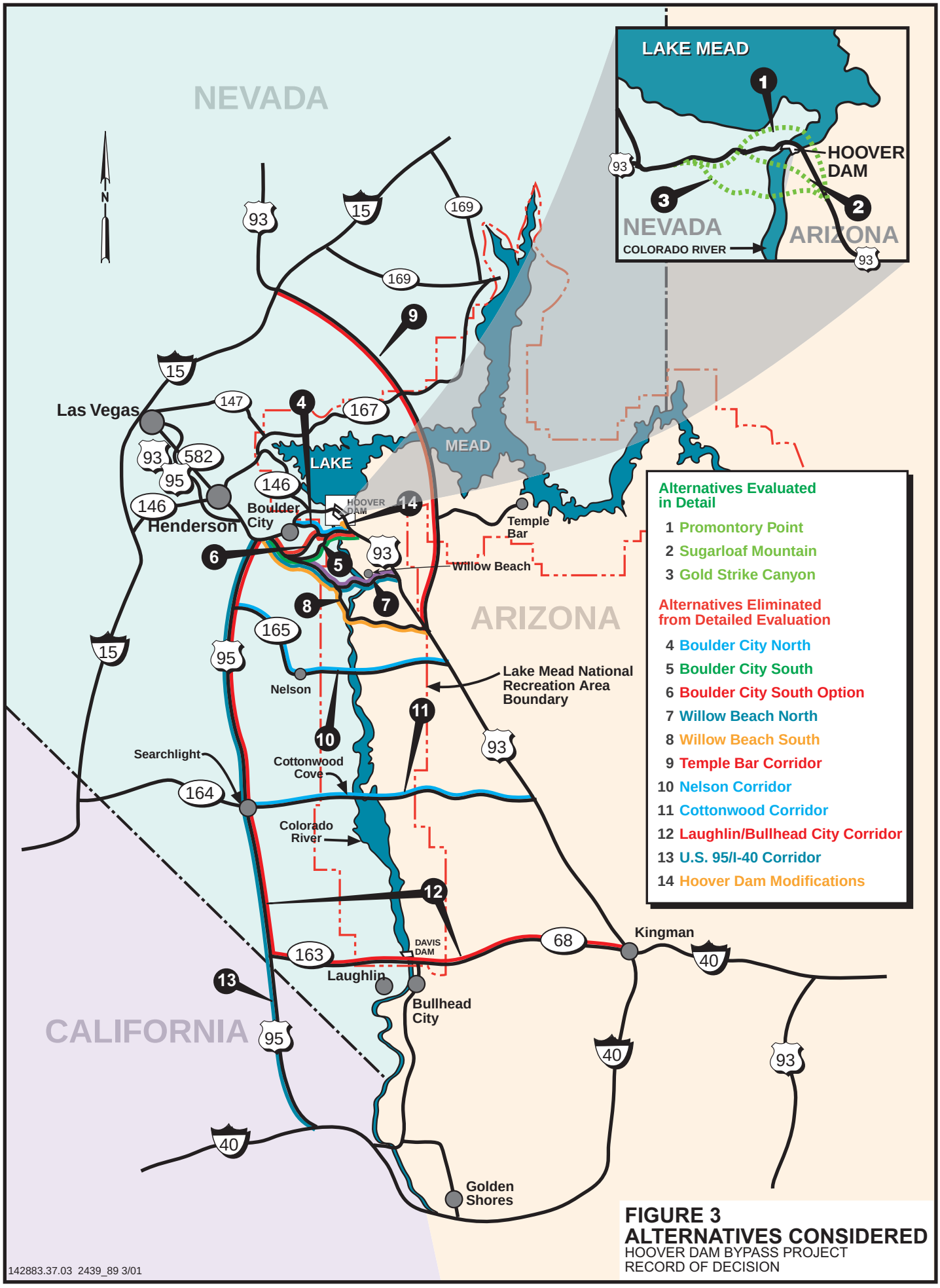

FIGURE 3
ALTERNATIVES CONSIDERED
HOOVER DAM BYPASS PROJECT
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3.2.4 Willow Beach North

This alternative crosses the Colorado River about 8 miles downstream from Hoover Dam and requires constructing approximately 13 miles of highway approach in Nevada, a 2,000-foot-long bridge, and a 4-mile highway approach in Arizona.

3.2.5 Willow Beach South

This alternative crosses the Colorado River about 14 miles downstream from Hoover Dam and requires constructing approximately 14.3 miles of highway approach in Nevada, a 2,080-foot-long bridge, and 8 miles of highway approach in Arizona.

3.2.6 Temple Bar

This alternative begins at Interstate 15 (I-15), approximately 30 miles northeast of Las Vegas. The alignment would proceed in a southeast direction and would require a long bridge to span the "Narrows" in Lake Mead. From the "Narrows," the alignment would generally follow the existing road corridor west of Detrital Wash until it ties with U.S. 93 near the LMNRA boundary. This alternative requires the construction of approximately 28 miles of new road north of Lake Mead and 26 miles of new road along the existing road corridor between Lake Mead and the tie to U.S. 93 in Arizona.

3.2.7 Nelson

This alternative begins at the U.S. 93/United States Highway 95 (U.S. 95) interchange west of Boulder City. It follows the U.S. 95 corridor for 10 miles and then the NV 165 corridor for approximately 20 miles. A new bridge across the Colorado River, 21 miles downstream from Hoover Dam, would be constructed. Approximately 12 miles of new road construction through previously undisturbed lands would be required on the Arizona side to tie back in with U.S. 93 about 40 miles north of Kingman.

3.2.8 Cottonwood

This alternative begins at the U.S. 93/U.S. 95 interchange west of Boulder City and proceeds southerly to Searchlight for approximately 35 miles. The alternative then proceeds easterly for approximately 14 miles, along the existing road corridor to Cottonwood Cove. A new bridge across Lake Mohave and an additional 26 miles of construction would be required on the Arizona side to tie back in with U.S. 93 about 24 miles north of Kingman.

3.2.9 Laughlin-Bullhead City

This alternative to U.S. 93 improves the existing route between Boulder City and Kingman via Laughlin and Bullhead City. This alternative uses existing U.S. 95, State Route (SR) 163, and SR 68. It requires widening approximately 55 miles of U.S. 95 (programmed) and 14.5 miles of SR 68 (currently under construction) to four lanes, adding more pavement to the existing lanes, and constructing a new multi-span bridge crossing the Colorado River between Davis Dam and the existing Laughlin Bridge. This alternative restricts truck traffic from crossing Hoover Dam and reroutes the traffic along the corridor discussed above.

3.2.10 U.S. 95/I-40

This alternative to U.S. 93 improves the existing route between Boulder City and Kingman via Needles, California. Approximately 56 miles of U.S. 95 in Nevada and 13 miles of U.S. 95 in California would be widened to four lanes, and existing U.S. 95 would be overlaid with new pavement. No improvements to existing Interstate 40 (I-40) and its crossing of the Colorado River south of Needles are necessary.

3.2.11 Modifications to Hoover Dam

This alternative includes two options for modifying existing U.S. 93 where it crosses the Colorado River on the crest of Hoover Dam: widening Hoover Dam and constructing an elevated roadway on the dam.

3.2.11.1 Widening Hoover Dam

This option widens the roadway to four lanes on the dam crest and its approaches.

3.2.11.2 Elevated Roadway on Hoover Dam

This option adds an elevated crossing structure to be supported by a portion of Hoover Dam. It also includes new and straighter highway approaches.

3.2.12 Restricting Motorized Traffic from Crossing Hoover Dam

This alternative includes two options: restricting truck traffic and restricting all vehicle traffic from crossing Hoover Dam.

3.2.12.1 Restricting Truck Traffic Only

This option restricts truck traffic from crossing Hoover Dam by restricting specific vehicle classifications. It diverts trucks to alternate routes, but allows automobile traffic to cross Hoover Dam. The most likely diversions are over Davis Dam or the Laughlin Bridge.

3.2.12.2 Restricting All Traffic

This option restricts all motorized vehicle traffic from crossing Hoover Dam by diverting all vehicles to alternate routes; it allows only bicycle and foot traffic on Hoover Dam. The most likely diversions are over Davis Dam or the Laughlin Bridge.

3.2.13 Traffic Systems Management

This alternative includes relatively low-cost, nonstructural improvements designed to reduce traffic congestion, improve traffic flow, and increase existing highway capacity. This alternative could include signs, traffic signals, turn lanes, barriers, traffic controls, and other devices to direct traffic and pedestrians.

3.3 Alternatives Considered but Eliminated from Detailed Evaluation

After applying screening criteria to the alternatives (see ROD Section 4), all were eliminated from further consideration except for the three alignments closest to Hoover Dam: Promontory Point, Sugarloaf Mountain and Gold Strike Canyon, and the No Build Alternative. The alternatives were eliminated for reasons described below:

1. Some alternative routes did not meet the project purpose and need because they would not substantially eliminate roadway deficiencies and reduce traffic congestion on U.S. 93 at Hoover Dam and the dam approaches, eliminate through traffic from the dam,

enhance public safety, or protect Hoover Dam and its visitors. Alternatives were also dropped from further consideration if they substantially increased travel time and did not provide system continuity to enhance travel within the U.S. 93 North American Free Trade Agreement (NAFTA) corridor. The Laughlin and U.S. 95/I-40 Alternatives were eliminated because motorists would avoid driving the additional 23 and 70 miles, respectively, by continuing to use the Hoover Dam crossing. Therefore, meeting the objectives of enhanced safety and reduced congestion on U.S. 93 at the dam would not be achieved. As described in Appendix B of the FEIS, the Laughlin Alternative would not improve the LOS on U.S. 93 on Hoover Dam.

2. Many alternatives would affect Section 4(f) lands; however, some routes have considerably more impact than others. The Temple Bar Alternative and all the highway alternatives south of Gold Strike Canyon except the Laughlin and U.S. 95/I-40 Alternatives would affect much more Section 4(f) land than the three alternatives near Hoover Dam. Based on the requirement to minimize harm to Section 4(f) property, these alternatives were eliminated from further consideration.

3. Routes nearest Hoover Dam would pass through lands already extensively disturbed by human-made features. Conversely, the Willow Beach, Nelson, Cottonwood, Boulder City, and Temple Bar Alternatives were eliminated because those routes would pass through areas of extensive pristine habitat.

4. Alternatives were eliminated from consideration because their impacts on known peregrine falcon breeding areas, bighorn sheep habitat and movement corridors, desert tortoise habitat, and other wildlife were more severe than the three alternatives near the dam.

5. The cost of constructing the routes would increase as the distance away from the dam increases because longer sections of new highway would be required; therefore, longer, more costly alternatives were eliminated. The estimated capital construction cost of $130 million for the Laughlin-Bullhead City Alternative (LBA) is less than the $198 million to $215 million for alternatives closer to Hoover Dam. However, considering traffic volumes over a 20-year period, an additional $1.4 billion in total user costs would be incurred due to the increased length of the LBA (see Appendix B of the FEIS). In addition, traffic projections indicate that the Hoover Dam crossing would currently operate at a LOS E at peak hours if trucks were removed from the traffic composition. Thus, the project purpose and need would not be met.

6. Alternatives that require keeping the existing highway open to through traffic to provide visitor access to the dam were dropped from further consideration if they also required operating and maintaining extensive lengths of duplicate highway. Alternative routes not close to Hoover Dam (Willow Beach, Nelson, Cottonwood, and Temple Bar) were eliminated for this reason.

7. Restricting truck traffic does not meet two critical elements of the project purpose and need; it removes only a portion of the traffic contributing to Hoover Dam congestion and results in a substantial increase in travel distance and time for truck traffic. Additionally, closing the dam to commercial truck traffic is subject to FHWA approval under the provisions of Title 23 of the Code of Federal Regulations (23 CFR). 23 CFR

Section 658.11 pertains to additions and deletions of roads on the National Network of Highways, of which U.S. 93 is a part. In response to Nevada Senate Concurrent Resolution No. 60, NDOT prepared a preliminary evaluation of the criteria used in 23 CFR to assess deletion of U.S. 93 from the National Network of Highways. The results of this analysis indicated that network deletion of U.S. 93 would not be feasible. Consequently, NDOT concluded it is not feasible to prohibit commercial trucks from crossing Hoover Dam unless an alternate crossing in the proximity of Hoover Dam was constructed.

In addition, a September 20, 1996, letter from the Laughlin Town Advisory Board to NDOT states that: "[We] cannot support any action … that would cause an increase in commercial truck traffic through Laughlin on the Laughlin bridge or over Davis Dam." In similar correspondence, dated September 18, 1996, the City of Bullhead City opposed routing of hazardous materials transports via State Route 68. In the fall of 1996, NDOT also received letters opposing closure of Hoover Dam to commercial trucks from the City of Kingman, the Nevada Motor Transport Association, Nevada Petroleum Marketers Association, Arizona Transport Association, Western States Petroleum Association, National Private Truck Council, and many other private freight companies.

8. Restricting all traffic from Hoover Dam, with the exception of bicycle and foot traffic, was eliminated for the reasons provided in Item 7 above and because it does not meet the need to remove a major bottleneck to interstate and international commerce. Further, this alternative would not meet other critical elements of the project purpose; specifically, it would not reduce vehicle travel time or improve speed.

9. Alternatives related to Hoover Dam widening were eliminated from further consideration for technical, economic, and cultural reasons. Because tourist traffic would not be separated from through traffic, this option does not solve the public safety problem, and does not protect power and water supplies. No practical way exists to modify Hoover Dam without impacting the historic appearance of the dam or disrupting traffic during construction.

   Attaining the required highway design criteria by adding an elevated crossing structure (which would be supported by some portion of Hoover Dam) would require new and straighter highway approaches. Deep and lengthy excavations, or possibly tunnels, are necessary to connect such a structure to the existing highway. Support piers for the elevated structure would cause traffic interference during construction and would permanently affect the space available on the dam crest for tourist movement and dam maintenance operations.

   Concerns identified with both dam modification options also include interference with existing transmission lines, towers, and other power facilities; impacts to the historical significance of the site (the integrity and setting of the dam and its status as a NHL); and limited space available for separating traffic, vehicle turning movements, and parking maneuvers.

4. Basis for Selected Alternative

The following screening criteria and narrative provide the basis and essential considerations used in selection of the Sugarloaf Mountain Alternative:

4.1 Criterion 1. *The purpose and need, including engineering and operational standards, safety, and traffic/freight capacity, should be achieved with a reasonable cost.*

The No Build Alternative does not meet the purpose and need of the project (as discussed in FEIS Section 2.7). All three build alternatives evaluated meet the purpose and need of the project. The Sugarloaf Mountain and Promontory Point Alternatives have the best roadway geometry; however, the Promontory Point Alternative has a curve at each end of the proposed bridge, whereas the Sugarloaf Mountain Alternative has long, straight approaches to the bridge. This maximizes sight distance and minimizes the possibility of an accident at the bridge. Numerous agencies and citizens opposed the Promontory Point Alternative because of the risk of a hazardous material spill into Lake Mead.

The Gold Strike Canyon Alternative, although 0.1 mile shorter than Sugarloaf Mountain and 0.6 mile shorter than Promontory Point, has the poorest horizontal and vertical alignments. It also has a curve at each end of the proposed bridge. The profile grade is by far the worst of the three build alternatives and includes more than 2.5 miles of grades steeper than 5 percent. The Promontory Point Alternative and the Sugarloaf Mountain Alternative have only 0.5 mile of grades steeper than 5 percent. Gold Strike Canyon requires the construction of 10 bridges in addition to the Colorado River bridge, whereas Promontory Point has 1 additional bridge and Sugarloaf Mountain has 2 additional bridges.

Construction access and constructibility of the Gold Strike Canyon Alternative are the most difficult, although these criteria are difficult to quantify. Gold Strike Canyon is also the most expensive at $215 million, although it is only 9 percent higher than the Sugarloaf Mountain Alternative, which is $198 million. The cost of the Promontory Point Alternative is $204 million.

The preferred alternative under this criterion is the Sugarloaf Mountain Alternative.

4.2 Criterion 2. *Impacts to Section 4(f) land should be avoided or minimized pursuant to Section 4(f) of the Department of Transportation Act of 1966.*

The FEIS and Section 4(f) Evaluation determined there are no feasible and prudent alternatives that avoid the use of Section 4(f) land. Although the Promontory Point Alternative uses 74 acres of Section 4(f) land and the Sugarloaf Mountain Alternative uses 92 acres, the Sugarloaf Mountain alignment has been determined to be the harm-minimizing alternative. (See discussion in next section and FEIS Chapter 6.)

The Gold Strike Canyon Alternative uses 128 acres of Section 4(f) land, impacts existing recreational use, substantially impairs pristine scenic conditions, and has an unavoidable and potentially unmitigable adverse impact on the Gold Strike Canyon TCP. Therefore, it cannot be considered the harm-minimizing alternative.

The preferred alternative under this criterion is the Sugarloaf Mountain Alternative.

4.3 Criterion 3. *Impacts to federally and/or state-listed threatened or endangered species and sensitive habitats, such as wetlands, should be avoided or minimized.*

The Gold Strike Canyon Alternative involves constructing through previously undisturbed areas, whereas the Sugarloaf Mountain and Promontory Point Alternatives are generally located along existing road corridors or through other disturbed areas. Therefore, the Gold Strike Canyon Alternative has substantially greater impacts under this criterion. NPS, the U.S. Fish and Wildlife Service (USFWS), the Nevada Division of Wildlife (NDOW), and the Arizona Game and Fish Department (AGFD) are opposed to the Gold Strike Canyon Alternative.

Because of the least impacts to the peregrine falcon, desert bighorn sheep, and desert tortoise, the Sugarloaf Mountain Alternative is preferred under this criterion.

4.4 Criterion 4. *Impacts to cultural resources, including HDNHL and archeological (prehistoric and historic) resources, should be avoided or minimized.*

The build alternatives adversely affect between 6 and 10 historic properties, including a Traditional Cultural Property (TCP). The Gold Strike Canyon Alternative is considered to have the least historic impacts because it is located the farthest from Hoover Dam. The Promontory Point and Sugarloaf Mountain Alternatives have an adverse effect on the "historic" setting of Hoover Dam. Consultation with the Native American tribes indicates that the tribes do not support any of the build alternatives; however, when asked about a preference, they favored the Promontory Point Alternative and strenuously opposed the Gold Strike Canyon Alternative because of significant disturbance to the TCP.

Therefore, the Gold Strike Canyon Alternative has the least historic impacts but has the greatest TCP concerns. The Promontory Point and Sugarloaf Mountain Alternatives have the greatest historic concerns (from a visual standpoint).

Consequently, only the No Build Alternative can be considered to meet this criterion.

4.5 Criterion 5. *Impacts to aesthetic resources (including visual, noise, dust, and odors) should be avoided or minimized.*

All of the build alternatives will enhance the visitors' experience at Hoover Dam, since truck traffic and much of the vehicular traffic will be removed from the dam. The Gold Strike Canyon Alternative is the only alternative that results in a substantial noise increase over existing levels; however, the Gold Strike Canyon Alternative is preferable for the visitors' experience at Hoover Dam since it moves the traffic out of sight and farther away than the other two alternatives. Traffic-generated noise, dust, and odors would be minimized. The number of hikers and recreationists downstream from Hoover Dam is very small compared to the number of visitors at Hoover Dam; therefore, under this criterion, it is reasonable to identify an alternative which minimizes impacts and maximizes benefits for the visitors at Hoover Dam.

The Gold Strike Canyon Alternative is considered the preferred alternative under this criterion.

4.6 Criterion 6. *Impacts on recreation resources and to tourists should be avoided or minimized.*

All of the build alternatives will have a major beneficial effect on recreation and tourism—primarily for the visitors at Hoover Dam. The visitors' experience at Hoover Dam will be enhanced by removing the truck traffic and much of the vehicular traffic from the crest of the dam. The Gold Strike Canyon Alternative has the greatest negative impact on recreation since the hot springs hiking trail would be closed during construction. The Gold Strike Canyon Alternative would also have a long-term, unavoidable adverse impact on the hiking trail because the highway would be adjacent to or bridged over the trail for most of its length and the traffic noise could not be mitigated. The Promontory Point Alternative has a potentially unavoidable adverse impact on NPS's planned bicycle path along the historic railroad grade north of the Reclamation warehouse area. It also has the most impact to water recreation since boating restrictions would be implemented during construction.

The Sugarloaf Mountain Alternative is the preferred alternative under this criterion.

4.7 Criterion 7. *Public and agency input should be taken into consideration.*

The approximately 160 commenters on the DEIS favored the Sugarloaf Mountain Alternative over either of the other two build alternatives and the No Build Alternative by a three to one margin (see FEIS Section 2.4 and FEIS Volume II). Public comments supported the Sugarloaf Mountain Alternative because of its lowest cost and least environmental impacts. Numerous citizens expressed concerns about the Promontory Point Alternative because of the possibility of a hazardous material spill into Lake Mead. The resource and regulatory agencies, with the exception of the SHPOs, unanimously supported the Sugarloaf Mountain Alternative because of its least impact to wildlife, wildlife habitat, water quality, and jurisdictional waters of the U.S. Gold Strike Canyon was widely disfavored due to the adverse effects on pristine habitat and recreation area.

The Sugarloaf Mountain Alternative is the preferred alternative under this criterion.

The Project Management Team (PMT) developed the screening criteria based on known environmental considerations within the project area and ideals for provision of a safe and efficient transportation facility. Analysis of the alternatives against the screening criteria was conducted after circulation of the DEIS and careful consideration of all analytical documentation and comments received. In November 1998, the PMT identified the Sugarloaf Mountain Alternative as the preferred alternative. In July 1999, regulations for implementation of the National Historic Preservation Act (NHPA) changed regarding Native American consultation. These revised regulations were incorporated into the decision-making process and the screening criteria were reanalyzed.

The table below summarizes the final decisions regarding the environmentally and operationally preferable alternative for the screening criteria.

U.S. 93 – Hoover Dam Bypass Alternative Preference by Individual Criteria

Alternative	Engineering and Cost	Section 4(f)	Biological	Cultural	Aesthetic/ Visual	Recreation	Public/ Agency Opinion
No Build				X[a]			
Promontory Point							
Sugarloaf Mountain	X	X	X			X	X
Gold Strike Canyon					X		

[a] Does not meet the purpose and need of the project (see FEIS Section 2.7).

The Sugarloaf Mountain Alternative is the preferable alternative for four of the six environmental criteria. Furthermore, it is the preferred alternative for the engineering criterion.

The environmental advantages of the No Build alternative regarding historic, prehistoric, and traditional cultural properties was given careful consideration in balancing the essential factors set forth in the screening criteria. However, the preferable aspects of the Sugarloaf Mountain Alternative regarding:

- Section 4(f) lands,
- Least harm to threatened and endangered species and sensitive habitats,
- Recreational activities, and
- Public and agency input

coupled with the beneficial impacts of providing a safe and efficient transportation facility, outweigh the cultural impacts when considering the benefits and impacts collectively.

The environmental advantage of the Gold Strike Canyon Alternative regarding the singular consideration of adverse aesthetic / visual impacts cannot be considered more imperative when balanced against the substantial negative environmental impacts to the previously undisturbed terrain associated with that alternative.

Furthermore, concentrated efforts have been made to minimize and mitigate the adverse effects to cultural and visual resources through the interagency Programmatic Agreement and Treatment Plan (PA / TP), establishment of a DAP, and the opportunity for continuing government-to-government consultation with Native American Tribes (see ROD Section 6).

Based on the above analysis of essential considerations and balancing of those considerations, the Sugarloaf Mountain Alternative is the environmentally preferable alternative when considering the benefits and impacts collectively.

5. Section 4(f)

5.1 Evaluation of Potential Avoidance Alternatives

The geographic shape of LMNRA and the location of existing U.S. 93 (i.e., a narrow strip of land extending approximately 60 miles south of the existing road corridor and a variable width strip of area extending approximately 40 miles east of the existing corridor) create a unique problem regarding avoidance of Section 4(f) land.

5.1.1 U.S. 95/I-40 and No Build

The U.S. 95/I-40 Alternative, passing to the south of LMNRA, and the No Build Alternative do not meet the project purpose and need because a substantial portion of the through traffic (all for the no build) would continue to use existing U.S. 93 due to the 70-mile trip length increase from Kingman, Arizona to Las Vegas, Nevada. Therefore, pedestrian-vehicle accident rates, congested bottleneck conditions, substandard approaches, and travel time would not be improved.

Moreover, any alternative that would route through traffic around the southern end of the LMNRA would add, at a minimum, approximately 25 miles of out-of-direction travel to the mileage currently traveled by existing U.S. 93 motorists and would have at least 17 miles of additional steep grades (3 to 6 percent). Based on analysis of the LBA, which traverses the extreme southern end of LMNRA, this would represent over $1.4 billion dollars in additional total 20-year costs. These additional total user costs would be an increase of at least 10 percent over the build alternatives studied in detail and result in a negative benefit to cost ratio. Thus, the U.S. 95/I-40 alternative that passes far to the south of LMNRA and adds approximately 70 miles to the trip length is unfeasible with respect to engineering economics and imprudent regarding the increased travel time, user costs, and environmental impacts.

5.1.2 Restricting Traffic from Hoover Dam

This alternative is unfeasible and imprudent primarily because:

- It does not fulfill the designated functional requirements of U.S. 93 as a principle arterial highway
- It would eliminate a major segment of a primary north-south U.S. highway

5.1.3 Traffic Systems Management

The Traffic Systems Management alternative would not significantly improve traffic flow across Hoover Dam, minimize the potential for pedestrian-vehicle accidents, improve protection of the dam facility, or improve operation and maintenance conditions, and therefore it does not meet the project purpose and need.

5.2 Least Harm Alternative

The final Section 4(f) evaluation demonstrates that the preferred alternative is a feasible and prudent alternative with the least-harm on the Section 4(f) resources after considering mitigation. The degree of harm considers not only size of land used, but also the:

- Location of the portion used
- Severity of the portion used
- Function of the portion used

The remainder of this section describes the logic used to determine the least-harm alternative. Two build alternatives with relatively lower Section 4(f) use are the Modifications to Hoover Dam and Laughlin-Bullhead City Alternatives.

5.2.1 Modifications to Hoover Dam

The two modification alternatives, widening the crest and elevating the highway structure, would not:

- Minimize the potential for pedestrian-vehicle accidents
- Improve protection of the dam facility
- Improve operation and maintenance conditions

Therefore, these alternatives do not meet the project purpose and need. In addition, the two modification alternatives would result in direct adverse physical alteration to the HDNHL in terms of its original design, setting, materials, and workmanship.

5.2.2 Laughlin-Bullhead City

The LBA would not reduce travel time; would have adverse impacts on public safety, sensitive wildlife species, and air quality; would not protect the HDNHL; and would not fully address long-term traffic issues on Hoover Dam. Therefore, it does not meet the project purpose and need.

Further, an additional $1.4 billion dollars in total 20-year costs would be accrued. These additional total user costs are an increase of approximately 10 percent over the build alternatives studied in detail and result in a negative benefit to cost ratio. Thus, this alternative is unfeasible with respect to engineering economics and imprudent regarding the increased travel time, user costs, and environmental impacts.

5.2.3 Alternatives Eliminated Based on Section 4(f) Acreage and Quality Impacts

The following alternatives were eliminated based on Section 4(f) acreage impact considerations.

- Gold Strike Canyon (128 acres)
- Boulder City North (145 acres)
- Boulder City South (165 acres)
- Boulder City South Option (135 acres)
- Willow Beach North (405 acres)
- Willow Beach South (575 acres)
- Nelson (491 acres)
- Cottonwood (436 acres)
- Temple Bar (818 acres)

Furthermore, the LMNRA Section 4(f) acreage traversed by these alternatives is essentially undisturbed.

5.2.4 Determination of Least-Harm Alternative

Based on the above considerations, the remaining two alternatives are Sugarloaf Mountain and Promontory Point. Promontory Point Alternative uses approximately 74 acres of Section 4(f) land. Sugarloaf Mountain Alternative uses approximately 92 acres. However, much of the Sugarloaf Mountain Alternative traverses or is adjacent to areas of existing disturbance (e.g., power lines and related facilities) that detract from recreational and scenic qualities.

Least-harm considerations are not always a function of minimizing acreage used. Other important factors such as location, severity and function of the portion used also may play a role in the decision-making process.

The Sugarloaf Mountain and Promontory Point Alternatives affect three primary Section 4(f) activities or features:

- Recreational opportunities associated with the LMNRA
- Recreational opportunities associated with the HDNHL
- Historic and cultural values of the HDNHL and contributing historic properties, and the TCP

Both alternatives cross waters of the Colorado River. However, during the comment period on the DEIS, there was strong public concern regarding the potential for a hazardous material spill in Lake Mead from the Promontory Point bridge. Furthermore, with the exception of the SHPOs who preferred the Gold Strike Canyon Alternative during early reviews for its lack of visibility from the HDNHL, the resource and regulatory agencies unanimously supported the Sugarloaf Mountain Alternative due to least impact to wildlife, wildlife habitat, water quality, and jurisdictional waters of the U.S. Through government-to-government consultation some of the Native American tribal representatives indicated they did not initially favor a new bridge crossing of the Colorado River. During these consultations they were most opposed to the Gold Strike Canyon Alternative for its severe impact on the canyon and hot springs, and also disfavored the Sugarloaf Mountain Alternative for its adverse effect on the TCP. The Native American group expressed a strong preference for the Promontory Point Alternative.

The Sugarloaf Mountain Alternative does not impact views of the dam and Lake Mead as visitors approach from Arizona or Nevada. Conversely, the Promontory Point Alternative is directly visible and would detract from the “first impression” historic views of the dam and lake.

Both alternatives would adversely impact the scenic views from the dam crest and Lake Mead. However, the Sugarloaf Mountain Alternative could be blended into the landscape more readily than the Promontory Point Alternative. This is because (1) the Sugarloaf Mountain Alternative deck structure would form a fairly contiguous horizontal line with the canyon rim, (2) the structure would not significantly protrude above the horizon line when viewed from the dam crest, and (3) the structure would not protrude above the horizon line when viewed from Lake Mead. Conversely, the Promontory Point Alternative would be obtrusive and protrude above the strong horizontal component of Lake Mead regardless of bridge type.

Both alternatives would affect the TCP. Both alternatives would be located in previously disturbed portions of the TCP. The Promontory Point Alternative follows the northern boundary of the TCP along existing U.S. 93, whereas the Sugarloaf Mountain Alternative traverses a portion of the TCP. Therefore, the Promontory Point Alternative would create less disturbance from a location standpoint. However, the Sugarloaf Mountain Alternative traverses the southern boundary of the existing disturbed area, and the tribal elders interviewed stated that the integrity of the Sugarloaf TCP has not been diminished by existing disturbance. In addition, impacts due to land disturbance, visual changes, and noise will be mitigated through continuing consultation with Native American tribes and by their involvement in the DAP, formed by the Programmatic Agreement (PA).

Therefore, the Sugarloaf Mountain Alternative is the harm-minimizing alternative based on the following factors:

- Resource and regulatory agency support for Sugarloaf Mountain due to least impact to wildlife, wildlife habitat, and water quality
- No effect on the "first impression" historic views of Hoover Dam and Lake Mead
- Strong public concern regarding hazardous materials spills in Lake Mead from the Promontory Point Alternative
- Ability to more readily blend Sugarloaf Mountain Alternative into the landscape
- Affecting the National Register-eligible TCP in an area of extensive disturbance
- Ability to minimize and mitigate impacts through continuing consultation and Native American participation on the Design Advisory Panel

6. Scoping and Public Involvement

Reclamation conducted numerous environmental and engineering studies for a Hoover Dam bypass, dating back to the late 1960s. Reclamation created the PMT in 1989, consisting of Reclamation, NPS, WAPA, NDOT, and ADOT, with FHWA joining in 1997 to perform engineering and environmental studies, develop funding agreements, and to manage the design and construction of a new crossing. Reclamation published a Notice of Intent in the *Federal Register* in May 1990 initiating the Environmental Impact Statement (EIS) as lead agency and beginning the scoping process. Public scoping meetings were held in June 1990 in Kingman, Arizona, and Boulder City and Las Vegas, Nevada. Reclamation stopped work on the project before a DEIS was released.

FHWA filed a Notice of Intent in September 1997 announcing the FHWA - Central Federal Lands Highway Division as the new lead agency for environmental review and continuation of Reclamation's efforts. FHWA conducted three public meetings in Kingman, Boulder City, and Las Vegas in October 1997 to receive comments on the alternatives carried forward from the June 1990 scoping meetings.

FHWA circulated the DEIS to the public on September 25, 1998, with publication of the Notice of Availability in the *Federal Register*. FHWA held three DEIS public hearings in Kingman, Boulder City and Las Vegas in October 1998.

Reclamation consulted with the ACHP and the Nevada and Arizona SHPOs from 1991 to 1993. FHWA reinitiated consultations with the two SHPOs and the ACHP in 1997, culminating in additional determinations of eligibility and adverse effects for the HDNHL, related historic features and the TCP, and execution of a PA/TP for resolving adverse effects on historic properties from the Sugarloaf Mountain Alternative.

Amendments to the NHPA regulations were published on July 1, 1999. Regulations implementing the amendments contained important changes that significantly altered the role of Native American Indian tribes in the Section 106 process for Federal undertakings both on and off Tribal lands. FHWA sent out invitations to 17 tribes in December 1999, requesting their participation in formal consultation meetings on the project. Five meetings have been held with the tribal representatives: on January 11, 2000, in Laughlin, Nevada; on March 30, 2000, at the Hoover Dam Visitor Center; on May 8, 2000, in Henderson, Nevada; and on August 15 and 16, 2000, and November 15, 2000, in Boulder City, Nevada. A PA/TP have been executed that provides an opportunity for continued consultation.

FHWA approved and distributed the FEIS, with publication of a Notice of Availability in the *Federal Register* on January 19, 2001. The FEIS documents the basis for identifying the Sugarloaf Mountain Alternative as the preferred alternative, responds to comments received on the DEIS, and describes the measures to minimize harm. The FEIS and related documentation were developed in close coordination with the PMT, the Nevada and Arizona SHPOs, the ACHP, USFWS, the U.S. Environmental Protection Agency (EPA), and the U.S. Army Corps of Engineers (ACOE), among many other government agencies and members of the public who have provided input to this project.

7. Measures to Minimize Harm

This section summarizes the specific measures adopted to minimize harm and identifies the standard measures appropriate for the proposed project. All practicable measures to minimize harm have been incorporated into the decision. See FEIS Chapters 3 and 6 for a full description of all measures to minimize harm adopted for this project.

In the case of historic and cultural properties, the PA specifies that FHWA will continue consultations with the Nevada and Arizona SHPOs, the federal land-managing agencies, Native American tribes, and other designated authorities (see ROD Section 7.5) through a DAP to review bridge design concepts and corridor wide aesthetic design elements, develop aesthetic design criteria, and mitigate adverse effects on historic resources according to the Secretary of Interior Standards and the views of the participating Native American tribes.

The extensive mitigation measures identified in the FEIS and those developed through implementation of the PA/TP will be incorporated into the design development, construction contract documents, and post design operation plan. In addition, Federal Lands Highway's *Standard Specifications for Construction of Roads and Bridges* is formulated to minimize environmental harm and will be incorporated into the construction contract documents. These standard specifications were developed for and are used in federal highway construction contracts in or accessing environmentally sensitive federal lands such as National Parks, National Forests, and Indian Reservations. The standard specifications are designed to control the work using the most environmentally friendly methods and include measures such as: erosion control and sedimentation prevention, compliance with local and state regulations and permitting requirements, prevention of material and fuel spills, prevention of fires, recycling of materials, and control of dust and noise.

7.1 Air Quality

The project will obtain and maintain all applicable permits pertaining to dust abatement and blasting. Dust control permits will be acquired from Clark County for construction in Nevada. An Arizona Department of Environmental Quality (ADEQ) permit for Mohave County will be acquired for any portable sources of air pollution (i.e., rock, sand, gravel, and asphaltic concrete plants). Reasonable steps will be taken to prevent fugitive dust emissions 24 hours a day, seven days a week, during project construction. Specific dust abatement measures (per Clark County Health District dust control permit requirements, revised July 1, 1997) will be adhered to, including:

- Keep all dirt access roads and staging areas watered.
- Keep dirt off paved roads by sweeping, scraping, or flushing with water.
- Install a gravel pad at least 30 feet wide by 50 feet long by 6 inches deep consisting of 1-inch- to 3-inch-thick material at truck exits to minimize dirt tracked out; and, if necessary, wash down trucks leaving proposed project area
- Stabilize disturbed areas by watering, revegetating, or applying dust suppressants where no continuing development occurs within 30 days of the disturbance of that area.
- Prohibit open burning onsite without appropriate permits.

- Stop all operations, except watering trucks, during high-wind conditions that result in dust emissions that leave the proposed project area, and apply appropriate mitigation (e.g., soil stabilizers and wind breaks) to areas susceptible to high winds to prevent further occurrences.
- Limit vehicle speeds to reduce dust emissions.

7.2 Noise

The following measures will be implemented to reduce construction noise levels:

- Ensure that all engine-powered equipment has mufflers installed according to the manufacturer's specifications.
- Require all equipment to comply with applicable equipment noise standards.

Remedial measures will be taken by the engineer if specific noise complaints are received during construction. These measures may include the following:

- Locate stationary construction equipment as far from nearby noise sensitive properties as possible.
- Shut off idling equipment.
- Reschedule construction operations to avoid periods of noise annoyance, as determined through consultation with NPS and Reclamation and defined in special provisions.
- Notify nearby affected parties whenever extremely noisy work will be occurring.
- Install temporary or portable acoustic barriers around stationary construction noise sources.

The following mitigation measures will be followed for short-term noise increases from blasting operations:

- Publicize the blasting schedule through the local media.
- Time blasts so that shock waves created by blasts dissipate or cancel shock waves created by subsequent blasts.

7.3 Biology

7.3.1 Waters of the U.S.

The following measures will be followed to minimize adverse project impacts on waters of the U.S. and help protect wildlife dependent on these waters.

- Revegetate approximately 50 percent of the disturbed, non-paved area within the highway right-of-way.
- Stockpile topsoil as much as possible during construction and replace on disturbed areas directly outside the highway shoulders after construction to re-establish desert vegetation.

- Remove, stockpile, and replant salvaged cacti, yucca, and candidate plant species.
- Protect desert washes by placing barriers below excavation areas to prevent construction spoil from falling in the washes. In addition, several sections of washes will be bridged.
- Install culverts placed in fill areas to allow runoff to flow unrestricted, and place erosion protection devices at the ends of each culvert.
- Scale loose rocks prior to and during excavation work for construction of bridge abutments, and install netting on the canyon slopes during blasting to minimize rock fall and contamination of Colorado River waters.
- Relocate wildlife drinking sources currently used by desert bighorn sheep, which could be directly affected by construction, to nearby areas. They will be placed so that they are easily found by resident sheep but are far enough from the construction site so that sheep could use the new water source without being disturbed by construction. Determine specific types and locations of these offsite watering facilities through consultation with AGFD, NPS, and NDOW.
- Avoid or minimize temporary impacts by designating construction access, stockpile, and staging areas outside of waters of the U.S. and by designing effective rock debris restraints on steep slopes.
- Use highway design and highway construction methods that will reduce the fill to less than 50 feet on either side of the centerline in the vicinity of waters of the U.S.

7.3.2 Wildlife Crossings

The location, design, and number of crossing structures were determined during consultations among wildlife biologists from AGFD, NDOW, NPS, and Reclamation. These criteria are based on studies conducted by AGFD and NPS from 1989 through 1992 in conjunction with this project. The following are specific mitigation measures to minimize impacts to wildlife:

- Strategically locate underpasses and overpasses near traditional bighorn sheep movement corridors to provide safe crossings for them and other wildlife and to prevent small populations from being isolated.
- Place fencing along both sides of the highway corridor to guide wildlife to crossing structures, thereby reducing the potential for animals being killed. Continue fencing approximately 0.5 mile beyond the intersections of the new highway with existing U.S. 93 in Arizona.
- Ensure that NDOT and ADOT maintain wildlife underpasses and overpasses in their respective states. Either NPS or Reclamation will maintain alternate water sources provided for mitigation.
- Replace and maintain the Reclamation sewage evaporation ponds as a wildlife watering source, or provide a new source if relocated ponds are fenced.

- Conduct monitoring to determine the effectiveness of the wildlife mitigation features following construction activities. Determine specific monitoring procedures and duration of effort through consultation with NPS, AGFD, USFWS, and NDOW.

7.3.3 Mohave Desert Tortoise and Gila Monster

In the Biological Opinion regarding construction of the selected alternative, USFWS determined the reasonable and prudent measures necessary and appropriate to minimize take of Mohave desert tortoises in Nevada. NDOW comments on the FEIS, requested that gila monster documentation be incorporated with those for the desert tortoise (see ROD Section 9). This requested documentation will be incorporated. Terms and conditions for implementation of the reasonable and prudent measures for the tortoise in the Biological Opinion will be adhered to, as follows (see FEIS Section 3.3.3 and Appendix E, for full details):

- Minimize mortality or injury of desert tortoises due to construction activities, blasting operations, and use of heavy equipment.
- Minimize predation on tortoises by ravens drawn to the project area. Promptly dispose of trash and food items in predator-proof containers with resealable lids. Remove and properly dispose of any construction refuse from the site each day, including but not limited to, broken parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, boxes, and welding rods.
- Minimize destruction of desert tortoise habitat, such as soil compaction, erosion, or crushed vegetation, due to construction and maintenance activities.
- Ensure compliance with the reasonable and prudent measures, terms and conditions, reporting requirements, and reinitiation requirements contained in the Biological Opinion.
- Incorporate gila monster documentation per NDOW protocols with those for the desert tortoise.

7.3.4 Desert Bighorn Sheep and Mountain Lion

Implement the following measures to minimize harm to desert bighorn sheep. Implement a mitigation monitoring plan in consultation with AGFD, NDOW, and NPS. The plan will assess effectiveness of the crossing structures, fencing, and alternate water sources. Adjustments will be made, if needed.

- Construct and maintain fencing to prevent desert bighorn sheep from entering the highway.
- Construct out-jumps at strategic locations to provide an escape for any sheep accidentally trapped inside the fenced highway right-of-way.
- Install roadside signing warning motorists of the possibility of encountering wildlife in the area.
- Incorporate crossing structures into the highway design to allow bighorn movement through established movement corridors.

- Provide alternate water sources.

7.3.5 Peregrine Falcons

Ensure that biologists from AGFD and NPS monitor peregrine falcons in the proposed project area 3 to 4 times per year at least 2 years before, during, and after 1 year of public use of the new Colorado River bridge. Ensure that NDOW will coordinate their ongoing peregrine falcon surveys in the area with AGFD and NPS.

7.3.6 Bald Eagles

Ensure that biologists from AGFD, NPS, and Reclamation monitor bald eagle use of the bridge crossing sites during two consecutive winters before construction, and that any preferred hunting perch sites or night roosting sites are identified. Take measures to not affect any preferred hunting perch sites or night roosting sites for bald eagles.

7.3.7 Devil's Hole Pupfish, Razorback Sucker, and Bonytail Chub

There will be no construction below the waterline in the Colorado River in Black Canyon. Construct a catch net and temporary spill containment system at the Colorado River crossing to catch falling debris and collect contaminants if spilled to avoid water quality impacts to these species downstream of Hoover Dam or in Lake Mohave. Scale loose rocks prior to and during excavation work for construction of bridge abutments, and use netting on the canyon slopes during blasting to minimize rock fall.

Complete an assessment of the potential effects of the blasting activities of the project prior to implementation. Initiate formal consultation with USFWS for inclusion of appropriate conservation and mitigation measures in the Biological Opinion, if the assessment identifies unavoidable impacts to any of these protected species.

7.3.8 Bicolored Penstemon

Perform preconstruction surveys for bicolored penstemon. Salvage plants and topsoil possibly containing penstemon seeds found within the construction right-of-way. Stockpile and replant any salvaged plants within the constructed highway right-of-way.

7.3.9 Migratory Birds

There will be no land clearing during the avian breeding season without taking actions to ensure that migratory birds, their nests, or nest contents will not be harmed during construction.

7.4 Water Resources

FHWA will implement Best Management Practices (BMPs) along the project corridor to reduce water quality impacts to the Colorado River and desert washes. BMPs will be used to mitigate both construction and operational impacts. FHWA will manage stormwater runoff above and below the project during construction, so that the net impact to receiving water is negligible, as follows:

- Isolate runoff-rich suspended sediment in treatment basins for both the construction and operation phase.

- Adhere to the standards of water quality below Hoover Dam that are pertinent to this project, as stipulated in the FEIS (Section 3.4.3).

A National Pollutant Discharge Elimination System (NPDES) permit will be required for each phase of construction that actively disturbs more than 5 acres. FHWA will implement and enforce both discharge limitations and water quality standards through the terms and conditions written into the permit. Construction mitigation measures are as follows:

- Manage all construction area runoff with BMP improvements, including silt barriers (silt fences or straw bale check dams).
- Remove trapped silt and debris to an offsite location before removing the barriers.
- Route offsite flows around cut and fill slopes to prevent contamination of runoff.
- Properly design bypass channels to convey anticipated flow volumes and velocities.
- Stabilize cut-and-fill slopes using vegetative and/or mechanical means.
- Construct sediment basins to collect and treat sediment-rich runoff to remove suspended solids before discharging to offsite drainage channels.
- Clean construction equipment on a regular basis to minimize potential runoff contamination from petroleum products.
- Inspect construction equipment frequently for leaks and repair immediately when discovered.
- Fuel and service all equipment at designated locations, away from nearby channels, swales or other drainage features that would quickly facilitate movement in the event of a spill.
- Remove and dispose of all contaminated material (e.g., concrete wash water) upon completing the construction, in accordance with local, regional, and federal regulations.
- Design and develop temporary sanitary waste facilities in a manner that protects both surface and subsurface water resources.
- Construct a catch net and temporary spill containment system at the Colorado River crossing to catch falling debris and collect contaminants if spilled.
- Scale loose rocks prior to and during excavation work for bridge abutments, and use netting on the canyon slopes during blasting to minimize rock fall.
- Relocate the Reclamation sewer evaporation ponds.

Design measures to minimize impacts to water quality consist of:

- Properly design roadway channels to resist erosion.
- Construct energy dissipating structures at all culverts whose discharge velocity will cause downstream erosion.

- Construct retaining walls and other structures at specific locations, rather than cut and fill slopes, to reduce runoff velocities and erosion potential.
- Apply rock slope protection to armor the slopes and prevent soil movement.
- Line channels and culvert discharges with rock riprap and design slope reduction at drainages to minimize erosion and sediment transport and reduce discharge velocities.
- Drain runoff to settling basins, capturing road pollutants and allowing the larger suspended material to settle. Strategically locate basins to maximize sediment removal and function for chemical spill containment resulting from vehicle accidents. Design each basin to contain a certain rainfall runoff volume before allowing discharge.
- Design the Colorado River bridge to collect the "first-flush" runoff volume from the bridge as well as the spill volume that might be generated from a semi-truck tanker spill.
- Design any fences that may be incorporated into the basins to be compatible with basin maintenance and function.
- Ensure that NDOT or ADOT maintain roadway and bridge settling basins, depending on their location.

7.5 Cultural Resources

Formal consultations were completed with the Nevada and Arizona SHPOs and federal land-managing agencies to determine measures to minimize harm to historic and cultural National Register properties adversely affected by the selected alternative.

A PA was developed in consultations among the ACHP, FHWA, Nevada and Arizona SHPOs, NPS, Reclamation, WAPA, NDOT, ADOT, and interested Native American tribal governments that commits FHWA to implement specific activities and mitigation measures to resolve the adverse effects on historic properties from the selected alternative. The PA incorporates a Treatment Plan for avoidance, minimization, and mitigation of adverse effects to historic and cultural properties. The mitigation measures in the Treatment Plan are specific for the HDNHL, related historic features, and the TCP (see FEIS Section 3.5.3 for a full description).

7.5.1 Design Coordination

A DAP will be formed to assist in development of aesthetic design elements, develop corridor aesthetic design criteria, mitigate adverse effects on historic resources, and minimize adverse effects on the TCP. Specific measures related to this activity are as follows:

- FHWA will establish a DAP consisting of representatives from FHWA, NDOT, ADOT, the Nevada and Arizona SHPOs, ACHP, the NHL Coordinator, NPS, Reclamation, WAPA, and a Native American tribal representative, as well as an independent architectural historian and a registered landscape architect.
- FHWA will establish a project development schedule, with design coordination milestones for the DAP.

- The DAP will provide input on bridge design concepts, structure type and materials, and other aesthetic treatments in light of the historical visual context of the HDNHL.
- The DAP will assist in development of a process for public involvement as design concepts evolve.
- FHWA will develop Corridor Design Criteria incorporating input from the DAP. The criteria will incorporate standards and specifications for the consistency of major structural, roadway, and earthwork elements. The design criteria will be applied throughout the U.S. 93 Hoover Dam Bypass project to bridges, railings, wing walls, tunnel portals, structural elements and colors, cut and fill slopes, and other highway appurtenances.
- FHWA will work with the DAP to insure consistency and compatibility of the constructed facility with the historical and cultural setting of the project area. FHWA will develop technical standards for the project in consultation with ADOT and NDOT who, as the owners of the bypass project, approve the final plans and specifications and are responsible for operation and maintenance.

7.5.2 Historic Resources

The PA/TP stipulate the following measures and procedures for resolving the adverse effects to the HDNHL and related historic properties from the selected alternative:

- FHWA will complete photographic Historic American Engineering Record (HAER) recordation of and from Hoover Dam according to Secretary of Interior Standards. The completed bypass bridge and approaches will also be subject to photographic HAER recordation from the same viewer points as for the existing condition. FHWA will coordinate with the NPS/HAER to ensure that recordation does not result in duplication of information that is already available on the HDNHL.
- FHWA will complete pre- and post-construction documentation, including HAER recordation, of the affected Old Government Railroad Grade, the Nevada Transmission Lines/Towers, the Nevada Stone Gates and Lower Portal Access Road, the Arizona-Nevada Switchyard, the Nevada U.S. 93 Switchback Segment, Kingman Switchyard, the Arizona Transmission Towers and the Old Arizona U.S. Highway 93 Segment within the area of potential effects (APE), in accordance with the Treatment Plan incorporated as Appendix A to the PA. Appropriate levels of documentation, including HAER recordation, will be determined in consultation with the NPS/HAER.
- FHWA will design the U.S. 93 bypass to maintain current serviceability of all operating historic properties physically impacted by the proposed undertaking. The affected portions of the Nevada Transmission Lines/Towers, Stone Gates and Lower Portal Access Road, the Arizona-Nevada Switchyard, and the Arizona Transmission Towers will be either avoided or relocated to meet this objective. All relocation and reconstruction plans will be prepared in consultation with WAPA, Reclamation, and the DAP.

7.5.3 Traditional Cultural Property

The following mitigation measures currently identified for the TCP have resulted from the ongoing government-to- government consultation meetings between FHWA, NPS, Reclamation, and the Native American tribes.

- FHWA will provide the Native American tribal representative, through participation on the DAP, the engineering details and receive their input to the Corridor Design Criteria.
- FHWA will provide periodic updates to the tribal representative's group on the progress of project development activities.
- FHWA will provide designated Native American tribal representatives the opportunity to monitor construction of the roadway facility through the TCP area and the related lithic scatter located on the eastern flank of Sugarloaf Mountain.
- FHWA, in concert with its federal partners, will maintain the confidentiality of all sensitive cultural information to the extent allowable under federal law and regulation.
- FHWA, the federal land managing agencies, and consulting tribes under this PA and Treatment Plan will refine and elaborate on the measures to reduce adverse effects on the TCP. The specific measures that have been recommended by the tribes during the government-to-government consultation for implementation by FHWA and the federal land managing agencies are to:
  - Consummate a Memorandum of Understanding (MOU) regarding the continued government-to-government consultation between FHWA and the tribes
  - Provide funds as available for ongoing tribal consultation
  - Involve the tribes through a representative on the DAP in the design aspects of the new bridge and roadway
  - Continue the consultation with the tribes throughout the design and construction process
  - Protect the confidentiality of sensitive cultural information provided to the federal agencies by tribal representatives
  - Provide access for the tribes to traditional cultural places in the project area
  - Develop statements of work for conducting future cultural landscape studies for the larger area encompassing the Gold Strike Canyon and Sugarloaf Mountain TCP
  - Provide Native American cultural interpretive exhibits, developed in consultation with tribal representatives
  - Develop a separate treatment plan with specific procedures for any inadvertent discoveries of human remains or related objects during any design or construction activity for the project

7.6 Visual Resources

FHWA will implement the following mitigation measures to reduce impacts on visual resources:

- Develop Corridor Design Criteria for aesthetic consistency of major structural, roadway and earthwork elements, per procedures established in the PA/TP.
- Provide public information and data sheets to Hoover Dam visitors. Information to be provided includes a description of the proposed project, the purpose and need, a construction schedule, and an explanation of what viewers are seeing and what can be expected to be seen in the future.
- Provide visual simulations so that the viewer can see what the constructed project will look like when complete.
- Tint concrete surfaces with a non-glare color that blends with the surrounding environment, as recommended by the DAP.
- Design the bridge profile to be below the horizon line of Black Canyon as seen from Lake Mead, if feasible.
- Color the bridge structures to blend with the surrounding environment, as recommended by the DAP.
- Engineer rock cuts adjacent to the proposed bridge to maintain a natural appearance. Mitigation techniques will include rough cuts, feathering cut/natural environmental interfaces, and use of artificial desert varnish on rock cuts to match adjacent natural colors.
- Use special blasting techniques to avoid pre-split shear rock faces.
- Remove all construction debris and other trash from the site as soon as construction is completed.

7.7 Recreation Resources

Certain areas will be designated for construction activities, which will preclude using those areas for dispersed recreational activities. The following mitigation measures are identified in the FEIS:

- Post warning signs in designated construction safety zones and construction areas, and preclude public access to those areas.
- Coordinate raft and canoe launchings at the put-ins on the Colorado River to avoid conflicts between construction access and launching activities.
- Use a net or other device to prevent construction materials or equipment from falling from the bridge into the river near rafters.
- Coordinate with NPS to adjust trail use regulations to accommodate construction activities.

- Coordinate scheduling of trail closings and construction safety zones with the NPS and Reclamation.
- Determine restrictions and schedules for blasting and communicate to NPS before construction.
- Maintain bicycle access to the existing dam crossing on U.S. 93 during construction.
- Study the technical feasibility of a separate viewing facility associated with the bridge.

7.8 Hazardous Materials

The following subsections describe measures to address environmental concerns at the Reclamation warehouse storage yard, the active switchyard, the sewage evaporation ponds, and the potential contractor staging and disposal areas:

7.8.1 Reclamation Warehouse Storage Yard

- Investigate and document chemical usage, storage, and releases at this site. Conduct interviews of onsite personnel and internal record reviews to determine locations and quantities of hazardous materials used and released in the storage yard.
- Implement an investigation of soils that would be affected by roadway construction. Take soil samples in areas where discoloration, odors, or known releases have occurred or are suspected. Monitor soil during excavation activities to segregate contaminated soils.
- Review records documenting underground fuel tank removal to determine the vertical and horizontal extent of contamination, location and quantity of contaminated soil excavated, whether in situ remediation was implemented, and the cleanup standard attained.
- Monitor soil in the tank area during excavation to segregate contaminated soils.
- Undertake additional control measures to ensure that airborne toxics concentration levels do not exceed any state or federal standards, since contaminants could become airborne during removal.

7.8.2 Arizona and Nevada Switchyard

- Conduct surface soil sampling in any areas of the site required for construction where oil stains are located in order to determine the presence of polychlorinated biphenyl (PCB)-contaminated soil.
- Remove and dispose of any PCB-contaminated soil in accordance with applicable environmental regulations.
- Control roadway runoff downgradient from any portion of the site required for construction by barrier use or diversion.

7.8.3 Sewage Evaporation Ponds

- Conduct soil and sludge sampling to confirm that industrial wastewater has not been discharged to the ponds.
- Remove any contaminated sludge or soils, if it is discovered that industrial wastewater has been discharged there.
- Contact the ADEQ before pond excavation to determine whether specific closure or material handling and disposal requirements apply.

7.8.4 Potential Contractor Staging and Disposal Areas

- Conduct documentation reviews and personnel interviews to determine whether releases have occurred, the extent of contamination, and how the contamination was addressed.
- Conduct an assessment at the site to ensure that cleanup was conducted properly.
- Conduct soil sampling if evidence (e.g., discolored soil, odors, stressed vegetation) suggests that contamination may still be present.
- Conduct post construction assessment to assure no residual contaminate is left from project construction activities.

7.9 Construction Impacts

Phased construction contracts will most likely be utilized. Other sections in this ROD address mitigation measures for construction impacts on the full range of environmental factors, whereas this section focuses on utility relocations, construction staging, and material sources.

7.9.1 Transmission Towers and Lines

Construction of the selected alternative will require removal and modification of existing electrical transmission components and construction of new electrical transmission components. The final configuration of electrical towers, transmission lines, and facilities will be determined during final design. (See FEIS Section 3.11.2.2 for alternative configurations.)

- Work with WAPA during final design to select the most beneficial solution considering all project elements and factors (e.g., operation and maintenance characteristics for both electrical transmission and transportation, historic and visual impacts, and construction considerations and costs).
- Work with the two SHPOs to mitigate any adverse effects related to removal of historic transmission towers and facilities (see Section 7.5 above).

7.9.2 Construction Staging Areas

No major detours, closures, or traffic delays are expected to occur during highway approach construction. The existing highway will remain open with little interference except during the tie-in activity at the beginning and end of the project, blasting in the vicinity of existing

U.S. 93, and setting girders at overpasses. Hauling across the existing highway in two locations will be necessary. The following mitigation measures apply:

- Provide continuous access to existing U.S. 93 and Hoover Dam, Lakeview Point, and the Reclamation warehouse.
- Maximize use of the proposed right-of-way for necessary contractor staging as feasible. Use the five areas identified by Reclamation for additional contractor staging, wherever feasible (see FEIS Figure 3-15).
- Use no new staging areas to construct the selected alternative, if feasible.

7.9.3 Material Sources

Earthwork quantities (cut and fill) will be balanced to the extent possible. Based on the FEIS, the following stipulations will mitigate any material source impacts:

- Attempt to attain a balance between cut and fill quantities on the Nevada and Arizona approaches, so no waste disposal area will be required.
- Use all material excavated from the Arizona approach to build roadway embankments on the Arizona approach, so no disposal area will be required.
- 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. Other aggregates may come from readily available commercial sources in Boulder City, Las Vegas, and Kingman.

8. Mitigation Monitoring

FHWA has compiled a listing of all mitigation measures and procedures established for the proposed project. Mitigation measures are organized according to major environmental categories. The measures are further subdivided into Federal, State, county, local, and other categories within each affected environment category. The anticipated timing of all mitigation measures is defined according to the following project development phases: prior to construction, during construction, and post construction. The responsible party for each mitigation measure is also identified. A final mitigation monitoring plan will be developed as part of the design process.

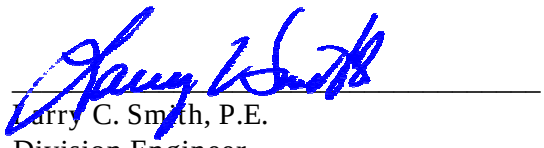
FHWA will be responsible for overseeing all mitigation measures and implementing the interagency / tribal PA / TP.

9. Responses to Comments on Final EIS

To shorten download time, Section 9, Responses to Comments on Final EIS, is in a separate file. To view Section 9, select the BACK button on your browser and click on the link for Section 9.

10. Record of Decision Approval

The Sugarloaf Mountain Alternative has been found to best provide a safe and efficient transportation facility and to be the environmentally preferable alternative. This selection was based on minimizing environmental impacts, engineering and operational advantages, slightly lower construction cost, and review of public and agency comments received during the environmental process. All practicable measures to minimize environmental harm have been adopted and will be incorporated into this decision.



3/21/01

Larry C. Smith, P.E.
Division Engineer
Central Federal Lands Highway Division

Date