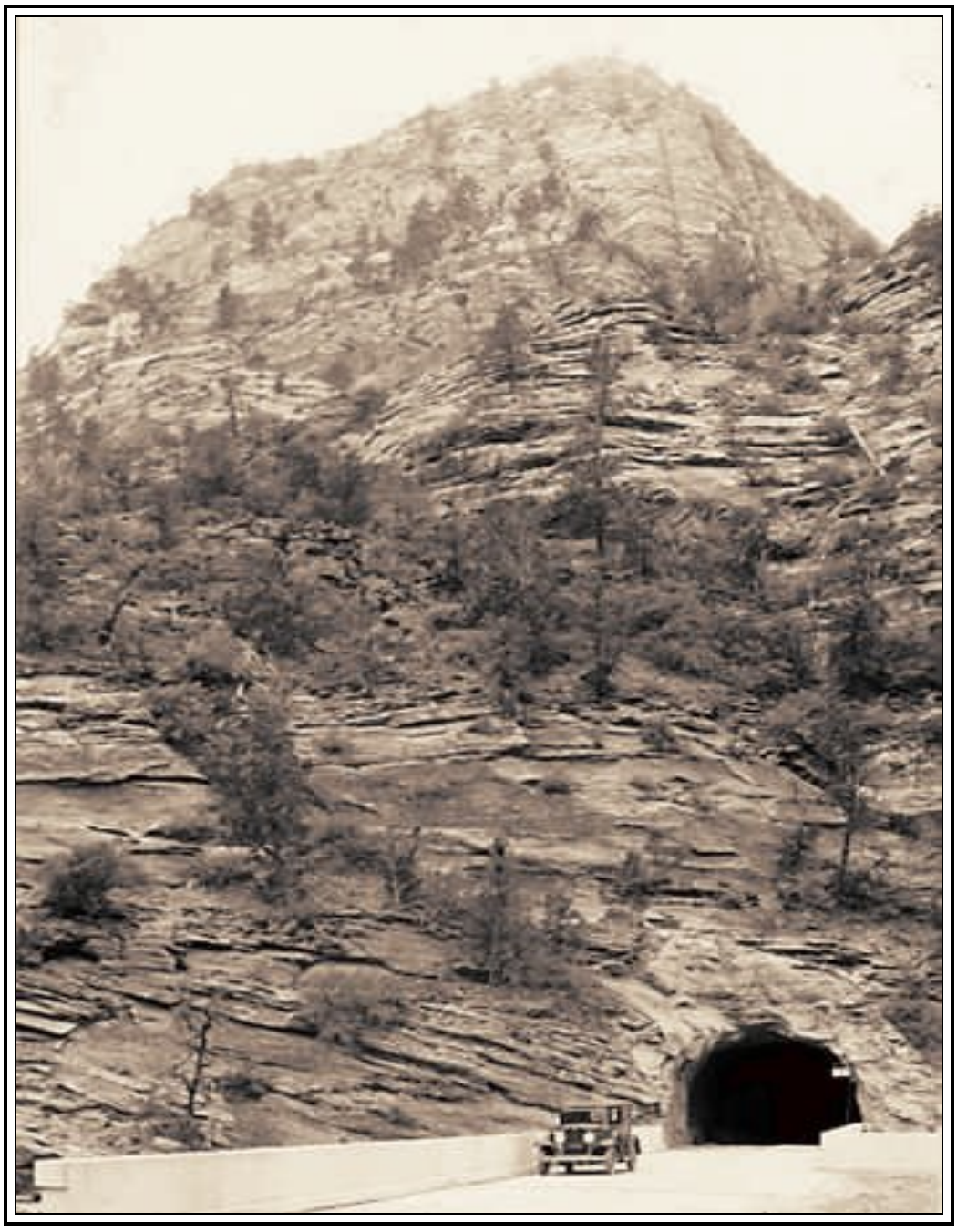
Zion National Park

National Park Service
U.S. Department of the Interior

Zion National Park
Utah

Environmental Assessment / Assessment of Effect

Route 10 Zion-Mt. Carmel Highway
Tunnel Area Road Rehabilitation
February 2006



East Portal of Zion Tunnel, 1929
National Park Service Historic Photograph Collection

ENVIRONMENTAL ASSESSMENT / ASSESSMENT OF EFFECT

Route 10 Zion-Mt. Carmel Highway Tunnel Area Road Rehabilitation

Prepared For:
National Park Service

Prepared By:
engineering-environmental Management, Inc.

ZION NATIONAL PARK
UTAH

U.S. Department of the Interior, National Park Service

Environmental Assessment / Assessment of Effect
Route 10 Zion-Mt. Carmel Highway Tunnel Area Road Rehabilitation
Zion National Park
Washington County, Utah

Summary

This environmental assessment / assessment of effect examines in detail two alternatives: no action and the National Park Service preferred alternative. The preferred alternative considers rehabilitation of the roadway and associated structures on either side of Route 10 (Zion-Mt. Carmel Highway) tunnel. The road work would primarily occur on the east side of the tunnel in a 0.25-mile segment beginning at the east tunnel entrance. Modifications on the east side of the tunnel would include slurry sealing the road surface and scaling rock slopes on both sides of the road; reconfiguring two parking areas; creating a painted center median with rumble strips; relocating the crosswalk from parking area 1 to the Canyon Overlook Trail; constructing a sidewalk from parking area 2 to the Canyon Overlook Trail; eliminating three informal pullouts, one of which would be reconfigured as a slow vehicle passing lane; establish erosion-control measures for the Pine Creek slot canyon access; and replacing and relocating the ranger kiosk. The area outside the west tunnel entrance would be modified by adding rumble strips to the existing painted center median, replacing the ranger kiosk.

The proposed project would provide a safer traffic control situation for park rangers and visitors; provide visitors with safer access to the Canyon Overlook Trail; reduce the potential for rockfalls onto waiting vehicles and traffic control rangers on the east side of the tunnel; create better defined parking areas, and better defined areas within which park rangers can direct traffic; eliminate informal parking and the problems associated with traffic control for these areas; provide a slow vehicle passing lane; and minimize erosion on the Pine Creek slot canyon access.

This action is needed because the east side of the tunnel is congested and traffic controls are difficult to maintain for vehicle, pedestrian, and ranger safety; informal parking areas allow vehicles to leave the road in areas not specifically designated for parking and create a safety risk; and rock slopes overhang portions of the road on the east side creating a potential for rockfalls and preventing the roadway from being widened to accommodate safety features such as a center median and a defined pedestrian sidewalk. The west side of the tunnel has a poorly defined median creating a safety risk and the potential for injury to rangers who stand in the middle of the road to direct traffic, and erosion occurring on the Pine Creek slot canyon access is creating an unstable hiking surface that allows sediment to enter into the creek below.

The preferred alternative would have no or negligible impacts on air quality, water quality, floodplains, wetlands, wildlife, threatened and endangered plant species and plant species of special concern, archeological resources, ethnographic resources, museum collections, Indian trust resources, prime and unique farmlands, ecologically critical areas, wild and scenic rivers, other unique natural areas, environmental justice, lightscapes, visual resources, transportation, and socioeconomics. The preferred alternative would have short-term, negligible, adverse impacts to vegetation, cultural landscapes, and park operations; short-term, negligible to minor, adverse impacts to health and safety; short-term, minor, adverse impacts to soils and historic structures; short-term, minor to moderate, adverse impacts to soundscapes; and short-term, moderate, adverse impacts to visitor experience. Long-term impacts would be minor and adverse for soundscapes, historic structures, and cultural landscapes. Beneficial impacts would occur to soils, vegetation, park operations, visitor experience, and health and safety. Anticipated impacts to the Mexican spotted owl would be short term, negligible, and adverse. There

would be no long-term impacts to the Mexican spotted owl. There would be no short- or long-term impacts to the California condor.

Notes to Reviewers and Respondents

If you wish to comment on the environmental assessment / assessment of effect, you may mail comments to the name and address below. The National Park Service practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that the National Park Service withhold their home address from the record, which we will honor to the extent allowable by law. If you want the National Park Service to withhold your name and address, you must state this prominently at the beginning of your comment. The NPS will make all submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials or organizations or businesses, available for public inspection in their entirety.

Please address comments to: Superintendent; Route 10 Zion-Mt. Carmel Highway Tunnel Area Road Rehabilitation; Zion National Park; Springdale, UT 84767 or via e-mail at:

http://parkplanning.nps.gov/parkHome.cfm?parkId=113

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ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
dB	Decibel
EA	Environmental Assessment / Assessment of Effect
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Office
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

INTRODUCTION

PURPOSE AND NEED

The National Park Service (NPS), in cooperation with the Federal Highways Administration – Central Federal Lands Highway Division, is proposing to complete road rehabilitation on Route 10 in the vicinity of the Zion-Mount Carmel tunnel in Zion National Park (Zion), Utah (figure 1). The road work would primarily occur on the east side of the tunnel in a 0.25-mile segment beginning at the east tunnel entrance. Some road work would occur on the west side of the tunnel within several hundred feet of the tunnel entrance. Modifications on the east side of the tunnel would include slurry sealing the road surface and scaling rock slopes on both sides of the road; minor road widening to incorporate a safety median; reconfiguring two parking areas; creating a painted center median with rumble strips; relocating the crosswalk from parking area 1 to the Canyon Overlook Trail; constructing a sidewalk from parking area 2 to the Canyon Overlook Trail; eliminating three informal pullouts, one of which would be reconfigured as a slow vehicle passing lane; establishing erosion-control measures for the Pine Creek slot canyon access; and replacing and relocating the ranger kiosk.

The area outside of the west tunnel entrance would be modified to include a painted center median with rumble strips, and a new ranger kiosk. The improvements are needed to enhance overall traffic control and safety conditions for visitors and park rangers in this congested area and enhance resource protection.

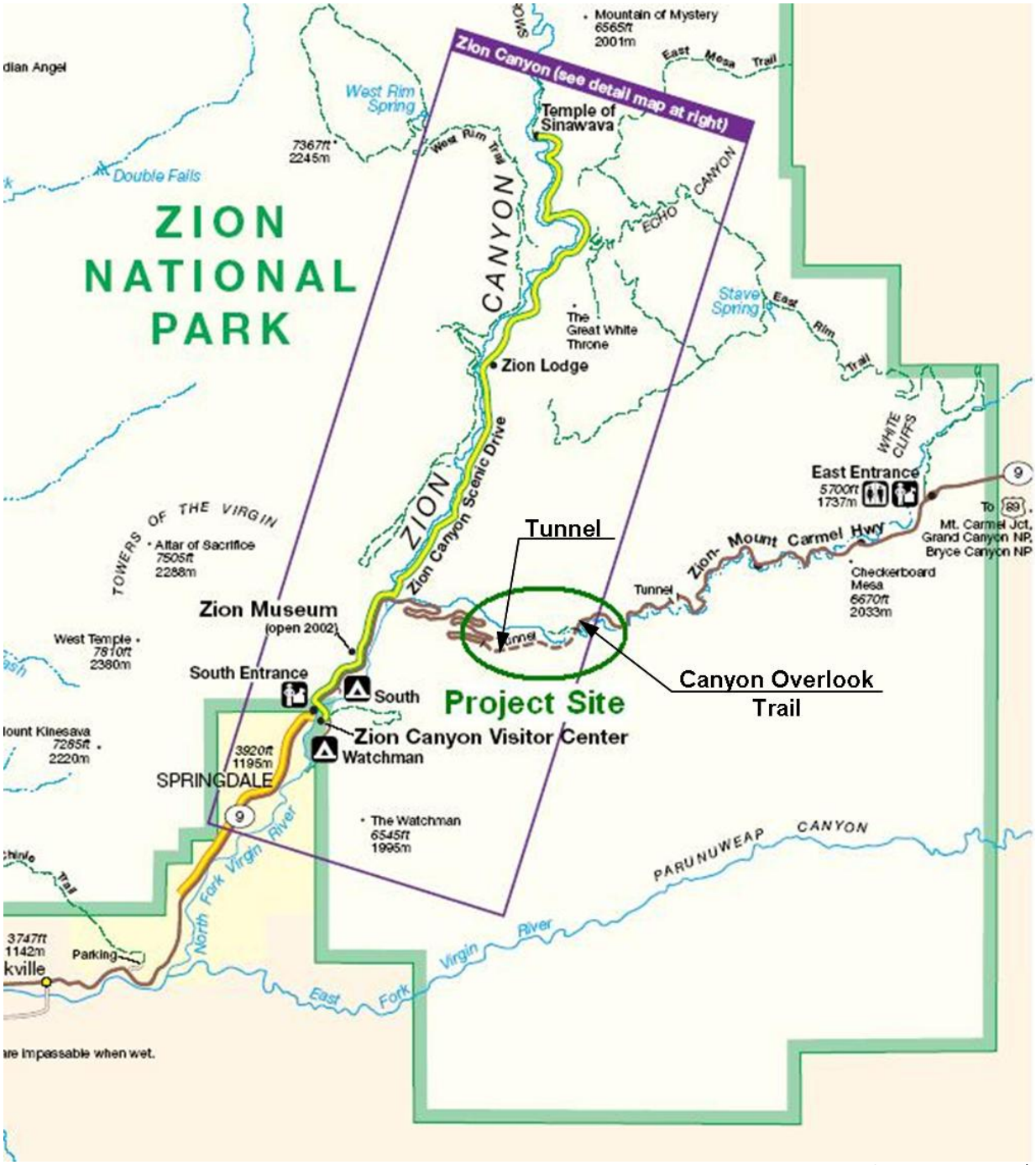
The proposed project would provide a safer traffic control situation for park rangers and visitors, permit safer access to the Canyon Overlook Trail for visitors, reduce the potential for rockfalls onto waiting traffic and traffic control rangers on the east side of the tunnel, create better defined parking areas and better defined areas for park rangers to direct traffic, eliminate informal parking and associated resource damage and the problems associated with traffic control for visitors and vehicles in these informal parking areas, provide a slow vehicle passing lane; and minimize erosion on the Pine Creek slot canyon access.

This action is needed because:

1. The east side of the tunnel is congested and traffic controls are difficult to maintain for both vehicle and pedestrian traffic safety.

    - Rangers currently stand in the middle of the road with no defined median or safety warnings, such as rumble strips, to prevent vehicles from accidentally hitting them.

    - Pedestrian traffic does not have a defined and safe walkway from parking area 2 to the Canyon Overlook Trail, and pedestrians walk along the narrow road or road shoulder.



Source: FHWA 2005b

FIGURE 1. ZION NATIONAL PARK PROJECT SITE MAP

- Informal parking areas allow vehicles to leave the road in areas not specifically designated for parking, which causes resource damage and creates a safety risk when vehicles re-enter traffic and do not have adequate site distance, and when visitors exit the vehicles to access the Canyon Overlook Trail or restroom facilities.

- Pedestrians are not well directed onto the crosswalk to safely cross the road and thus, cross the road in many locations.

2. Rock slopes overhang portions of the road on the east side creating a potential for rockfalls.

3. For eastbound traffic, slow vehicles have no designated area to pull over to allow passing after exiting the tunnel.

4. The west side of the tunnel has a poorly defined median creating a safety risk and potential for accidents to rangers who stand in the middle of the road to direct traffic.

5. Erosion is occurring on the Pine Creek slot canyon access creating an unstable hiking surface and resource damage.

An environmental assessment analyzes the preferred alternative and other alternatives and their impacts on the environment. This environmental assessment / assessment of effect (EA) has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and regulations of the Council on Environmental Quality (40 *Code of Federal Regulations* [CFR] 1508.9); National Park Service Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making*; and the National Historic Preservation Act of 1966, as amended (NHPA).

PURPOSE AND SIGNIFICANCE OF THE NATIONAL PARK

An essential part of the planning process is to understand the purpose, significance, and mission of the national park for which this EA is being prepared.

Park Purpose

Purpose statements are based on legislation, legislative history, and National Park Service policies. The statements reaffirm the reasons for which the park was set aside as a unit of the national park system, and provide the foundation for the management and use of the park.

The purposes of Zion National Park are to:

- Preserve the dynamic natural process of canyon formation as an extraordinary example of canyon erosion.

- Preserve and protect the scenic beauty and unique geological features: the labyrinth of remarkable canyons, volcanic phenomena, fossiliferous deposits, brilliantly colored strata, and rare sedimentation.

- Preserve the archeological features that pertain to the ancestral Indian tribes and other historic features.

- Preserve the entire area intact for the purpose of scientific research and the enjoyment and enlightenment of the public.

- Provide a variety of opportunities and a range of experiences, from solitude to high use, to assist visitors in learning about and enjoying park resources without degrading those resources (NPS 2001a).

Park Significance

Park significance statements capture the essence of the park's importance to the natural and cultural heritage of the United States. Significance statements do not inventory park resources; rather, they describe the park's distinctiveness and help place the area within the regional, national, and international context. Defining significance helps park managers make decisions that preserve the resources and values necessary to accomplish the purpose of the park.

Zion National Park is unique for the following reasons:

- Zion's stunning scenery features towering, brilliantly colored cliffs and associated vegetation highlighted by a backdrop of contrasting luminous southwestern skies.

- Zion is a geologic showcase with sheer sandstone cliffs—among the highest in the world.

- The Virgin River—one of the last mostly free-flowing river systems on the Colorado Plateau—is responsible for the ongoing carving of this deeply incised landscape.

- Because of its unique geographic location and variety of life zones, Zion is home to a large assemblage of plant and animal communities.

- Zion preserves evidence of human occupation from prehistoric to modern times, including American Indian sites, remnants of Mormon homesteading, and engineering and architecture related to park establishment and early tourism (NPS 2001a).

Park Mission

The park's purpose describes the specific reason the park was established. Park significance is the distinctive features that make the park unique from any other. Together, purpose and significance lead to a concise statement—the mission of the park. The mission statement describes conditions that exist when the legislative intent for the park is being met.

The mission goals of Zion National Park are to:

- Provide park visitors with educational and recreational opportunities that foster an appreciation of Zion and its resources.
- Ensure that visitor impacts do not impair resources.
- Maintain the resources, including plant and animal communities, at healthy and viable levels consistent with natural processes.
- Manage cultural and physical resources to ensure long-term integrity.
- Ensure that the built environment provides safe visitor and staff uses in a sustainable and cost-effective manner.
- Ensure that the organization is responsive to employee needs, recognizing the contributions of each individual.
- Foster mutually supportive partnerships with private and public organizations and individuals to achieve visitor use and resource protection goals (NPS 2001a).

PROJECT BACKGROUND

Route 10 (Zion-Mt. Carmel Highway) is the main east-west route through the park, and includes the 1.1-mile-long tunnel. The tunnel is located approximately 5 miles west of the east entrance to the park, and 5 miles northeast of the south entrance of the park. The tunnel is too narrow for today's wider vehicles (e.g., travel trailers, motor homes) and, although two cars can safely pass in the tunnel, two oversized vehicles cannot safely pass. As a result, the National Park Service has stationed park rangers, from mid-April through the beginning of October, on either side of the tunnel to control traffic through the tunnel when oversized vehicles (e.g., travel trailer, motor homes) need to drive through. Traffic is stopped at one end of the tunnel to allow the oversized vehicles to pass through. Once the oversized vehicle has passed, smaller passenger vehicles are once again allowed in both directions. During the busy summer season, tunnel traffic can back up with much of the traffic through the tunnel being one-way due to the large number of oversized vehicles. Traffic can be stopped at the tunnel entrance for periods of time, generally not exceeding 15 to 20 minutes. Rangers are available after hours to escort oversized vehicles. During the winter, one ranger is stationed at the tunnel and oversized vehicles are required to notify the park at the entrance station or visitor center. Contact is then made with the ranger to coordinate passage through the tunnel.

The entire length of Route 10 is scheduled to be rehabilitated in the future. Work on the section of roadway just before the tunnel and on both sides of the tunnel has been accelerated due to safety concerns for visitors and park rangers. The east tunnel entrance has rock outcrops on both sides with several overhanging features. The roadway is narrow and rock loosened by general weathering or by storms tumbles directly onto the roadway. Although no injuries have occurred as a result of rockfalls, they have resulted in delays as the roadway is

cleared and represent a future potential liability for injury to visitors or park rangers. In addition, park rangers currently stand in the middle of the roadway to direct traffic with little in the way of protection in the event a visitor is distracted or loses control of their vehicle. The preferred alternative presented in this EA would alleviate these conditions and protect visitors and park rangers.

SCOPING

Scoping is an effort to involve agencies and the general public in determining which issues are to be addressed in this EA and to determine important issues to be given detailed analysis and eliminate issues not requiring detailed analysis; allocate assignments among the interdisciplinary team members and/or other participating agencies; identify related projects and associated documents; identify permits, surveys, consultations, etc., required by other agencies; and create a schedule that allows adequate time to prepare and distribute the EA for public review and comment before a final decision is made. Scoping includes any interested agency, or any agency with jurisdiction by law or expertise (including the state historic preservation office [SHPO] and Indian tribes) to obtain early input.

Staff of Zion and resource professionals of the National Park Service-Denver Service Center conducted internal scoping. This interdisciplinary process defined the purpose and need, identified potential actions to address the need, determined the likely issues and impact topics, and identified the relationship of the proposed action to other planning efforts at Zion.

A press release initiating scoping and describing the proposed action was issued on August 11, 2005 (appendix A). Comments were solicited during a public scoping period that ended August 26, 2005. No comments were received to date. The public and American Indian groups traditionally associated with the lands of Zion will also have an opportunity to review and comment on this EA. American Indian tribes were sent an information letter on October 24, 2005, describing the project and asking for comments.

The NHPA (16 *United States Code* [USC] 470 *et seq.*), NEPA, NPS Organic Act, NPS *Management Policies 2001,* Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (2001), and Director's Order – 28: *Cultural Resources Management Guideline* require the consideration of impacts on cultural resources, either listed in or eligible to be listed in, the National Register of Historic Places (NRHP). The Zion-Mt. Carmel Highway is listed in the NRHP. The Utah SHPO was notified of the project by letter dated October 24, 2005, and early input into the project was solicited. The SHPO did not comment on the scoping process. This EA will be forwarded to the Utah SHPO for review and comment.

ISSUES AND IMPACT TOPICS

Issues

Issues and concerns affecting the proposed action were identified from past NPS planning efforts, and input from interested organizations, and state and federal agencies. The major issues include how the proposed action conforms to the Zion *General Management Plan* (NPS 2001a), and what potential impacts may be realized in terms of the park's geologic resources, soils, vegetation, threatened and endangered animal species and other animal species of concern, historic structures, cultural landscapes, health and safety, park operations, visitor experience, and soundscapes.

NEPA calls for an examination of the impacts on all components of affected ecosystems and is the charter for the protection of the environment. NEPA requires federal agencies to use all practicable means to restore and enhance the quality of the human environment and to avoid and minimize any possible adverse effects of their actions on the environment. The preferred alternative was developed to minimize the impact to natural and cultural resources and visitor experience, while protecting health and safety. Issues and mitigation measures are included in the rationale for selection of impact topics for further consideration, or for dismissal from further consideration, as discussed below.

Derivation of Impact Topics

Specific impact topics were developed for discussion focus and to provide comparison of the environmental consequences of each alternative. These impact topics were identified based on federal law, regulations, and executive orders; NPS *Management Policies 2001*; and NPS knowledge of limited or easily impacted resources. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

Impact Topics Included in this Document

Soils

Existing informal pullouts, use of multiple paths to access the Pine Creek canyoneering route, and foot traffic along the roadside accessing the Canyon Overlook Trail would continue to impact soils under the no-action alternative. Ground-disturbing activities would occur in the proposed project area under the preferred alternative by equipment and construction activity that would disturb roadside soils and construction activity associated with scaling the canyon walls and expansion and elimination of some pullouts. Therefore, soils are addressed as an impact topic in this EA.

Geologic Structures

Impacts to geologic structures would occur in the proposed project area under the no-action alternative as rock slides/falls continue, potentially affecting health and safety of visitors and employees. Impacts would also occur under the preferred alternative as small areas of loose rock would be excavated and scaled back to prevent future rockfall within the project area. Because impacts to geologic structures would primarily affect health and safety and visual resources, geologic structures and hazards are discussed under these impact topics, rather than as a separate impact topic in this EA.

Vegetation

NPS policy is to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants and animals (NPS *Management Policies 2001*). Under the no-action alternative, visitors walking along the road to access the Canyon Overlook Trail would continue to trample vegetation. The proposed road rehabilitation would involve ground-disturbing activities with the potential to affect vegetation through construction equipment and activity destroying existing roadside vegetation, and removal of informal pullouts that would eliminate trampling of vegetation. Therefore, vegetation is addressed as an impact topic in this EA.

Threatened and Endangered Animal Species and Animal Species of Concern and Designated Critical Habitat

The Endangered Species Act (1973), as amended, requires an examination of impacts on all federally listed threatened or endangered species. NPS policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. The U.S. Fish and Wildlife Service (USFWS) was contacted by letter dated July 22, 2005, to provide a list of threatened and endangered species that may occur in the area of influence for the proposed project (appendix B). Based on their response, Zion is within the Colorado Plateau recovery unit for the Mexican spotted owl (*Strix occidentalis lucida*), which is federally listed as a threatened species. In addition an experimental, nonessential population of the federally endangered California condor (*Gymnogyps californianus*) appears to be expanding its range north from Arizona, and is expected to continue to be a summer visitor to Zion.

After reviewing the available data, it is anticipated that the project will have no effect to the Mexican spotted owl of its habitat, based on lack of suitable habitat (i.e., no upland forest habitat) in the project area, and the fact that the project would occur outside of the Mexican spotted owl breeding season, which runs from March 1 to August 31. The California condor is a transient visitor that does not breed in Zion, and is also unlikely to be adversely affected.

Historic Structures

The NHPA, as amended in 1992 (16 USC 470 *et seq.*), NEPA, NPS Organic Act, NPS *Management Policies 2001,* Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* (2001), and Director's Order – 28: *Cultural Resources Management Guideline* require the consideration of impacts on cultural resources, including historic structures, either listed in or eligible to be listed in the NRHP. The process and documentation required for preparation of this EA will be used to comply with section 106 of the NHPA, in accordance with section 800.8(3)(c) of Advisory Council on Historic Preservation regulations (36 CFR Part 800). This document will be submitted to the Utah SHPO for review and comment. The Zion-Mt. Carmel Highway is listed in the NRHP. The proposed rehabilitation of the 0.25-mile section of the highway would have the potential to impact the historic roadway and associated structures such as stone headwalls, curbing, and culverts. Therefore, historic structures is addressed as an impact topic in this EA.

Cultural Landscapes

As described by the NPS *Cultural Resource Management Guideline* (Director's Order – 28), a cultural landscape is,

> *"…a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions."*

The Route 10 (Zion-Mt. Carmel Highway) road corridor is not designated a cultural landscape, but is a candidate for designation and is managed as if it were designated (Horton 2005). Changes to the roadway could impact the character of the historic road, and thus, the cultural landscape. Therefore, cultural landscapes is addressed as an impact topic in this EA.

Health and Safety

Public safety and worker safety could potentially be affected by selection of either alternative. Under the no-action alternative, there are potential safety risks associated with possible rockfalls, from visitors walking along the road to access the Canyon Overlook Trail, and from park rangers controlling traffic through the Zion-Mt. Carmel tunnel from the middle of the road. Under the preferred alternative, public and worker safety could be at risk during the period of construction due to continued visitor use in the midst of construction activities. Therefore, health and safety is addressed as an impact topic in this EA.

Park Operations

Effects on park operations would be anticipated under either the no-action or preferred alternatives. Under the no-action alternative, visitors are using informal parking areas and

walking along the road for trail access, requiring park rangers to direct traffic while dealing with area congestion. The proposed action would eliminate informal parking and re-direct foot traffic, generally reducing congestion in the area and improving operational efficiency. Therefore, park operations is addressed as an impact topic in this EA.

Soundscapes

In accordance with NPS *Management Policies 2001* and Director's Order – 47: *Sound Preservation and Noise Management*, an important part of the National Park Service mission is preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequency, magnitude, and duration of human-caused sound considered acceptable varies among NPS units, as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

Noise associated with road improvements under the proposed action would be short term and localized, and construction activities would be scheduled so as to minimize effects on the soundscape. Night time work would occur and could include blasting of the rock faces that would create sound impacts. Under the preferred alternative, rumble strips would be installed in the safety medians where park rangers direct traffic. Rumble strips create additional traffic noise that has the potential to impact the soundscape of the area. Therefore, soundscapes is addressed as an impact topic in this EA.

Visitor Experience

Visitor experience could be impacted by either the no-action or preferred alternatives. Under the no-action alternative, continued use of informal pullouts and social trails would degrade resources and detract from visitor experience over time. Short-term effects to visitor use and experience would be expected during the proposed project construction in the form of traffic delays, closed parking areas in the construction zone, and night time work that would increase noise and lights impacting visitor experience in the campground. Implementation of the proposed action would improve delineation of parking spaces, but would eliminate informal parking areas, which could increase demand for formalized parking, limiting the amount of visitors who stop in this area and impacting incidental business permit holders who require parking to pick up customers that are bicycle touring through the park. Therefore, visitor experience is addressed as an impact topic in this EA.

Impact Topics Dismissed from Further Analysis

Threatened and Endangered Plant Species and Plant Species of Special Concern

Zion hosts one federally listed endangered plant species, Shivwits milkvetch (*Astragalus ampullarioides*), and 22 plant species that are considered sensitive by the park and the state of Utah because of their limited distribution (endemism), or are discontinuous from more abundant population centers. The endangered species does not grow in the area of the proposed action. Eight of the sensitive species are specialized to sandstone crevice communities similar to those in the project area, although none occur in the project area. Therefore, since no threatened and endangered plant species or plant species of special concern occur within the project area, this topic is dismissed from further analysis in this EA.

Air Quality

The 1963 Clean Air Act provides that the federal land manager (the assistant secretary for fish and wildlife and parks and the park superintendent) has an affirmative responsibility to protect the park's air quality-related values (including visibility, plants, animals, soils, water quality, cultural and historic resources and objects, and visitor health) from adverse air pollution impacts. Section 118 of the 1963 Clean Air Act requires the park to meet all federal, state, and local air pollution standards. Section 176(c) of the 1963 Clean Air Act requires all federal activities and projects to conform to state air quality implementation plans to attain and maintain national ambient air quality standards. NPS *Management Policies 2001* address the need to analyze potential impacts to air quality during park planning.

Zion is classified as a class I air quality area under the Clean Air Act, as amended. Should the preferred alternative be selected, local air quality would be temporarily affected by dust and vehicle emissions. Operating equipment and hauling construction material during the construction phase would result in increased vehicle exhaust and emissions. Hydrocarbons, nitrogen oxide, and sulfur dioxide emissions would be rapidly dissipated. In addition, to reduce construction equipment emissions, Zion would apply appropriate mitigating measures that limit idling of construction vehicles.

Fugitive dust plumes from construction activities would intermittently increase airborne particulates in the area near the construction site, but loading rates are not expected to be considerable. To mitigate these effects, such activity would be coupled with water sprinkling to reduce dust and airborne particulates.

Overall, there would be a slight and temporary degradation of local air quality due to dust generated from construction activities and emissions from construction equipment. These effects would occur only in the limited section of road where the project would occur and last only as long as the estimated construction period. The park's overall class I air quality would not be affected by the proposal; impacts would be negligible and short term. Therefore, air quality was dismissed from further analysis as an impact topic in this EA.

Water Quality

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters; to enhance the quality of water resources; and to prevent, control, and abate water pollution. NPS *Management Policies 2001* provide direction for the preservation, use, and quality of water in national park units. The only water quality resource in the area is Pine Creek, a seasonal channel that is dry approximately 66% of the year (Sharrow 2005). Potential impacts to Pine Creek from the preferred alternative could include sediment transport to the creek from the road construction. Best management practices would be implemented to control runoff from the construction site to reduce impacts to the creek. Any impacts would be short term and negligible. Therefore, water quality is dismissed from further analysis as an impact topic in this EA.

Floodplains

Executive Order 11988 (*Floodplain Management*) requires an examination of impacts to floodplains and potential risk involved in placing facilities within floodplains. NPS *Management Policies 2001*; Director's Order – 2: *Planning Guidelines*; and Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* provide guidelines for proposed actions in floodplains. Federal Emergency Management Agency floodplain maps describe the area containing the proposed project as an area of minimal flooding (FEMA 2005). Under the preferred alternative, no work would occur in a floodplain, including the improvements planned for the Pine Creek slot canyon access. Therefore, floodplains is dismissed from further analysis as an impact topic in this EA.

Wetlands

Executive Order 11990 (*Protection of Wetlands*) requires an examination of impacts to wetlands. Wetlands occur in the park along river margins and floodplains, and as isolated wetlands associated with springs, seeps, and small impoundments. The area of the park that consists of wetlands is very small; 191 acres have been mapped, or about 0.1% (NPS 2002). There are no jurisdictional or NPS-defined wetlands within the proposed project area. The wetlands nearest the proposed project would be 0.5 mile downstream on Pine Creek, and would not be expected to be impacted by the project if sediment control measures are installed and dutifully maintained (Sharrow 2005). Therefore, wetlands is dismissed from further analysis as an impact topic in this EA.

Wildlife

National Park Service policy is to protect the components and processes of naturally occurring biotic communities, including the natural abundance, diversity, and ecological integrity of plants and animals (NPS *Management Policies 2001*). No new impacts to wildlife would be anticipated from the no-action alternative. The project area is currently heavily used by people and traffic and most wildlife would likely avoid the area due to existing traffic and noise. Negligible to minor habitat damage would continue from visitors parking and walking in

undesignated areas. Road and parking area rehabilitation and rock wall scaling under the preferred alternative would involve ground-disturbing activities. Some wildlife mortality and disturbance of habitat could occur during the construction period. Most wildlife would avoid the construction zone due to the noise and human activity associated with the work, although such noise and human presence would be expected to represent only a slight increase over the existing noise and traffic. Night time work would affect wildlife species. Mitigation measures such as restricting night time construction work to the hours of 10:00 p.m. to 4:00 a.m. to avoid the more active dusk and dawn foraging times of desert wildlife. In addition, construction equipment operators would be required to reduce their speed while traveling the Zion-Mt. Carmel Highway at night (below posted speed limits) to reduce collisions with wildlife, such as owls preying on rodents. With mitigation, short-term impacts to wildlife would be negligible. Over the long term, there would be no impacts to wildlife. No unique wildlife species, their movement or migration patterns, or their habitats would likely be affected by the preferred alternative. Therefore, wildlife is dismissed from further analysis as an impact topic in this EA.

Archeological Resources

As a result of an archeological survey of the proposed project area was conducted by Matthew Betenson in 1998 entitled, "Zion National Park – East Side State Route 9 Corridor Survey," no sites were located in the vicinity of the project (Betenson 1998). Therefore, archeological resources is dismissed from further analysis as an impact topic in this EA.

Should any unknown archeological sites be encountered during the proposed project activities, all work would be halted until the park archeologist could examine the site. The sites would be subjected to mitigation described in "Mitigation Measures for the Preferred Alternative."

Ethnographic Resources

The National Park Service defines ethnographic resources as any

> *". . .site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it"* (Director's Order – 28: *Cultural Resource Management Guideline,* p. 191).

Ethnographic resources are not known to exist in or in proximity to the proposed project area (Horton 2005); therefore, ethnographic resources is dismissed from further analysis as an impact topic in this EA.

Museum Collections

Museum collections include historic artifacts, natural specimens, and archival and manuscript material. They may be threatened by fire, vandalism, natural disasters, and careless acts. The preservation of museum collections is an ongoing process of preventive conservation, supplemented by conservation treatment, when necessary. The primary goal is preservation of

artifacts in as stable condition as possible to prevent damage and minimize deterioration. The proposed activities along Route 10 (Zion-Mt. Carmel Highway) would not affect the museum objects of Zion and there is no potential to add objects to the collection; therefore, museum collections is dismissed from further analysis as an impact topic in this EA.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of the Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United Sates to protect tribal lands, assets, resources, and treaty rights. It represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. There are no Indian trust resources in Zion National Park (Nelson 2005). The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources is dismissed from further analysis as an impact topic in this EA.

Prime and Unique Farmlands

In 1980, the Council on Environmental Quality directed federal agencies to assess the effects of their actions on farmland soils classified as prime or unique by the United States Department of Agriculture, Natural Resources Conservation Service. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops (CEQ 1980). According to Natural Resource Conservation Service maps, there are no prime or unique farmlands associated with the proposed project area (NRCS 2005a); therefore, prime and unique farmlands is dismissed from further analysis as an impact topic in this EA.

Ecologically Critical Areas, Wild and Scenic Rivers, Other Unique Natural Areas

No areas within the proposed project corridor are designated as ecologically critical. Zion is an important natural area and the proposed action would not threaten the associated qualities and resources that make the park unique.

The Zion *General Management Plan* (2001) identified Pine Creek and Clear Creek as eligible and suitable for inclusion in the national wild and scenic river system. They were both classified as recreational, which means that they are readily accessible by road and may have development along their shorelines. Both Pine Creek and Clear Creek are adjacent to the project area. The proposed action will not affect the outstandingly remarkable values or the free-flowing nature that made them both eligible and suitable. The proposed action will not affect the potential for inclusion in the national wild and scenic river system. Therefore, the topic of ecologically critical areas and wild and scenic rivers is dismissed from further analysis as an impact topic.

Environmental Justice

Executive Order 12898 (*General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)*, requires all agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations or communities. No alternative under consideration would have disproportional health or environmental effects on minorities or low-income populations or communities as defined in the Environmental Protection Agency's *Draft Environmental Justice Guidance* (July 1996). Any adverse impacts to the socioeconomic environment of gateway communities would be minor and occur only during the construction process and would not disproportionately impact minorities or low-income populations. The proposed alternatives would not result in any identified effects that would be specific to any minority or low-income community. Therefore, environmental justice is dismissed from further analysis as an impact topic in this EA.

Lightscapes

In accordance with NPS *Management Policies 2001*, the National Park Service strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-caused light. To minimize impacts to visitor traffic during the day, some construction work could occur at night. Night time work would be limited and would occur only on the east side of the tunnel, which would be largely unnoticeable in the areas where overnight park visitors would be concentrated. Lights used for the night time construction activities would be shielded and directed downward and the topography of the east side of the tunnel would shield the impacts of the construction lighting from park campgrounds and overnight visitors. Construction vehicles would travel along Route 10 during the night, but volume would represent only a slight increase over normal night time traffic. Impacts to overall lightscapes would be short term and negligible to minor; therefore, lightscapes is dismissed from further analysis as an impact topic in this EA.

Visual Resources

Visual impacts would occur during construction and in areas close to the road and along the rock slopes being scaled. However, the effects would be short term, localized, and negligible. Mitigation measures such as scaling rock surfaces to appear naturally irregular, and coloring concrete to match the surroundings would reduce any long-term impacts below the level of detection. The scenic viewsheds for which Zion National Park is renowned would not be affected by the proposed project. Therefore, visual resources is dismissed from further analysis as an impact topic in this EA.

Transportation

The tunnel would continue to affect traffic movement under the no-action alternative as a result of the need to accommodate oversized vehicles moving through the tunnel. During the busy summer months, traffic can be delayed at either entrance for as much as 15 to 20 minutes

to allow oversized vehicles to pass through the tunnel. Implementation of the preferred alternative would result in added traffic delays for visitors using the tunnel on a limited basis and local residents and businesses (such as UPS and FederalExpress) that routinely travel through the park via Route 10 (Zion-Mt. Carmel Highway). Traffic delays would only be slightly longer (up to 30 minutes) during routine construction, although blasting could result in delays of up to 1 hour. However, the road construction would be expected to last only 2 to 3 months and would occur during the fall when visitation is lower. Visitors, residents, and businesses would be informed of the potential for delay upon entering the park and through park radio transmissions. Local residents and businesses would know in advance of the work schedule. Upon completion of the project, there would be no long-term changes, although delays as a result of traffic control through the tunnel would continue. Impacts to transportation as a result of the proposed construction would affect the small portion of local residents and businesses that routinely travel on Route 10, but these impacts are anticipated to be short term and negligible to minor. Impacts to visitors would also occur, but due to the time of year of the construction, impacts to visitor transportation would be negligible. Therefore, transportation is dismissed from further analysis as an impact topic in this EA.

Socioeconomics

Benefits to the local economy from proposed construction spending associated with the preferred alternative would be temporary, lasting only during construction. The proposed road rehabilitation would not result in increased traffic through the park or cause any long-term benefits to the socioeconomic environment as a result. Past road construction projects in Zion have been interpreted by tourists to mean that the road through the park would be closed, reducing the number of tourists in the area and impacting gateway community businesses; however, park employees would provide information on the park Web site and radio transmissions to inform visitors and gateway communities that the road is open, but that traffic delays may occur. Traffic delays are expected to be similar to existing delays related to larger vehicles passing through the tunnel, but may be slightly longer for routine construction. During blasting, delays would be longer because all blasted materials must be cleared from the area before traffic would be allowed to pass. Impacts to the socioeconomic environment would be short term and negligible. Therefore, socioeconomics is dismissed from further analysis as an impact topic in this EA.

ALTERNATIVES

INTRODUCTION

The alternatives section describes two management alternatives for the Route 10 (Zion-Mt. Carmel Highway) tunnel area road rehabilitation at Zion National Park.

The no-action alternative describes the action of continuing present management operations and conditions; it does not imply or direct discontinuing the present action or removing existing uses, developments, or facilities. The no-action alternative provides a basis for comparing the management direction and environmental consequences of the preferred alternative. Should the no-action alternative be selected, the National Park Service would respond to future needs and conditions associated with this segment of Route 10 (Zion-Mt. Carmel Highway) at Zion without major actions or changes in course.

The preferred alternative presents the NPS preferred alternative and defines the rationale for the action in terms of resource protection and management, and visitor and operational use, costs, and other applicable factors.

Additional alternatives considered and dismissed from detailed analysis are also discussed in this section. A summary table comparing the environmental consequences of each alternative is presented at the end of the alternatives section.

ALTERNATIVE A: NO-ACTION ALTERNATIVE

The no-action alternative would continue existing conditions for the 0.25-mile section of Route 10 (Zion-Mt. Carmel Highway) and its associated parking areas. Park rangers stationed on the west side of the tunnel would continue to have a narrow, painted median in which to stand and control traffic and would have access to an existing kiosk. The road east of the tunnel would continue to be narrow, with rock overhangs that could permit rocks to fall onto the highway or pedestrians walking along the highway. Park rangers stationed on the east side of the tunnel would continue to control traffic through the tunnel by standing in traffic lanes on the roadway, and using existing kiosks in their present locations. East of the tunnel, visitors would continue to use informal pullouts and walk along the road to access the Canyon Overlook Trail. The Canyon Overlook Trail crosswalk would remain in its present location. The Pine Creek canyoneering route would continue to be accessed by six informal trails leading from the parking area, contributing to soil erosion in this steeply sloped area. Should the no-action alternative be selected, the National Park Service would respond to future needs and conditions associated with the road segments on either side of the tunnel, Route 10 (Zion-Mt. Carmel Highway) in Zion without major actions or changes in the present course.

The no-action alternative does not preclude short-term, minor repair or improvement activities for the road that would be part of routine maintenance for continuing operation of Route 10 (Zion-Mt. Carmel Highway).

ALTERNATIVE B: PREFERRED ALTERNATIVE

Alternative B is the National Park Service preferred alternative. The preferred alternative presents the NPS proposed action and defines the rationale for the action in terms of resource protection and management, visitor and operational use, and costs. The preferred alternative meets Zion planning objectives of maintaining the historic built environment and managing park visitors and resources.

The proposed project would be located within Zion National Park on Route 10 (Zion-Mt. Carmel Highway), and would involve roadway and parking improvements on both the east and west sides of the tunnel. The proposed modifications proposed in this alternative are sensitive to the original layout, and character-defining features are being preserved.

East Side of the Tunnel (Tunnel East)

The following discussion covers project components for the proposed work on the east side of the tunnel. Existing parking areas and the pullouts that would be eliminated are shown on figure 2.

Parking Area 1

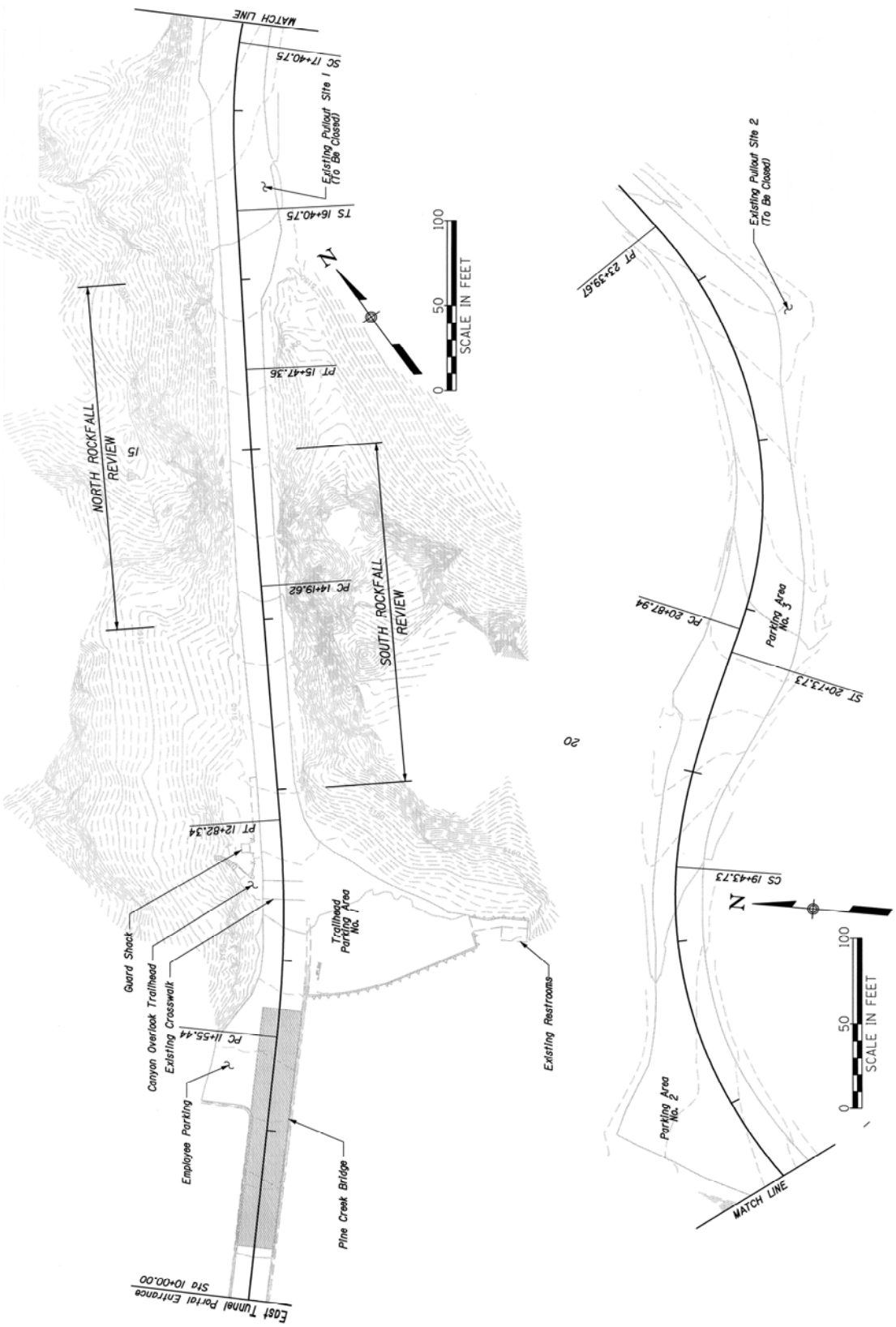
Parking area 1 (figure 3) is the first parking area east of the tunnel on the south side of the road, and serves as parking for comfort stations located at the parking area and for the Canyon Overlook Trail. Improvements to parking area 1, as shown on figure 4, would include the following:

- Existing asphalt surface would be widened approximately 5 feet along the east side, excavating enough of the existing rock face east of the parking area to allow for this expansion. The expanded areas would receive 6 inches of base and 3 inches of asphalt-concrete. The entire parking area would be slurry sealed.

- Parking spaces would be reconfigured and striped to provide eight turn-in spaces on the east side of the parking area (the southern-most parking space nearest the existing restrooms would be wheelchair accessible), and four turn-in spaces on the west side of the parking area.

- A concrete sidewalk would be constructed along the eastern edge of the parking area directing foot traffic to the newly relocated crosswalk, which accesses the Canyon Overlook Trail. The concrete surface would be textured to have the appearance of stone, and would be colored to blend with the existing stone.

- Stone curbing would be installed along the northern edge of the parking area, west of the entrance/exit to delineate the parking area from the roadway. The stone curbing would be styled after the historic curbing found elsewhere in the parking area and along Route 10 (Zion-Mt. Carmel Highway) (FHWA 2005b). Curbing would also be placed along the newly constructed sidewalk.



Source: FHWA 2005b

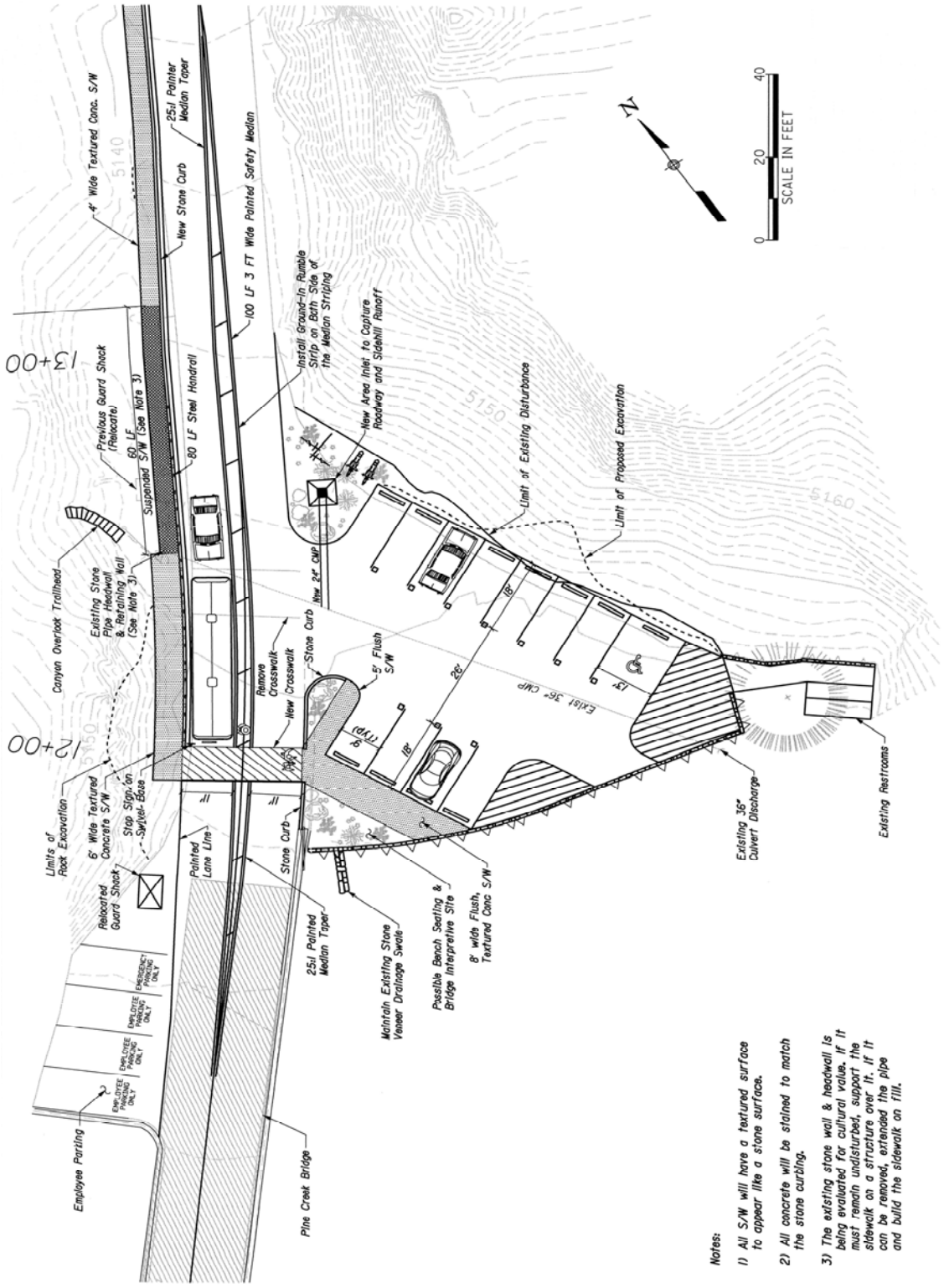
FIGURE 2. PROJECT SITE-SPECIFIC MAP

FIGURE 3. PARKING AREA 1

Parking Area 2

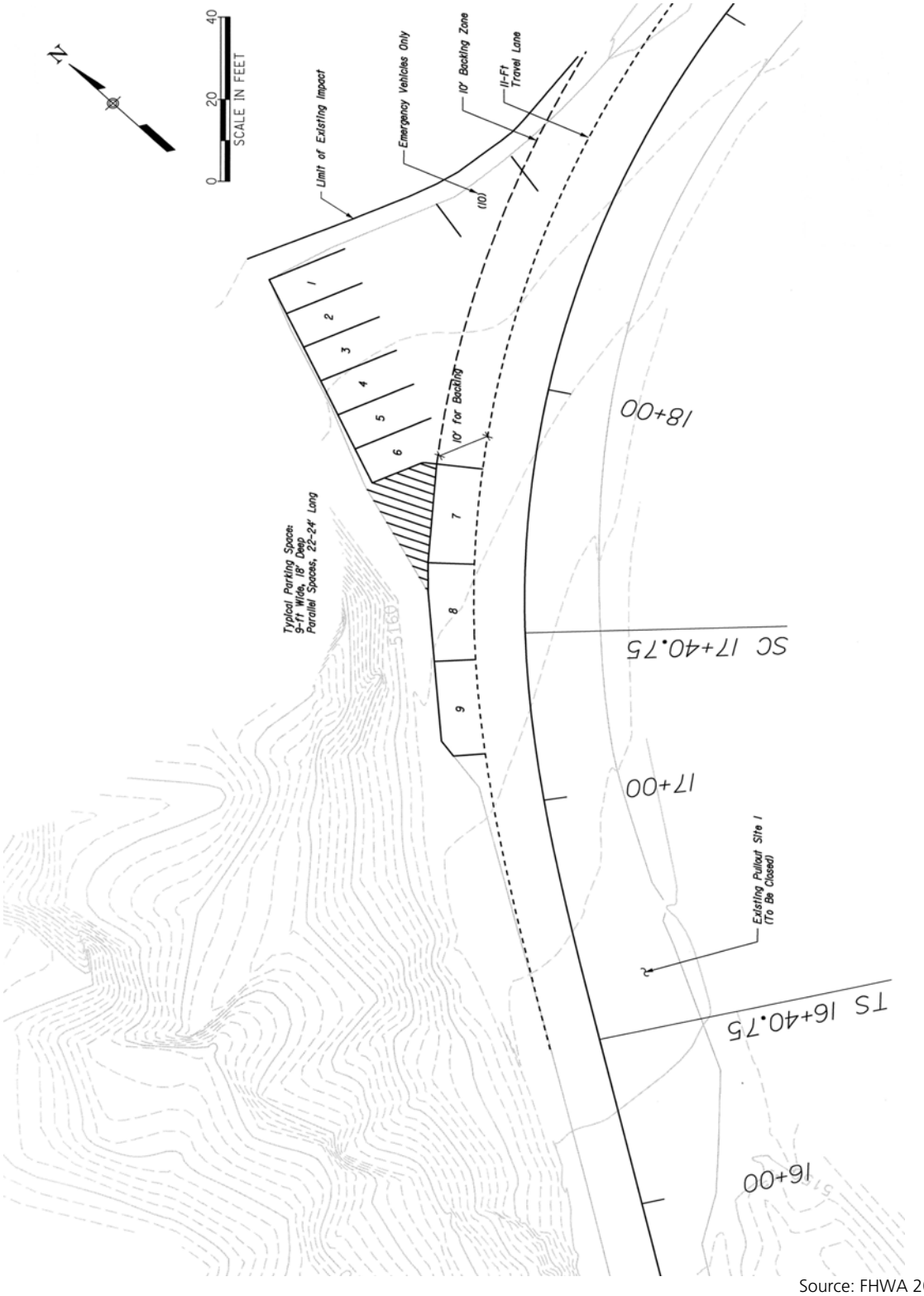
Parking area 2 is located on the north side of the road, just east of parking area 1. The existing parking area would be widened within the existing disturbed area. The widened areas would be overlain with 6 inches of base, then 3 inches of asphalt concrete; the entire parking area would then be slurry sealed and striped to provide parking space for up to seven vehicles (six turn-in parking spaces along the northern edge of the parking area and one parallel space along the eastern edge). A 50-foot-long by 11-foot-wide travel lane projecting west from the parking area could potentially provide additional parallel parking spaces should it be deemed necessary (FHWA 2005b).

This parking area was probably created during initial road construction and was likely used as a staging area and not as a parking area. It has only been within the last 20 to 30 years that parking has become its primary function. Therefore, the proposed modifications are not likely to affect the integrity of the road.



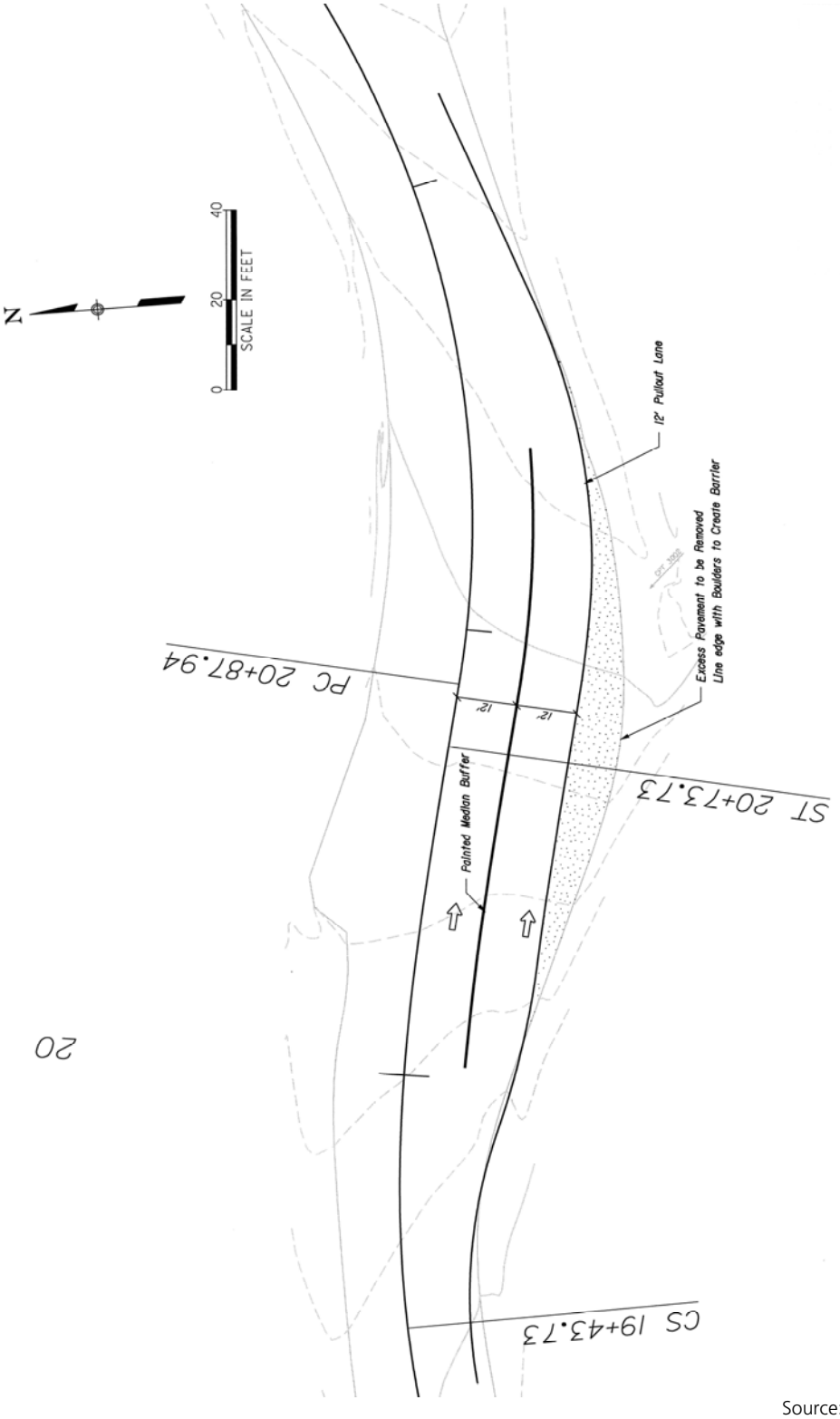
Source: FHWA 2005b

FIGURE 4. PARKING AREA 1 PROPOSED IMPROVEMENTS



Source: FHWA 2005b

FIGURE 5. PARKING AREA 2 PROPOSED IMPROVEMENTS



Source: FHWA 2005b

FIGURE 6. PARKING AREA 3 PROPOSED IMPROVEMENTS

Parking Area 3

This parking area is a more recent road feature and is non-historic. Parking area 3 is currently an informal pullout located on the south side of the road, east of parking area 2 (figure 5). The existing pullout is approximately 180-feet long and 22-feet wide at its widest point near the center, with the width tapering at both ends. This informal pullout currently used for parking by the public, would be slurry sealed, striped, and signed as an eastbound, slow-moving vehicle passing lane. The lane would be approximately 140-feet long by 12-feet wide, with tapering at the ends to divide and merge traffic. The remainder of the site, a strip approximately 120-feet long and 10-feet wide at its widest point near the center length, would be modified to remove excess pavement, graded and/or landscaped to prohibit future informal parking, and the area revegetated (FHWA 2005b). The slow moving vehicle pullout lane would be signed to warn that vehicles should not stop or park in this area.

FIGURE 7. PARKING AREA 3 TO BECOME SLOW-MOVING VEHICLE PASSING LANE

Proposed Closed Site 1

Site 1, proposed for closure, is a more recent, informal, nonhistoric pullout located on the south side of the road, between parking areas 1 and 3 (see figure 2 for location). The pullout is approximately 100-feet long and 15-feet wide at its widest point near the west end, with the width tapering at both ends (FHWA 2005b). This informal pullout would be eliminated by grading and/or landscaping to prevent vehicle access, and the area would be revegetated.

Proposed Closed Site 2

This site is a more recent, informal nonhistoric pullout located on the south side of the road, just east of parking area 3 (see figure 2 for location). The pullout is approximately 100-feet long and 15-feet wide at its widest point near the center, with the width tapering at both ends (FHWA 2005b). This informal pullout would be eliminated by grading and/or landscaping to prevent vehicle access, and the area would be revegetated.

Employee Parking

The employee parking area is the first parking area on the north side of the road, east of the tunnel entrance (see figure 2). This parking area would remain employee parking for park rangers performing traffic control duties east of the tunnel, and for other official purposes. No changes are proposed to the employee parking area, although a rock outcrop on the east end of the parking area would be scaled back slightly to make room for the relocation of the ranger kiosk.

Canyon Overlook Trail Crosswalk

The crosswalk is currently located at the eastern-most end of parking area 1, and provides access to the north side of the road where pedestrians access the Canyon Overlook Trail (see figure 2). This crosswalk would be relocated to the western-most end of parking area 1 and would provide access to a new sidewalk leading to the trailhead (see figure 4*)* (FHWA 2005b).

Sidewalk from Parking Area 2 to Canyon Overlook Trail

A new raised sidewalk and curb would be constructed along the north edge of the road, between parking area 2 and the Canyon Overlook Trail, just east of the tunnel (see figures 2 and 4). Details of the improvement would include:

- The sidewalk from the access steps of the trail to parking area 2 would be 4-feet wide, behind a curb.
- The sidewalk would be graded to drain toward the roadway and end at the base of the cut slope.
- The concrete sidewalk would be textured to blend with the stone surfaces in the area and colored to blend with the natural stone curbing after completion.
- The vertical face curb would be constructed from stone to blend in with the other natural, vertical rock faces found in the park.

- Where the sidewalk would cover a culturally important headwall and retaining wall, it would be supported.

Sidewalk from Parking Area 1 Crosswalk to Canyon Overlook Trail

A new raised sidewalk and curb would be constructed along the north edge of the road, between parking area 1 crosswalk and the Canyon Overlook Trail, just east of the tunnel (see figures 2 and 4). Details of the improvement would include:

- The concrete sidewalk would be textured and colored to blend with the stone surfaces in the area and stained after completion to match the natural stone curbing.
- The sidewalk from the crosswalk to the trailhead access steps would be 6-feet wide.
- The slopes of the sidewalk would be 1%, graded toward the roadway.
- The back of the sidewalk would tie into the existing rock surface, or be graded to drain the area behind the sidewalk toward the roadway.
- An 80-linear-foot metal handrail would be installed to prevent pedestrians from entering the roadway, located at the beginning of the crosswalk and continuing eastward.
- The rock wall on the north side of the road would be scaled to widen the area for construction of the sidewalk (see section entitled “Scaling and Excavation of Rock Slopes” for details).

East Tunnel Entrance Safety Improvements

Safety improvements would be implemented on the east side of the tunnel including:

- Adequate pedestrian and “stop ahead” warning signs would be posted for westbound traffic preceding the right-turning curve east of parking area 3.

- Full-size signs approved by the Federal Highway Administration would replace the current undersized signs at the eastbound location of the safety inspection area. The replacement stop sign and the “stop ahead” sign would continue to be on rotating bases so they could be turned 90 degrees (not facing traffic) when a stop condition is not required.

- A 100-linear-foot, 3-foot-wide painted safety median would be provided where park rangers would stand for traffic-control duties without being in the traffic lanes (see figure 3). Tapers for the median would be constructed at 25:1 ratios.

- Ground-in rumble strips on the inside and outside lane lines, as well as the limits of the new safety median, would be provided to alert the park ranger of any approaching vehicles that are outside the travel lanes, and to alert the driver that they are outside the limits of the travel lane.

- White stop bars would be provided on the westbound lanes where the park ranger would stop traffic. Perpendicular approach markings or legends would also be installed

at the same location as the warning sign to reinforce the message that a required stop is impending.

- The roadway just east of the tunnel entrance would be widened by approximately 3 feet by scaling the rock slopes on the north side of the road (see section entitled "Scaling and Excavation of Rock slopes").

- A large, undercut block of rock would be removed (no blasting), and cobble- to small boulder-sized rocks removed using manual scaling techniques to reduce the potential of rockfall on the south side of the east tunnel entrance.

Road Surface

The road surface east of the tunnel would be resurfaced with a slurry seal throughout the construction area, from the bridge through the proposed slow vehicle passing lane.

Wayside Exhibit

The current wayside exhibit at the Canyon Overlook trailhead would be replaced with an updated exhibit. Masonry from the existing wayside exhibit would be removed and concrete would be used to install the new wayside exhibit base. Areas disturbed around the exhibit during construction would be revegetated.

Scaling and Excavation of Rock slopes

According to a geological hazard report, the primary hazard associated with the slopes at the eastern approach to the tunnel is a random rockfall (FHWA 2005b). The sandstone formations are very blocky and individual blocks can separate from the slope and fall to the roadway. The occurrence of falling rocks likely will increase during and immediately after periods of intense or prolonged rainfall. Along steeper sections of both the north and south road cuts, there are rare cases of large blocks that are undercut and overhang the roadway posing serious hazards to vehicles and pedestrians below.

The natural bedrock terrain on the north side of the road consists of a shallow depression adjacent to the road and a natural slope to the east with a moderate grade (approximately 25 degrees) near the tunnel (figure 8). Moving eastward along the roadway, the rock slopes on the north side steepen (approaching 1V:1H). Even steeper slopes occur at a higher elevation on the rock face (as steep as 1/4H:1V). No potential for massive failures has been identified, but the steep slopes have the potential for random rockfalls that would endanger roadway users and pedestrians walking along the road.

Slopes above the pedestrian path from parking area 2 would be excavated to provide a shallower grade (2V:1H slope) to reduce the rockfall hazard. A portion of the roadway closer to parking area 2 would require more extensive cutting and blasting due to the steep slopes. Any blasting would conform with NPS 65, *Explosives Use and Blasting Program* (1991) specifications. All blasting would use the minimum amount of explosives necessary to

accomplish the task and would be used to shatter, not distribute, any material. At the conclusion of construction activities, the cut slope would be inspected for loose rocks and unstable blocks, and these rocks would be removed using hand scaling techniques (FHWA 2005b).

FIGURE 8. ROCK EXPOSURE ON NORTH SIDE OF ROADWAY

No massive failures are indicated on the south side of the east tunnel entrance. The primary concern with this area is the rockfall hazard to roadway users (figure 9). A large block of rock located approximately three-fourths of the way up the slope and approximately half-way between parking area 1 and the proposed closed site 1 is undercut, creating an overhanging block of rock. This block has minimum dimensions of approximately 15 feet by 15 feet, and is undercut by between 5 to 10 feet. Because the block appears to be underlain by a zone of weaker rock creating a potential for the overhanging rock to fall onto the roadway, the overhanging portion of the block would be removed using a jackhammer or drill. Upon removal, the slope in the vicinity of the rock block would be observed for loose or hanging rocks and, if present, these rocks would be removed using manual scaling techniques (FHWA 2005b).

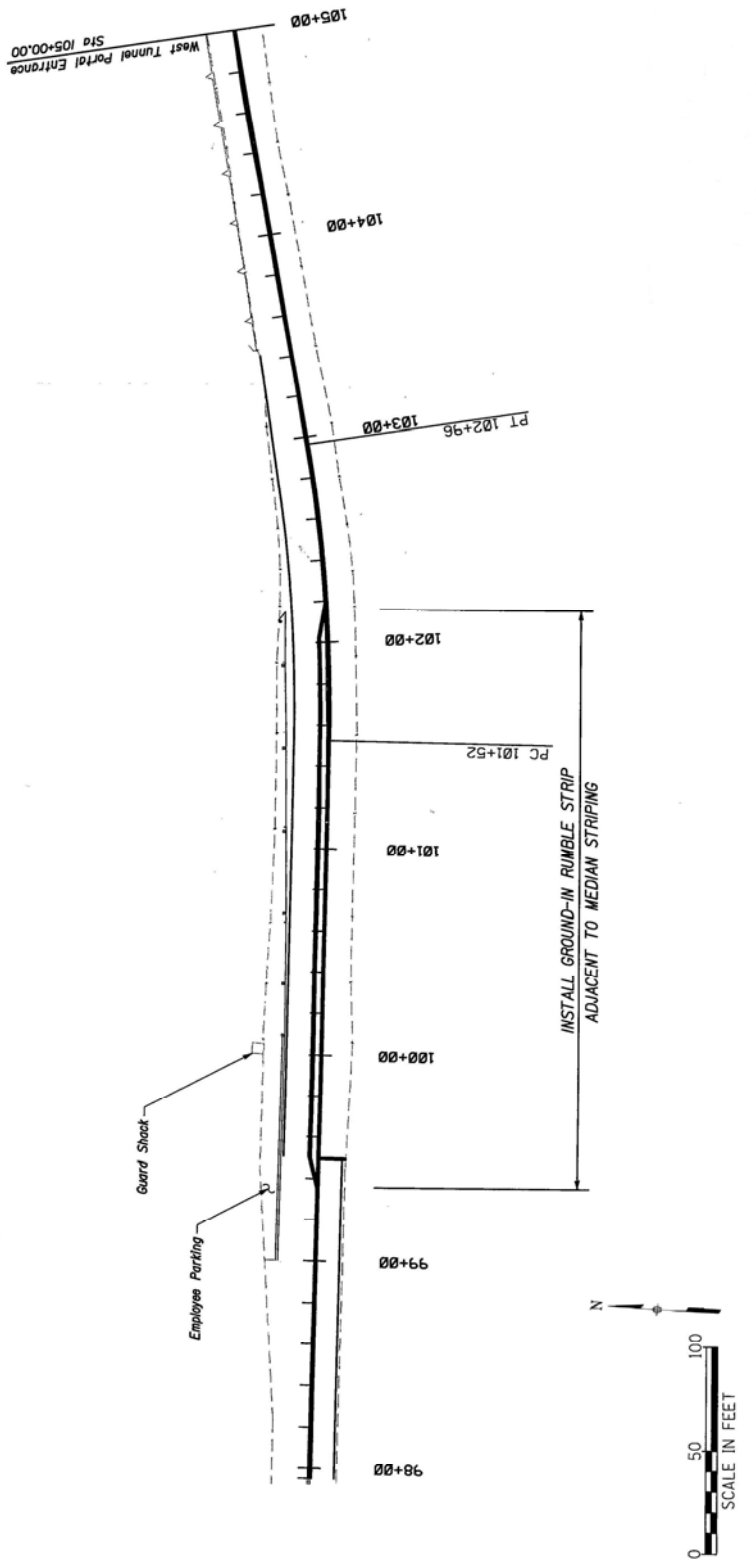
To the southeast of the undercut block, there are two zones that would require additional scaling. In the first zone, the upper portion of the road cut is characterized by massive, near-horizontally bedded sandstone cut by steeply dipping, closely to widely spaced joints. This upper portion of the road cut is very steep, approaching vertical in some areas, and is locally undercut. A number of loose, precarious rocks are present and would be removed using manual scaling techniques (FHWA 2005b).

In the second area, the slope is littered with a number of cobble- to small boulder-sized rocks that have fallen from the upper portion of the slope. Some of these rocks have settled in localized, flatter areas of the slopes and are stable, whereas others appear precarious and unstable. These rocks would be removed from the slope or moved to stable areas within the slope (FHWA 2005b).

FIGURE 9. ROCK EXPOSURE ON THE SOUTH SIDE OF ROADWAY

West Side of the Tunnel (Tunnel West)

The western approach to the tunnel currently provides a striped median separating the park ranger performing traffic control duties at the tunnel entrance from opposing traffic. The following safety improvements would be made (figure 10):



Source: FHWA 2005b

FIGURE 10. WEST TUNNEL PORTAL SAFETY IMPROVEMENTS

- Pedestrian warning signs for westbound traffic leaving the tunnel would be posted to alert the driver of the upcoming park ranger. These signs would be located immediately outside tunnel portals.

- Warning signs for eastbound traffic ("be prepared to stop") would be replaced. Current signs do not meet Federal Highway Administration size requirements and would be replaced by larger, easier to read signs that are compatible with NPS rustic style. White stop bars would be provided on the eastbound lanes where the ranger expects to stop traffic. Perpendicular approach markings or legends would also be installed at the same location as the warning sign to reinforce to the driver that a stop is ahead. New signs are to be considered a mitigating measure that will be clearly stated as such in any construction contract.

- A full-size stop sign would be provided at the eastbound location of the safety inspection area. Both the stop sign and the "be prepared to stop" sign could be placed on rotating bases so they could be turned 90 degrees, facing away from oncoming traffic, when a stop condition is not required.

- The westbound tapered approach to the outside parking area would be striped so that only 11 feet of travel lane would remain between the outside parking and inside median area.

- A white outside shoulder stripe that narrows the lane to 11 feet would be provided for the eastbound traffic approaching the stop condition.

- Ground-in rumble strips on the inside and outside lane lines, as well as the limits of the new safety median, would be provided to alert the park ranger of any approaching vehicles that are outside the travel lanes, and to warn drivers that they are outside the limits of the travel lane (FHWA 2005b).

Ranger Kiosks

The ranger kiosk on the east side of the tunnel is currently located on the north side of the road between the employee parking area and parking area 2 (see figures 4 and 10). The kiosk would be replaced and relocated to the eastern end of the employee parking area (west of the relocated crosswalk). Other than relocating the kiosk, no additional foundation work is anticipated. The park ranger kiosk currently located on the west side of the tunnel would be replaced in its current location (figure 11) (FHWA 2005b).

The new kiosks at each end of the tunnel would be approximately 75- to 100-square feet in size and would be designed in the NPS rustic architectural style characterized by the use of wood and stone on the exterior of the structure (NPS 2005b). The roof would be wood or wood-like shingles. There would be no electrical lines brought to the buildings. The structures would be designed to harmonize with the historic nature of the roadway and blend with the existing cultural landscape. It should be noted that exact designs have not been decided upon. The aforementioned designs utilized general conceptual data. The National Park Service will

review designs and complete compliance under separate documentation once design details are finalized.

FIGURE 11. EXISTING RANGER KIOSK

Pine Creek Canyoneering Route

Visitors have created six informal paths from parking area 1 to the bottom of the creek bed to either access the Pine Creek Canyon canyoneering route or to hike along upper Pine Creek and Clear Creek. Four of these paths are unnecessary and would be eliminated and the area revegetated. The route that traverses under the bridge would remain and no further work

would be necessary to stabilize soils because most of the route is on durable surfaces. A route between the parking area 1 comfort station and the bridge was selected for soil erosion control and informal delineation because of its relatively gentle slope and active use. The following improvements would be made to this route:

- As much soil as possible would be stabilized through rock placement and water diversion techniques. Natural materials (mostly rock) would be used to build primitive steps for the descent. The steps would be constructed so they would blend with the surrounding areas to prevent the access from resembling a stepped trail. In general, most of the work can be completed by hand; however, it may be necessary to use a punjar (rock hammer) for some portions. Grip hoists would be used to bring rocks in by air using winches and a series of overhead wire cables to avoid impacts while moving rocks within the site.

- Efforts would be made to ensure that the route appears to be the best way to the creek bed from the parking area, and eliminate other informal paths. Work would include pruning, rock placement, and eradication of all extraneous paths. Methods for eliminating extraneous paths would include: raking and re-contouring soil, broadcasting indigenous seed on the disturbed area, adding vertical and horizontal organic mulch, and planting cacti or other appropriate native plant species. If the informal trails that are eliminated continue to be used, "no hiking" signs would also be installed (NPS 2005c).

Staging Area

All staging would take place in previously disturbed areas. The primary location for staging would be parking area 1, which would result in closure of the parking area and associated restrooms for the duration of the proposed construction project. Since the construction would also result in closure of the Canyon Overlook Trail, the other parking areas could be used for temporary staging of equipment or materials.

General Construction Scheduling and Costs

Costs for this proposed rehabilitation project are estimated to be between $350,000 and $400,000. The construction would begin after Labor Day to avoid the Mexican spotted owl breeding season, March 1 to August 31 (FHWA 2005a). Construction is expected to occur in 2006, and is anticipated to last approximately 2 to 3 months (FHWA 2005a).

Typically, project work would occur Monday through Friday and exclude holidays and weekends. Night time work may be performed, particularly during blasting and rock scaling activities, to avoid delays and road closures during high visitor-use times. The road would need to be completely closed for short periods of time during rock blasting. The delays during blasting would be expected to be approximately 1 hour, but could be more or less, depending on the effectiveness of the blast and removal of loose rock.

Traffic through both the construction zone and the tunnel would be controlled by moving the park rangers to a location just outside the construction zone.

Traffic delays that result from non-blasting construction activities would be limited to a maximum of 30 minutes in one direction, but would be expected to average 15 minutes. Emergency vehicles would be provided immediate access through the project, including fire-fighting equipment in the event of a wildland fire. The contractor would be prepared, at all times, to immediately halt construction operations and restore the roadway such that emergency vehicles may pass through the project. Due to the activities occurring in the construction zone and safety concerns for visitors, parking areas on the east side of the tunnel and the Canyon Overlook Trail would be closed for the duration of the construction period.

Visitors would be notified of construction delays and parking area closures by staff at park entrance stations and by park information radio transmissions. Information on construction delays and parking area closures would also be posted on the park Web site.

The Pine Creek slot canyon access would remain open during the proposed construction. The Pine Creek slot canyon requires a backcountry permit and is typically accessed from parking area 1, which would be within the construction zone. Access would be moved to a side canyon east of the construction zone, and visitors would be notified of the alternate access at the time they receive their backcountry permit. Access would not be allowed during construction blasting.

Sustainability

The National Park Service has adopted the concept of sustainable design as a guiding principle of facility planning and development. The objectives of sustainability are to design park facilities to minimize adverse effects on natural and cultural values, to reflect their environmental setting, and to maintain and encourage biodiversity; to construct and retrofit facilities using energy-efficient materials and building techniques; to operate and maintain facilities to promote their sustainability; and to illustrate and promote conservation principles and practices through sustainable design and ecologically sensitive use. Essentially, sustainability is living within the environment with the least impact on the environment. The preferred alternative subscribes to and supports the practice of sustainable planning, design, and use of this section of Route 10 (Zion-Mt. Carmel Highway).

ALTERNATIVES CONSIDERED BUT DISMISSED

Staff at Zion, the Denver Service Center, and the Federal Highway Administration evaluated several other alternatives to accomplish the purpose and need of the proposed action. One alternative considered was to stop traffic at a different location while waiting to go through the tunnel in order to avoid traffic being stopped in an area of potentially falling rock and parking area / circulation problems. Moving the location for traffic stops would not address all of the potential safety issues, nor would it solve the parking and circulation problems for the area, so this was dismissed as an alternative.

The team also evaluated options for the pedestrian sidewalk to access the Canyon Overlook Trail. A sidewalk with a width of 6 feet for the entire length, from parking area 2 to the trailhead, was dismissed due to the potential resource impacts of the additional rock excavation required to widen the area to accommodate a 6-foot sidewalk. An alternate location for the sidewalk was considered. It would have directed pedestrians from parking area 2, up the hill, and along the hillside to connect with the trailhead. The alternate location was dismissed because it would not fully eliminate pedestrians walking along the road to access the restrooms and trailhead and avoid the hill climb. It would also result in additional resource damage.

The team also evaluated other options for parking area locations and configurations, but alternate designs and configurations did not provide adequate parking while protecting visitor safety and minimizing resource impacts.

Other options for the width and length of the safety median east of the tunnel were considered, but the proposed configuration optimized the safety median while allowing park rangers maximum flexibility in directing traffic into and out of the tunnel and controlling traffic circulation into and out of parking areas. Other options for widening the roadway would have resulted in additional disturbance, impacting park resources.

Adding signals, stop gates, and warning lights in the area of the tunnel to assist in warning and controlling traffic were considered. No power is available at this site, and bringing power to the site by cables would be expensive and visually distracting. Using solar power for these facilities would also be a challenge because sunlight is limited by weather conditions and site location. Also, this type of improvement would disrupt the visual character of the site, as would adding lights or signals to the tunnel portals. Therefore, use of these types of traffic controls was dismissed (FHWA 2005b).

To avoid rock excavation, use of netting and rock containment systems along the north slope, east of the tunnel, was evaluated to protect staff and visitors from rockfalls, but determined to create an unacceptable visual intrusion (FHWA 2005b).

Expansion of the tunnel to allow passage of two oversized vehicles traveling in opposite directions was not considered because of impacts to the tunnel as a cultural resource and cost.

MITIGATION MEASURES OF THE PREFERRED ALTERNATIVE

Mitigation measures are presented below as part of the preferred alternative. These actions have been developed to lessen the adverse effects of the preferred alternative.

The NPS project manager would ensure that the project remains confined within the parameters established in the compliance documents and that mitigation measures are properly implemented and maintained throughout the project. Construction zones outside the existing disturbed area would be identified and in areas of special concern flagged or fenced, as appropriate. All protection measures would be clearly stated in the construction specifications

and workers would be instructed to avoid conducting activities beyond the construction zone. This does not exclude necessary temporary structures such as erosion-control fencing.

All tools, equipment, barricades, signs, surplus materials, and rubbish would be removed from the project work limits upon project completion. Any asphalt surfaces damaged due to work on the project would be repaired to the original condition. Demolition debris from rock scaling would be immediately hauled to the park storage yard located near the visitor center for future use in the park. Asphalt demolition debris would be removed from the park and transported to a local contractor for recycling. The construction contractor would be instructed to keep all garbage and food waste contained and removed daily from the work site to avoid attracting wildlife into the construction zone. In addition, construction workers would be instructed to remove food scraps and not feed wildlife.

Contractors would be required to properly maintain construction equipment (i.e., mufflers) to minimize noise. A hazardous spill plan would be required from the contractor prior to the start of construction, stating what actions would be taken in the case of a spill and preventive measures to be implemented such as the placement of refueling facilities, storage, and handling of hazardous materials, etc. All equipment on the project would be maintained in a clean and well-functioning state to avoid or minimize contamination from automotive fluids; all equipment would be checked daily. Equipment and materials to contain fluid spills or leaks would be supplied by the contractor and would be on-site at all times.

Best management practices for drainage and sediment control, as identified and used by the Federal Highway Administration and the National Park Service, would be implemented to prevent or reduce nonpoint source pollution and minimize soil loss and sedimentation in drainage areas. Use of best management practices in the project area for drainage area protection would include all or some of the following actions, depending on site-specific requirements:

- Keep disturbed areas as small as practical to minimize exposed soil and the potential for erosion.
- Locate waste and excess excavated materials outside of drainages to avoid sedimentation.
- Install silt fences, temporary earthen berms, temporary water bars, sediment traps, stone check dams, or other equivalent measures (including installing erosion-control measures around the perimeter of stockpiled fill material) prior to construction.
- Conduct regular site inspections during the construction period to ensure that erosion-control measures were properly installed and are functioning effectively.
- Store, use, and dispose chemicals, fuels, and other toxic materials in an appropriate manner.

Construction activities would be coupled with water sprinkling to reduce fugitive dust emissions. Idling of construction vehicles would be limited to reduce construction equipment emissions. Concrete and asphalt plants would be located outside Zion.

In much of the project area, revegetation work would be unnecessary because construction would be completed in previously disturbed areas of the roadway template. Staging areas would utilize previously disturbed areas, primarily parking area 1. Informal pullouts to be

eliminated and other areas would be revegetated upon completion of construction activities. Compacted soils would be loosened and the areas revegetated using native plant species collected in the park. Reclaimed areas would be monitored after construction to determine if reclamation efforts are successful or if additional remedial actions are necessary. Remedial actions could include installation of erosion-control structures, reseeding and/or replanting the area, and controlling nonnative plant species. In an effort to avoid introduction of nonnative/noxious plant species, no imported topsoil or hay bales would be used during revegetation.

Undesirable plant species would be controlled in high-priority areas and would be monitored and controlled, as necessary. To prevent the introduction and minimize the spread of nonnative vegetation and noxious weeds, the following measures would be implemented during construction:

- Minimize soil disturbance.
- Pressure wash and/or steam clean all construction equipment and vehicles to ensure that all equipment, machinery, rocks, gravel, or other materials are cleaned and weed free before entering Zion.
- Cover all haul trucks bringing asphalt or other fill materials from outside the park to prevent seed transport.
- Limit vehicle parking to existing roadways, parking areas, or access routes.
- Limit disturbance to roadsides, including limiting equipment to the roadbed area; no machinery or equipment should access areas outside the construction zone.
- Initiate revegetation of disturbed sites immediately following construction activities.
- Monitor disturbed areas following construction to identify growth of noxious weeds or nonnative vegetation. Treatment of nonnative vegetation would be completed in accordance with NPS-13, *Integrated Pest Management Guidelines*.

Night time construction work would be restricted to the hours of 10:00 p.m. to 4:00 a.m. to avoid the more active dusk and dawn foraging times for desert wildlife. In addition, construction equipment operators would be required to reduce their speed traveling Route 10 (Zion-Mt. Carmel Highway) at night (below posted speed limits) to reduce collisions with wildlife, such as owls preying on rodents. Lights used for the night time construction activities would be shielded and directed downward to minimize the areas impacted by the artificial light and to avoid light pollution.

Should unknown archeological resources be uncovered during construction, work would be halted in the discovery area, the site secured, and Zion would consult according to 36 CFR 800.13 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990. In compliance with the Native American Graves Protection and Repatriation Act, the National Park Service would also notify and consult representatives of American Indian tribes likely to be culturally affiliated with the area for the proper treatment of human remains, funerary, and sacred objects should these be discovered during project construction.

To minimize impacts to historic structures and the potential cultural landscape, concrete for the sidewalk and curbing would be colored and textured to match the surrounding area. Sandstone curbing would be used around parking area 1 and along the proposed sidewalk

from parking area 2, and would resemble historic sandstone curbing in color and cut. The construction contractor would produce detailed documentation showing before and after conditions where any historic fabric or feature was modified. New sandstone curbing would be of similar workmanship and quality as the existing ones, but will use stones of a different width so as to not be mistaken for original historic fabric. The handrail that would be installed along the proposed sidewalk would match existing handrails.

No construction for this project would be allowed between April and the end of August to minimize impacts to visitor experience and the Mexican spotted owl breeding season.

When rock slopes are scaled, the scaled surfaces would be made rough and uneven to match the surrounding surfaces and minimize the appearance of disturbance. Pockets would be created in the scaled walls for revegetation.

Construction delays would be kept to a minimum, with the maximum delay being no more than 30 minutes. Road closures would also be kept to the minimum possible, with closures expected to be 1 hour or less. Visitors would be notified of construction activities and delays at the entrance station, on park radio transmissions, and on the park Web site. The park staff would coordinate with adjacent communities in advance to share information about the nature of the proposed road construction project to avoid misunderstandings about park road closures.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with Director's Order 12, the National Park Service is required to identify the "environmentally preferred alternative" in all environmental documents, including environmental assessments. The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality. The Council on Environmental Quality provides direction that "[t]he environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA, which considers:

1. fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations
2. assuring for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings
3. attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences
4. preserving important historic, cultural, and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice
5. achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities
6. enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources."

The no-action alternative is not the environmentally preferred alternative because it would not:

- provide adequate traffic control and maximize safety of park rangers in the area of the tunnel (criteria 3 and 5)
- alleviate traffic and pedestrian congestion in the area of the tunnel (criteria 2 and 5)
- reduce the potential for damage and injuries resulting from potential rockfalls (criterion 2)
- eliminate resource impacts from informal pullouts (criteria 1, 4, and 5)
- address erosion issues with the four social trails leading from parking area 1 to the Pine Creek canyoneering route (criterion 1)
- provide safe foot traffic routes from parking areas to trailheads (criterion 2)

The environmentally preferred alternative in this EA is the National Park Service preferred alternative. This alternative was selected based on the following criteria:

- visitor and employee safety would be improved through traffic control, reduction in congestion, reduction in rockfalls, separation of foot traffic from vehicle traffic (criteria 2, 3, and 5)
- informal pullouts resulting in resource impacts would be eliminated (criteria 1, 4, and 5)
- contributions to soil erosion in Pine Creek would be reduced through elimination of social trails (criterion 1)
- ranger kiosks would be replaced (criterion 2)
- improvements would be designed to minimize impacts to cultural resources (criterion 4)

In short, the preferred alternative would provide protection of visitor and employee health, safety, and welfare; improve visitor experience; and improve day-to-day operations of the park with minimal disturbance to natural and cultural resources.

ALTERNATIVES COMPARISON TABLE

TABLE 1. ALTERNATIVES COMPARISON TABLE

No-Action Alternative	Preferred Alternative
The no-action alternative would continue existing conditions for the 0.25-mile section of Route 10 (Zion-Mt. Carmel Highway) and its associated parking areas. Park rangers stationed on the west side of the tunnel would continue to have a narrow, painted median in which to stand and control traffic and have access to an existing kiosk. The road east of the tunnel would continue to be narrow with rock overhangs that could permit rocks to fall onto the highway or pedestrians. Park rangers stationed on either side of the tunnel would continue to control traffic through the tunnel by standing in traffic lanes on the road, and continue to use existing kiosks in their present locations. East of the tunnel, visitors would continue to use informal pullouts and walk along the roadway to access the Canyon Overlook Trail. The Canyon Overlook Trail crosswalk would remain in its present location. The Pine Creek canyoneering route would continue to be accessed via four social trails leading from the parking area, contributing to soil erosion in this steeply sloped area.	The preferred alternative would involve rehabilitating a 0.25-mile segment of Route 10 (Zion-Mt. Carmel Highway), east of the tunnel and the tunnel entrance segment west of the tunnel. On the east side of the tunnel, rock slopes would be excavated and scaled back; parking areas would be reconfigured; the crosswalk to the Canyon Overlook Trail from parking area 1 would be relocated; a sidewalk would be constructed from parking area 2 to the trailhead; informal pullouts would be eliminated with conversion of one informal pullout to a slow vehicle passing lane. For both sides of the tunnel, medians would be stripped in the center of the road with rumble strips added to provide safety protection for rangers directing traffic. Ranger kiosks would be replaced and the kiosk on the east side of the tunnel would be relocated. Road work and parking areas would be slurry sealed upon completion of construction. The preferred alternative would also provide for implementation of erosion-control measures for the access to Pine Creek.
Meets Project Objectives? **No.** Continuation of existing conditions does not reduce the potential for damage and injuries from rockfalls, provide safe access for foot traffic to trailheads from parking areas, improve safety conditions for park rangers directing traffic, reduce congestion in the tunnel area, designate an area for slower traffic to pull over and allow faster traffic to pass, eliminate informal pullouts and their associated resource impacts, prevent contributions to erosion in the Pine Creek access area, or provide for new park ranger kiosks in new locations.	Meets Project Objectives? **Yes.** The preferred alternative meets the Zion planning objectives of maintaining the historic built environment in good condition, and managing park visitors and resources. Visitor and employee safety would be improved through traffic control, reduction in congestion, reduction in rockfalls, and separation of foot traffic from vehicle traffic. Informal pullouts resulting in resource impacts would be eliminated. Contributions to soil erosion in Pine Creek would be reduced by elimination of social trails and improvements in access.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES / IMPACT COMPARISON MATRIX

TABLE 2. SUMMARY OF ENVIRONMENTAL CONSEQUENCES/IMPACT COMPARISON MATRIX

Potential Environmental Impacts		
Impact Topic	**Alternative A: No Action**	**Alternative B: Preferred Alternative**
Soils	Continuation of the existing conditions would result in short- and long-term, minor, and adverse impacts to soils.	Impacts to soils would be short term, minor, and adverse, and long term, beneficial.
Vegetation	There would be no new impacts to vegetation under the no-action alternative. The existing condition constitutes a short- and long-term, localized, negligible, adverse impact to vegetation.	The preferred alternative would have a short-term, negligible, adverse, and long-term beneficial impact to vegetation.
Threatened and Endangered Species	There would be no new impacts or changes to impacts to threatened and endangered species, species of concern, or their habitat under the no-action alternative.	Anticipated impacts to the Mexican spotted owl would be short term, negligible, and adverse. There would be no long-term impacts to the Mexican spotted owl and no short- or long-term impacts to the California condor.
Historic Structures	There would be no new impacts or changes to historic structures under the no-action alternative.	During construction, short-term potential impacts to historic structures would be minor and adverse. Long-term impacts from the preferred alternative would be minor and adverse. Under section 106, the impact would be *no adverse effect*.
Cultural Landscapes	There would be no impacts to cultural landscapes under the no-action alternative.	Potential impacts to cultural landscapes as a result of construction activities would be short-term, negligible, and adverse. Long-term impacts would also be minor and adverse as the proposed changes might alter a pattern or feature of the cultural landscape, but would not affect overall integrity. Under section 106, the impact would be *no adverse effect.*
Health and Safety	The no-action alternative would have a short- and long-term, minor to moderate, adverse impact to health and safety.	Impacts to health and safety would be short term, negligible to minor, and adverse; and long term, beneficial.
Park Operations	Continuation of the no-action alternative would result in short- and long-term, minor, adverse impacts to park operations.	Implementation of the preferred alternative would result in short-term, negligible, adverse impacts, and long-term, beneficial impacts to park operations.
Soundscapes	There would be no new impacts to soundscapes under the no-action alternative.	The impacts to soundscapes from the preferred alternative would be short term, minor to moderate, and adverse, and long term, minor, and adverse.
Visitor Experience	There are no new impacts to visitor experience. Ongoing effects to visitor experience from the no-action alternative would be short and long term, moderate, and adverse.	Impacts to visitor experience would be short term, moderate, and adverse; and long term, beneficial.

AFFECTED ENVIRONMENT

Detailed information on the resources of Zion can be found in the Zion National Park *General Management Plan* and *Fire Management Plan* (NPS 2001a, NPS 2002). This section provides a description of the park and identifies resources potentially affected by the proposed tunnel area road rehabilitation project.

LOCATION AND GENERAL DESCRIPTION OF THE PARK

Zion is located in Washington, Iron, and Kane counties in southwestern Utah. The proposed action would be located in Washington County. The western boundary of the park abuts the city limits of the town of Springdale, Utah. St. George, Utah, is approximately 40 miles southwest of the park, along Interstate 15. The town of Kanab, Utah, is located on U.S. 89, approximately 30 miles southeast of the park's eastern boundary.

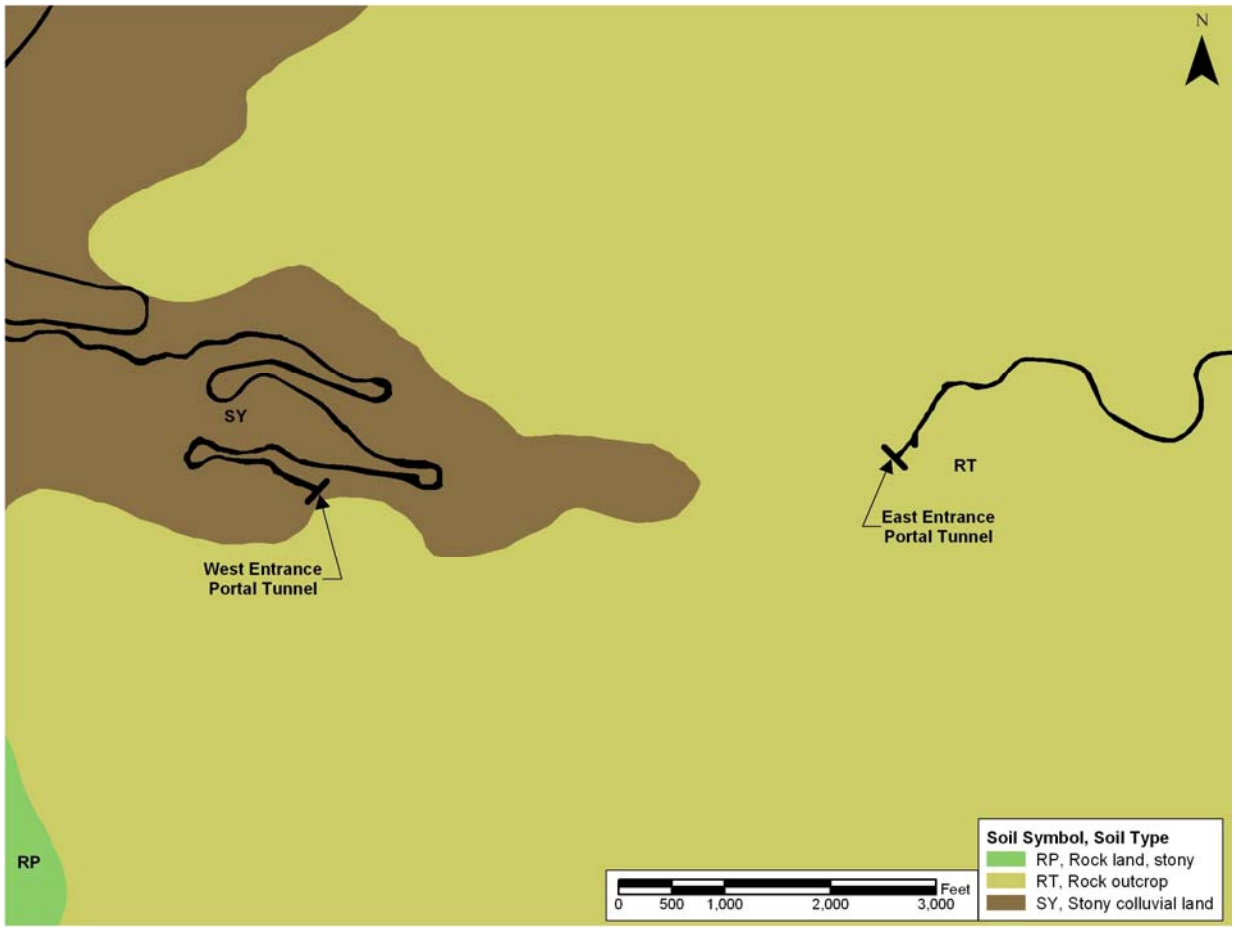
The park is characterized by high plateaus; a maze of narrow, deep, sandstone canyons; and striking rock towers and mesas. Zion Canyon is the largest and most visited canyon in the park. The North Fork of the Virgin River has carved a spectacular gorge here, with canyon walls in most places rising 2,000 to 3,000 feet above the canyon floor. The northern sections of the park are higher plateaus covered by forests (NPS 2001a).

The Route 10 (Zion-Mt. Carmel Highway), listed in the NRHP, is the main east-west route through the park, and includes the tunnel, which is located approximately 5 miles west of the east entrance to the park, and 5 miles northeast of the south entrance of the park. Construction on the tunnel began in 1927, and was completed in 1930. The narrow tunnel will not allow two oversized vehicles to pass side-by-side, and as a result, the National Park Service has stationed park rangers on either side of the tunnel to control traffic moving through the tunnel.

The Zion Canyon scenic drive, where much of the park's hiking and visitor attractions are located, travels north from Route 10 (Zion-Mt. Carmel Highway). Visitors travel the scenic drive and access surrounding areas via a free shuttle bus system. The scenic drive is accessed from Route 10 (Zion-Mt. Carmel Highway), west of the proposed project site and would not be affected by the proposed project.

SOILS

With very few exceptions, soils in the park are young, very well drained, easily eroded, and low in fertility (NPS 200d). The soils in the proposed project area are classified primarily as rock outcrop (figure 12). This type has little or no soil and supports little or no vegetation, although vegetation is present in the washes, and pockets of soil and vegetation are also found upslope of the roadway, along the rock slopes (NRCS 2005b).



Source: www.nps.gov/gis/

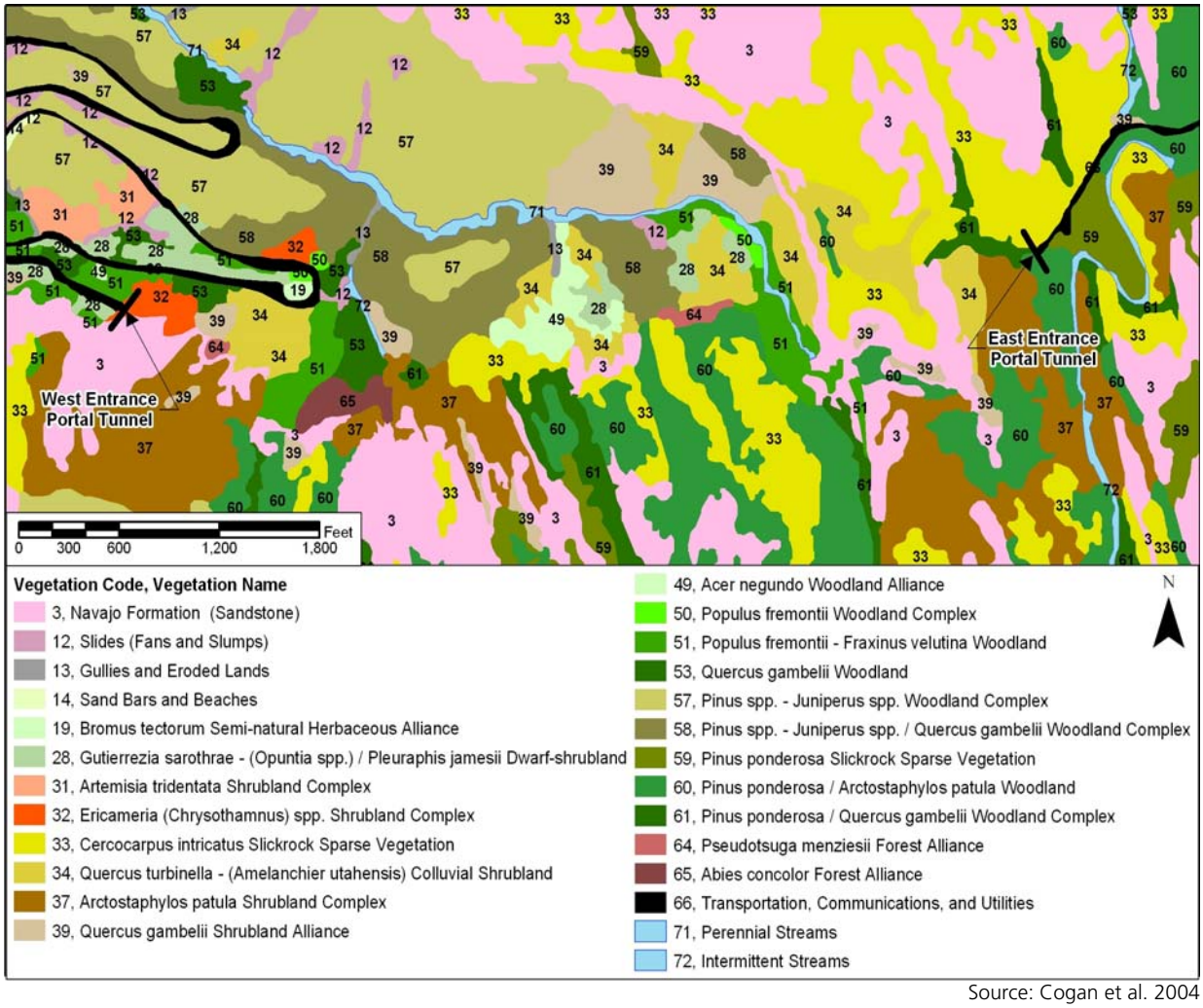
FIGURE 12. SOILS MAP

VEGETATION

Due to its location and elevation range, Zion supports plant communities with affinities ranging from the northern Mojave Desert and Great Basin to the southern Rocky Mountains, in addition to large areas of unvegetated and sparsely vegetated bedrock exposures (Cogan et al. 2004). Vegetative communities within the project area include one xeric shrubland plant community, three upland shrubland plant communities, one riparian woodland community, and one coniferous woodland community, as well as coarse vegetation and bedrock exposures. The habitats include sandstone bedrock; colluvial slopes, seeps, and springs; and roadway fill material. Figure 13 illustrates the vegetative communities along the roadway and table 3 describes those communities (Cogan et al. 2004).

Roadside habitats and plant communities near the tunnel entrances consist of unvegetated Navajo sandstone formation, sparse to very sparse shrub and woodland communities growing from bedrock crevices, sparsely to moderately vegetated shrublands of disturbed cut-and-fill slopes, and woodlands occupying talus and deeper soils of slopes. There is one stand of

deciduous riparian trees that have become established along a mesic drainage and seep located on the western approach/exit to the tunnel.



Source: Cogan et al. 2004

FIGURE 13. PLANT COMMUNITY DISTRIBUTION WITHIN PROJECT AREA

The western roadway approach/exit of the tunnel is located within three plant communities and an associated, unvegetated exposure of Navajo sandstone formation (figure 13). These plant communities include the snakeweed – (prickly-pear cactus species) / James' galleta dwarf-shrubland, the rabbitbrush shrubland complex, and the Fremont cottonwood – velvet ash woodland. At least one of the plant communities, the rabbitbrush shrubland complex, likely became established because of disturbance related to historic road construction and routine road maintenance.

TABLE 3. PLANT COMMUNITY DESCRIPTIONS

Ecological Group	Map Unit Number and Name	Map Unit Description	Vegetation Description
Unvegetated Surface	3 – Navajo Formation (Sandstone)	Predominantly exposed bedrock with <1% vegetative cover.	
Xeric Shrubland	28 – *Gutierrezia sarothrae* – (*Opuntia* spp.) / *Pleuraphis jamesii* Dwarf-shrubland [Snakeweed – (Prickly-pear Cactus Species) / James' Galleta Dwarf-shrubland]	Occupies harsh habitats, many disturbed, including old fields, pastures, arid sandy deposits, and south-facing slopes.	This association occupies clayey soils that support up to 10% cover by snakeweed and prickly-pear dwarf-shrubs. The common herbaceous associates include the perennial grasses James' galleta and squirreltail (*Elymus elymoides*) and the nonnative annual cheatgrass (*Bromus tectorum*). Other herbaceous plant species that could occur include muttongrass (*Poa fendleriana*), blue grama (*Bouteloua gracilis*), Fendler sandwort (*Arenaria fendleri*), and wild buckwheat (*Eriogonum umbellatum*).
Upland Shrubland	32 – *Ericameria* (*Chrysothamnus*) spp. Shrubland Complex [Rabbitbrush Shrubland Complex]	Occupies disturbed early seral sites, particularly along roadways and in old agricultural fields.	This association is scattered throughout Zion on disturbed, sandy soils of gentle to steep slopes. Rabbitbrush provides up to 40% cover, along with low to abundant cover of ill-scented sumac (*Rhus trilobata*), big sagebrush (*Artemisia tridentata*), yucca (*Yucca elata* var. *utahensis*), and prickly-pear (*Opuntia macrorhiza*). Herbaceous understory species contribute sparse cover and include cheatgrass and sand dropseed (*Sporobolus cryptandrus*).
Upland Shrubland	33 – *Cercocarpus intricatus* Slickrock Sparse Vegetation [Littleleaf Mountain-mahogany Slickrock Sparse Vegetation]	Occupies Navajo formation sandstone where it provides extremely sparse cover and roots in crevices, canyon walls, and on small ledges.	This association occupies steep slopes of the Navajo formation sandstone exposure where bedrock is typically 85%–100% of the ground cover. Shallow, sandy soil is usually present where vegetation becomes established, mostly in rock crevices. Littleleaf mountain-mahogany shrubs may contribute up to 10% cover and is usually associated with scattered greenleaf manzanita (*Arctostaphylos patula*), live oak (*Quercus turbinella*), and yucca shrubs, and trees of two-needle pinyon pine, Utah juniper, and ponderosa pine (*Pinus ponderosa*) trees. Herbaceous plant species contribute sparse cover and include hairy gold-aster (*Heterotheca villosa*), Fendler sandwort, sand dropseed, muttongrass, and purple three-awn (*Aristida purpurea*).
Upland Shrubland	39 – *Quercus gambelii* Shrubland Alliance [Gambel Oak Shrubland Alliance]	The most common shrub community that occupies diverse habitats from mesic valley floors to slopes and broad areas on post-fire mesa tops.	This association occupies gentle to moderate-sloped drainage bottoms and hill slopes. The total canopy cover can approach 80%, mostly contributed by Gambel oak along with occasional Rocky Mountain or Utah juniper (*Juniperus scopulorum* or *J. osteosperma*) and/or two-needle pinyon (*Pinus edulis*) trees. Leaf litter is deep, precluding establishment of herbaceous plant species.
Riparian Woodland	51 – *Populus fremontii* – *Fraxinus velutina* Woodland [Fremont Cottonwood – Velvet Ash Woodland]	A woodland mosaic that occupies floodplains, seeps, and springs, and has very high species diversity.	This association is common along the Virgin River and its tributaries, occupying sandy alluvial terraces, streambanks, and a few seeps. The total canopy cover of individual stands may approach 60% and can include Fremont cottonwood, velvet ash, boxelder (*Acer negundo*), narrowleaf cottonwood (*Populus angustifolia*), and/or Gambel oak (*Quercus gambelii*) trees. Fremont cottonwood may attain heights of over 65 feet and young trees are typically present in the stand. Stands are disturbed in the understory. The common herbaceous grasses are the annual nonnatives cheatgrass and ripgut brome (*Bromus diandrus*).

TABLE 3. PLANT COMMUNITY DESCRIPTIONS

Ecological Group	Map Unit Number and Name	Map Unit Description	Vegetation Description
Sparse Vegetation	59 – *Pinus ponderosa* Slickrock Sparse Vegetation	A sparse woodland occurring on Navajo sandstone slopes above 6,000 feet.	This association occurs frequently on Navajo sandstone formations of the eastern side of Zion. The plant stands are too sparse to classify as woodland, shrublands, or grasslands. Ponderosa pine cover is between 5% and 20% and usually less than 15%. Other species may include Two-needle pinyon (*Pinus edulis*), singleleaf pinyon (*Pinus monophylla*), and/or Utah juniper (*Juniperus osteosperma*). The ponderosa pines typically have stunted growth with heights averaging 10 meters or less. Shrub can also occur with shrub cover that is less than tree cover. Shrubs that typically occur include Greenleaf manzanita (*Arctostaphylos patula*), Utah serviceberry (*Amelanchier utahensis*), turbinella live oak (*Quercus turbinella*), and littleleaf mahogany (*Cercocarpus intricatus*).Vegetation is sparse and inconsistent in composition, although composition can be relatively diverse.
Coniferous Woodland	60 – *Pinus ponderosa* / *Arctostaphylos patula* Woodland [Ponderosa Pine / Greenleaf Manzanita Woodland]	A widespread woodland community that occupies gentle to moderate slopes of variable aspect, occurring on high mesa tops, plateaus, and Navajo sandstone formation benches and basins.	This association occupies gentle to moderately sloping sites of mesa tops, plateaus, and Navajo formation sandstone benches and basins where the soil is sandy loam with a moderate cover of pine needle duff. Ponderosa pine contributes cover up to 70% and can be 65 feet tall. Greenleaf manzanita typically contributes cover up to 10% and the following shrubs are nearly always present: Utah serviceberry (*Amelanchier utahensis*), Gambel oak, Mountain mahogany (*Cercocarpus montanus*), live oak, and antelope bitterbrush (*Purshia tridentata*). Herbaceous species provide sparse to low cover and typically include hairy gold-aster, squirreltail, sandhills muhly (*Muhlenbergia pungens*), blue grama, muttongrass, and the nonnative Kentucky bluegrass (*Poa pratensis*).
Coniferous Woodland	61 – *Pinus ponderosa* / *Quercus gambelii* Woodland Complex [Ponderosa Pine / Gambel Oak Woodland Complex]	A widespread woodland community that occupies gentle to moderate slopes of variable aspect, occurring adjacent to stands of Gambel oak shrubs.	This association occupies the gently sloping terrain of mesas and plateaus with sandy to clay loam soils. Ponderosa pine trees typically contribute up to 20% cover and Rocky Mountain juniper trees are sometimes present. Gambel oak contributes low to moderate tall and/or short shrub cover and is commonly associated with greenleaf manzanita, Utah serviceberry, antelope bitterbrush, mountain snowberry (*Symphoricarpos oreophilus*), big sagebrush, creeping Oregon-grape (*Mahonia repens*), and black sagebrush (*Artemisia nova*). Herbaceous cover is typically low, but can approach 40% cover by muttongrass, squirreltail, Ross sedge (*Carex rossii*), hairy gold-aster, Fendler sandwort, and hymenopappus (*Hymenopappus filifolius*).

Source: Cogan et al. 2004

The roadway approach/exit to the east end of the tunnel was constructed through five plant communities, two of them sparse, and minor exposures of Navajo sandstone formation (figure 13). Plant communities in the vicinity of the east tunnel approach include littleleaf mountain mahogany slickrock sparse vegetation, ponderosa pine slickrock sparse vegetation, Gamble oak shrubland alliance, ponderosa pine / greenleaf manzanita woodland, and ponderosa pine / Gambel oak woodland complex.

THREATENED AND ENDANGERED ANIMAL SPECIES AND ANIMAL SPECIES OF CONCERN

Under the Endangered Species Act of 1973, as amended, endangered species are defined as any species in danger of extinction throughout all or a significant portion of its range. Threatened species are defined as any species likely to become an endangered species in the foreseeable future throughout all or a significant portion of its range. The USFWS is responsible for providing other federal agencies with a list of endangered or threatened species or species of concern that may be affected by a proposed federal action. The USFWS provided a letter dated July 22, 2005, that lists the threatened and endangered species for the proposed project area (appendix B). For Zion, the USFWS identified the California condor (*Gymnogyps californianus*) and the Mexican spotted owl (*Strix occidentalis lucida*). For the Mexican spotted owl, the USFWS indicated that critical habitat and nests are located in the same county as the proposed project.

Zion is within the Colorado Plateau recovery unit for the Mexican spotted owl, which is federally listed as a threatened species. The Mexican spotted owl reaches the northwestern limits of its range in this recovery unit, and all of Zion is designated as critical habitat for this species. Zion has 17 (possibly 18) known Mexican spotted owl territories, which are widely distributed. A spotted owl monitoring program for the park was initiated in 1995. The Mexican spotted owl uses upland forests for foraging, dispersal, and wintering, and the breeding season lasts from March 1 to August 31 (NPS 2002).

A nonessential, experimental population (section 10(j) of the Endangered Species Act) of the federally endangered California condor was reintroduced to northern Arizona. The condors appear to be expanding their range farther to the north and may be expected to continue to be a summer visitor to Zion. They currently are not known to use the park year-round, and do not use the park as a breeding area.

Although the peregrine falcon (*Falco peregrinus anatum*) was removed from the federal list of endangered and threatened species in 1999, Zion has continued to monitor territories associated with climbing routes. Zion is known to have 19 historic falcon territories. A subset of those territories and the climbing route territories are monitored each year (NPS 2002). Peregrine eyries are known to be located on the cliffs on the southern side of the west entrance to the tunnel.

HISTORIC STRUCTURES

Zion National Park is rich in cultural resources that include historic districts, structures, buildings, and sites. Among the historically important features of the park is Route 10 (Zion-Mt. Carmel Highway) where the proposed project is taking place. The highway has five structures identified as contributing structures including the Upper Pine Creek Bridge at tunnel east, Virgin River Bridge, Zion-Mt. Carmel Highway tunnel, and Zion-Mt. Carmel Highway switchbacks. Other contributing structures of the highway include numerous culverts and ashlar masonry retaining walls, two 20-yard bridges, and a 0.10-mile-long rock-faced tunnel. The highway was included in the NRHP in 1987 (NPS 1987).

The highway was dedicated on July 4, 1930, after 4 years of planning and construction. It was built as part of a tour loop envisioned by the Utah Parks Company in the early 1920s, linking Zion, Bryce, and Cedar Breaks National Parks and the North Rim of the Grand Canyon. Specifically, it connects U.S. Highways 9 and 89. The following discussions indicate why the highway and associated components are important.

The Upper Pine Creek Bridge is located on Route 10 (Zion-Mount Carmel Highway), immediately outside the east portal of the main tunnel. It spans the narrow but deep upper Pine Creek gorge and is necessary to carry the roadway from the main tunnel to the slickrock country to the east. The bridge is a 128.5-foot-long, 4-span, steel I-beam and concrete deck bridge, with concrete abutments poured into the solid rock at either side of the gorge, and three sets of simple, tapered concrete piers with ornamented caps. The poured-in-place concrete deck is edged with flanking solid concrete guardrails with recessed bands on the outside. The guardrail on the north side curves to accommodate a small parking lot that is now used for employees only.

The Upper Pine Creek Bridge was constructed in 1929 by the Nevada Contracting Company under contract to the National Park Service and the Bureau of Public Roads. As an integral and necessary component of the highway, the bridge is significant for its association with the Zion-Mount Carmel Highway.

Route 10 (Zion-Mt. Carmel Highway)

The highway is an early representation of the National Park Service and Bureau of Public Roads road building, which incorporated easy grades, scenic vistas, minimal landscape marring in mountainous terrain, and rustic style aesthetics. It was one of the most expensive stretches of road in the National Park Service at the time of completion.

Zion-Mt. Carmel Highway Tunnel

The tunnel was the longest constructed vehicle tunnel in the national park system and in the western United States at the time of completion in 1930. The tunnel is also the major engineering feature of the 25-mile Zion-Mt. Carmel Highway and was unique in its method of construction at the time as well. A pilot hole was drilled initially and allowed “ring drilling” to

complete the tunnel to the final dimensions. The galleries were drilled prior to the main tunnel, which had not been done before.

Zion-Mt. Carmel Highway Switchbacks and Associated Highway Features

A series of dramatic switchbacks carry the highway to the Virgin River valley floor below. The switchbacks consist of stone guardrails, as well as hundreds of cubic yards of random ashlar masonry retaining walls and culverts that are all important contributing elements to the highway, which is listed on the NRHP.

In addition, other elements of the highway, including short bridges, a short tunnel, and various culverts and retaining walls, are all contributing elements to the integrity of the Zion-Mt. Carmel Highway. It is the sum of many of these smaller elements, in addition to the larger engineered features, that combine to create the overall historic significance of the highway.

Pine Creek Bridge

The Pine Creek Bridge, located west of the tunnel entrance below the switchbacks, is valuable for its individual engineering importance as well as its association with the Zion-Mt. Carmel Highway. The bridge is considered important in the contexts of tourism and engineering, and is an integral component of the highway. The bridge is also unique because of its rustic style, which was designed to blend in with the surrounding local landscape. The arched design was purposeful in mimicking Zion's Great Arch. Various shades of Navajo sandstone were used in the bridge. These purple, green, tan, brown, red, and pink colors vary constantly with the sun's angle and make the bridge one of the most admired features in southwest Utah.

CULTURAL LANDSCAPES

Two officially designated cultural landscapes have been identified in the park. Both are located in Zion Canyon and will not be affected by this project. Route 10 (Zion-Mt. Carmel Highway) and its associated contributing historic features have been identified by the National Park Service as a potential cultural landscape and is currently managed as such.

HEALTH AND SAFETY

The tunnel area is a busy area for the park. Approximately 33% of visitors in private vehicles and 66% of visitors in tour buses enter the park through the east entrance and 65% of visitors typically visit Route 10 (Zion-Mt. Carmel Highway) (NPS 2001a). Traffic counts for this segment include an average annual daily traffic count of 1,283 vehicles in 2004, while the average annual daily traffic count in 1994 was 1,696 vehicles. The seasonal average daily traffic, computed during the months containing 80% of the annual volume (summer months), resulted in a daily traffic count of 2,447 in 1994 and 1,851 in 2004.

The posted speeds approaching the area are 25 miles per hour from the west, and 35 miles per hour from the east, with the speed reduced to 25 miles per hour approaching the tunnel from the east, and suggested, through supplemental signing, as 15 miles per hour through the tunnel.

At both entrances, the area is congested and rangers stand in the middle of the roadway to direct traffic. In addition, at the east entrance during busy summer months, visitors park vehicles in any available space, cross the road at any point, and walk along the road to access the Canyon Overlook Trail and the comfort station. Visitors often exit their vehicles while waiting to be allowed through the tunnel and stand around on the roadway. Although there have been no reported accidents, there is a potential for accidents to happen based on the congested conditions at the east tunnel area.

The east entrance to the tunnel is a narrow roadway with rock faces on either side. Rockfalls have occurred that have caused delays and required park employees to send equipment to clean up the rock, and in at least one case required blasting to reduce the size of the rock for removal. Loose rock falling on the roadway has not caused any known injuries, but random rockfall from either the north or south road cuts pose a safety hazard for visitors walking along the highway and for vehicles waiting to pass through the tunnel.

PARK OPERATIONS

Park employees are actively involved in traffic management for the tunnel. The tunnel is too narrow for two oversized vehicles to pass. Two rangers are stationed at the tunnel, one at either entrance, to control oversized vehicle traffic through the tunnel during daylight hours from mid-April through the beginning of October. Vehicles that are not considered oversized can pass through the tunnel as two-way traffic; however, when oversized vehicles are passing through the tunnel, only one lane of traffic is open. Traffic flows unimpeded until an oversized vehicle approaches the tunnel entrance. The ranger stops traffic and waits until the tunnel is clear before allowing the oversized vehicle (and the traffic backed up behind this vehicle) to proceed. Hours for ranger control are reduced as daylight hours decrease. Rangers are available for escorts after hours, if necessary. During the winter, one park ranger is stationed at the tunnel, and oversized vehicles are required to notify the park at the entrance station or visitor center that they will be traveling through the tunnel. The entrance station or visitor center then contacts the park ranger to coordinate passage. The rangers use small kiosk structures located along the highway to stage from and as a resting place to get out of the sun when no traffic is present. The kiosks have been periodically hit by snow plows and other vehicles.

Park rangers use the employee parking area on the east side of the tunnel and park along the roadway in designated areas on the west side of the tunnel. On the east side, rangers are also responsible for directing vehicles into and from parking area 1 where the restrooms are located and for maintaining some control over pedestrian traffic. Vehicles exiting the tunnel on the east side drive into a highly congested area; vehicles are entering and exiting the roadway into the parking areas and pedestrians are walking along the roadway on both sides and crossing the roadway in many different locations. The east side tunnel ranger must pay close attention to all of the activity and direct vehicles and pedestrians to avoid accidents.

Other park operations in the area include resource management monitoring. Park staff use the employee parking area or parking area 1 to park vehicles to hike to remote monitoring stations in the vicinity for monitoring wildlife, vegetation, air quality, backcountry use, or other monitoring sites. Park staff also clean and maintain the comfort stations at parking area 1 and have been responsible for monitoring and controlling erosion that is occurring as a result of social trails in the area, both social trails to access Pine Creek and social trails to access the Canyon Overlook Trail.

SOUNDSCAPES

Natural soundscapes are comprised of the natural sound conditions that exist in the absence of any human-produced sound. These conditions are actually composed of many natural sounds, near and far, which often are heard as a composite, not individually. Natural sound conditions include the sound of running water, blowing wind, chirping birds, and many other natural sounds. The opportunity to experience Zion's natural soundscape unimpaired by the sounds of human civilization is an important part of the overall visitor experience, especially as it contributes to the solitude and wilderness experience that is integral to much of the park (NPS 2001a).

Acoustic data has been collected in Zion over the years. The most recent and most comprehensive data collection effort was by Wyle Laboratories (Hobbs and Downing 2003), which collected acoustic data from October 2000 to November 2001, at 13 sites throughout the park. Data was collected during spring, summer, and fall at 12 sites and during all four seasons at one site. The data suggests that Zion is a quiet soundscape. Little variation in the soundscape was observed across the park during the day, and throughout the year (NPS 2002).

Human-generated noise in the park is predominantly from vehicle traffic, aircraft overflights, and maintenance and administrative activities (including fire management). Areas near campgrounds, Zion Lodge, and roads often have higher levels of noise. Mechanical noises can drown out these natural sounds on a temporary basis (NPS 2002).

VISITOR EXPERIENCE

In 2004, approximately 2.7 million people visited Zion. Visitors participate in a wide range of activities, including lodging and camping (both within the park and in the gateway towns), hiking, canyoneering, rock climbing, attending ranger guided programs, and nature observation. Zion Canyon attracts the majority of visitors; most hike along at least one trail during their visit. Trails range from short, easy walks from points along the Zion Canyon scenic drive to long, strenuous hikes such as the East and West Rim trails (NPS 2002). The Canyon Overlook Trail is located within the construction zone for the preferred alternative. Many visitors hike this trail as opposed to other trails in the park because it does not require visitors to use the park's shuttle bus system to access the trailhead. Public restrooms are available at the parking area directly across from the Canyon Overlook Trail.

The tunnel is 1.1 miles long, and located midway between the east and south park entrances on Route 10 (Zion-Mt. Carmel Highway) (NPS 2003). Because of the narrow width of the tunnel, two oversized vehicles cannot pass side-by-side through the tunnel. Rangers are stationed at either entrance of the tunnel to direct traffic. As a result, visitors traversing the park along Route 10 (Zion-Mt. Carmel Highway) are required to stop and wait for passage through the tunnel. Traveling through the tunnel is an experience different from traveling through other tunnels because windows were created throughout the tunnel that provide views of the park.

An increasing number of visitors are visiting Zion's backcountry. In 2002, 7,801 backcountry permits were issued, a 97% increase from 1998 (NPS 2002). The Pine Creek slot canyon route, accessed from parking area 1 within the construction zone for the preferred alternative, requires backcountry permits. The following table shows permit issuance for the Pine Creek slot canyon access for the months of September and October in 2004 and 2005 and November 2004. These months represent the anticipated construction period for the preferred alternative.

TABLE 4. PINE CREEK SLOT CANYON PERMITS

Month and Year	Number of Groups	Number of Individuals
September 2004	73	293
October 2004	44	169
November 2004	10	25
September 2005	90	374
October 2005	56	181

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section describes the potential environmental consequences associated with the no-action and preferred alternatives. The methodologies and assumptions for assessing environmental consequences are discussed, including consideration of context, intensity, and duration of impacts; cumulative impacts; and measures to mitigate impacts. As mandated by NPS policy, resource impairment is explained and then assessed for each alternative. Subsequent sections are organized by impact topic, first for the no-action alternative and then for the NPS preferred alternative.

METHODOLOGY

Overall, the National Park Service based these impact analyses and conclusions on the review of existing literature and Zion studies, information provided by experts at the park and in other agencies, professional judgments, and park staff insights.

Context, Duration and Intensity, and Type of Impact

The following definitions were used to evaluate the context, intensity, duration, and cumulative nature of impacts associated with proposed project alternatives.

Context

Context is the setting within which an impact is analyzed such as local, parkwide, or regional. The Council on Environmental Quality requires that impact analyses include discussions of context. For this EA, local impacts would occur within the general vicinity of the tunnel on Route 10 (Zion-Mt. Carmel Highway), while parkwide impacts would affect a greater portion of the park and regional impacts would extend outside the limits of the park.

Duration

The duration of an impact is the time period for which the impacts are evident and are expressed in the short term or in the long term. A short-term impact would be temporary in duration and would be associated with road improvements, as well as the period of site restoration. Depending on the resource, impacts may last as long as construction takes place, or a single year or growing season, or longer. Impact duration for each resource is unique to that resource. Impact duration for each resource is presented in association with impact intensities in the following "Methodologies" section.

Intensity

Impact intensity is the degree to which a resource would be beneficially or adversely affected. The criteria that were used to rate the intensity of the impacts for each resource topic are presented later in this section under each topic heading.

Type of Impact

Impacts can be beneficial or adverse. Beneficial impacts would improve resource conditions while adverse impacts would deplete or negatively alter resources.

Direct Versus Indirect. The National Park Service conducts analysis for direct and indirect impacts, but does not identify the impacts as such. The following definitions of direct and indirect impacts are considered:

> *Direct* – an effect that is linked to a specific action and occurs immediately during or after that action.
>
> *Indirect* – an effect that is caused by the consequences of an action, but is removed from the action itself.

Cumulative Effects

The Council on Environmental Quality regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects can result from individually minor, but collectively important, actions taking place over a period of time.

Cumulative impacts are considered for all alternatives and are presented at the end of each impact topic discussion analysis.

Projects that Make Up the Cumulative Impact Scenario

Potential projects identified as cumulative actions included any planning or development activity that was currently being implemented or that would be implemented in the reasonably foreseeable future.

These cumulative actions are evaluated in the cumulative impact analysis in conjunction with the impacts of each alternative to determine if they would have any additive effects on a particular natural resource, cultural resource, visitor use, or the socioeconomic environment. Because some of these cumulative actions are in the early planning stages, the evaluation of cumulative effects was based on a general description of the project.

Past Actions

The following past actions could contribute to cumulative effects:

- Rehabilitation of the park road from the south entrance, continuing along the Zion Canyon scenic drive, to the Temple of Sinawava. This project was scheduled to be completed in 2005.

Current and Future Actions

Current actions and those projected for the future could also contribute to cumulative effects. These include:

- Rehabilitation of Route 10 (Zion-Mt. Carmel Highway). The project is planned to include rehabilitation of segments of Route 10 (Zion-Mt. Carmel Highway) not included in the proposed project that is the subject of this EA.

- Replacement of Wayside Exhibits, Phase II. Wayside exhibits on the east side of the tunnel are planned to be replaced. The project could begin as early as winter 2006, involving removing stonework for old exhibits, then installation of concrete work to hold new exhibits.

IMPAIRMENT OF ZION NATIONAL PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the preferred and other alternatives, NPS *Management Policies 2001* and Director's Order − 12, require analysis of potential effects to determine if actions would impair Zion resources.

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirements that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park
- identified as a goal in the Zion National Park *General Management Plan* or other relevant National Park Service planning documents

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. In this "Environmental Consequences" section, a determination on impairment is made in the conclusion statement of the appropriate impact topics for each alternative. The National Park Service does not analyze recreational values / visitor experience (unless impacts are resource based), socioeconomic values, health and safety, or park operations for impairment.

IMPACTS TO CULTURAL RESOURCES AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

In this EA, impacts to cultural resources are described in terms of type, context, duration, and intensity, as described above, which is consistent with the regulations of the Council on Environmental Quality that implement NEPA. These impact analyses are intended, however, to comply with the requirements of both NEPA and section 106 of the NHPA. In accordance with Advisory Council on Historic Preservation regulations implementing section 106 of the NHPA (36 CFR Part 800, *Protection of Historic Properties*), impacts to archeological and cultural resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that were either listed in or eligible to be listed in the NRHP; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

Under Advisory Council regulations, a determination of either *adverse effect* or *no adverse effect* must also be made for affected, NRHP-eligible cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristics of a cultural resource that qualify it for inclusion in the NRHP, e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by the preferred alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of no adverse effect means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the NRHP.

Council on Environmental Quality regulations and Director's Order – 12: *Conservation Planning, Environmental Impact Analysis, and Decision-making* also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of an impact from major to moderate or minor. Any resultant

reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect, as defined by section 106, is similarly reduced. Although adverse effects under section 106 may be mitigated, the effect remains adverse.

A section 106 summary is included in the impact topic analysis sections for all cultural resource topics under the preferred alternative. The section 106 summary is intended to meet the requirements of section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based on the criterion of effect and criteria of adverse effect found in Advisory Council regulations.

IMPACT INTENSITY THRESHOLDS AND ENVIRONMENTAL CONSEQUENCES

Soils

Impact Intensity Threshold

All available information on soils potentially impacted in the park was compiled from Natural Resource Conservation Service information on soils within the proposed project area, and the *Zion National Park Fire Management Plan Environmental Assessment* (NPS 2002). Predictions about short- and long-term site impacts were based on previous projects with similar soils and recent studies. The thresholds of change for the intensity of an impact to soils are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Soils would not be affected or the effects would be below or at the lower levels of detection. Any effects to soils would be slight.
Minor	The effects to soils would be detectable and could affect soil productivity or fertility. Effects to areas, such as soil erosion, would be small and localized. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.
Moderate	The effect on soils would be readily apparent and result in a change to the soil character, including soil productivity or fertility over a relatively wide area. Erosion could occur over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely be successful.
Major	The effect on soils would be readily apparent and substantially change the character of the soils over a large area, including soil productivity or fertility. Erosion would be a concern over a large area. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Soil impacts would be considered short term if the soils recover in less than 3 years and long term if the recovery takes longer than 3 years.

No-Action Alternative Analysis

Soils in the proposed project area are young and easily eroded. Vehicles creating informal turnoffs and visitors walking along the roadside disturbs the soil, encouraging further erosion in the localized area. Hikers using the various informal paths to access the Pine Creek canyoneering route are disturbing soils, contributing to further erosion in the area. Impacts from the no-action alternative in the form of soil erosion would be localized and detectible, but would not change the soil character. Therefore, continuation of the existing conditions would result in short- and long-term, minor, and adverse impacts to soils.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect soils include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. All of these projects would involve disturbing soils along roadways throughout the park during the construction process. The impacts to soils from these projects would be readily apparent in the short term. Over the long term, construction activities would cease and there would be no long-term impacts to soils. The no-action alternative would contribute short- and long-term, minor, adverse impacts. The overall cumulative impacts to soils from the no-action alternative, in combination with past, present, and reasonably foreseeable future activities, would result in short-term, moderate, adverse impacts. Since there are no long-term impacts from cumulative projects, there would be no long-term cumulative impacts.

Conclusion. Implementation of the no-action alternative would result in short- and long-term, minor, adverse impacts to soils. The overall cumulative impacts to soils from the no-action alternative, in combination with past, present, and reasonably foreseeable future activities, would result in short-term, moderate, adverse impacts. Since there are no long-term impacts from cumulative projects, there would be no long-term cumulative impacts.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

Soils in the proposed project area would be impacted during construction activities. Soils would be excavated, moved, compacted, and overlain with asphalt or concrete as a result of the excavation of the rock slopes, placement of the pedestrian sidewalk, and conversion of the informal parking area to a slow vehicle passing lane. These impacts to soils would be detectible and localized, but would not result in a change to the overall soil character of the area. Impacts would be short term, minor, and adverse. Over the long term, soils in the sidewalk and pullout lane areas would become permanently compacted and covered with asphalt or concrete; however, these areas are either paved or currently compacted as a result of the informal pullouts and existing pedestrian use of the roadside for walking. The area of permanent

coverage with asphalt and concrete is less than 0.1 acre. Soils in the areas used for informal parking would be loosened and revegetated. Once rock excavation is completed, soil pockets would be formed on the rock slopes and planted with native vegetation. The Pine Creek access would have erosion controls to prevent the further loss of soil. The total area of soil restoration is estimated to be approximately 0.1 acre. Long-term impacts would be both minor and adverse and beneficial. The overall long-term impacts to soils would be beneficial.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect soils include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. All of these projects would involve disturbing soils along roadways in the park during the construction process. The impacts to soils from these projects would be readily apparent in the short term. Over the long term, construction activities would cease and there would be no long-term impacts to soils. The preferred alternative would contribute short- and long-term, minor, adverse impacts. The overall cumulative impacts to soils from the no-action alternative, in combination with past, present, and reasonably foreseeable future activities, would result in short-term, moderate, adverse impacts. Impacts from the preferred alternative would be short-term, minor, and adverse, and long-term, beneficial. Cumulative impacts from other past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor to moderate, and adverse. There would be no long-term cumulative impacts since the other projects are not expected to have long-term impacts to soils.

Conclusion. Impacts to soils would be short term, minor, and adverse, and long term, beneficial. Cumulative impacts from other past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor to moderate, and adverse. There would be no long-term cumulative impacts since the other projects are not expected to have long-term impacts to soils.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Vegetation

Impact Intensity Threshold

All available information on vegetation and vegetative communities potentially impacted at either tunnel entrance of Route 10 (Zion-Mt. Carmel Highway) was compiled from the detailed vegetation inventory performed for the park from 1993 to 2003 (Cogan et al. 2004). Where possible, map locations of sensitive vegetation species, populations, and communities were identified. Predictions about short- and long-term site impacts were based on previous

projects with similar vegetation and recent studies. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be on a small scale.
Minor	The alternative would affect some individual native plants and would also affect a relatively limited portion of that species' population. Mitigation to offset adverse effects could be required and would be effective.
Moderate	The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful.
Major	The alternative would have a considerable effect on native plant populations and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Duration of vegetation impacts is considered short term if the vegetation recovers in less than 3 years and long term if the vegetation takes longer than 3 years to recover.

No-Action Alternative Analysis

Under the no-action alternative, there would be no new ground-disturbing activities with the potential to affect vegetation. Ongoing use of the informal pullouts and visitors walking along Route 10 (Zion-Mt. Carmel Highway) to access the Canyon Overlook Trail would continue to result in trampling of roadside vegetation and destruction of native plants, along with soil disturbance that could lead to invasion by nonnative species. However, there would be no changes in the current overall status of vegetative communities parkwide, either in terms of species composition or population dynamics, other than those brought about by natural environmental processes. The existing conditions would result in some individual plants being affected, but there would be no effect on native species populations. The existing condition would constitute a short- and long-term, localized, negligible, adverse impact.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect vegetation include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. All of these projects would involve some level of ground disturbance that would impact roadside vegetation. While the projects would collectively cover a large area, only areas directly adjacent to the projects would be affected, and only a relatively limited portion of the species population would be affected, resulting in short-term, localized, minor, adverse impacts. Over the long term, the cumulative projects would be completed and disturbed areas revegetated with native species and monitored for control of nonnative species. There would be no long-term impacts to vegetation from the other projects. The no-action alternative would contribute short- and long-term, negligible, localized, adverse impacts to vegetation. The overall cumulative impacts to vegetation from past, present, and reasonably foreseeable future projects, in combination with the no-action

alternative, would result in short-term, minor, adverse impacts to vegetation. There would be no long-term cumulative impacts.

Conclusion. The existing condition would constitute a short- and long-term, localized, negligible, adverse impact. The overall cumulative impacts to vegetation from past, present, and reasonably foreseeable future projects, in combination with the no-action alternative, would result in short-term, minor, adverse impacts to vegetation. There would be no long-term cumulative impacts.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

The character of the soils and topography of the proposed project areas result in a limited capacity to support vegetation. The more abundant vegetation in the wash below the roadway would be unaffected by the proposed project. Under the preferred alternative, equipment used to complete the construction work would have a short-term, negligible, adverse impact to roadside vegetation. Excavation and scaling of the rock slopes would result in short-term elimination of sparse pockets of vegetation in the rock wall areas, also resulting in a short-term, negligible, adverse impact. Over the long term, some areas would lose vegetation due to covering with asphalt and concrete (less than 0.1 acre). Existing pullout sites 1 and 2 would be eliminated and revegetated, and small pockets of soil would be replaced in the rock excavations and planted with native species (estimated 0.1 acre of restoration). Social trails to access Pine Creek would be eliminated and erosion-control measures implemented to prevent further loss of vegetation. Mitigation measures would include revegetation of some areas, monitoring of revegetation success, and integrated methodologies for control and/or elimination of noxious weeds. In general, the effects would be on a small, localized scale and there would be no effect on native species populations. Taken together, the preferred alternative would have a short-term, negligible, adverse, and long-term, beneficial impact to vegetation.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect vegetation include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. All of these projects would involve some level of ground disturbance that would impact roadside vegetation. While the projects would collectively cover a large area, only areas directly adjacent to the projects would be affected and only a relatively limited portion of the species population would be affected, resulting in short-term, localized, minor, adverse impacts. Over the long term, the cumulative projects would be completed and disturbed areas revegetated with native species and monitored for control of nonnative species. There would be no long-term impacts to vegetation from the other projects. The preferred alternative would contribute short-term, negligible, adverse impacts, and long-term, beneficial impacts to vegetation. The overall cumulative impacts to

vegetation from past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would result in short-term, minor, adverse impacts to vegetation. There would be no long-term cumulative impacts because the other projects would not result in long-term impacts.

Conclusion. The preferred alternative would have a short-term, negligible, adverse, and long-term, beneficial impact to vegetation. The overall cumulative impacts to vegetation from past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would result in short-term, minor, adverse impacts to vegetation. There would be no long-term cumulative impacts because the other projects would not result in long-term impacts.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Threatened and Endangered Animal Species and Animal Species of Concern

Impact Intensity Threshold

The Endangered Species Act of 1973 (16 USC 1531 *et seq.*), as amended, mandates that all federal agencies consider the potential effects of their actions on species listed as threatened or endangered. If the National Park Service determines that an action may adversely affect a federally listed species, consultation with the USFWS is required to ensure that the action would not jeopardize the species' continued existence or result in the destruction or adverse modification of critical habitat. NPS *Management Policies 2001* states that potential effects of agency actions would also be considered for state or locally listed species.

It is the policy of the National Park Service to manage critical habitat of such species and to perpetuate the natural distribution and abundance of these species as well as the ecosystems upon which they depend. The USFWS was contacted for a list of special-status species and designated critical habitats that may be within the project area or affected by any of the alternatives (appendix B). Information on possible threatened, endangered, and candidate species, as well as species of special concern, was gathered from published sources. Information from prior research at Zion was also incorporated. Known impacts caused by development and human use were also considered. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	The action could result in a change to the individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. This impact intensity equates to a USFWS *no effect* or *may affect, not likely to adversely affect* determination.
Minor	The action could result in a change to the individuals of a species or designated critical habitat. The change would be measurable, but small and localized and of little consequence. Mitigation measures, if needed to offset the adverse effects, would be simple and successful. This impact intensity equates to a USFWS *may affect, not likely to adversely affect* determination.
Moderate	Impacts on special-status species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful. This impact intensity equates to a USFWS *may affect, likely to adversely affect* determination.
Major	The action would result in a noticeable effect to the viability of the individuals of a species or resource or designated critical habitat. Impacts on a special-status species, critical habitat, or the natural processes sustaining them would be detectable, both in and out of the park. Loss of habitat might affect the viability of at least some special-status species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed. This impact intensity equates to a USFWS *may affect, likely to jeopardize the continued existence of a species or adversely modify critical habitat for a species* determination.

Special-status species impacts are considered short term if the species recovers in less than 1 year and long term if it takes longer than 1 year for the species to recover.

No-Action Alternative Analysis

There would be no new impacts or changes to impacts to threatened and endangered species, species of concern, or their habitat under the no-action alternative. There would be no changes in the current status of threatened and endangered animal species and animal species of concern communities, either in terms of species composition or population dynamics, other than those brought about by natural environmental processes.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect threatened and endangered animal species and animal species of concern include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. Because Zion is within the Colorado Plateau recovery unit for the Mexican spotted owl, all three projects could impact the species. The California condor is a summer visitor to Zion and is not currently known to use the park year-round, nor does the condor use the park as a breeding area. Project noise and construction activities could impact both the Mexican spotted owl and the California condor during construction activities. Habitat could be disturbed by the road projects, although care would be taken to disturb as little habitat as possible. The continued human disturbance from the no-action alternative would not contribute to additional habitat loss or noise outside of the existing condition. Therefore, it is anticipated that the no-action alternative would have no adverse contribution

to the cumulative impacts to threatened and endangered species and the cumulative impact would be zero.

Conclusion. There would be no new impacts or changes to impacts to threatened and endangered animal species and animal species of concern under the no-action alternative. Because the no-action alternative would not impact threatened and endangered animal species and animal species of concern, there would be no cumulative impacts from the no-action alternative.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

Because Zion is within the Colorado Plateau recovery unit for the Mexican spotted owl, the preferred alternative has the potential to impact this species. The breeding season for the owl is March 1 through August 31. Since the proposed project is anticipated to be completed outside this time period, no impacts to Mexican spotted owl breeding would be anticipated. The proposed project area affects only 0.25-mile of roadway. The project is anticipated to last a short period of time, reducing the scope and amount of time for potential impacts. There could be impacts to the Mexican spotted owl from construction noise and increased activity in the area; however, such impacts would not be measurable and would be within natural variation and would be short term, negligible, and adverse. Since the California condor is a summer visitor to Zion, it is not currently known to use the park year-round, and it does not use the park as a breeding area; therefore, no impacts from the proposed action would be anticipated. Over the long term, there would be no increased traffic or associated noise and there would be no long-term impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect threatened and endangered animal species and animal species of concern include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. Because Zion is within the Colorado Plateau recovery unit for the Mexican spotted owl, all three projects could impact the species. The California condor is a summer visitor to Zion and is not currently known to use the park year-round, nor does the condor use the park as a breeding area. Project noise and construction activities could impact both the Mexican spotted owl and the California condor. Habitat could be disturbed by the road projects, although care would be taken to disturb as little habitat as possible. Although the future actions may affect individuals of these species or designated critical habitat, it is anticipated that it would be of little consequence to the viability of the species as a whole. Because of the limited scope of the proposed project and implementation of the mitigation measures, the proposed action would have no adverse contribution to the cumulative impact

to threatened and endangered species. Therefore, this project would result in no cumulative impacts.

Conclusion. Anticipated impacts to the Mexican spotted owl would be short term, negligible, and adverse. There would be no long-term impacts to the Mexican spotted owl. There would be no short- or long-term impacts to the California condor. The preferred alternative, in conjunction with the cumulative impacts, would be anticipated to have short-term, negligible, adverse impacts to threatened and endangered animal species and animal species of concern.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Historic Structures

Impact Intensity Threshold

In order for a structure or building to be listed in the NRHP, it must be associated with an important historic context, i.e., possess significance—the meaning or value ascribed to the structure or building, *and* have integrity of those features necessary to convey its significance, i.e., location, design, setting, workmanship, materials, feeling, and association (see *National Register Bulletin 15*, *How to Apply the National Register Criteria for Evaluation*).

Impact Intensity	Intensity Definition
Negligible	Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for section 106 would be *no adverse effect.*
Minor	*Adverse Impact*: Alteration of a feature(s) would not diminish the overall integrity of the resource. The determination of effect for section 106 would be *no adverse effect.*
	Beneficial Impact: Stabilization/preservation of character-defining features, in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. The determination of effect for section 106 would be *no adverse effect.*
Moderate	*Adverse Impact:* Alteration of a feature(s) would diminish the overall integrity of the resource. The determination of effect for section 106 would be *adverse effect.* A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation, in accordance with 36 CFR 800.6(b). Measures identified in the memorandum of agreement to minimize or mitigate adverse impacts reduce the intensity of the impact under NEPA from major to moderate.
	Beneficial Impact: Rehabilitation of a structure in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties.* The determination of effect for section 106 would be *no adverse effect*.

Impact Intensity	Intensity Definition
Major	*Adverse Impact:* Alteration of a feature(s) would diminish the overall integrity of the resource. The determinations of effect for section 106 would be *adverse effect.* Measures to minimize or mitigate adverse impacts cannot be agreed on and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council on Historic Preservation are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).
	Beneficial impact: Restoration of a structure in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. For purposes of section 106, the determination of effect would be *no adverse effect*.

Since historic structures are non-renewable—any impact is considered long term and permanent, there are no short-term impacts to historic structures.

No-Action Alternative Analysis

Under the no-action alternative, there would be no changes in current park management of Route 10 (Zion-Mt. Carmel Highway). No new construction would take place and no improvements would be made. As a result, no historic structures would be impacted by this alternative.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect historic structures include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. These construction projects would have the potential to disturb historic structures and diminish the overall integrity of the historic resource through such activities as disturbance or damage to the structures. Historic features could also be covered through activities such as placement of asphalt layers that would be positioned near historic curbing or drainage features. Any of the projects would be designed to minimize impacts to listed historic structures and their contributing features. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to historic structures would be short and long term, negligible, and adverse. However, because the no-action alternative would not impact historic structures, there would be no cumulative impacts.

Conclusion. There would be no new impacts or changes to impacts to historic structures under the no-action alternative. Because the no-action alternative would not impact historic structures, there would be no cumulative impacts from the no-action alternative.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

Route 10 (Zion-Mt. Carmel Highway) was included in the NRHP in 1987 (NPS 1987). The road has four structures identified as contributing structures including the Pine Creek Bridge, Virgin River Bridge, Zion-Mt. Carmel Highway tunnel, and Zion-Mt. Carmel Highway switchbacks. Other contributing structures of the highway include numerous culverts and ashlar masonry retaining walls, two 20-yard bridges, and a 0.10-mile-long rock-faced tunnel.

Under this alternative, proposed changes would have the potential to impact Route 10 (Zion-Mt. Carmel Highway [LCS #051307]). Parking areas would be modified on the east side of the tunnel, a slow-moving vehicle lane would be added, a sidewalk constructed, the current park ranger kiosks replaced, scaling of the canyon walls completed, a crosswalk relocated, a wayside exhibit installed, and a painted safety median added in the center of the road. The safety median improvement includes adding rumble strips to enhance driver awareness and ranger safety. Over the short term during construction activities, historic structures could be damaged by construction equipment. Mitigation measures would require that construction workers stay within the defined construction zone and that care be taken to avoid historic structures not impacted by construction activities. During construction, short-term potential impacts to historic structures would be minor and adverse.

The addition of a painted median and rumble strips in the center of the roadway is likely to have a long-term impact to the historic fabric of Route 10 (Zion-Mt. Carmel Highway) by creating a visual intrusion that does not harmonize with the historic character. In addition, stone curbing would be replaced or added in parking area 1, and some existing stone blocks in the vicinity of the proposed pedestrian walkway may need to be removed or covered to widen the walkway. Construction work on the pedestrian walkway would occur to prevent damage to important headwall features by supporting the walkway independently of the headwall to prevent damage to the stone headwall. These changes would not diminish the overall historic integrity of the resource and the impacts would be long term, minor, and adverse.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect historic structures include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. These construction projects would have the potential to disturb historic structures and diminish the overall integrity of the historic resource. Historic features could also be covered by placement of asphalt layers that would be installed near historic curbing or drainage features. Any of the projects would need to be designed to minimize impacts to listed historic structures and their contributing features and meet the *Department of the Interior Standards for Historic Preservation*. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to historic structures would be short and long term, negligible, and adverse. The preferred alternative would contribute short-term, negligible, and adverse, and long-term, minor, and adverse impacts to historic structures.

Conclusion. During construction, short-term potential impacts to historic structures would be minor and adverse. Long-term impacts from the preferred alternative would be minor and adverse. The cumulative impacts from the preferred alternative, in combination with other

past, present, and reasonably foreseeable future projects, would be short term, negligible to minor, and adverse.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Section 106 Summary. After applying Advisory Council on Historic Preservation criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on Zion historic structures.

Cultural Landscapes

Impact Intensity Threshold

Cultural landscapes are the result of the long interaction between people and the land, the influence of human beliefs and actions over time on the natural landscape. Shaped through time by historical land-use and management practices, as well as politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes; making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

Impact Intensity	Impact Type	Intensity Description
Negligible	Adverse or Beneficial	Impact is at the lowest levels of detection with neither adverse or beneficial consequences. The determination of effect for section 106 would be *no adverse effect*.
Minor	Adverse	Alteration of a pattern(s) or feature(s) of the landscape would not diminish the overall integrity of the landscape. The determination of effect for section 106 would be *no adverse effect*.
	Beneficial	Preservation of landscape patterns and features in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties, with Guidelines for the Treatment of Cultural Landscapes* (1996). The determination of effect for section 106 would be *no adverse effect*.
Moderate	Adverse	Alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for section 106 would be *adverse effect*. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation, in accordance with 36 CFR 800.6(b). Measures identified in the memorandum of agreement to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.

Impact Intensity	Impact Type	Intensity Description
	Beneficial	Rehabilitation of a landscape or a pattern(s) or feature(s) of the landscape in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties, with Guidelines for the Treatment of Cultural Landscapes* (1996). The determination of effect for section 106 would be *no adverse effect*.
Major	Adverse	Alteration of a pattern(s) or feature(s) of the landscape would diminish the overall integrity of the landscape. The determination of effect for section 106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council on Historic Preservation are unable to negotiate and execute a memorandum of agreement, in accordance with 36 CFR 800.6(b).
	Beneficial	Restoration of a landscape or its pattern(s) and feature(s) in accordance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties, with Guidelines for the Treatment of Cultural Landscapes.* The determination of effect for section 106 would be *no adverse effect*.

Impacts to cultural landscapes would be short term if the effects last less than 1 year and long term if the effects last greater than 1 year or are permanent.

No-Action Alternative Analysis

Under the no-action alternative, there would be no changes in current park management of Route 10 (Zion-Mt. Carmel Highway) as a potential cultural landscape. As a result, the potential cultural landscape would not be impacted by the proposed project alternative.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway). These construction projects would have the potential to disturb cultural landscapes through changes to the features or character. Any of the projects would be designed to minimize impacts to cultural landscapes. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to cultural landscapes would be short and long term, negligible, and adverse. However, because the no-action alternative would not impact cultural landscapes, there would be no cumulative impacts.

Conclusion. There would be no new impacts to cultural landscapes under the no-action alternative. Because the no-action alternative would not impact cultural landscapes, there would be no contribution to cumulative impacts from the no-action alternative.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

The same changes and additions as those identified in the historic structures section would have the potential to impact cultural landscapes. Route 10 (Zion-Mt. Carmel Highway) and its associated contributing historic features have been identified by the National Park Service as a potential cultural landscape and is currently managed as such. Potential impacts to cultural landscapes would arise from changes to the historic character of Route 10 (Zion-Mt. Carmel Highway) in the vicinity of the tunnel. As discussed under "Historic Structures," those changes would include the addition of the painted center median and rumble strips, the new ranger kiosks, and the potential for impacts to the historic curbing as a result of construction of the pedestrian sidewalk. Potential impacts to cultural landscapes as a result of construction activities would be short term, negligible, and adverse. Long-term impacts would also be minor and adverse as the proposed changes would add structural elements that are similar in material type, texture, and color, but would not diminish or distract from the overall integrity of the landscape.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect cultural landscapes include rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway). These construction projects would have the potential to disturb cultural landscapes by changes to the features or character. Any of the projects would have to be designed to minimize impacts to cultural landscapes. As a result, assuming appropriate mitigation measures are enacted for the cumulative projects, impacts to cultural landscapes would be short term, negligible, and long term, negligible, and adverse. The preferred alternative would contribute short- and long-term, minor, adverse impacts to the cultural landscape. The cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short- and long-term, negligible to minor, adverse impacts to cultural landscapes.

Conclusion. Potential impacts to cultural landscapes as a result of construction activities would be short term, negligible, and adverse. Long-term impacts would be minor and adverse as the proposed changes would add structural elements that are similar in material type, texture, and color, but would not diminish or detract from the overall integrity of the landscape. The cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short- and long-term, negligible to minor, adverse impacts to cultural landscapes.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Section 106 Summary. After applying Advisory Council on Historic Preservation criteria of adverse effects (36 CFR Part 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on Zion cultural landscapes.

Health and Safety

Impact Intensity Threshold

The impact assessment for health and safety focused on the number of potential individuals impacted and the severity of the impact. The thresholds of change for the intensity of an impact are defined as follows:

Impact Intensity	Intensity Definition
Negligible	Health and safety would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on visitor or employee health and safety.
Minor	The effects would be detectable, but would not have an appreciable effect on health and safety. If mitigation were needed, it would be relatively simple and would likely be successful.
Moderate	The effects would be readily apparent and would result in substantial, noticeable effects to health and safety on a local scale. Mitigation measures would probably be necessary and would likely be successful.
Major	The effects would be readily apparent and would result in substantial, noticeable effects to health and safety on a regional scale. Extensive mitigation measures would be needed, and their success would not be guaranteed.

The effects to safety are considered short term if the effects last for the period of construction and long term if the effects last beyond the period of construction.

No-Action Alternative Analysis

In the short term, there would be no new impacts or changes to impacts to health and safety under the no-action alternative. The current situation constitutes several health and safety concerns. The area east of the tunnel is congested with traffic stopping and vehicle occupants standing in the road while waiting for passage through the tunnel; drivers looking for parking spaces in designated parking areas and parking in informal pullouts; and pedestrians walking along the road to access the Canyon Overlook Trail. Park rangers are required to stand in the road to direct traffic through the tunnel. Potential for rockfalls along this section of Route 10 (Zion-Mt. Carmel Highway) would continue in the long term as the steep rock slopes erode. These effects would not only be detectible, but could be extensive and affect health and safety on a local scale. There have been no reports of accidents, but the congested nature of the area and the interaction between pedestrians and motorized vehicles creates a potential for future problems. Together, these conditions result in short- and long-term, minor to moderate, adverse impacts to health and safety.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect health and safety include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. These projects could impact worker safety in the construction zones, and employee and public safety as visitors travel through the construction zones. Construction workers would be trained in safety, and visitors would be advised of

the construction projects. The ability for visitors to stop and leave their vehicles in the construction zone would be minimized. The impacts to health and safety during construction associated with these projects would be short term, minor, and adverse. Improved traveling surfaces on roadways could improve safety. Improved wayside exhibits may provide safety information that would reduce visitor accidents. These projects would be anticipated to result in long-term, beneficial impacts to health and safety. The no-action alternative would contribute short- and long-term, minor to moderate, adverse impacts to health and safety. The overall cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the no-action alternative, would be short-term, minor, and adverse, and long-term, negligible, and adverse impacts to health and safety.

Conclusion. The no-action alternative would have a short- and long-term, minor to moderate, adverse impact to health and safety. The overall cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the no-action alternative, would be short-term, minor and adverse, and long-term, negligible, and adverse impacts to health and safety.

Proposed Action Analysis

The preferred alternative could impact the health and safety of construction workers in the proposed project area, the health and safety of park staff directing traffic, and the health and safety of those traveling Route 10 (Zion-Mt. Carmel Highway) during the period of construction. One-lane traffic through the proposed project area increases the chance of accidents, although traffic would be controlled, directed, and move slowly through the construction zone. Rock scaling and blasting would be conducted in accordance with applicable safety guidelines to ensure that impact to workers, rangers, and visitors is minimized. Impacts to health and safety in the short term, during the construction period under the proposed action, would not have an appreciable effect on health and safety and would have negligible to minor and adverse impacts. Long-term beneficial impacts from the preferred alternative would include improved employee safety by constructing a safety median and rumble strips to assist park rangers with traffic control through the tunnel. Scaling the rock slopes to prevent rockfalls would address visitor and park staff safety concerns. Relocation of the crosswalk to a safer location and construction of a sidewalk along the north side of the highway for foot traffic accessing the Canyon Overlook Trail would eliminate visitors walking over uneven surfaces and potential accidents resulting from pedestrians walking in or near roadway traffic. The effects of these improvements would be noticeable and result in substantial improvements to health and safety in this area. These improvements would be anticipated to result in long-term, beneficial impacts.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect health and safety include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. These projects could impact worker safety in the construction zones, and employee and public safety as visitors travel through the construction zones. Construction workers would be trained in safety procedures and visitors would be advised of the construction work. The ability of visitors to stop and leave their vehicles in the construction zone would be minimized. The impacts to health and safety during

the construction work associated with these projects would be short term, minor, and adverse. Improved surfaces on roadways could enhance safety, and improved wayside exhibits may provide safety information that would reduce visitor accidents. These projects would be anticipated to result in long-term, beneficial impacts to health and safety. The preferred alternative would contribute short-term, negligible to minor, adverse impacts, and long-term, beneficial impacts to health and safety. The overall cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor, and adverse, long term, and beneficial to health and safety.

Conclusion. Impacts to health and safety would be short term, negligible to minor, and adverse; and long term, beneficial. The overall cumulative impacts of past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor, and adverse, and long-term and beneficial to health and safety.

Park Operations

Impact Intensity Threshold

Park operations, for the purpose of this analysis, refers to the quality and effectiveness of the infrastructure, and the ability to maintain the infrastructure used in the operation of a park in order to adequately protect and preserve vital resources and provide for an effective visitor experience. This includes an analysis of the condition and usefulness of the facilities and developed features used to support the operations of the park. Facilities included in this proposed project include Route 10 (Zion-Mt. Carmel Highway), including the tunnel, parking areas, and social pullouts; park ranger kiosks located on either side of the tunnel; the Canyon Overlook Trail and trailhead; and the crosswalk accessing the Canyon Overlook Trail.

Impact Intensity	Intensity Definition
Negligible	Park operations would not be affected, or the effects would be at low levels of detection and would not have an appreciable effect on park operations.
Minor	The effect would be detectable and likely short term, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation was needed to offset adverse effects, it would be simple and likely successful.
Moderate	The effects would be readily apparent, likely long term, and would result in a substantial change in park operations in a manner noticeable to staff and to the public. Mitigation measures would be necessary to offset adverse effects and would likely be successful.
Major	The effects would be readily apparent, long term, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.

The effects to park operations are considered short term if the effects last for the treatment action and long term if the effects last longer than the treatment action.

No-Action Alternative Analysis

Under the no-action alternative, park staff would continue the effort to maintain traffic control with the congested nature of the area east of the tunnel. Park rangers would continue to direct traffic through the tunnel amidst vehicles turning into the parking area and vehicles parking along the road. The use of four social trails would continue to challenge staff efforts at minimizing erosion and protect natural resources. Rockfalls would continue to cause full or partial road closures, resulting in park staff redirecting traffic and removing the fallen rocks. These conditions would be detectible, but not appreciable, and therefore, would result in short- and long-term, minor, adverse impacts to park operations.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect park operations include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. During construction, some additional park staff time would be required to notify visitors of the projects and to monitor construction activities. In addition, travel time for park staff through the construction zone could be increased. Such impacts would be short term, negligible, and adverse. All three of these projects rehabilitate worn and dated park infrastructure, which could appreciably reduce maintenance requirements. These improvements would allow the park to focus its resources in other areas, which would result in a noticeable, but not appreciable effect on park operations. The long-term impacts from other projects would be beneficial. The no-action alternative would contribute short- and long-term, negligible, adverse impacts to park operations. Overall cumulative impacts to park operations from the no-action alternative, in combination with other past, present, and reasonably foreseeable future projects, would be short term, negligible, and adverse, and long term, beneficial.

Conclusion. Continuation of the no-action alternative would result in short- and long-term, minor, adverse impacts to park operations. Overall cumulative impacts to park operations from the no-action alternative, in combination with other past, present, and reasonably foreseeable future projects, would be short term, negligible, and adverse, and long term, beneficial.

Proposed Action Analysis

Under the preferred alternative, elimination of informal parking areas would reduce the overall amount of congestion in the area by reducing the number of vehicles that could park there. Construction of a sidewalk along the roadside would direct the flow of foot traffic to the Canyon Overlook Trail, also reducing congestion in the area. Reducing the total number of vehicles and pedestrians in the area, thus reducing congestion, would increase the operational efficiency of the park rangers directing traffic and minimize the need for additional rangers. Replacement of ranger kiosks on either side of the tunnel would provide better staging for the park ranger staff. Elimination of perceived safety concerns by providing medians for the park rangers would permit the park rangers to focus on directing traffic by reducing the need to focus on personal safety. Rehabilitation of the 0.25-mile road section would reduce the future maintenance requirements of the road and allow the park to focus its resources in other areas. The proposed improvements would not result in an appreciable effect on park operations, but

there would be some effect. The impacts would be long term and beneficial. Short-term, negligible, adverse impacts to park operations may occur as a result of traffic delays impacting park staff traveling through the proposed project area during construction.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect park operations include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. During construction, some additional park staff time would be required to notify visitors of the projects and to monitor construction activities. In addition, travel time for park staff through the construction zone could be increased. Such impacts would be short term, negligible, and adverse. All three of these projects rehabilitate worn and dated park infrastructure, which could appreciably reduce maintenance requirements. The road rehabilitation projects would reduce the potential for closure due to road failure or rockfalls, and increase the overall effectiveness of park roads. These improvements would allow the park to focus its resources in other areas, which would result in a noticeable, but not appreciable, effect on park operations. The long-term impacts from other projects would be beneficial. The preferred alternative would contribute short-term, negligible, adverse impacts, and long-term, beneficial impacts to park operations. Overall cumulative impacts to park operations from the preferred alternative, in combination with other past, present, and reasonably foreseeable future projects, would be short term, negligible, and adverse, and long term, beneficial.

Conclusion. Implementation of the preferred alternative would result in short-term, negligible, adverse impacts, and long-term, beneficial impacts to park operations. Overall cumulative impacts to park operations from the preferred alternative, in combination with other past, present, and reasonably foreseeable future projects, would be short term, negligible, and adverse, and long term, beneficial.

Soundscapes

Impact Intensity Threshold

The methodology used to assess noise impacts is consistent with NPS *Management Policies 2001* and Director's Order 47: *Soundscape Preservation and Noise Management*. Soundscape impacts were evaluated based on national literature available to estimate the average decibel levels of the short-term construction activities and long-term proposed addition of rumble strips, areas of use by the public identified in relation to where the construction activity is proposed, and other considerations such as topography and prevailing winds.

Impact Intensity	Intensity Definition
Negligible	Natural sound environment would not be affected or the effects would be at or below the level of detection, would be short term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the public experience.

Impact Intensity	Intensity Definition
Minor	Effects to the natural sound environment would be detectable, although the effects would be short term, localized, and would be small and of little consequence to the public experience. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Effects to the natural sound environment would be readily detectable, long term and localized, with consequences at the regional or population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Effects to the natural sound environment would be obvious, long term, and would have substantial consequences to the visitor experience or to biological resources in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Impacts to the soundscape would be short term if they occur only during the construction period and long term if they occur after the construction period.

No-Action Alternative Analysis

There would be no new impacts to soundscapes under the no-action alternative.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect soundscapes include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. The first two projects in particular, would use heavy equipment that would directly impact the soundscape of the project area by contributing detectible heavy equipment noise to the soundscape; however, the noise would be short term. The wayside exhibit replacement project would involve little or no mechanized equipment that would contribute noise to the soundscape. Hand-tool noise would likely be below the level of detection. Therefore, impacts to soundscapes from the other projects would be short term, minor, and adverse. Because the no-action alternative would not impact soundscapes, there would be no cumulative impacts.

Conclusion. There would be no new impacts to soundscapes under the no-action alternative. Because the no-action alternative would not impact soundscapes, there would be no contribution to cumulative impacts from the no-action alternative.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Proposed Action Analysis

The opportunity to experience Zion's natural soundscape unimpaired by the sounds of human civilization is an important part of the overall visitor experience, especially as it contributes to the solitude and wilderness experience that is integral to much of the park (NPS 2002). Data collected in the park suggests that Zion is a quiet soundscape. Little variation in the soundscape was observed across the park during the day, and throughout the year (NPS 2002). Human-generated noise in the park is predominantly from vehicle traffic, aircraft overflights, and maintenance and administrative activities (including fire management). Areas near campgrounds, Zion Lodge, and roads often have higher levels of noise. Mechanical noises can drown out these natural sounds on a temporary basis (NPS 2002).

Under the preferred alternative, soundscapes would be impacted by blasting, rock excavation, and heavy equipment noise during construction, both day and night. Table 5 shows the expected noise levels for various pieces of equipment that could be used during the road construction. Blasting noise would be intermittent and readily detectible when it occurs; however, the effects would be short term and localized. Noise associated with construction would be more consistent during the project than blasting noise, would be readily detectible, but would be localized and short term. Some noise for blasting and construction equipment could be carried over into a larger area. Hikers in the Pine Creek slot canyon would hear construction noise at the entrance to the canyon, but once they descend into the slot canyon, the sound would not be heard because the topography would act as a natural sound barrier. There are no campgrounds east of the tunnel, and campgrounds on the west side of the tunnel are located at a great distance from the construction activities. Construction noise would be blocked by the topography and would likely not be heard in any campground. Short-term impacts to soundscapes from construction noise would be minor to moderate and adverse.

Installation of ground-in rumble strips on the inside and outside lane lines, as well as the limits of the new safety median, would create additional noise if vehicles drift outside the travel lane, across the lane lines, or into the safety median, and drive over the rumble strips. The posted speed limit approaching the proposed rumble strips is 25 miles per hour, with posted signs warning of the potential for stopping. Vehicles may be stopped (in the vicinity of the safety median) before entering the tunnel; therefore, vehicles that cross the rumble strips on the safety medians should be traveling well below 25 miles per hour.

Rumble strips produce a low frequency sound that increases the ambient decibel (dB) level an additional 7 dB over noise levels produced by traffic on normal pavement; however, the type of rumble strips tested (rolled or ground-in), type of vehicle used in the test, and the speed at which the vehicle was traveling in the test is unknown (FHWA 2005c). Normal freeway traffic noise is approximately 70 dB, while heavy traffic is approximately 85 dB (FHWA 2005c). The rumble strips in this location should produce an intermittent increase in localized noise of 7 dB or less (less because the vehicles in this circumstance would be traveling below normal highway speeds, which would reduce the pitch and noise level).

TABLE 5. NOISE LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Equipment	A-Weighted Noise Level (dB) at 50 feet
Front-End Loaders	72 – 98 dB
Backhoes	72 – 96 dB
Excavator	72 – 98 dB
Graders	76 – 96 dB
Compactors (Rollers)	72 – 88 dB
Pavers	82 – 94 dB
Trucks	70 – 96 dB
Concrete/Grout Mixer	72 – 91 dB
Rock Drill	75 – 98 dB

Because the sound created by vehicles driving over the rumble strips would be intermittent and at a different pitch from normal traffic on Route 10 (Zion-Mt. Carmel Highway), it may be more noticeable. The effects would be readily detectible in the localized area, but would likely not be detectable over the regional area. The impacts of installation of rumble strips would be long term, minor, and adverse.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect soundscapes include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. The first two projects, in particular, would use heavy equipment that would directly impact the soundscape of the project area by contributing detectible heavy equipment noise; however, that noise would be short-term. The wayside replacement project would involve little or no mechanized equipment that would contribute noise to the soundscape. Noise from hand tools would likely be below the level of detection. Therefore, impacts to soundscapes from the other projects would be short term, minor, and adverse. The preferred alternative would contribute short-term, minor to moderate, and adverse, and long-term, minor, and adverse impacts to the cumulative impacts. The overall cumulative impacts from past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor, and adverse. There would be no long-term cumulative impacts since the other projects would have no long-term impacts.

Conclusion. Impacts to soundscapes from the proposed action would be short term, minor to moderate, and adverse, and long term, minor, and adverse. The overall cumulative impacts from past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, minor, and adverse. There would be no long-term cumulative impacts since the other projects would have no long-term impacts.

Impairment. Because there would be no major adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the park's establishing legislation, (2) key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park, or (3) identified as a goal in the park's *General Management Plan* or

other relevant National Park Service planning documents, there would be no impairment of park resources or values.

Visitor Experience

Impact Intensity Threshold

Public scoping input and observation of visitation patterns, combined with an assessment of what is available to visitors under current management, were used to estimate the effects of the actions in the various alternatives of this document. The impact on the ability of the visitor to experience a full range of Zion resources was analyzed by examining resources and objectives presented in the park significance statement. The potential for change in visitor use and experience proposed by the alternatives was evaluated by identifying projected increases or decreases in use of the Route 10 (Zion-Mt. Carmel Highway) section where construction is proposed to take place, and other visitor uses, and determining how these projected changes would affect the desired visitor experience, and to what degree, and for how long. The thresholds of change for the intensity of an impact to visitor experience are defined as follows:

Impact Intensity	Intensity Definition
Negligible	The visitor would not be affected or changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.
Minor	Changes in visitor use and/or experience would be detectable, although the changes would be slight. Some of the visitors would be aware of the effects associated with the alternative, but the effects would be slight and not noticeable by most visitors.
Moderate	Changes in visitor use and/or experience would be readily apparent to most visitors. Visitors would be aware of the effects associated with the alternative and might express an opinion about the changes.
Major	Changes in visitor use and/or experience would be readily apparent to all visitors, severely adverse or exceptionally beneficial. Visitors would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Impacts to visitor use and experience are considered short term if the effects last only as long as the construction period. Impacts are considered long term if the effects last longer than the construction period.

No-Action Alternative Analysis

There would be no new impacts to visitor experience under the no-action alternative. Visitor experience is currently adversely impacted by the traffic congestion in the area east of the tunnel associated with visitors parking in informal pullouts, walking along the road to access the Canyon Overlook Trail, and the deteriorated appearance of the landscape caused by the social trails from the parking area to the Pine Creek canyoneering route. These effects are readily apparent and visitors would likely notice these effects. Taken together, these effects would result in short- and long-term, moderate, adverse impacts to visitor experience.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect visitor experience include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. The first two projects would be expected to cause travel delays; however, because none of the highway construction projects would be executed simultaneously, there would be no compounding of adverse impacts to visitors (in the form of traffic delays). In addition, private vehicles are not permitted on the route to Temple of Sinawava, so traffic delays would impact the park bus system and not create a line of vehicles waiting at the traffic stop. The third project would impact the availability of wayside exhibits for visitor use, and construction workers and equipment performing the work would increase congestion in the project area. Upon completion of the projects, the road surfaces and visitor wayside exhibits would be improved. The cumulative impacts from these projects would be short term, moderate, adverse, and long term, beneficial. However, because the no-action alternative would not impact visitor experience, there would be no cumulative impacts.

Conclusion. There would be no new impacts or changes to impacts to visitor experience under the no-action alternative. Current impacts to visitor experience are short and long term, moderate, and adverse. Because the no-action alternative would not impact visitor experience, there would be no contribution to cumulative impacts from the no-action alternative.

Proposed Action Analysis

Under the preferred alternative, visitor experience would be adversely impacted in the short term by delays due to construction; however, with mitigation, those delays would be limited to a maximum of 30 minutes on both sides of the tunnel, except during blasting when delays could be as long as an hour. Oversized vehicles driving through the tunnel already delay visitors from 15 to 20 minutes, so construction delays would not impede visitors much beyond existing conditions. Also, parking at the tunnel and access to the Canyon Overlook Trail would be closed for the duration of the project to avoid conflicts with construction activities. The comfort station at parking area 1 would also be unavailable to visitors. Bicycle touring groups would be able to pick up and transport bicyclists through the tunnel during construction; however, the pick-up location could be moved depending on construction activities. Access to the Pine Creek slot canyon would be rerouted from parking area 1 to a side canyon east of the tunnel and visitors would be informed about this change when they obtain their backcountry permits. Night time construction activities, including blasting, would result in increased equipment traffic and lights, which could impact visitor experience in the campground as some sites are located adjacent to, and are visible from the road. Short-term impacts related to construction activities would be apparent to most visitors, resulting in moderate adverse impacts.

Long-term impacts to visitor experience would include fewer parking spaces near the east entrance of the tunnel because two informal pullouts would be eliminated. Bicycling outfitter incidental business permit holders would also experience less parking availability for pick-up of bicyclists to transport through the tunnel. In the long term, visitor experience would be positively impacted by improved roadway and parking area surfaces, the conversion of one informal pullout to a slow vehicle passing lane, and reduced congestion of the area east of the tunnel by eliminating informal pullouts, redirecting pedestrian traffic, and by improving

delineation of parking spaces. Scaling rock slopes would alleviate potential safety concerns from falling rock. Establishment of a sidewalk along the road east of the tunnel for pedestrian access to the Canyon Overlook Trail would improve visitor experience for visitors accessing the trail from parking area 2. Visitors stopping at the east side of the tunnel to access the Canyon Overlook Trail would notice these beneficial changes; however, those traveling through the tunnel might not be aware of the changes. Improvements to infrastructure would be anticipated to result in long-term, minor, beneficial impacts to visitor experience.

Cumulative Impacts. Past, present, and reasonably foreseeable future projects with the potential to affect visitor experience include rehabilitation of the park road to the Temple of Sinawava, rehabilitation of the remainder of Route 10 (Zion-Mt. Carmel Highway), and Phase II of the wayside exhibit replacement program. The first two projects would be expected to cause travel delays; however, because none of the highway construction projects would be executed simultaneously, there would be no compounding of adverse impacts to visitors (in the form of traffic delays). In addition, private vehicles are not permitted on the route to the Temple of Sinawava, so traffic delays would impact the park bus system and not create a line of vehicles waiting at the traffic stop. The third project would impact the availability of wayside exhibits for visitor use and construction workers and equipment performing the work would increase congestion in the project area. Upon completion of the projects, the road surfaces and visitor wayside exhibits would be improved. The cumulative impacts from these projects would be short term, moderate, adverse, and long term, beneficial. The preferred alternative would contribute short-term, moderate, and adverse impacts, and long-term, beneficial impacts. The overall cumulative impacts from past, present, and reasonably foreseeable future projects, in combination with the preferred alternative, would be short term, moderate, and adverse, and long term, beneficial.

Conclusion. Impacts to visitor experience would be short term, moderate, and adverse, and long term, minor, and beneficial. The preferred alternative, in conjunction with the cumulative impacts, would result in short-term, moderate, adverse impacts, and long-term, beneficial impacts to visitor experience.

CONSULTATION AND COORDINATION

SCOPING

Scoping is the effort to involve agencies and the general public in determining the scope of issues to be addressed in the environmental document. Among other tasks, scoping determines important issues and eliminates issues not important; allocates assignments among the interdisciplinary team members and/or other participating agencies; identifies related projects and associated documents; identifies other permits, surveys, consultations, etc., required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made. Scoping includes any interested agency, or any agency with jurisdiction by law or expertise (including the Advisory Council on Historic Preservation, the Utah SHPO, and American Indian tribes) to obtain early input.

Staff of Zion National Park, the Federal Highway Administration, and resource professionals of the National Park Service-Denver Service Center, conducted internal scoping. This interdisciplinary process defined the purpose and need, identified potential actions to address the need, determined the likely issues and impact topics, and identified the relationship of the proposed action to other planning efforts at the park.

A press release initiating public scoping and describing the proposed action was issued August 11, 2005 (appendix A). Comments were solicited during a public scoping period. No comments were received. Letters were sent out to tribes and agencies on October 24, 2005 (appendix B).

COMPLIANCE WITH FEDERAL AND STATE REGULATIONS

For the no-action alternative, no permits would be required.

The undertakings described in this document are subject to section 106 of the NHPA, as amended in 1992 (16 USC 470 *et seq.*).

In accordance with section 7(c) of the Endangered Species Act of 1973, as amended (16 USC 1531 *et seq.*), it is the responsibility of the federal agency proposing the action (in this case the National Park Service) to determine whether the preferred alternative would adversely affect any listed species or designated critical habitat. The National Park Service contacted the USFWS to obtain a list of potential threatened, endangered, or special-status species in the project area. Based on the list provided by the USFWS dated July 22, 2005, and an analysis of the preferred alternative, the National Park Service has determined that impacts to threatened, endangered, or special-status species would be short term and negligible and would not be likely to adversely affect such species. A copy of this EA will be provided to the USFWS for their review and comment.

The National Park Service preferred alternative would comply with Executive Order 11988 (*Floodplain Management*) and the Fish and Wildlife Coordination Act of 1934, Public Law 85-624, as amended (16 USC §§ 661–666c).

LIST OF NATIONAL PARK SERVICE CONTACTS AND DOCUMENT PREPARERS

This environmental assessment / assessment of effect was prepared by engineering-environmental Management, Inc., under the direction of the National Park Service. Denver Service Center and Zion National Park staff provided invaluable assistance in the development and technical review of this EA. National Park Service staff that provided information include:

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Federal Emergency Management Administration (FEMA)

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Federal Highway Administration (FHWA)

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2005b E-mail message from Kezia Nielsen to David Hayes regarding ranger kiosk design. Dated August 2, 2005.

2005c E-mail message from Kezia Nielsen to David Hayes regarding soil erosion reduction along the access route to Pine Creek Canyon. Dated August 2, 2005.

2005d Zion National Park soils information found at: <http://science.nature.nps.gov/nrdata/datastore.cfm?ID=33712> and <http://www.nps.gov/gis>

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U.S. Geologic Service (USGS)
2005 National Atlas Map found at <www.nationalatlas.gov/natlas/Natlasstart.asp>.

APPENDIX A: NATIONAL PARK SERVICE PRESS RELEASE

National Park Service
U.S. Department of the Interior

Zion National Park

Springdale, Utah 84767

435 772-3256 phone
435 772-3426 fax
www.nps.gov/zion

Zion National Park News Release

August 11, 2005
For Immediate Release
Ron Terry 435 772-0160
05-20

Zion National Park Begins an Environmental Assessment

Zion National Park is beginning an environmental assessment (EA) to evaluate the potential impacts from a proposed road rehabilitation project to improve visitor and park staff safety near the east entrance to the Zion-Mt. Carmel tunnel. The project area includes the road corridor and vehicle pullouts from the bridge at the east entrance to the tunnel - east ¼-mile, adjacent vehicle pullouts, and the Canyon Overlook trailhead and parking area. Construction is proposed to begin in September 2006 and could take up to 3 months to complete.

This proposed project includes: overlaying the existing pavement for ¼ mile; scaling areas of overhanging rock in the road-cut near the tunnel entrance; changing an existing pullout into a parking area; placing a 4-foot curbed pedestrian walkway along the north side of the road from the new parking area to the trailhead; and reconfiguring the Canyon Overlook parking area.

The National Park Service welcomes your comments, suggestions, and other input concerning this project to help us identify issues of concern and to ensure that the EA thoroughly addresses potential impacts from the proposal. Please submit written comments by **August 26, 2005** to: Superintendent, East Portal Road Rehabilitation, Zion National Park, Springdale, UT 84767.

Please be aware that names and addresses of respondents may be released if requested under the Freedom of Information Act. The NPS practice is to make comments, including names and home addresses of respondents, available to the public during regular business hours. Individual respondents may request that their home address be withheld from the record, which will be honored to the extent allowable by law. There may also be circumstances in which a respondent's identity would be withheld from the record, as allowable by law. If you wish your name and/or address to be withheld, you must state this prominently at the beginning of your written comments. Submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be made available for public inspection in their entirety.

For more information on this proposed project contact Kezia Nielsen, Environmental Protection Specialist, at (435) 772-0211 or visit the park website at http://www.nps.gov/zion/PlanningDocs.htm.

-NPS-

APPENDIX B: CONSULTATION AND COORDINATION LETTERS

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

In Reply Refer To
FWS/R6
ES/UT
05-1102

July 22, 2005

To: Superintendent, (Attention: Kezia Nielsen), Zion National Park, Springdale, Utah 84767

From: Acting Field Supervisor, Fish and Wildlife Service, Ecological Services, West Valley City, Utah

Subject: Road Rehabilitation Project Near East Entrance to Mt. Carmel Tunnel N1621(ZION-RM&R)

Based on information provided in your letter of July 14, 2005, below is a list of endangered (E), threatened (T), and candidate (C) species that may occur in the area of influence of your proposed action.

Common Name	Scientific Name	Status
California Condor[7]	*Gymnogyps californianus*	E
Mexican Spotted Owl[1,4]	*Strix occidentalis lucida*	T

[1] Nests in this county of Utah.
[4] Critical habitat designated in this county.
[7] Experimental nonessential population.

The proposed action should be reviewed and a determination made if the action will affect any listed species or their critical habitat. If it is determined by the Federal agency, with the written concurrence of the Service, that the action is not likely to adversely affect listed species or critical habitat, the consultation process is complete, and no further action is necessary.

Formal consultation (50 CFR 402.14) is required if the Federal agency determines that an action is "likely to adversely affect" a listed species or will result in jeopardy or adverse modification of critical habitat (50 CFR 402.02). Federal agencies should also confer with the Service on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10). A written request for formal consultation or conference should be submitted to the Service with a completed biological assessment and any other relevant information (50 CFR 402.12).

Only a Federal agency can enter into formal Endangered Species Act (ESA) section 7 consultation with the Service. A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment by giving written notice to the Service of such a designation. The ultimate responsibility for compliance with ESA section 7, however, remains with the Federal agency.

Your attention is also directed to section 7(d) of the ESA, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

Please note that the peregrine falcon which occurs in all counties of Utah was removed from the federal list of endangered and threatened species per Final Rule of August 25, 1999 (64 FR 46542). Protection is still provided for this species under authority of the Migratory Bird Treaty Act which makes it unlawful to pursue, hunt, take, capture, or kill migratory birds, their parts, nests, or eggs (16 U.S.C. 703-712). When taking of raptors or other migratory birds is determined by the applicant to be the only alternative, application for federal and state permits must be made through the appropriate authorities. For take of raptors; nests occupied by eggs or nestlings; nests still essential to the survival of the juvenile bird; nestlings; or eggs, Migratory Bird Permits pursuant to 50 CFR parts 13 and 21 must be obtained through the Service's Migratory Bird Permit Office in Denver at (303) 236-8171.

We recommend use of the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* which were developed in part to provide consistent application of raptor protection measures statewide and provide full compliance with environmental laws regarding raptor protection. Raptor surveys and mitigation measures are provided in the Raptor Guidelines as recommendations to ensure that proposed projects will avoid adverse impacts to raptors, including the peregrine falcon.

If we can be of further assistance or if you have any questions, please feel free to contact Laura Romin of our office at (801)975-3330 extension 142.

United States Department of the Interior

NATIONAL PARK SERVICE
Zion National Park
Springdale, UT 84767

H4217 (ZION-RM&R)

October 24, 2005

Mr. Philip F. Notarianni, Director
Utah State Historic Preservation Office
Attention: Chris Hansen
300 Rio Grande
Salt Lake City, Utah 84101

Dear Mr. Notarianni:

Zion National Park is proposing to complete road rehabilitation on the Zion – Mount Carmel Highway in the vicinity of the east and west portals of the 1.1 mile long tunnel. The Zion - Mount Carmel Highway, and the tunnel as a contributing feature, were listed in the National Register of Historic Places in 1987. We are enclosing a map to show the proposed locations of the project.

Modifications on the east side of the tunnel would include widening the road and scaling rock walls on both sides of the road; reconfiguring two parking areas; creating a painted center median with rumble strips; relocating the crosswalk connecting parking area 1 to the Canyon Overlook trailhead; constructing a 4 – 6 foot wide sidewalk from parking area 2 to the trailhead; eliminating three informal pullouts, one of which would be reconfigured as a slow vehicle pullout lane; establishment of erosion control measures for the Pine Creek slot canyon access; and replacing and relocating the ranger kiosk. The road would be resurfaced within the area of the project. The west tunnel entrance area would be modified to include a painted center median with rumble strips and the ranger kiosk would be replaced. The work is needed to improve overall traffic control, reduce resource impacts, and enhance safety conditions for visitors and park rangers in these congested areas.

The park is preparing an environmental assessment (EA) for the proposed project. Preparation of the EA is necessary to meet the requirements of the National Environmental Policy Act. In addition, the process and documentation required for preparation of the EA will be used to comply with section 106 of the National Historic Preservation Act. In accordance with section 800.8(c) of the Advisory Council on Historic Preservation's regulations (36 CFR Part 800), we are notifying your office in advance of the park's intention to use the EA to meet its obligations under section 106.

If you have further questions, please contact Park Archaeologist Sarah Horton at 435-772-0214.

Sincerely,

/s/ Jock F. Whitworth
Superintendent

Enclosure

TAKE PRIDE® IN AMERICA

United States Department of the Interior

NATIONAL PARK SERVICE
Zion National Park
Springdale, UT 84767

H4217 (ZION-RM&R)

October 24, 2005

Arden Kucate
Pueblo of Zuni
P.O. Box 339
Zuni NM 87327

Dear Mr. Kucate:

Zion National Park is proposing road rehabilitation on the Zion – Mount Carmel Highway in the vicinity of the east and west portals of the 1.1 mile long tunnel. The Zion - Mount Carmel Highway, and the tunnel as a contributing feature, were listed in the National Register of Historic Places in 1987. We are enclosing a map to show the proposed locations of the project.

Modifications on the east side of the tunnel would include widening the road and scaling rock walls on both sides of the road; reconfiguring two parking areas; creating a painted center median with rumble strips; relocating the crosswalk connecting parking area 1 to the Canyon Overlook trailhead; constructing a 4 – 6 foot wide sidewalk from parking area 2 to the trailhead; eliminating three informal pullouts, one of which would be reconfigured as a slow vehicle pullout lane; establishment of erosion control measures for the Pine Creek slot canyon access; and replacing and relocating the ranger kiosk. The road would be resurfaced within the area of the project. The west tunnel entrance area would be modified to include a painted center median with rumble strips and the ranger kiosk would be replaced. The work is needed to improve overall traffic control, reduce resource impacts, and enhance safety conditions for visitors and park rangers in these congested areas.

We are requesting your assistance in identifying any issues associated with the project including, but not limited to, cultural properties of importance to the Pueblo of Zuni or other issues or concerns in the vicinity of the proposed project in accordance with 36 CFR Part 800. Information that you provide will be used for evaluation of project impacts to cultural resources in the environmental assessment (EA) being prepared for this project.

The park is preparing an environmental assessment (EA) for the proposed project. Preparation of the EA is necessary to meet the requirements of the National Environmental Policy Act. In addition, the process and documentation required for preparation of the EA will be used to comply with section 106 of the National Historic Preservation Act. In accordance with section 800.8(c) of the Advisory Council on Historic Preservation's regulations (36 CFR Part 800), we are notifying your office in advance of the park's intention to use the EA to meet its obligations under section 106.

If you have further questions, please contact Park Archaeologist Sarah Horton at 435-772-0214.

Sincerely,

/s/ Jock F. Whitworth
Superintendent

Enclosure

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cc: Paiute Tribe of Utah
Kaibab Band of Paiute Indians
Shivwits Paiute Band
Northern Ute Tribe
Goshute Indian Tribe
Skull Valley Goshute Tribe
Moapa Band Paiute Tribe
Las Vegas Paiute Tribe
Hopi Tribe
Navajo Nation

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. Administration.

NPS D-258A February 2006 / Printed on recycled paper