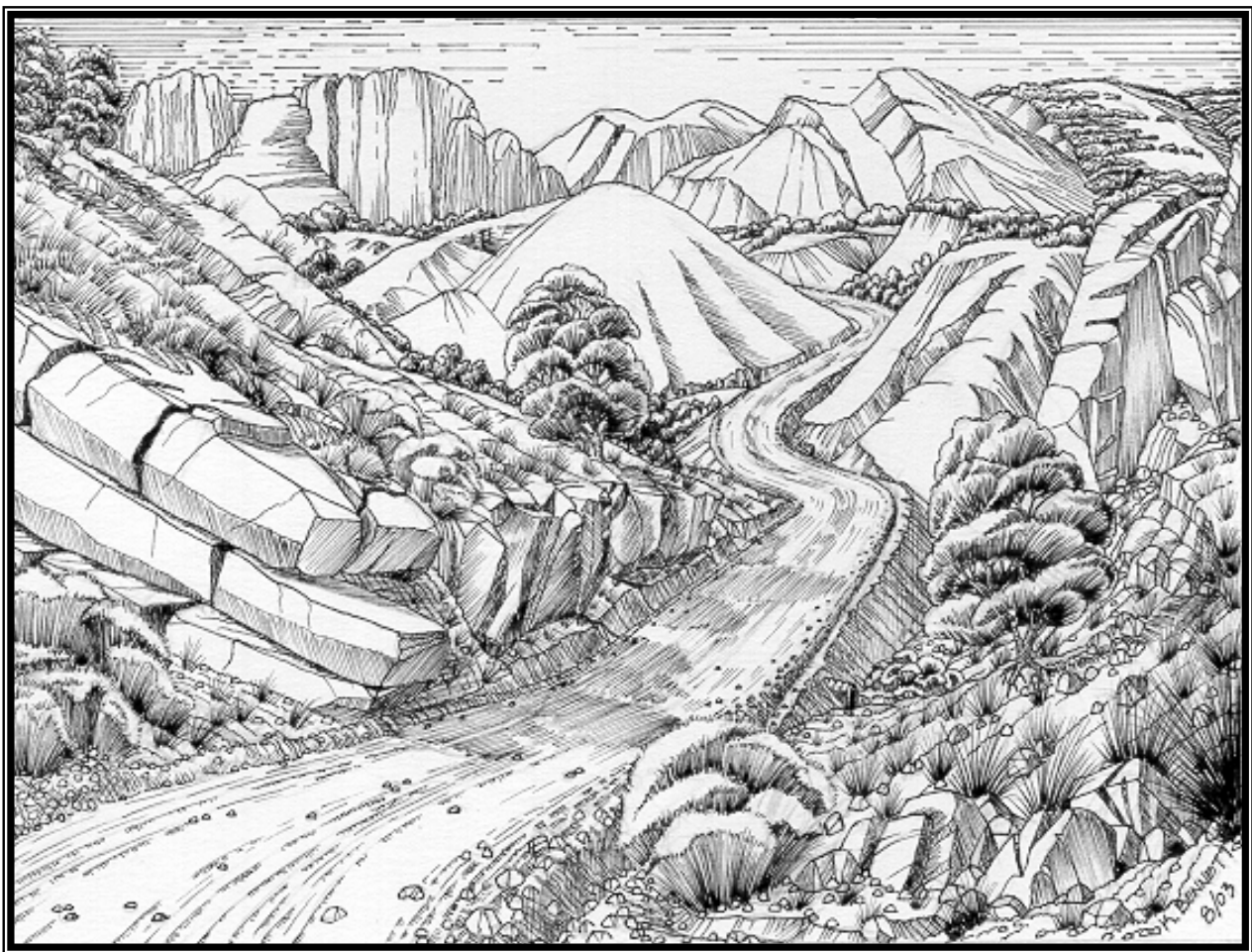




Burr Trail Modifications Final Environmental Impact Statement/ Assessment of Effect

December 2005



Capitol Reef

National Park • Utah

Final Environmental Impact Statement Burr Trail Modifications

CAPITOL REEF National Park • Utah

The National Park Service has prepared this final environmental impact statement with three cooperating agencies: the state of Utah, Garfield County, Utah, and Federal Highway Administration. This document evaluates the effects of proposed road modifications to the Burr Trail within Capitol Reef National Park. The proposed action is the product of the environmental compliance process that was needed to fulfill the May 30, 2001, settlement agreement that established a mutually agreeable procedure among the National Park Service, the state of Utah, and Garfield County, Utah to address road modifications that Garfield County would like to make to the Burr Trail.

This final environmental impact statement evaluates four alternatives. Three of these involve road modifications that stabilize parts of the road surface using gravel base material (some with geotextile fabric), install or improve drainage facilities at creek crossings, modify the road at mile point 0.65 to accommodate two-way traffic, and install slope protection along portions of the northern bank of Sandy Creek. The fourth alternative, the No Action Alternative, describes continuation of current conditions. This was the baseline condition against which the other alternatives were compared. Environmental consequences of the actions were evaluated to determine their potential effects to air quality; geologic features and landforms; biological soil crusts and soils; vegetation; wildlife; surface water, hydrology, and floodplains; natural soundscapes; ethnographic and ethnographic landscape resources; public health and safety; visitor use and experience; socioeconomics; park operations; Garfield County road maintenance operations; and sustainability and long-term management.

Public Comment

The draft environmental impact statement was on public review following publication of the Notice of Availability in the *Federal Register* by the Environmental Protection Agency beginning May 13, 2005. Public comments were accepted through July 19, 2005. The substantive comments received, and NPS responses, are included in the Consultation and Coordination section of this final environmental impact statement. All submissions from organizations, businesses, and individuals identifying themselves as representatives or officials of organizations or businesses are available for public inspection in their entirety.

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United States Department of the Interior • National Park Service • Capitol Reef National Park

SUMMARY

Capitol Reef National Park is located in south central Utah. The area is known for its sedimentary formations, cliffs, monoliths, and an abundance of canyons.

The Burr Trail (Boulder- to- Bullfrog Road) is a 66- mile- long backcountry road that passes through lands administered by two federal agencies, the National Park Service, and the Bureau of Land Management. About 8.4 miles of this road pass through the southern portion of Capitol Reef National Park.

Under Revised Statute 2477, Garfield County, Utah owns a right- of- way along the road. In accordance with a settlement agreement dated May 30, 2001, among the National Park Service, the State of Utah, and Garfield County, Utah, Garfield County has proposed road modifications to the Burr Trail within Capitol Reef National Park. The National Park Service prepared this final environmental impact statement to evaluate the effects of three action alternatives (including elements of the county's proposal) and a no action alternative.

Purpose and Need for Action

The proposed action would modify a one- mile segment of the Burr Trail in Capitol Reef National Park and address drainage concerns at the Burr Trail/Halls Creek crossing and at a drainage that crosses the road near the base of the switchbacks in Burr Canyon. The one- mile segment of the Burr Trail extends from the eastern park boundary to The Post. Based on the park's 1998 general management plan, Capitol Reef National Park has the following objectives for the proposed action:

- Provide for safe travel on an all- weather, maintained, variable- width, unpaved, gravel and native material road, acknowledging that the road would be occasionally impassable depending on weather conditions;
- Retain the winding nature and adventuresome character of the Burr Trail through Capitol Reef National Park; and
- Protect the natural and cultural resources of the park.

Garfield County has identified safety, stabilization, and improved drainage as the purposes of their proposal.

The proposed action is the product of the environmental compliance process that was needed to fulfill a May 30, 2001, settlement agreement, that established a mutually agreeable procedure between the National Park Service, the state of Utah, and Garfield County, Utah to address proposed road modifications that Garfield County would like to make to the Burr Trail.

Issues and Concerns

Issues and concerns addressed in this final environmental impact statement were identified through a cooperative planning process involving the National Park Service, the Federal Highway Administration, the state of Utah, and Garfield County, Utah. A conceptual design for the road modifications developed early in the planning process was used to help identify the objectives and issues for the proposed Burr Trail modifications.

Initial agency and public scoping emphasized adherence to the park's general management plan to ensure that the Burr Trail "remains an unpaved road with a winding nature and adventuresome character." The public requested that the Burr Trail's "primitive, less crowded, more solitary visitor experience be protected."

Impact topics (specific resources or values that could be affected by the proposed action) were used to focus the evaluation of the potential consequences of the proposed action and alternatives. Impact topics were identified based on required agency topics, public scoping, and park-specific resource information. Impacts analyzed included air quality; biological soil crusts and soils; geologic features and landforms; surface water, hydrology, and floodplains; natural soundscapes; vegetation; wildlife; ethnographic and ethnographic landscape resources; Garfield County road maintenance operations; park operations; public health and safety; socioeconomics; sustainability and long-term management; and visitor use and experience.

Alternatives

This final environmental impact statement evaluates four alternatives for managing the Burr Trail in Capitol Reef National Park. Three of the alternatives would involve road modifications. The fourth alternative, the No Action Alternative, would continue current conditions.

The No Action Alternative would continue management and maintain conditions as they currently exist. There would be no modifications to the drainage crossings, the road width would not be altered, the road surface would not be replaced, and road maintenance that currently takes place would continue.

Alternative A (the preferred alternative) would emphasize maintaining the rustic character of the road, minimizing disturbance to the environment, and integrating the visitor with the surrounding landscape. A prominent overhanging rock at mile point 0.65, which is a local landmark but which restricts the road to less than two lanes, would be left in place. Additional width for a two-lane road at this point would be obtained by expanding the roadside ditch toward the rock and adding a rock embankment on the south road bank adjacent to Sandy Creek. This would preserve this geological feature and landform. Alternative A was determined to be the environmentally preferred alternative. Other actions associated with Alternative A would include:

- Paved fords designed to contain 10-year storm event floodwaters overflowing the road within the paved portion of the ford at all of the drainage crossings; vented paved fords at two of the Sandy Creek crossings and at the Halls Creek crossing would allow 2-year storm events to pass through corrugated metal culverts without overtopping the road.

Each of the fords would be signed to warn travelers not to cross when water is present on the road;

- Excavation of one foot of bentonite clay along portions of the road in areas that get extremely slippery when wet, and replacement with gravel underlain by geotextile fabric;
- Slope protection at mile points 0.75 to 0.85 to stabilize the road embankment;
- Shifting the road a short distance downstream (primarily within the confines of the existing disturbed area between the road embankment slopes) from the confluence of the Burr Canyon drainage with Halls Creek and installing a vented paved ford at the crossing;
- Installing three 36- inch culverts and a downslope rock embankment to stabilize the slope at the upper Burr Canyon side drainage; and
- A cattle guard at the eastern park boundary.

Visitors traveling along the winding, hilly terrain would continue to experience the remote feeling and sense of adventure currently provided on the Burr Trail.

Alternative B would remove the overhanging rock, making room to widen and straighten the road at mile point 0.65. Other major differences between this alternative and Alternative A would include:

- The use of culverts designed to pass a 25- year storm event at the four crossings of Sandy Creek and at the Halls Creek crossing;
- The use of culverts designed to pass a 2- year storm event at the two minor drainage crossings;
- Road surface stabilization would be accomplished by excavating those sections with high bentonite clay content to a depth of one foot and installing a gravel road surface directly over the substrate (no geotextile would be used); and
- Slope protection at mile points 0.75 to 0.85 to stabilize the road embankment.

Alternative C also would remove the overhanging rock, use culverts at the major and minor drainage crossings, install gravel on selected sections of the road surface, and install slope protection between mile points 0.75 to 0.85. The major feature associated with Alternative C that differs from Alternative B includes:

- The culverts used would be able to pass a 50- year storm event at the major drainage crossings in the project area.

Environmental Consequences

Impacts of the four alternatives were assessed in accordance with *Director's Order 12 and Handbook: Conservation Planning, Environmental Impact Analysis and Decision Making*.

This handbook requires that impacts on park resources be analyzed in terms of their context, duration, and intensity. The analysis provides the public and decision-makers with an understanding of the implications of road modification actions in the short- and long-term, cumulatively, and within context, based on an understanding and interpretation by resource professionals and specialists. This final environmental impact statement was prepared in compliance with the National Environmental Policy Act (NEPA) and all applicable federal rules and regulations.

For each impact topic, methods were identified to estimate the change in park resources that would occur with the implementation of each road management alternative. Thresholds were established for each impact topic to help understand the intensity of changes in resource conditions, both adverse and beneficial.

Each road modification alternative was compared to a baseline to determine the context, duration, and intensity of resource impacts. The baseline is the condition that would result from management of the Burr Trail under the existing approach and is represented by the No Action Alternative.

The analysis of environmental consequences determined that none of the alternatives would have any major effects, including cumulative effects, on any of the impact topics. In addition, it found that there would not be any major adverse impacts to resources or values whose conservation was necessary to fulfill purposes identified in the established legislation of Capitol Reef National Park, key to the natural or cultural integrity of the park, or identified as a goal in the park's general management plan or other relevant NPS planning documents. Therefore, none of the alternatives for modifying the Burr Trail in Capitol Reef National Park would result in the impairment of the park's resources or values.

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INTRODUCTION

PROJECT BACKGROUND

The Burr Trail, also known as the Boulder- to- Bullfrog Road, is a 66- mile- long backcountry road that passes through lands administered by two federal agencies, the National Park Service (NPS) and the Bureau of Land Management. As shown in the General Vicinity map, about 8.4 miles of this road pass through the southern portion of Capitol Reef National Park. As decided by federal district court, Garfield County, Utah has a valid, existing right-of- way for the road under Revised Statute 2477.

Since the 1970s, the National Park Service has evaluated proposals to upgrade the Burr Trail within the park. These proposals have included paving and constructing an all- weather road. The most recent environmental assessment, prepared in 1993, evaluated the impacts of road modifications within the limits of National Park Service and Bureau of Land Management lands.

In February 1996, a Garfield County road crew performed unauthorized road work along this portion of the Burr Trail. The U.S. Department of Justice filed a trespass suit against the county, which resulted in a February 1999 trial in U.S. District Court. In a decision dated October 24, 2000, the court found that the work performed by Garfield County was unauthorized “construction” rather than “maintenance” and that the county did the work without a permit or NPS approval. In particular, the court said that the work by the county precluded an analysis of the action under the National Environmental Policy Act of 1969 (as amended) and frustrated the National Park Service in its ability to develop alternatives that would have a lesser level of effect. Specifically, the court said that:

- Pursuant to the Property Clause of the United States Constitution, pertinent Acts of Congress, and lawful rules and regulations issued by the Secretary of the Interior, the National Park Service has the power to regulate construction work performed by Garfield County in the Burr Trail right- of- way within the boundaries of Capitol Reef National Park to the extent provided by 36 C.F.R. § 5.7 and other pertinent statutes and rules..
- Garfield County may not perform construction within the meaning of 36 C.F.R. § 5.7 without first obtaining a permit, approval, or agreement from the National Park Service.
- Any Garfield County road construction action in the Park is subject to review and disclosure under the provisions of the National Environmental Policy Act.
- When the National Park Service receives from Garfield County a proposed plan for construction along the Burr Trail, the National Park Service shall proceed in timely fashion:
 - To determine if the work falls within the county’s right- of- way;
 - To comply with the National Environmental Policy Act, as well as any other applicable legal requirements;
 - To consider alternatives; and

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- To grant timely approval of the proposed work within the existing right-of-way, unless the work will significantly and adversely affect park lands, resources, values, or administration, in which case the National Park Service needs to formulate alternatives to reduce effects.

The court also ordered that Garfield County can do road maintenance to preserve the existing condition of the road without prior National Park Service approval.

A settlement agreement was filed in district court on May 30, 2001, on a counterclaim filed by Garfield County regarding the original case. The agreement established a cooperative process for addressing modifications that Garfield County and the state of Utah would like to make along the Burr Trail within Capitol Reef National Park. The settlement agreement commits the National Park Service to carry out the necessary environmental analysis in a timely fashion consistent with the district court's order. It also established that Garfield County and the state of Utah would be cooperating agencies in completing the environmental compliance process. A copy of the settlement agreement is provided in Appendix A. Appendix A also includes a Memorandum of Agreement, signed by the National Park Service, Garfield County, Utah, the State of Utah, and the National Parks Conservation Association, to confirm a mutually agreeable procedure to address improvements that the county and state want to make on the Burr Trail through Capitol Reef National Park.

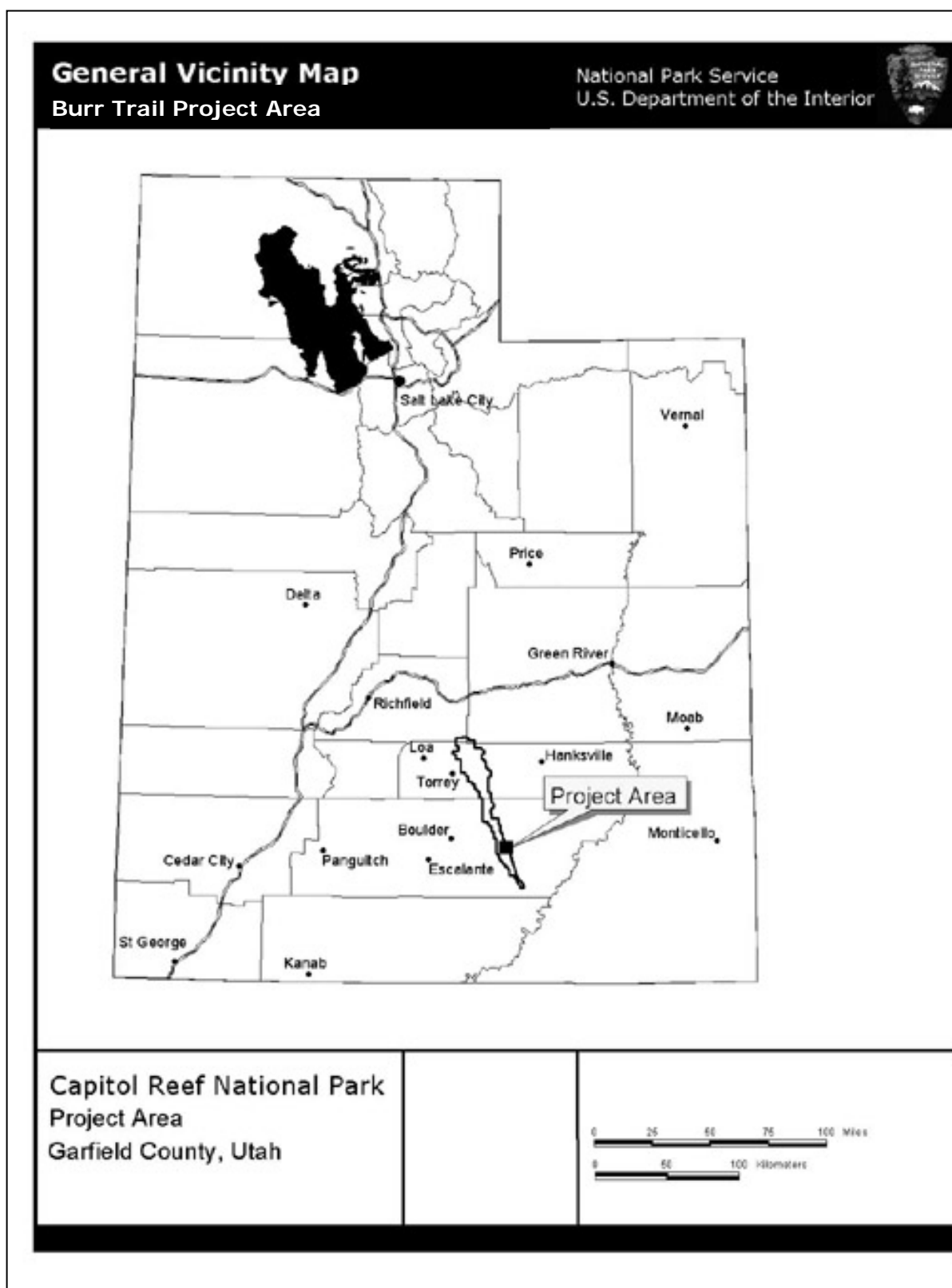
In accordance with the settlement agreement, Garfield County has proposed road modifications to the Burr Trail within Capitol Reef National Park. Under the provisions of the National Environmental Policy Act of 1969, (as amended), the National Park Service prepared this final environmental impact statement to evaluate the effects of Garfield County's proposal and alternatives.

Garfield County's proposed action includes road widening, resurfacing, roadbed and road bank stabilization, and drainage modifications along the Burr Trail. The proposed action also includes two drainage modifications outside the one-mile segment. These actions would be implemented about three miles northwest of the one-mile segment and would include the Burr Trail crossing of Halls Creek and a drainage crossing near the base of the switchbacks in Burr Canyon. The installation of a cattle guard at the east park boundary, which has been proposed by the National Park Service, also is included in the proposed action.

GENERAL SETTING OF THE BURR TRAIL PROJECT AREA

The Burr Trail winds through the hilly terrain of southern Utah's Garfield County. The Burr Trail has historically been the major access road into eastern Garfield County and is the primary route through the southern part of the Waterpocket Fold, a major physiographic feature of Capitol Reef National Park (see the Capitol Reef National Park map).

The Burr Trail alignment, which is along a natural pass across the Waterpocket Fold, initially was used by American Indians. The 8.4 mile-long section of the Burr Trail within the park boundary was later improved by local ranchers. The road was extensively used by uranium miners and ore trucks throughout the 1950s and into the 1960s.



General Vicinity Map

INTRODUCTION

The Burr Trail is now used by visitors to the southern part of Capitol Reef National Park for sightseeing, hiking within the Circle Cliffs, and accessing surrounding public lands. It also provides access to the Bullfrog Marina area of Glen Canyon National Recreation Area, south of the park. In addition, it continues to be used by local farmers and ranchers who, along with other transportation uses, trail cattle to and from grazing allotments.

On an annual basis, about 29 vehicles per day use the Burr Trail through the park. Use is heaviest during April to June, when daily traffic counts occasionally exceed 50 vehicles per day. The peak traffic volume of 122 vehicles in one day was recorded in May 1994 (Wilson 2002).

The segment of road under consideration is shown on the Capitol Reef National Park map. It begins on the eastern boundary of Capitol Reef National Park. Features of the road are as follows:

- From the eastern park boundary, the road alignment is to the northwest. Starting near mile point 0.50, it makes a curve to a southwest alignment. As shown on the map, there are numerous curves along the entire road length.
- The road descends throughout most of its length from east to west after entering the park across the east boundary.
- The road surface is composed of native material.
- The design speed for traffic on the road is less than 25 miles per hour.
- The road width averages 18 feet with one- foot shoulders for a total road width of 20 feet.
- Typical road maintenance actions conducted by Garfield County involve repair of road surfaces, shoulders, slopes, and culverts, and maintaining the existing shape and width of the road.
- The road crosses the large Sandy Creek drainage channel four times. It also crosses two small, unnamed washes.
- Rough, hilly, terrain is present on both sides of the road along a long curve in the central portion of the one- mile road segment.
- A prominent, weathered, overhanging rock is located at the 0.65- mile point. This overhanging rock is an outstanding example of the rugged visual character of the Burr Trail. As the road approaches this rock, it narrows in width to less than two lanes and curves below the overhanging rock.
- From the overhanging rock to a point near mile point 0.75, Sandy Creek follows the base of the slope along the south side of the road.
- The intersection known as The Post occurs at the 1.0- mile point.

About 3.5 miles north and west of the park's eastern boundary, the road crosses Halls Creek near its confluence with the Burr Canyon drainage. At mile 4.0 from the east boundary, the road crosses a side drainage of the Burr Canyon. It then goes up an incline into an area known as the switchbacks.

THE GARFIELD COUNTY PROPOSAL

The National Park Service consulted with Garfield County and prepared a conceptual design for roadway modification proposals. The conceptual design plan is provided in Appendix B. The modifications would occur along the Burr Trail, plus the Halls Creek crossing and a side drainage crossing in Burr Canyon. Road modifications proposed by the county would include:

- Gravel surfacing on portions of the road,
- Modifying the roadway at the overhanging rock,
- Installing or modifying drainage facilities at selected wash and creek crossings,
- Installing slope protection along the bank of Sandy Creek where it runs parallel to the road, and
- Widening the road paralleling the Burr Canyon drainage, and stabilizing this area with a retaining wall.

Garfield County would be responsible for implementing the proposed road modifications.

PARK PURPOSE AND SIGNIFICANCE

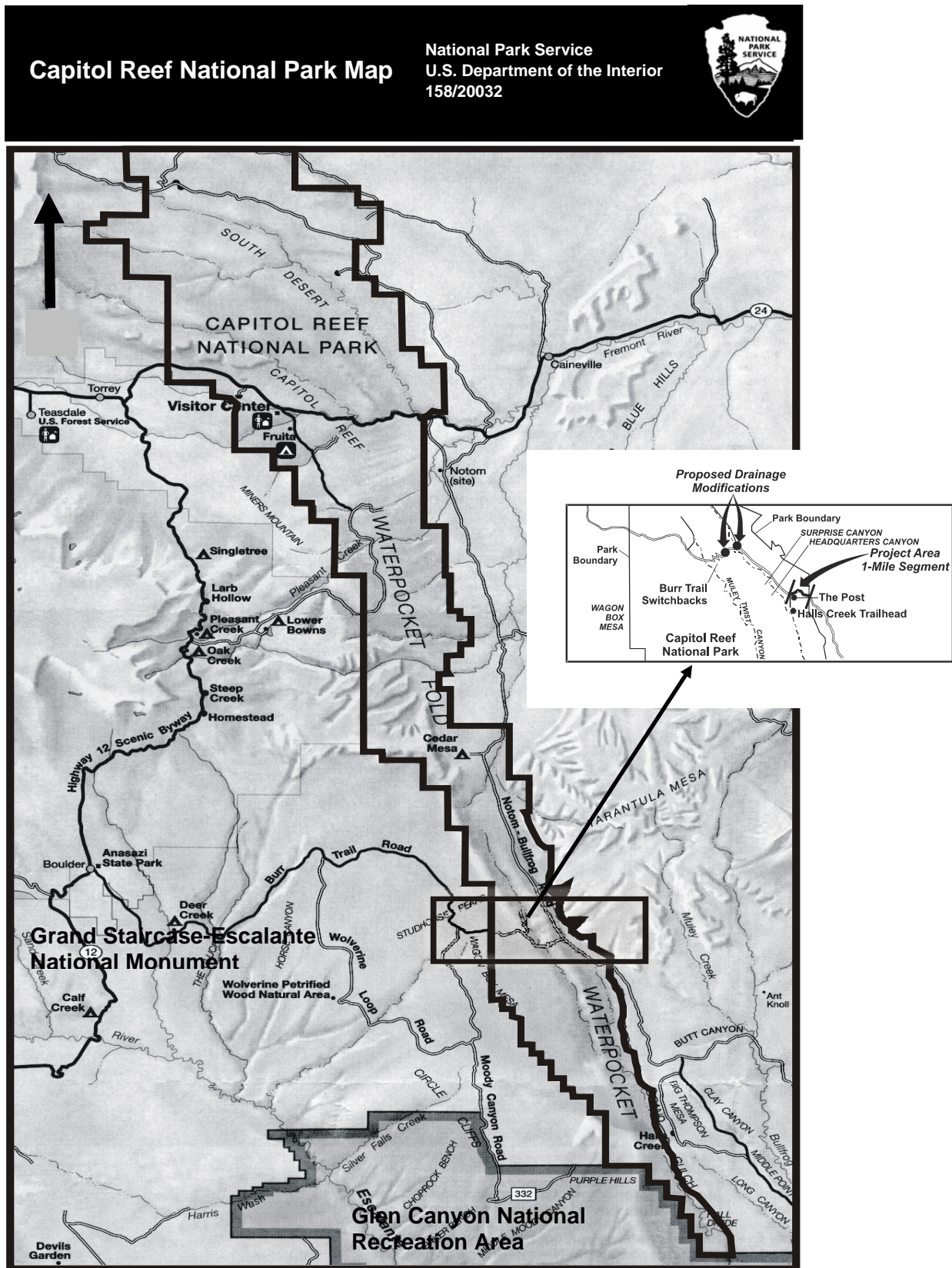
The purpose and significance of Capitol Reef National Park are defined in the *Final Environmental Impact Statement, General Management Plan, and Development Concept Plan: Capitol Reef National Park* (NPS 1998c). According to this document, the purposes of Capitol Reef National Park include:

- Conserving and protecting such geologic wonders as the Waterpocket Fold, Cathedral Valley, narrow canyons, evidence of ancient sand dune deposits, and objects of geologic and scientific interest; and
- Protecting all park features from unauthorized appropriation, injury, destruction, or removal.

The features of the park that contribute to its significance include the following:

- The Waterpocket Fold, the largest exposed monocline in North America.
- Numerous superlative geologic features carved by weathering, creating a diverse array of canyons, domes, cliffs, and pinnacles.
- Clear air, striking scenic views, and some of the best opportunities for quiet and solitude on the Colorado Plateau.
- A variety of habitat types that support diverse plant and animal life.
- Significant archeological resources, in particular those of the Fremont culture, and historical resources that illustrate the story of Mormon settlement and the closing frontier.
- Economic, recreational, and cultural importance to surrounding areas of visitation to Capitol Reef.

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CAPITOL REEF NATIONAL PARK MAP

PURPOSE OF AND NEED FOR ACTION

The proposed action would modify a one- mile segment of the Burr Trail in Capitol Reef National Park and address drainage concerns at the Burr Trail/Halls Creek crossing and at a drainage crossing the road near the base of the switchbacks in Burr Canyon. The one- mile segment of the Burr Trail that would be modified extends from the eastern park boundary to The Post.

The *Final Environmental Impact Statement, General Management Plan, and Development Concept Plan: Capitol Reef National Park* (NPS 1998c) was approved in a March 2001 Record of Decision (NPS 2001c). This document sets National Park Service management direction within Capitol Reef National Park. Based upon this management direction, Capitol Reef National Park has the following objectives in connection with the proposed action:

- Provide for safe travel on an all- weather, maintained, variable- width, unpaved, gravel and native material road, acknowledging that the road occasionally would be impassable, depending on weather conditions.
- Retain the winding nature and adventuresome character of the Burr Trail through Capitol Reef National Park.
- Protect the natural and cultural resources of the park.

As described in the park's 1998 General Management Plan, the desired visitor experience is: "Visitors in this road corridor encounter an essentially all- weather, maintained, variable- width dirt road. The road may be seasonally impassible, depending on weather conditions" (NPS 1998c).

Garfield County has identified safety, stabilization, and improved drainage as the purposes of their proposal.

The purpose of the action is to ensure the continued passability, safety, and integrity of the roadway along the Burr Trail. The need for this project is based on erosion and undercutting of stream banks and the road bed along Sandy Creek and at other drainages, the slippery- when- wet character of the road surface, and concerns about the limited sight distance and narrowness of the road in the vicinity of the overhanging rock. The May 30, 2001, Settlement Agreement and a Memorandum of Agreement (both included in Appendix A) established a mutually agreed- to procedure among the National Park Service, the state of Utah, and Garfield County, Utah, to address road modifications.

The purpose of this environmental impact statement is to determine the effects of modifications to the Burr Trail on the natural, cultural, and social resources of the park and surrounding area. This would include the effects of the No Action Alternative and effects from three action alternatives. In accordance with Judge Jenkins' October 24, 2000 decision, the environmental impact statement develops alternatives that would reduce the potential adverse effects of the Garfield County proposal to park resources and values.

BALANCING PARK VALUES WITH COUNTY TRANSPORTATION NEEDS

The National Park Service and Garfield County have worked together to develop reasonable and necessary road modifications to provide safe passage on the two-lane, low-traffic-volume Burr Trail. The modifications are intended to blend the park's resource values and road design standards with the county's interest in keeping county roads safe and in good repair. A key element involves minimizing impacts on adjacent public lands and protecting important values of Capitol Reef National Park.

According to NPS Park Road Standards, which were developed by the National Park Service and the Federal Highway Administration, the road would be classified as Class IV: Primitive Park Road. Primitive park roads are those "which provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas" (NPS 1984). Further guidance from NPS Park Road Standards states "The fundamental purpose of national parks – bringing humankind and the environment into closer harmony – dictates that the quality of the park experience must be our primary concern. Full enjoyment of a national park visit depends on its being a safe and leisurely experience. The distinctive character of park roads plays a basic role in setting this essential unhurried pace. Consequently, park roads are designed with extreme care and sensitivity with respect to the terrain and environment through which they pass – they are laid lightly onto the land...The purpose of park roads remains in sharp contrast to that of the Federal and State highway systems. Park roads are not intended to provide fast and convenient transportation; they are intended to enhance visitor experience while providing safe and efficient accommodation of park visitors and to serve essential management access needs" (NPS 1984).

The Burr Trail is identified in the park's general management plan (NPS 1998c) as being within a Dirt, All-Weather, Two-Wheel-Drive Road Corridor Zone located within Capitol Reef National Park. Roads within this zone are sometimes washboarded and dusty, and traverse drainage bottoms. Visitors within this zone may encounter other visitors rarely to occasionally, depending on the season and location. Park facilities within this zone would include directional signs, cattle guards, pullouts, picnic areas, and trailhead parking areas. Emphasis in this zone is placed on preserving the natural character of the lands within the road corridor to ensure that the road provides the visitor with a sense of remote lands exploration.

Garfield County has identified Burr Trail as a Major Collector (part of the Rural Collector System), and the Burr Trail is shown on Utah state highway maps with that classification. According to the American Association of State Highway and Transportation (AASHTO) guidance, Major Collector routes "(1) serve county seats not on arterial routes, larger towns not directly served by the higher systems, and other traffic generators of equivalent intra-county importance, such as consolidated schools, shipping, points, county parks, and important mining and agricultural areas; (2) link these places with nearby larger towns or cities, or with routes of higher classifications; and (3) serve the more important intracounty travel corridors" (AASHTO 2001).

The park's management approach for the road is focused on protecting the area's scenic, natural, and cultural resources, while providing for visitor safety. This approach is consistent with the National Park Service' mandate under the Organic Act (USC 1916), park enabling legislation (U.S. Public Law 1971), and park general management plan (NPS 2001c). In accordance with the settlement agreement and memorandum of agreement (provided in Appendix A), the National Park Service will review and regulate road construction work performed by Garfield County or the state of Utah to ensure the protection of park resources.

As decided in federal district court, Garfield County has a Revised Statute 2477 right-of-way along the Burr Trail and is responsible for ensuring a safe, passable roadway (USDC 2000). The county's interest is to keep this and all other county roads in a safe condition and good repair. This includes preserving and maintaining existing county rights-of-way through federal lands.

The transportation goals of the Garfield County general plan (Five County Association of Governments 1995) relating to the Burr Trail state that the county will continue to maintain county roads to preserve their state funding and class designation. The county's general plan indicates that existing roads will be upgraded as traffic increases and safety standards are raised, to include developing and protecting the landscaping along routes proposed for scenic enjoyment. Garfield County's goal is to maintain or improve existing roads, and to maintain Revised Statute 2477 access rights-of-way to federal and state lands.

County road maintenance conducted on the Burr Trail is intended to preserve the existing condition of the Burr Trail. Road maintenance activities may involve:

- Repair of wear or damage to existing road surfaces, shoulders, and cut or filled slopes;
- Repair, clearing, or replacement in-kind of culverts and other structures; and
- Maintaining the existing shape and width of the road, which would include grading as needed to preserve a passable surface in both lanes.

Under the proposed action evaluated in this final environmental impact statement, the county would implement road modifications that would involve "construction" rather than "maintenance." The proposed action is intended to widen two sections of the road from 14 feet to 20 feet, improve sight distance along narrow and curved portions of the road, stabilize road banks and roadbeds, and install drainage structures that either are new or do not meet the definition of "in-kind."

SCOPE OF THE ANALYSIS

This final environmental impact statement evaluates the effects of road modifications to be implemented on the Burr Trail. The modification locations are shown on the Project Area map. To ensure conformance with the National Environmental Policy Act and the Council on Environmental Quality (1978) guidelines for its implementation, this environmental impact statement includes an analysis of cumulative effects on resources of the proposal in conjunction with all past, present, and reasonably foreseeable actions.

RELATIONSHIP TO OTHER PLANNING PROJECTS

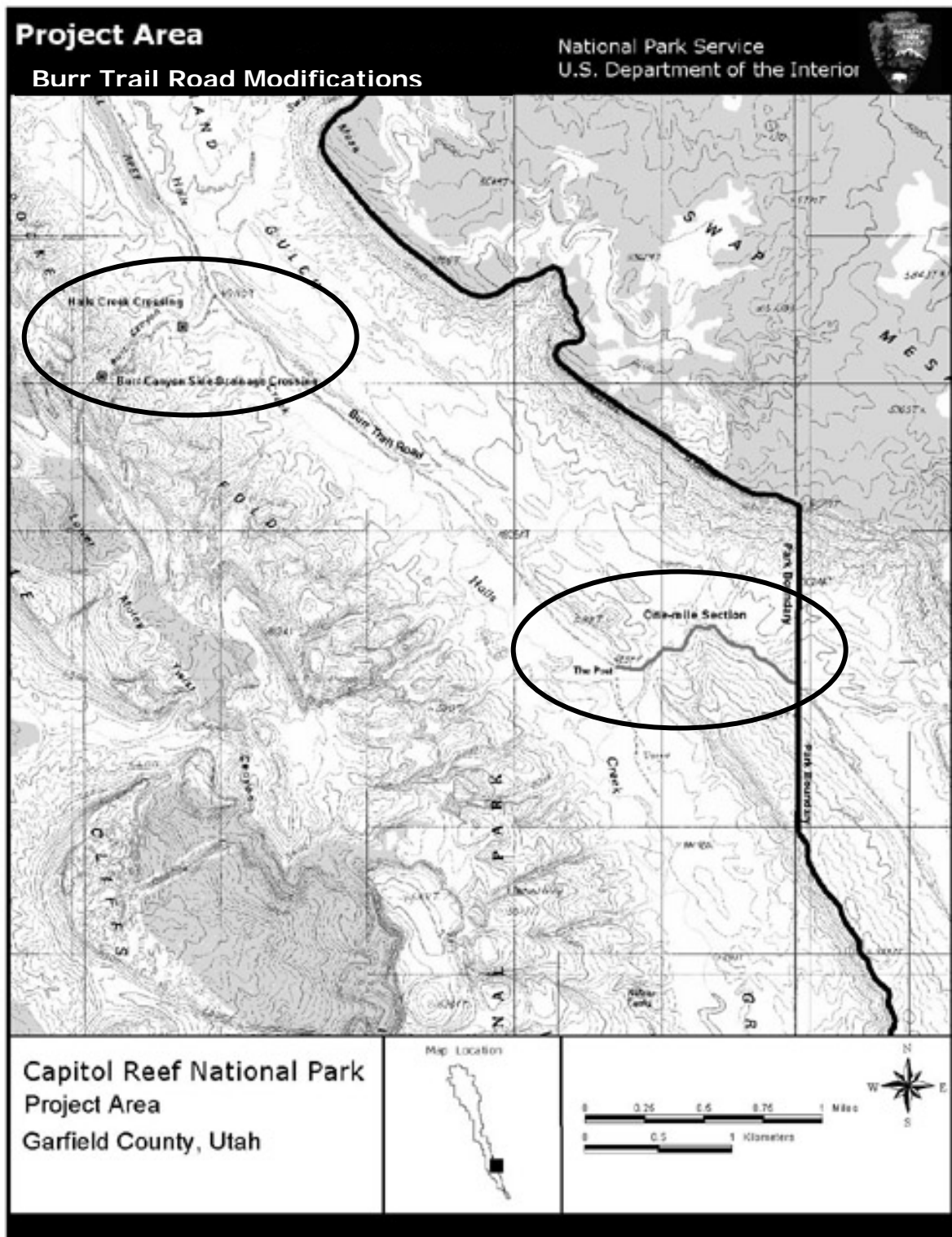
NATIONAL PARK SERVICE PLANS, PROJECTS, AND STANDARDS

Several plans, projects, and standards that the National Park Service and Capitol Reef National Park either have in place or have in progress may affect decisions regarding the modification of the Burr Trail. Two existing plans and policy documents are particularly applicable to the Burr Trail and visitor use characteristics. These documents provide the broad guidance within which the proposed action would function.

- ***Park Road Standards: National Park Service*** (NPS 1984). Park road standards for the planning, design, and construction of National Park Service roads were published in 1968 (NPS 1968) and updated in 1984. These standards include minimizing disturbance to the environment and creating a positive visitor experience that integrates the road with the surrounding landscape and preserves the natural and cultural values of the park. These standards were used for the planning, design, and construction of the proposed Burr Trail modifications.
- **Engineering & Landscape Architectural Assessment of the Burr Trail Road from The Post to the East Boundary** (NPS 1998a). This report evaluated the Burr Trail and recommended approaches that would minimize disturbances of the environment and integrate the visitor with the surrounding landscape. The report highlighted key design principles by assessing the character of the Burr Trail, outlined engineering and landscape architectural considerations, and recommended treatments to specific sections of the Burr Trail that would conform to National Park Service park road standards (NPS 1984).

Twelve other documents that were prepared by the National Park Service, the Bureau of Land Management, or a joint effort of these two U.S. Department of the Interior agencies could affect decisions regarding the Burr Trail. Some of these relate specifically to the road, while others focus on related facilities, such as the park as a whole or the visitor center. Identification of these documents, with key features or their relevance to Burr Trail modifications when it is not readily apparent, are provided below.

- **Environmental Assessment, Paving the Boulder- to- Bullfrog Road** (NPS and BLM 1985a). The National Park Service and Bureau of Land Management prepared this environmental assessment to evaluate paving the road. The basis for this action was the Boulder- to- Bullfrog Scenic Road Preliminary Engineering Report prepared by Creamer and Noble Engineers and Five County Association of Governments (1984).
- **Environmental Assessment Supplement, Paving the Boulder- to- Bullfrog Road** (NPS and BLM 1985b). The supplement to the 1985 environmental assessment was prepared to summarize the response to public comment on the environmental assessment identified in the preceding bullet.



Project Area Map

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- **Finding of No Significant Impact, Paving the Boulder- to- Bullfrog Road** (NPS and BLM 1985c). This document recommended that the entire length of the trail become a rural scenic road maintained by and under the jurisdiction of the National Park Service. The road was to adhere to the present horizontal and vertical alignment and cross-section but would be improved to have an all- weather gravel surface. The document also identified the need to conduct additional detailed investigations to satisfy environmental concerns.
- **Final Environmental Assessment, Boulder- to- Bullfrog Road Improvement Project (Burr Trail), a Supplement to Paving the Boulder- to- Bullfrog Road, 1985** (BLM 1989a). The Bureau of Land Management prepared additional site- specific environmental impact analyses to evaluate Garfield County proposals for improvements to sections 1 and 3 of the road, through what is now Grand Staircase- Escalante National Monument and the Henry Mountain Resource Area. No analysis was performed for section 2 within Capitol Reef National Park, or section 4 within Glen Canyon National Recreation Area.
- **Finding of No Significant Impact and Record of Decision, Boulder- to- Bullfrog Road Improvement Project, Segment 1** (BLM 1989b) and **Finding of No Significant Impact and Record of Decision, Boulder- to- Bullfrog Road Improvement Project, Segment 3** (BLM 1989c) These documents provided detail regarding site- specific decisions or proposed Garfield County road improvements for sections 1 and 3.
- **Environmental Assessment for Road Improvement Alternatives, Boulder- to- Bullfrog (Burr Trail), Capitol Reef National Park, Glen Canyon National Recreation Area, Escalante Resource Area, Henry Mountain Resource Area, Garfield County, Utah** (NPS and BLM 1993). This document was prepared by the National Park Service and Bureau of Land Management to further evaluate site- specific effects of improvement alternatives for the entire road. Four alternatives were considered, including a Garfield County proposal.
- **Finding of No Significant Impact, Road Improvement Alternatives, Boulder- to- Bullfrog Road (Burr Trail), Capitol Reef National Park, Glen Canyon National Recreation Area, Escalante Resource Area, Henry Mountain Resource Area** (NPS and BLM 1995). This document identified a preferred alternative that would improve the road in sections 1, 3, and 4. It also identified the need for additional environmental impact analysis before work is performed within section 2 (Capitol Reef National Park).
- **Final Environmental Impact Statement, General Management Plan, and Development Concept Plan: Capitol Reef National Park** (NPS 1998c). The park's general management plan describes the road as a dirt, all- weather, two- wheel- drive road corridor that provides the visitor with a sense of remote lands exploration. Natural resource management within the road corridor emphasizes preserving the natural character of the land. All road development activities for the Burr Trail are reviewed and regulated by the National Park Service to ensure that they remain compatible with these visitor management policies and resource protection measures.

- **Visitor Center and Existing Operations Offices Renovation Plan** (NPS no date c). This plan would result in a renovation of the visitor center to accommodate a larger annual visitation. The renovation plan includes expanding the exhibit space, expanding the public restrooms, renovating the indoor theatre to meet Americans with Disabilities Act standards, and making improvements to the visitor parking area. The proposed modifications would potentially provide improved audio/visual exhibits and interpretive programs that would encourage more visitors to travel from the park headquarters and visitor center area into the southern part of the park and explore opportunities in and around the Burr Trail.
- **Sleeping Rainbow Ranch Adaptive Reuse Plan and General Agreement** (NPS 1998c). This project would involve the adaptive reuse of existing facilities through the rehabilitation of existing buildings and utilities and a possible addition of facilities to be used for year-round education and research programs. The facility located at the ranch headquarters area near Pleasant Creek in Capitol Reef National Park would accommodate day-use and extended stays of up to three weeks for small Utah Valley State College groups and research teams participating in workshops, classes, and retreats in conjunction with park education, interpretation, and research. The proposed rehabilitation would potentially encourage more research to be conducted at other locations throughout the park. As a result, research groups may increase their study of areas in and around the Burr Trail, or may increase their use of the Burr Trail to access other areas of the park.
- **Livestock Trailing Special Use Permits.** Livestock trailing is allowed on the Burr Trail by permit. Livestock are driven twice per year between high summer grazing allotments and lower winter grazing allotments along the Notom Road and the Burr Trail from the Notom Road junction to the east boundary of the park. A special use permit is required each time livestock trailing is conducted. Special use permits for livestock trailing would continue to be issued to allow seasonal access and use of the Burr Trail by livestock.

PLANS, PROJECTS, OR ACTIONS OF OTHERS

Most of the following documents or actions were prepared or undertaken by parties other than the National Park Service and describe plans and actions that could influence the Burr Trail. They also include National Park Service documents for the management of other areas that could affect use of the Burr Trail. Identification of these documents, with key features or their relevance to Burr Trail road modifications when it is not readily apparent, are provided below.

- **Grand Staircase- Escalante National Monument Approved Management Plan, Record of Decision, Cedar City, Utah** (Bureau of Land Management 1999). This management plan identifies a portion of the Burr Trail as a “Passage Zone.” This zone includes all secondary travel routes that receive use as throughways and recreation destinations. Rudimentary facilities that are necessary to protect resources, educate visitors about monument resources, or protect public safety would be provided in these areas. These proposed modifications would provide improved facilities and could encourage additional visitors to explore portions of the park adjacent to the Burr Trail.

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- **Resource Management Plan for Public Lands and Resources in Garfield, Piute, Sanpete, Sevier, and Wayne Counties.** A resource management plan is currently under development by the Bureau of Land Management for public lands adjacent to or in the vicinity of Capitol Reef National Park. Portions of the Burr Trail on Bureau of Land Management- administered lands within the study area will be addressed in this plan.
- **Bureau of Land Management Cattle Grazing Permits.** Cattle grazing is permitted on Bureau of Land Management lands adjacent to Capitol Reef National Park. This activity leads to the transport and trailing of cattle along the Burr Trail and, sometimes, the trespass of animals onto the park.
- **Garfield County, Utah General Plan.** The Garfield County general plan, prepared by the Five County Association of Governments (1995), documents the goals, policies, and objectives relating to the present and future needs of the county, including growth and development of land within the county. The general plan also identifies the relationship of county land use plans to those of federal and state government land management activities. The planning assumptions and policy statements within the general plan provide the future goals for land use or desirable conditions, and the strategies that the county would pursue to achieve them. These include policies that would apply to the Burr Trail and other state and county roads in the county. The Garfield County general plan guides transportation operations and activities on the Burr Trail.
- **Glen Canyon National Recreation Area General Management Plan (NPS 1979).** The most recent general management plan for Glen Canyon National Recreation Area was completed in 1979 and reprinted in 1991. The plan established management zones, including the Recreation and Resource Utilization, Natural, Cultural, and Development Zones. The general management plan includes the segment of the Boulder- to- Bullfrog Road within recreation area boundaries in the Development Zone, which provides for permanent structures necessary to support recreational activities.
- **Bullfrog Development Concept Plan (NPS 1997) as amended.** This plan would increase visitor use by expanding the existing facilities at Bullfrog Marina. A portion of the visitor use would use the Boulder- to- Bullfrog Road to access the Bullfrog Marina.
- **Upgrades to the Burr Trail on Bureau of Land Management Lands.** Garfield County has paved the Burr Trail on Bureau of Land Management lands both east and west of the park. Throughout these areas, the road is wider and more developed than in the park. These changes did not increase the average daily traffic volume traveling the Burr Trail but probably have increased vehicle speeds both on the paved areas and at the park's west entrance, where the road surface changes to native material. The road is paved to within 8 miles of the east park boundary. The presence of paving on the Burr Trail on both sides of the park may increase future pressure to pave the entire road.
- **Wayne County's Upgrade of the Notom Road.** Wayne County paved the Notom Road south to the Garfield County line in 2002. The Notom Road provides access from Utah Highway 24 to the southern part of the park, where it connects with the Burr Trail. Paving of the Notom Road has not increased the average daily traffic on the Burr Trail,

but may increase pressure to pave the Notom Road to the current inholding of agricultural lands and, perhaps, to the park.

- **Travel Promotion by Grand Circle Association.** The Grand Circle Association promotes travel and vacation opportunities in the Four Corners region of the southwestern United States. This organization promotes travel destinations in southeast Utah, including Capitol Reef National Park, Deer Creek Recreation Site, Long Canyon, Lake Powell, and the Bullfrog Marina. This organization's literature depicts the Burr Trail as a scenic backway ("A backway is a paved or dirt road that reaches less traveled, but breathtaking areas." [Grand Circle Association 2004]) providing access to these areas, and may lead to increased traffic on the road in the future.

ISSUES AND OBJECTIVES

Issues and objectives addressed in this final environmental impact statement were identified through a cooperative planning process involving the National Park Service, the state of Utah, and Garfield County, Utah. A conceptual design for the proposed road modifications developed early in the planning process was used to help identify the objectives and issues.

Project objectives for the National Park Service include:

- Provide for safe travel on an all-weather, maintained, variable-width, unpaved, gravel and native material road, acknowledging that the road occasionally would be impassable because of weather conditions;
- Retain the winding nature and adventuresome character of the Burr Trail through Capitol Reef National Park; and
- Protect the natural and cultural resources of the park.

Garfield County has identified safety, stabilization, and improved drainage as the purposes of their proposal.

Issues associated with road modifications on the Burr Trail were identified using the following methods.

- Scoping meetings were held at Capitol Reef National Park. Participants included representatives from the National Park Service, the state of Utah, and Garfield County.
- A notice of intent to prepare an environmental impact statement was published in the *Federal Register* on April 10, 2002 (NPS 2002h). This notice of intent solicited comments from the public.
- A public scoping brochure was mailed to the public on May 20, 2002, soliciting their comments. A copy of the brochure is provided in Appendix C.

Additional information on scoping is provided in the "Consultation and Coordination" section and in the consultation letters in Appendix D.

All issues that were identified using these methods and that were received by June 21, 2002, were classified in three categories: natural resource issues, cultural resource issues, and visitor use and socioeconomic issues. Brief descriptions of the issues within each of these categories are provided below.

NATURAL RESOURCE ISSUES

Air Quality. Scoping comments expressed concern that construction activities required to install road modifications could generate airborne particulates (dust). Increased numbers of vehicles could increase fugitive dust and temporarily affect air quality. This local release of particulates could reduce regional visibility.

Alterations of Geologic Features, Landforms, and Terrain. The geologic character and features of the landforms along the Burr Trail contribute to the road's distinctive character. Traveling along the road gives visitors a close-up perspective of natural features such as overhanging rock faces and eroded hills. It also provides a variety of scenic views of the Waterpocket Fold and the visual transition of slopes leading up to mesas. Changes in the horizontal or vertical alignment or the established surface contours of the road could change the shape, character, or views of some natural features. Weathering of the overhanging rock may cause rock-fall hazards that could impact vehicles. Constriction of drainage or storm flows may undermine surrounding landforms, changing the natural shape and contours of the landform.

Biological Soil Crusts and Soils. Soils disturbed by human activity are vulnerable to wind and water erosion. Concern was expressed that the disturbance of biological soil crusts could reduce natural soil nutrients and would result in soil loss through erosion and cause increased sedimentation. The clay road subgrade could create a slippery road surface when wet.

Vegetation. Land disturbance associated with some construction activities could remove or modify native vegetation and leave unvegetated, disturbed areas. Disturbed areas in arid environments are vulnerable to invasive non-native plant species that potentially could outcompete native species.

Wildlife, including Endangered or Threatened Species. Concerns were expressed that road modifications could cause the loss of some individuals or could decrease the suitability of habitat used by endangered or threatened species. Wildlife may be disturbed by vehicle noise or lights. Effects could include disrupted behavior or temporary or permanent displacement of wildlife.

Surface Water, Hydrology, and Floodplains. Motorized vehicles traveling the road may displace the gravel and native surface material, increasing surface roughness and leaving an uneven road surface. This could change the hydrology so that concentrated flows would change downstream sediment erosion and deposition or redirect natural surface drainage. Changes in road elevation at drainage crossings could cause periodic backflooding or over-bank flooding. Pollutants accumulating in sediments could be washed downstream, eventually entering water storage facilities. Installing permanent elevations in a streambed that

naturally fluctuates could change hydrology and erosion characteristics of the washes during flood events.

Wilderness Values. According to National Park Service policy, the National Park Service is not permitted to take any action that might diminish the wilderness suitability of an area recommended for wilderness study or designation. The Burr Trail is adjacent to several Bureau of Land Management wilderness study areas and National Park Service proposed wilderness areas. The road corridor along the one-mile segment abuts the Bureau of Land Management Mount Pennell wilderness study area boundary to the east and the National Park Service proposed wilderness to the south and west.

Natural Soundscapes. Changes in the number of trips per day and type of vehicles may cause noise impacts to the natural soundscape. Road construction activity may also temporarily affect natural soundscapes.

CULTURAL RESOURCE ISSUES

Cultural resource categories identified during scoping included archeological resources (prehistoric and historic), historic resources (including trails), and ethnographic resources. The cultural resource category of museum collections was not considered because there are no museum collections within the project area or its general vicinity.

Cultural Landscapes. Although there are no cultural landscapes formally determined for the project area, there may be one or more ethnographic landscapes. This landscape topic was combined with the discussion of ethnographic resources.

Archeological Resources. Road modifications could directly affect archeological resources within the construction zone, or could indirectly affect archeological resources by causing increased erosion.

Historic Resources and Historic Properties. Concerns about project impacts on cultural resources focused on historic properties, which include that subset of cultural resources that are listed in, or eligible for listing in the National Register of Historic Places. Road and culvert construction has the potential to affect historic resources; however, no *formally* designated historic properties (including cultural landscapes) are within the project area.

Ethnographic Resources and Landscapes. During scoping, concern was expressed that ethnographic landscapes containing ethnographic resources may be present within the project area. In the interest of clarity, discussions of ethnographic landscapes and ethnographic resources were combined. Road, culvert, and drainage channel construction has the potential to affect ethnographic and ethnographic landscape resources.

VISITOR USE AND SOCIOECONOMIC ISSUES

Visitor Use and Experience. According to Capitol Reef National Park's general management plan (NPS 2001c), travel along the Burr Trail is intended to provide the visitor with a feeling of remoteness in the hilly and winding terrain. Changes in the character of the road may reduce the feeling of adventure and remoteness. Some visitors could be sensitive to a potential

PURPOSE OF AND NEED FOR ACTION

increase in noise from motorized uses because they want to experience the natural quiet in the park.

Visual Quality. Changes in the character of the road may affect the visual or scenic quality. Road construction activity may also temporarily affect visual or scenic quality.

Public Health and Safety. Several concerns were expressed about road safety:

- Emergency services are limited along the Burr Trail because of its relatively remote location in the southernmost portion of the park and eastern Garfield County. In addition, the semi- primitive character of the road increases response times by emergency vehicles. These factors could increase the severity of effects from accidents compared to more developed areas.
- Areas of the road that contain bentonite clay become slippery when wet.
- The road narrows and curves in several places, which affects line of sight and increases the potential for accidents.
- It is difficult for two vehicles to safely pass along the upper portion of the Burr Canyon drainage and at the overhanging rock. This situation could lead to accidents, especially for visitors who are not familiar with common passing courtesies that are practiced along single- lane stretches.
- Under normal circumstances, the drainages crossed by the road are dry. However, during flash- flood events, surface water flows can be fast and deceptively deep. Deposition of silt and mud can leave drainages difficult to cross following rainstorms. Travel across these drainages can be unsafe for short periods of time during and after a flood.
- Trailing of cattle along the road can present a safety hazard, particularly for visitors who do not recognize the potential to encounter a herd around a blind curve.
- There is limited signage within the one- mile reach. As a result, visitors who are not familiar with the road could be more susceptible to local hazards.

Garfield County Road Maintenance Operations. Safe public transportation and use of the Burr Trail often depends on the frequency, quality, and timing of road maintenance and repair. Road surfaces and safe travel are influenced by seasonal and local climate conditions that erode the road and inundate drainages with water and sediment. This could result in increased need for road maintenance and repair to ensure safe travel. Issues of concern also include transportation safety, road stabilization, and improved drainage.

Park Operations. Increased visitation and use of the Burr Trail could increase the need for visitor services and for monitoring and controlling impacts on natural and cultural resources. Increased visitation could also result in insufficient visitor services and could limit the National Park Service' ability to meet land management objectives in the southern part of the park. Visitor safety and security and the protection of park resources were particularly cited. Another issue of concern was the potential need to implement park entrance

fees to offset the increased need for services and visitor facilities if the proposed action were implemented.

Socioeconomics. The road modifications may affect the local economy or the use of county, state, and federal lands adjacent to or in the vicinity of Capitol Reef National Park. Concern was expressed that the project could result in less visitor traffic and more pass-through traffic on the Burr Trail.

IMPACT TOPICS

Impact topics were used to focus the evaluation of the potential consequences of the proposed action and alternatives. Impact topics were identified based on legislative requirements, topics specified in *Directors Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making* (NPS 2001b), public scoping, and park-specific resource information.

The method used to select impact topics and the reasons for dismissing candidate impact topics from further consideration are provided below. The analysis in this final environmental impact statement included impacts to:

Air quality,

Geologic features and landforms,

Biological crusts and soils,

Vegetation,

Wildlife,

Surface water, hydrology, and floodplains,

Natural soundscapes,

Ethnographic and ethnographic landscape resources,

Public health and safety,

Visitor use and experience,

Socioeconomics,

Park operations,

Garfield County road maintenance operations, and

Sustainability and long-term management.

CANDIDATE IMPACT TOPICS

All impact topics considered for evaluation are presented in Table 1. The regulatory bases for considering these impact topics and whether each topic was retained for detailed analysis also are listed. In cases where an impact topic could be dismissed, the rationale for dismissal is provided under the heading “Impact Topics Dismissed From Further Consideration.” Topics were dismissed because the range of Burr Trail modification alternatives would have no effect on these particular resources or because the effects were evaluated as part of a closely related impact topic.

TABLE 1: IMPACT TOPICS FOR THE BURR TRAIL MODIFICATION PROJECT AT CAPITOL REEF NATIONAL PARK

Impact Topic	Retain or Dismiss	Relevant Regulations or Policies
Air quality	Retain	Federal Clean Air Act (CAA), CAA Amendments of 1990 (CAAA), <i>Management Policies 2001</i> (NPS 2000b)
Geologic features and landforms	Retain	<i>Management Policies 2001</i> (NPS 2000b)
Biological crusts and soils	Retain	<i>Management Policies 2001</i> (NPS 2000b)
Ecologically critical areas or other unique natural resources	Dismiss	Wild and Scenic Rivers Act, 36 Code of Federal Regulations 62 criteria for national natural landmarks, <i>Management Policies 2001</i> (NPS 2000b)
Endangered or threatened species	Dismiss	Endangered Species Act, <i>Management Policies 2001</i> (NPS 2000b)
Vegetation	Retain	<i>Management Policies 2001</i> (NPS 2000b), Capitol Reef National Park general management plan (NPS 1998c).
Wildlife	Retain	<i>Management Policies 2001</i> (NPS 2000b), National Park Service Organic Act, Fish and Wildlife Coordination Act, Bald and Golden Eagles Protection Act, Migratory Bird Treaty Act
Surface water, hydrology and floodplains	Retain	Clean Water Act, Executive Order 12088, <i>Management Policies 2001</i> (NPS 2000b), Executive Order 11988 (Floodplain Management), National Park Service Special Directive 93- 4, Floodplain Management Guideline (1993c)
Natural soundscapes	Retain	Directors Order #47 (NPS 2000a), <i>Management Policies 2001</i> (NPS 2000b)
Prime and unique agricultural lands	Dismiss	Council on Environmental Quality (1980) memorandum on prime and unique farmlands

TABLE 1: IMPACT TOPICS FOR THE BURR TRAIL MODIFICATION PROJECT AT CAPITOL REEF NATIONAL PARK (CONTINUED)

Impact Topic	Retain or Dismiss	Relevant Regulations or Policies
Water quality	Dismiss	Clean Water Act, <i>Management Policies 2001</i> (NPS 2000b)
Wetlands	Dismiss	Executive Order 11990, Clean Water Act Section 404, Directors Order #77-1 (NPS 2002i)
Wilderness	Dismiss	1964 Wilderness Act, Directors Order #41 (NPS 1999), <i>Management Policies 2001</i> (NPS 2000b)
Archeological resources	Dismiss	National Historic Preservation Act, Section 106 regulations in 36 <i>Code of Federal Regulations</i> 800, National Environmental Policy Act, Executive Order 13007, Directors Order #28 (NPS 1996a), <i>Management Policies 2001</i> (NPS 2000b)
Cultural landscapes	Dismiss	National Historic Preservation Act, Section 106 regulations in 36 <i>Code of Federal Regulations</i> 800, National Environmental Policy Act, Executive Order 13007, Directors Order #28 (NPS 1996a), <i>Management Policies 2001</i> (NPS 2000b)
Ethnographic and ethnographic landscape resources	Retain	National Historic Preservation Act, Section 106 regulations in 36 <i>Code of Federal Regulations</i> 800, National Environmental Policy Act, Executive Order 13007, Directors Order #28 (NPS 1996a), <i>Management Policies 2001</i> (NPS 2000b)
Historic resources	Dismiss	National Historic Preservation Act, Section 106 regulations in 36 <i>Code of Federal Regulations</i> 800, National Environmental Policy Act, Executive Order 13007, Directors Order #28 (NPS 1996a), National Park Service <i>Management Policies 2001</i>
Museum collections	Dismiss	National Historic Preservation Act, Section 106 regulations in 36 <i>Code of Federal Regulations</i> 800, National Environmental Policy Act, Executive Order 13007, Directors Order #28 (NPS 1996a), National Park Service <i>Management Policies 2001</i>
Conflicts with land use plans, policies, or controls	Dismiss	<i>Management Policies 2001</i> (NPS 2000b)
Energy requirements and conservation potential	Dismiss	<i>Management Policies 2001</i> (NPS 2000b)

TABLE 1: IMPACT TOPICS FOR THE BURR TRAIL MODIFICATION PROJECT AT CAPITOL REEF NATIONAL PARK (CONTINUED)

Impact Topic	Retain or Dismiss	Relevant Regulations or Policies
Environmental justice	Dismiss	Executive Order 12898
Indian trust resources	Dismiss	Department of the Interior Secretarial Order No. 3206, Secretarial Order No. 3175
Natural or depletable resource requirements and conservation potential	Dismiss	<i>Management Policies 2001</i> (NPS 2000b)
Public health and safety	Retain	Organic Act, <i>Management Policies 2001</i> (NPS 2000b)
Visitor use and experience	Retain	Organic Act, <i>Management Policies 2001</i> (NPS 2000b)
Visual quality	Dismiss	Organic Act, <i>Management Policies 2001</i> (NPS 2000b)
Socioeconomics	Retain	40 <i>Code of Federal Regulations</i> 1500 Regulations for Implementing the National Environmental Policy Act
Park operations	Retain	<i>Management Policies 2001</i> (NPS 2000b)
Garfield County road maintenance operations	Retain	American Association of State Highway Transportation Officials <i>Design Guidelines 2001</i> , <i>Garfield County, Utah General Plan</i> (Five County Association of Governments 1995)
Sustainability and long-term management	Retain	National Environmental Policy Act, 40 <i>Code of Federal Regulations</i> 1500 Regulations for Implementing NEPA, <i>Management Policies 2001</i> (NPS 2000b)

IMPACT TOPICS DISMISSED FROM FURTHER CONSIDERATION

The following impact topics were eliminated from detailed impact analysis. Specific reasons for their dismissal are provided for each impact topic.

Ecologically critical areas: The analysis area does not contain any designated ecologically critical areas such as wild and scenic rivers, or other unique natural resources, as referenced in 40 *Code of Federal Regulations* 1508.27 (Council on Environmental Quality 1978).

Endangered or threatened species: Table 2 presents the endangered, threatened, and candidate species that were identified by the U.S. Fish and Wildlife Service as potentially occurring in the area of influence of the proposed action. The following factors contributed to the dismissal of endangered or threatened species or designated critical habitat as an impact topic in this document.

The park has no records of endangered, threatened, or candidate plants species within the project area. Recent field examinations of the site by park staff confirm that none of the species listed in Table 2 are found within the project area.

A large portion of the park lies within habitat designated as critical habitat for the Mexican spotted owl (USFWS 2001). However, only those areas within the park that meet the definition of protected and restricted habitat are designated as critical habitat, and the project area lies outside of these areas. Mexican spotted owls have not been documented in the project area. They may fly over the site, but do not depend on it for habitat.

The park believes that the project, as proposed, is not likely to adversely affect any protected species. Further, this project would not impact wetlands or other important fish and wildlife habitat. In a letter dated July 16, 2002, the U.S. Fish and Wildlife Service had no comments on the project as proposed. A copy of this letter is included among the consultation letters in Appendix D. In response to an October 11, 2005 NPS letter, the U.S. Fish and Wildlife Service concurred that the project would not likely adversely affect listed species.

TABLE 2: ENDANGERED, THREATENED, AND CANDIDATE SPECIES THAT POTENTIALLY COULD OCCUR IN THE AREA OF INFLUENCE OF THE PROPOSED ACTION

Common Name	Scientific Name	Status ^{a/}	Present in the Analysis Area
Plants			
Aquarius paintbrush	<i>Castilleja aquariensis</i>	C	No
Autumn buttercup	<i>Ranunculus aestivalis</i>	E	No
Jones cycladenia	<i>Cycladenia humilis</i> var. <i>jonesii</i>	T	No
Maguire daisy	<i>Erigeron maguirei</i>	T	No
Ute ladies'- tresses	<i>Spiranthes diluvialis</i>	T	No
Winkler cactus	<i>Pediocactus winkleri</i>	T	No
Wright fishhook cactus	<i>Sclerocactus wrightiae</i>	E	No
Fish			
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	E	No
Humpback chub	<i>Gila cypha</i>	E	No
Razorback sucker	<i>Xyrauchen texanus</i>	E	No
Birds			
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	No
California condor	<i>Gymnogyps californianus</i>	EXPN	No
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	No
Southwestern willow fly-catcher	<i>Empidonax traillii extimus</i>	E	No
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	C	No
Mammals			
Utah prairie dog	<i>Cynomys parvidens</i>	T	No

^{a/} E = federally endangered; T = federally threatened; P = proposed for federal listing as threatened; C = candidate for federal listing; EXPN = experimental, non-essential population (equivalent to threatened status in the National Park System).

Prime and unique agricultural lands: Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. The Fruita Rural Historic District, located in Capitol Reef National Park, includes agricultural lands with 40 acres of orchard and 25 acres of open fields and pastures. These agricultural lands are managed and maintained as a historic landscape resource. They are located in the north half of the park about 25 miles from the project area and would not be affected by any of the alternatives. There are no prime and unique agricultural lands located in the project area.

Water quality: During construction, the removal of vegetation and disturbance of soils would have the potential to increase sediment transport into nearby waterways. Therefore, standard best management practices such as diversion structures and silt fences would be employed to ensure that construction-related adverse effects did not exceed negligible levels. Likewise, standard best management practices such as prohibiting the refueling or maintenance of construction equipment near waterways would prevent spills of fuels or oils into waterways. Water quality is not addressed as a separate impact topic; however, potential effects are evaluated under the Hydrology impact topic.

Wetlands: The project area within Capitol Reef National Park does not contain any wetlands regulated under the provisions of Section 404 of the Clean Water Act, or areas designated as wetlands using the classification system of Cowardin *et al.* (1979), within the areas of potential effect.

Wilderness: The Burr Trail corridor is adjacent to the Bureau of Land Management Mount Pennell wilderness study area to the east and the National Park Service proposed wilderness to the south and west. While construction activities would generate some noticeable noise at the edge of these areas, the noise would be short-term and would not be distinguishable from the sounds made by heavy vehicles or road equipment used to conduct routine road maintenance. There would not be any incursions of equipment into the wilderness areas. None of the activities associated with any of the alternatives would have adverse effects on the values or solitude associated with the proposed wilderness lands or wilderness study area.

Archeological resources: National Park Service archeologists intensively surveyed the roadway corridor, including the current project area, in March and April 1992 (NPS 1993a and 1993b). Previously documented sites were revisited during this survey. The proposed channel relocation area was surveyed by park archeologist Lee Kreutzer in July 2002 (NPS, Kreutzer, 2002f). Cultural resources discovered during the surveys were evaluated. No archeological sites listed in or eligible for the National Register of Historic Places are within the area of potential effect. Therefore, archeological resources were dismissed as an impact topic.

Cultural landscapes: No cultural landscapes have been formally determined for the project area. However, there appears to be a possible ethnographic landscape(s). Therefore, the potential ethnographic landscape has been combined with the discussion of ethnographic resources, and cultural landscapes were dismissed as a separate impact topic.

Historic resources: The Burr Trail has a long history. However, modifications to the road during the 20th century have changed its character and appearance, and it has been determined ineligible for the National Register of Historic Places. No National Register-eligible historic properties are within the area of potential effect, so historic resources were not considered as an impact topic.

Museum collections: The National Park Service's *Management Policies, 2001* (2000) and Director's Order- 28, *Cultural Resource Management Guideline* (1997) require the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material). None of the items in the park's museum collection, nor those on display in the visitor center, would be affected by the proposed action. Hence museum collections was dismissed as an impact topic in this document.

Conflicts with land use plans, policies, or controls: The section "Relationship to Other Planning Projects" describes National Park Service and other plans, projects, or actions in the area. The proposed project was designed to balance park values with county transportation needs to ensure that it would not conflict with any of these plans.

The Burr Trail lies within an area designated by the park's general management plan (NPS 2001c) as a Road Corridor Zone. The Burr Trail is within the Dirt, All- Weather, Two-Wheel Drive category of the Road Corridor Zone. Although the area is remote, the zoning provides for basic resource and visitor management and is designed to be consistent with the adjacent zones. The construction activities associated with the proposed action would not conflict with park zoning for this area.

Energy requirements and conservation potential: None of the alternatives would affect continued fuel availability. The amount of fuel consumed by equipment during construction would be negligible. None of the alternatives would change the number of vehicles using the Burr Trail or the number of miles driven per vehicle, and both the design speed of the Burr Trail and the average vehicle speed would remain below 25 miles per hour. As a result, energy requirements and fuel consumption would not be affected by the proposed road modifications.

Environmental justice: Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low- Income Populations" requires that all federal agencies address the effects of policies on minorities and low- income populations and communities. None of the alternatives would have disproportionate health or environmental effects on minorities or low- income populations, as defined in the Environmental Protection Agency's (1996) *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis*.

Indian trust resources: Indian trust assets are owned by Native Americans but held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order No. 3206, "American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act," and Secretarial Order No. 3175, "Departmental Responsibilities for Indian Trust Resources." There are no Indian trust assets within Capitol Reef National Park.

PURPOSE OF AND NEED FOR ACTION

Natural or depletable resource requirements and conservation potential: Natural or depletable resources address the quality, recycling, or conservation of petroleum products and other natural resources. The use and conservation of fuels is considered under the impact topic of “energy requirements and conservation potential.” The use and conservation potential of other natural or depletable resources would be negligible.

There are no marketable natural or depletable resources located within the proposed project area. While the Burr Trail may be used to access these types of resources on adjacent Bureau of Land Management lands, none of the road modification alternatives would change access to these resources.

Visual quality: The scenic quality of the landscape surrounding the Burr Trail is comprised of geological features and landforms and views of the Waterpocket Fold. The park’s general management plan (NPS 2001c) recommends enhancing the visitor experience within road corridors while protecting natural resources. Therefore, the primary goal is to maintain existing natural resources within the Road Corridor Zone while maintaining existing unobstructed views and ensuring that the road is consistent with National Park Service road standards (NPS 1984). In keeping with the focus of visual quality as discussed in the park’s general management plan, this issue was dismissed as a separate topic but has been incorporated into the geologic features and landforms and the visitor use and experience topics.

PROPOSAL AND ALTERNATIVES

FORMULATION OF ALTERNATIVES

This section describes three action alternatives and the no action alternative (continue current management). The features of each of the alternatives are summarized in Table 3.

Some of the action alternatives were identified by the County and the State within the Settlement Agreement (United States District Court, 2001) established among Garfield County, the state of Utah, and the National Park Service. Others were the result of agency input and public scoping.

The roadway modifications considered during the development of the alternatives include gravel surfacing on portions of the road, installing drainage conveyance features at four major and two minor drainage crossings, modifying the roadway at the overhanging rock, and installing slope protection for stream bank stabilization adjacent to the road. Additional alternative components include drainage structures, drainage channel recontouring, re-alignment or a minor shift in the road alignment at Halls Creek and at a Burr Canyon side drainage near the base of the Burr Trail switchbacks, and installation of a cattle guard at the park's eastern boundary.

The settlement agreement, signed May 30, 2001, included an attachment entitled "Proposed Improvements to One Mile Segment of Burr Trail." The county and state proposed improvements included:

- Add a 6- inch gravel base course from mile point 0.0 to 0.45 and 0.85 to 0.9.
- New drainage facilities for four crossings of Sandy Creek (galvanized steel culverts for 10- year events or hardened low- water crossings of concrete or asphalt for 10- year events).
- New culverts for two minor wash crossings (galvanized steel culverts sized for 10- year events).
- Improvement of the existing 24- inch culvert at mile point 0.75.
- Widening of roadway width to 20 feet at the overhanging rock at mile point 0.65 (cutting into the rock or construction of a concrete or rock retaining wall to accommodate greater roadway width).
- Addition of slope protection to the bank of Sandy Creek at locations where the creek cuts into existing fill slope of the road between mile points 0.6 to 0.9 (placing protection up to 6 feet up the bank, using native rock in the streambed, or rock previously removed from the roadway/ hauled in from other areas).

A *Conceptual Design Plan* (see Appendix B) was developed using these elements. This plan has since been revised to minimize resource impacts and included consultation among the National Park Service, Garfield County, and the Federal Highway Administration.

ROAD DESIGN STANDARDS

The alignment and character of the Burr Trail are formed by the steep topography of the Waterpocket Fold. Where it passes through National Park Service lands, the Burr Trail is subject to road design standards and guidelines established by both the National Park Service and the American Association of State Highway Transportation Officials (AASHTO).

The AASHTO design guidelines (2001) are the industry standard for geometric road design and construction for all public roads, including local and rural roads. Design guidelines include road function, design and operating speed, traffic volumes, hydrology and hydraulics, road and shoulder width, criteria for intersection sight distance, stopping sight distance, and access management techniques.

Under AASHTO design guidelines, the Burr Trail would be classified as a two lane, low volume (a road with an average daily traffic (ADT) of less than 400 vehicles), rural collector. AASHTO guidelines for this type of roadway, with a design speed of 25 mph, recommend a traveled way width of 20 feet plus two 2- foot wide shoulders. The traveled way width may be reduced to 18- feet for roadways with an ADT less than 250 vehicles. On level terrain, the maximum road grade recommended is 7 percent. In mountainous terrain, a maximum grade of 12 percent is recommended. Typical design speeds recommended for this type of road range from 40 mph on level terrain to 20 mph in mountainous terrain.

For comparison purposes, National Park Service road standards (NPS 1984) require a minimum of two 8- foot lanes with 1- foot shoulders, based on an average daily traffic (ADT) of less than 50. However, on roads where greater than 5 percent of the design volume is recreational vehicles, the park service would consider adding an additional foot of lane width, for a total of 20 feet.

Road design standards and policies of the National Park Service (1984) require that parks consider the balance between how the visitor views the park and how this relates to the management objectives for the particular area of the park in which the road is located. As the senate report accompanying the Federal- Aid Highway Improvement Act of 1982 states, “Roads must be carefully designed to protect important natural and cultural resources under the jurisdiction of those agencies. Such roads must be designed to blend in with the natural landscape. Because of the resources preserved in Federal land management areas, and the type of tourist use in such areas, the roads in certain instances do not have to be constructed to normal highway standards.”

The Burr Trail has multiple functions. It serves as a scenic route, providing an adventure-some driving experience through undeveloped areas of stark geology and scenic vistas. The road also provides access to the southern part of the park and serves as a through route to other features in and near the park and throughout the region.

The park’s general management plan (NPS 2001c) identifies the Burr Trail as a dirt, all-weather, two- wheel- drive corridor that provides the traveling visitor with a unique natural and recreational experience. The plan directs the National Park Service to manage the road to provide an all- weather, maintained, variable- width, unpaved road of gravel and native surfacing. The plan recognizes that the road may be occasionally and briefly impassable because of local weather conditions. Visitors would be provided a sense of remote lands, adventure, and exploration.

TABLE 3: SUMMARY OF FEATURES FOR ALTERNATIVES FOR ROAD MODIFICATION FOR THE BURR TRAIL

Feature	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Roadbed Stabilization Mile point 0.00- 0.45 Mile point 0.85- 0.90	Grade bentonite road base and maintain as needed.	Excavate road bed to a depth of one foot in portions of road surface with high bentonite clay content. Install a gravel road base over geotextile fabric. Maintain as needed.	Install gravel road base on bentonite and maintain as needed.	Same as Alternative A.
Road Width and Overhanging Rock Mile point 0.65	Rock overhang and narrow road width would remain without alteration of natural features.	Widen road by shifting the drainage ditch to the north, closer to the overhanging rock. Support the road and protect the stream bank using a rock embankment on the north bank of Sandy Creek. The resulting 20- foot- wide road would provide two full traffic lanes, and the overhanging rock would remain intact.	Remove the overhanging rock and widen road by 6 to 10 feet. The resulting 20- foot- wide road would provide two full traffic lanes.	Same as Alternative B.
Road Bank Stabilization Mile point 0.75- 0.85 Mile point 0.75 culvert	Road embankments would remain natural soil and rock with minimal shaping or soil erosion control.	Install up to 530 linear feet of slope protection 6 feet up the slope from the base of the embankment. Outlet protection would be added to the culvert at mile point 0.75.	Same as Alternative A.	Same as Alternative A.

TABLE 3: SUMMARY OF FEATURES FOR ALTERNATIVES FOR ROAD MODIFICATION FOR THE BURR TRAIL (CONTINUED)

Feature	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Major Road Drainage Crossings	Surface and stormwater would drain across existing terrain and road surface.	Install paved fords designed to allow a 10- year storm event to pass over the paved portion of the roadway at mile points 0.1 and 0.2. Install vented paved fords designed to let 2- year storm pass through two 24- inch- diameter corrugated metal pipe culverts, with larger storms overtopping the paved portion of the roadway, at mile points 0.5 and 0.6. At each crossing, inlet and outlet protection would be installed to reduce and minimize erosion and scour.	Install culverts designed to pass floodwaters from a 25- year storm event. Each crossing would include five 48- inch- diameter corrugated metal pipe culverts with a concrete headwall and wingwalls. At each crossing, inlet and outlet protection would be installed to reduce and minimize erosion and scour.	Install culverts designed to pass floodwaters from a 50- year storm event. Each crossing would include six 60- inch- diameter corrugated metal pipe culverts with a concrete headwall and wingwalls. At each crossing, inlet and outlet protection would be installed to reduce and minimize erosion and scour.
Mile point 0.10				
Mile point 0.20				
Mile point 0.50				
Mile point 0.60				
Minor Road Drainage Crossings	Surface and stormwater would drain across existing terrain and road surface.	Install paved fords. At each crossing, recontour the inlet and protect the outlet.	Install culverts designed to handle a 2- year storm event. Each crossing would include one 24- inch- diameter corrugated metal pipe. Protect both the inlet and outlet as needed.	Install culverts designed to handle a 10- year storm event. Each crossing would include one 36- inch- diameter corrugated metal pipe. Protect both the inlet and outlet as needed.
Drainage at Halls Creek	Surface and stormwater would drain across existing terrain and road surface and natural	Install vented paved ford (four 36- inch pipes) designed to pass a 10- year storm event. Shift the roadway down-	Install culverts designed to handle a 25- year storm event. The crossing would consist of eight 72- inch-	Same as Alternative B.

TABLE 3: SUMMARY OF FEATURES FOR ALTERNATIVES FOR ROAD MODIFICATION FOR THE BURR TRAIL (CONTINUED)

Feature	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
	contours would be maintained. Washed-out 60- inch- diameter corrugated metal pipe culvert may be replaced with in- kind culvert of corrugated metal pipe.	stream, away from the confluence of Halls Creek and the Burr Canyon drainage, but within the area currently disturbed by the road embankments, so that culverts can accommodate high flows from the two drainages. Install protection for outlet, upstream and downstream stream banks as needed.	diameter corrugated metal pipes with a headwall and wingwalls. Realign 300 linear feet of Burr Canyon drainage channel in a northerly direction to enter Halls Creek 100 feet upstream of the Halls Creek road crossing.	
Drainage at Burr Canyon	Existing 24- inch- diameter corrugated pipe culvert would direct surface and storm-water under road and discharge into a Burr Canyon side drainage. Road would remain narrow. Flows exceeding culvert capacity would continue to flow over the road.	Install three 36- inch- diameter corrugated metal pipe culverts designed to handle a 10- year storm event. Widen 50 feet of road by 6 to 10 feet using a rock embankment at the toe of the fill and backfill using rock material from slope..	Same as Alternative A.	Same as Alternative A.
Signage	Maintain existing signs.	Provide advisory signs to ensure vehicle safety at narrow road segments and to warn travelers against crossing drainages when water of any depth is on the roadway.	Signs would not be needed at drainage crossings. Provide advisory signs to ensure vehicle safety at narrow road segments	Same as Alternative B.

TABLE 3: SUMMARY OF FEATURES FOR ALTERNATIVES FOR ROAD MODIFICATION FOR THE BURR TRAIL (CONTINUED)

Feature	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Cattle Guard	Eastern park entrance would remain unrestricted, allowing cattle to trespass. Existing cattle guard would remain at mile point 0.55.	Install a cattle guard at the eastern park boundary to prevent cattle from entering the park. National Park Service would remove existing cattle guard at mile point 0.55 when grazing allotment expires.	Same as Alternative A.	Same as Alternative A.

ROAD DESIGN PARAMETERS

The action alternatives were developed to include measures that would provide the visitor with a safe, leisurely travel experience that would differ substantially from that along a typical federal or state highway. The road would rise and fall below the mean road grade in conformance with the natural slopes of the hilly terrain, and the horizontal and vertical road alignment would follow the natural contours. The unpaved gravel and native material road surface, combined with the variable width that establishes the character of this road, would respect the terrain, environment, and resource protection aspects of the adjacent zones, slopes, and geological formations through which it passed.

In developing the action alternatives, the general character of the road was defined using the following design parameters:

- Design speeds would not exceed 25 miles per hour.
- Traffic volumes are not expected to change significantly from the current average daily traffic (ADT). National Park Service traffic counts along the Burr Trail from 1998 through 2001 averaged 29 vehicles per day (NPS no date b, NPS 1998b).
- Traveled way width would be set at 18 feet with two one-foot-wide shoulders. This would provide a total roadway width of 20 feet in accordance with National Park Service Standards *Park Road Standards* (NPS 1984) and AASHTO Guidelines. This figure was calculated based on an ADT of less than 50, which, under NPS Park Road Standards for roads with this volume of traffic, require two 8-foot lanes with 1-foot shoulders. However, on roads where greater than 5 percent of the design volume is recreational vehicles, the park service would consider adding an additional foot of lane width, for a total of 20 feet.
- Geometric design would follow the existing horizontal and vertical alignment to maintain the current contours of the road, and any alterations would be kept to a minimum.
- Drainage channel crossings would be treated sensitively using concrete paved fords, with some fords vented using corrugated metal pipe culverts, or a series of corrugated metal pipe culverts.
- Erosion would be controlled through careful shaping of terrain, by installing soil erosion control devices, and with revegetation in areas where suitable, although the arid environment typically limits revegetation success. Materials used for surface, fill, stone, rails, and signs would be chosen or treated to blend with the surrounding landscape to the greatest extent possible.
- Regulatory and advisory speed and hazard signs that comply with the *Manual on Uniform Traffic Control Device Standards* would be used to ensure vehicle speeds remained within the design capacity of the road and that drivers were warned of drainage crossing hazards.

NO ACTION ALTERNATIVE

The No Action Alternative is defined as the continuation of current road management and project area conditions. It does not mean that road management would cease. The No Action Alternative was used as the baseline condition against which all other alternatives were compared.

The segment of the Burr Trail where Garfield County has proposed road modifications begins at the eastern boundary of the park (see Eastern Park Entrance photo). At the boundary, the road enters the park through an ungated fence with no cattle guard. A cattle guard is currently located at mile point 0.55. During the winter grazing period, cattle trespass across the park boundary and adversely affect soils and vegetation along the roadside.



EASTERN PARK ENTRANCE

The road extends westerly, passing over gently to moderately rolling terrain. The road gradually progresses downgrade as it crosses two small washes and makes four crossings of the large Sandy Creek drainage channel at mile points 0.10, 0.20, 0.50, and 0.60, as measured from the park's eastern boundary.

The road surface at the crossings is native material (see Native Material Drainage Crossing photo). There are no crossing structures, such as an elevated roadway with culverts or paved low- water crossing in these drainage channels.

An area of winding terrain along a horizontal s- curve occurs between mile points 0.40 and 0.75. Within this area, the road narrows to less than two lanes as it passes a prominent, overhanging rock at mile point 0.65. The rock overhang constricts the roadway so that two vehicles cannot pass. The low height of the rock overhang affects passage by tall vehicles, and the location of the rock adjacent to a curve in the road restricts line of sight for on-coming vehicles.

West of the s- curve, the road proceeds in a southwesterly direction through hilly terrain. At mile point 1.00, it reaches the area known as The Post.



NATIVE MATERIAL DRAINAGE CROSSING

The road surface within this one- mile- long segment is a graded mixture of gravel and native material. The average roadway width is 20 feet.

Depending on weather conditions, the road is occasionally impassable at drainage crossings, and the road surface is slippery when wet along sections of the road with high bentonite clay content. In particular, two segments of road, between mile points 0.00 to 0.45

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and 0.85 to 0.90, are on grades with high bentonite content . These segments become extremely slippery and are often impassable during and following rainstorms.

Much of the road runs directly adjacent to the Sandy Creek channel. As shown in the Sandy Creek Channel photo, the roadway between mile points 0.75 and 0.85 is threatened by stream bank erosion.



SANDY CREEK CHANNEL

About 2.5 miles northwest of The Post is the first of two additional drainage crossings addressed in this proposed action. At this site, the road crosses the Halls Creek drainage, shown in the Halls Creek Drainage Crossing photo. The Burr Canyon drainage joins Halls Creek immediately upstream from the crossing. The size of the drainage and the close proximity of the confluence to the road result in very destructive storm water flows.

The road surface material at the Halls Creek drainage is similar to the material in the one-mile segment, composed of gravel and native soil. Previously, a corrugated metal pipe culvert was installed at this location. However, on two occasions, floods washed out culverts as large as 5 feet in diameter at this crossing. Maintenance of this site causes visual scars ranging from piles of sediment to twisted corrugated metal pipe removed after flood events.



HALLS CREEK DRAINAGE CROSSING

Just over 3 miles west of The Post is an area of the Burr Trail known as the switchbacks. Near the east side of the switchbacks, the road passes over a side drainage of Burr Canyon (see Burr Canyon Side Drainage Crossing photo). High water at this site overtops an existing, undersized, corrugated metal pipe and sediment-laden water flows directly onto the Burr Trail. Erosion causes deep gullies in the road and the side slope, and has caused roadway narrowing (see Burr Canyon Side Slope photo).



BURR CANYON SIDE DRAINAGE CROSSING

Under the No Action Alternative, current characteristics of the Burr Trail would not be modified. Road features would include the following:

- The road would continue to be maintained to provide travel on a variable- width, unpaved road of gravel and native material.
- During inclement weather, the road might be impassable at drainage crossings and the road surface would be slippery along sections of the road with high clay content on the surface.
- Maintenance needs as a result of storm- related drainage would remain at their current moderately high levels.



BURR CANYON SIDE SLOPE

- The overhanging rock at mile point 0.65 would remain as a natural feature along the road, and only one vehicle at a time would be able to pass around the curve adjacent to the rock.
- The road design would remain consistent with the management goals described in the park's general management plan (NPS 1998c).
- The Burr Trail at Halls Creek would remain a gravel and native material, low- water crossing, unless Garfield County replaces the previously washed out 60- inch- diameter corrugated metal pipe culvert with an in- kind culvert.
- Surface water runoff from the Burr Canyon side drainage would cross beneath the road and drain through the existing 24- inch- diameter corrugated metal pipe.
- The lower portion of the Burr Canyon drainage would channel storm flows and sediment directly onto the road, causing further erosion of the road and displacement of drainage culverts where it intersects with Halls Creek.
- During the winter grazing period, cattle would trespass across the eastern park boundary and adversely affect soils and vegetation along the road.

ALTERNATIVE A (PREFERRED ALTERNATIVE)

Alternative A would emphasize maintaining the rustic character of the road, minimizing disturbance to the environment, and integrating the visitor with the surrounding landscape, while improving safety for motorists. Road surface and drainage modifications would conform to the natural terrain and blend with the surrounding landscape. Advisory signs would ensure vehicle safety at narrow roads segments and warn travelers against crossing drainages when water is flowing over the road. Visitors traveling along the winding, hilly terrain would expect to experience the remote feeling and sense of adventure currently provided on the Burr Trail.

Alternative A is the preferred alternative because it meets the objectives associated with the purpose and need for the proposed action. The National Park Service has selected this alternative among others that have been considered to fulfill its mandate to the fullest extent possible in connection with this county proposal, in part because the settlement terms and resultant cooperative relationship with the county and state have allowed the selection to be made in this manner. Under this alternative, road modifications involving portions of the road surface, width, bank stabilization, slope protection, and drainage would be conducted along the target road segment. These are illustrated on the figure entitled Proposed Project Area One- Mile Section – Alternative A and Proposed Project Area Burr Canyon– Alternative A.

The road would remain passable during the majority of the year; some sections would occasionally be impassable when drainage crossings were overtopped by floodwaters.

Opportunities for visitors to experience the surrounding geologic features would be provided from various roadside views. The driving experience in Alternative A would be consistent with the geology, topography, and environment through which the road passes.

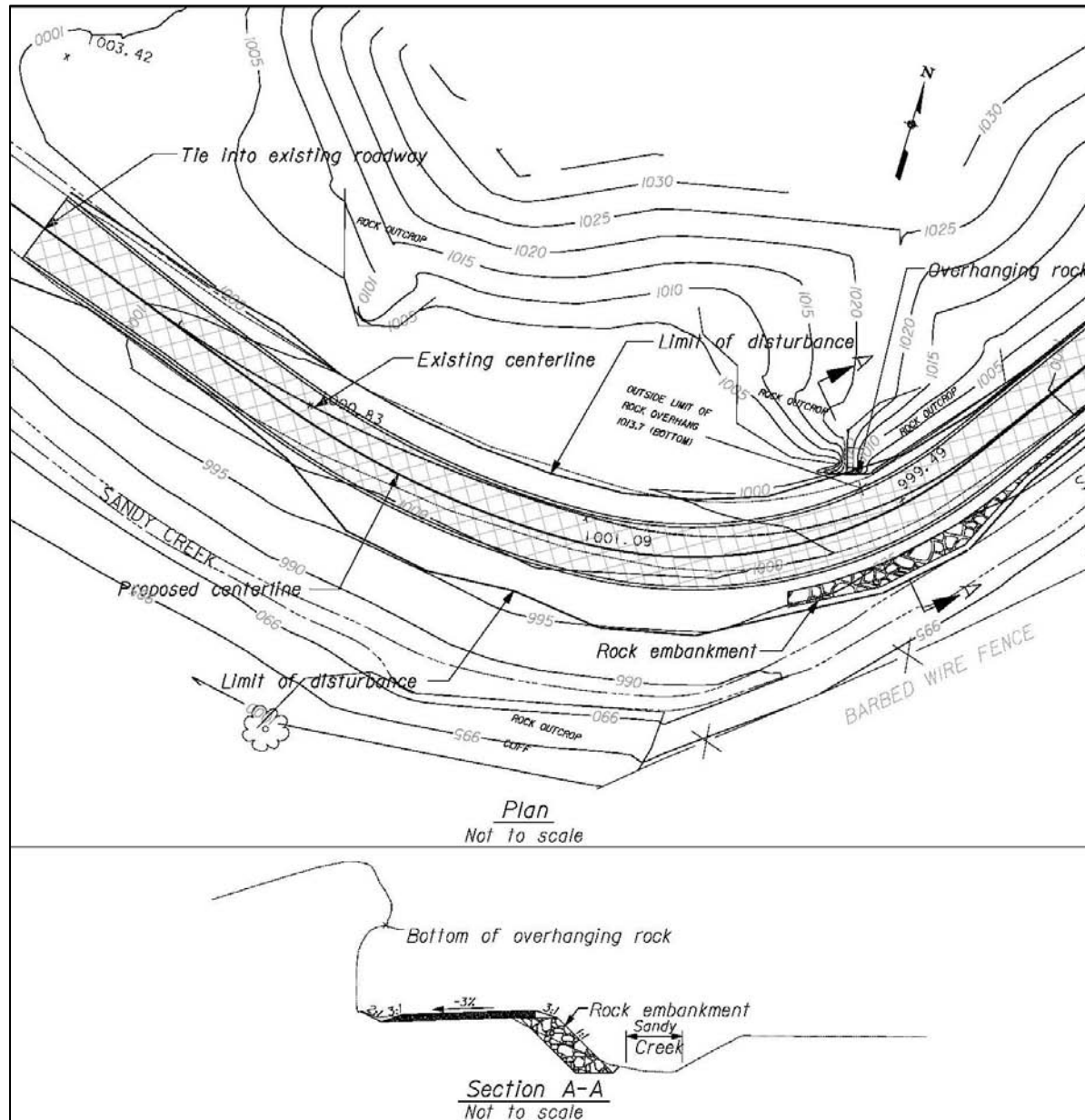
The road surface has a high bentonite clay content from mile point 0.00 to 0.45, from mile point 0.85 to 0.90, and in a few other isolated locations. These areas would be excavated to 1 foot below the current road surface. A gravel base would be installed over a protective layer of geotextile fabric. The fabric would minimize gravel loss due to compression into the clay substrate. This action would improve vehicle passage and decrease the tendency of the road to become slippery during wet weather.

Without altering the overhanging rock, a narrow section of the road at mile point 0.65 would be widened by 6 feet to 10 feet. This would be accomplished by moving the northern roadside ditch toward the overhanging rock. A rock embankment would be added to the southern side of the road (the north bank of Sandy Creek) to provide structural stability for a portion of the road as well as slope protection. This would produce a road segment with two 9-foot-wide lanes with 1-foot-wide shoulders and a design speed of less than 25 miles per hour. This action would improve vehicle passage in accordance with the existing contours and current design standards (NPS 1998a, NPS 1998b).

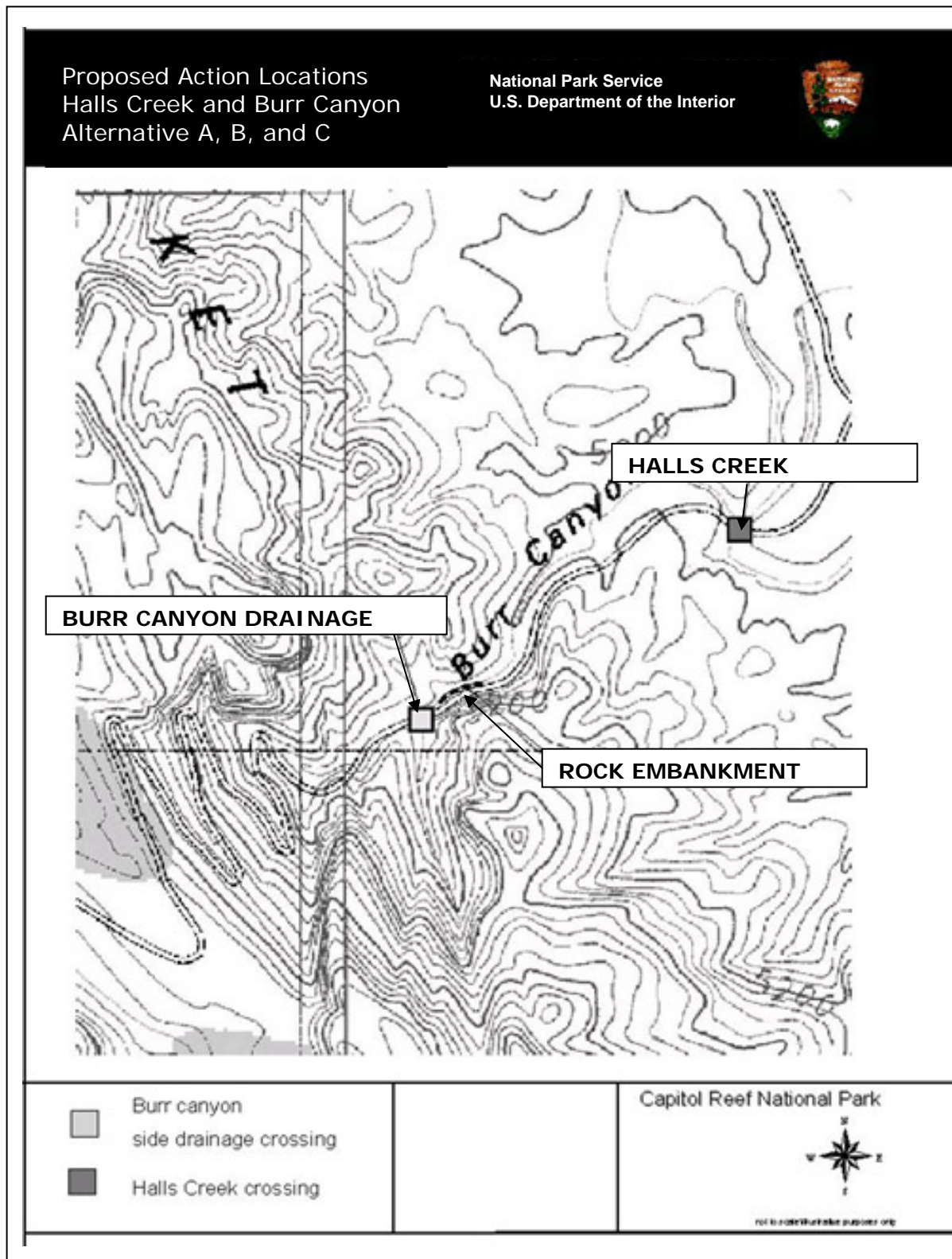


PROPOSED PROJECT AREA ONE- MILE SECTION – ALTERNATIVE A

PROPOSAL AND ALTERNATIVES



ROAD MODIFICATIONS AT THE OVERHANGING ROCK – ALTERNATIVE A



ACTION LOCATIONS HALLS CREEK AND BURR CANYON – ALTERNATIVES A, B, AND C

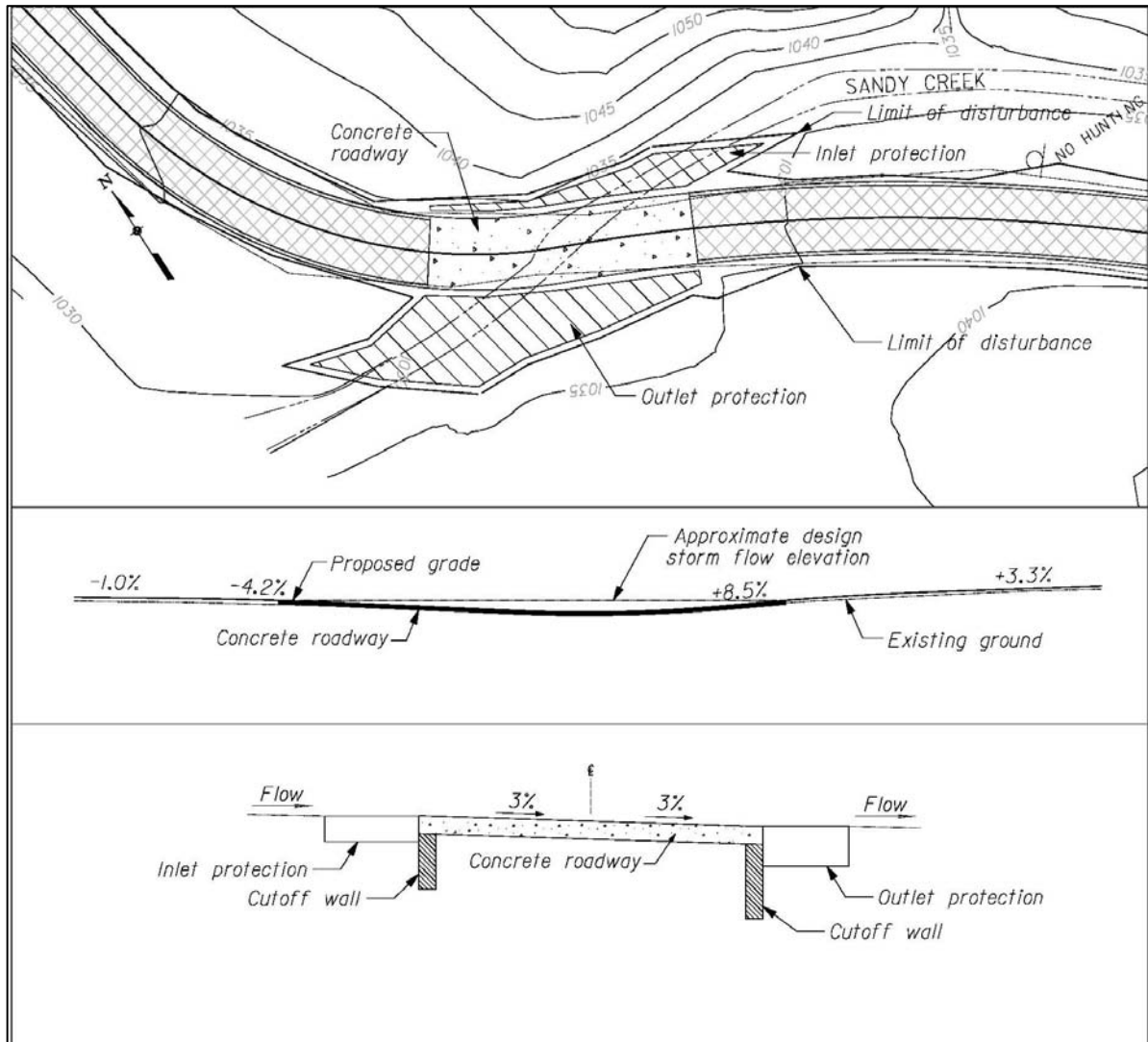


RETAIN THE OVERHANGING ROCK – ALTERNATIVE A

The road bank in the vicinity of mile points 0.75 and 0.85 would be stabilized using slope protection to reduce erosion and maintain the natural contours of the existing stream channel. Up to 530 linear feet of slope protection would be placed along the base and 6 feet up the sides of the road embankment. The base width of the protection would remain aligned with the slope to minimize placement of rock within the existing stream channel.

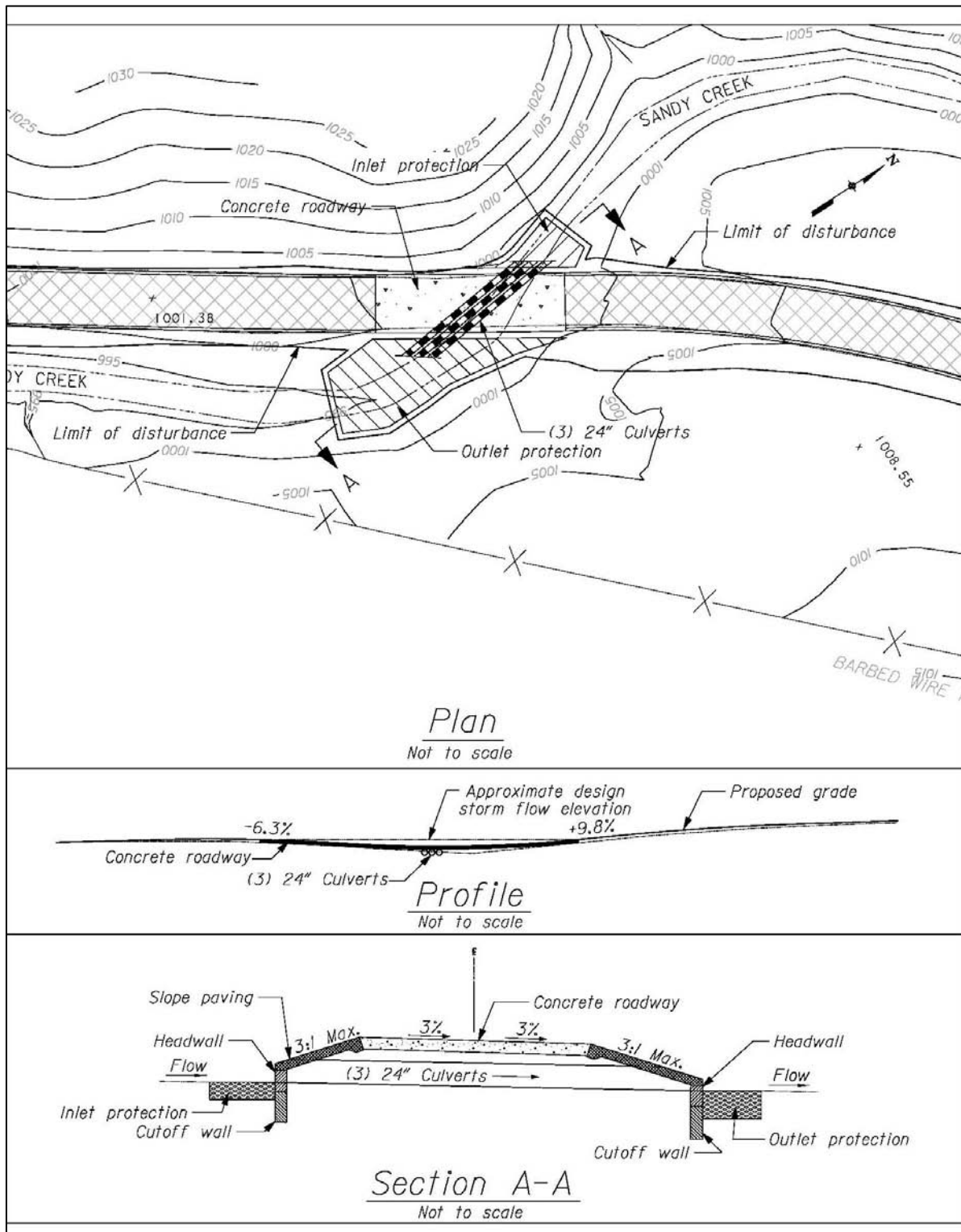
Two paved fords, impassable whenever water overtopped the roadway, would be constructed at mile points 0.10 and 0.20. The construction of the paved fords would disturb approximately 6,500 and 4,500 square feet of ground at mile points 0.10 and 0.20, respectively. Two vented paved fords would be constructed at mile points 0.50 and 0.60. These crossings would be passable during 2- year storm events; floodwaters would be conveyed through two 24- inch- diameter corrugated metal pipe culverts. The vented paved fords would be impassable during events greater than the 2- year storm because floodwater would overtop the paved portion of the roadway. Construction of the vented paved fords would disturb about 8,000 and 7,000 square feet of ground at mile points 0.50 and 0.60, respectively. The paved fords (vented and unvented) would be relatively consistent with the existing topography, and their length would be sufficient to contain overtopping 10- year storm event floodwaters within the paved area. Each of the fords would include slope protection to protect the up- and downstream banks and inlet and outlet protection to reduce and minimize erosion and scour. The fords are illustrated in the Major Road Drainage Crossings,

Mile Points 0.10 and 0.20, Typical Paved Ford Design and the Major Road Drainage Crossings, Mile Points 0.50 and 0.60, Typical Vented Paved Ford Design figures.



MAJOR ROAD DRAINAGE CROSSINGS, MILE POINTS 0.10 AND 0.20, TYPICAL PAVED FORD DESIGN – ALTERNATIVE A

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MAJOR ROAD DRAINAGE CROSSINGS, MILE POINTS 0.50 AND 0.60, TYPICAL VENTED
PAVED FORD DESIGN - ALTERNATIVE A

Paved fords, similar to those that would be constructed at mile points 0.10 and 0.20, would be constructed at each of the two minor drainage channels. There would be approximately 4,000 square feet of new ground disturbance associated with the construction of each of the paved fords at the minor crossings. The upstream channel (i.e., inlet) would be recontoured to direct surface flow over the paved ford, and inlet and outlet protection would be installed to minimize erosion and scour. Slope protection would be added to portions of the downstream road embankment to minimize erosion.

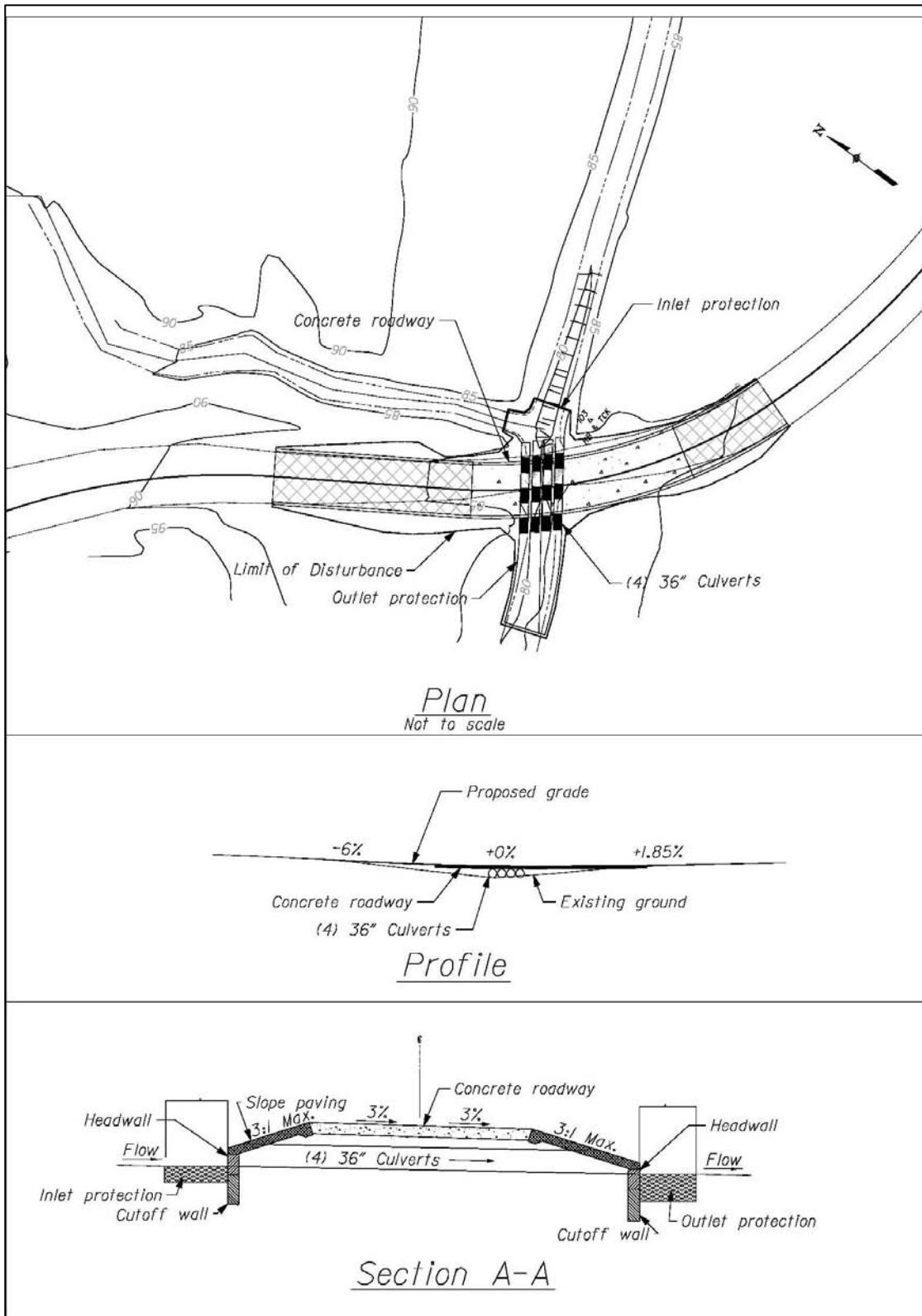
A vented paved ford would be constructed to facilitate crossing Halls Creek. This ford would include four 36- inch- diameter corrugated metal pipe culverts. Floodwaters from a 2- year storm event would be contained in the culverts, while events up to the 10- year storm would overtop the roadway within the limits of the concrete pavement, thus preventing erosion of the roadway. The roadway at the crossing would be shifted a short distance downstream (i.e., to the south) from the Halls Creek/Burr Canyon drainage confluence so that the culverts in the paved ford could accommodate flows from the two drainages. Construction of the vented paved ford and the roadway shift would disturb about 6,000 square feet, with approximately 3,500 square feet of that disturbance outside the existing roadway footprint. The vented paved ford and new road alignment is illustrated in the Burr Canyon Drainage at Halls Creek – Alternative A figure. Inlet and outlet protection would be added to minimize scour and erosion. Slope protection would also be placed on the stream banks both upstream and downstream of the crossing if necessary to reduce the potential for erosion of the stream banks.

An existing culvert near the base of the switchbacks in Burr Canyon would be replaced by three 36- inch- diameter corrugated metal pipe culverts, as illustrated in the Burr Canyon Drainage Culverts – Alternatives A, B, and C figure. Inlet protection would be installed while the outlet will use the existing rock channel as erosion protection. A 50- foot length of road just east of the existing culvert would be widened 6 to 10 feet by adding a rock embankment and backfilling with local material to widen the road on the south slope of the Burr Canyon drainage. These modifications in Burr Canyon would create about 8,000 square feet of new ground disturbance.

A cattle guard would be placed at the park boundary by the National Park Service to prevent cattle from entering the park from adjacent Bureau of Land Management-administered lands, and the existing cattle guard at mile point 0.55 would be removed when the current grazing allotment expires.

Prior to implementation of Alternative A, a construction operations plan would be prepared that would include construction staging, materials storage, and mitigation measures. This plan would include best management practices that would be implemented to insure that effects on resources were minimized.

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BURR CANYON DRAINAGE AT HALLS CREEK – ALTERNATIVE A

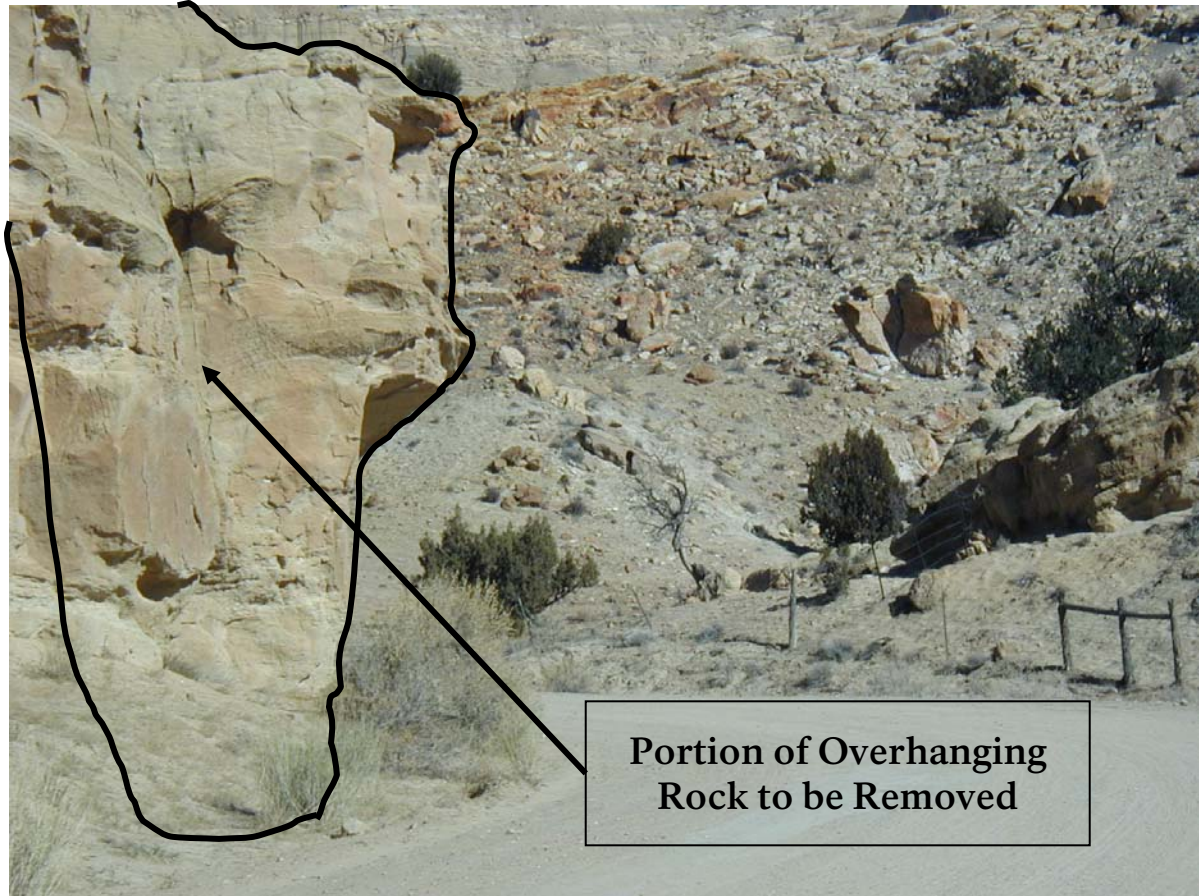
ALTERNATIVE B

Alternative B would remove the overhanging rock at mile point 0.65 due to a shifting of the alignment to improve safety. Other features of the road modification would include gravel surfaces, culverts at drainage crossings, and a cattle guard.

The road surface in areas with high bentonite clay content would be improved, and corrugated metal pipe culverts would direct drainage at the major and minor crossings underneath the road. Road elevations would be raised at drainage crossings to accommodate the large culverts that would pass floodwaters associated with a 25- year storm event. Stone and rock used to stabilize road banks, frame culverts, and reduce erosion would be treated, if sufficiently different than local materials, to blend into the surrounding landscape.

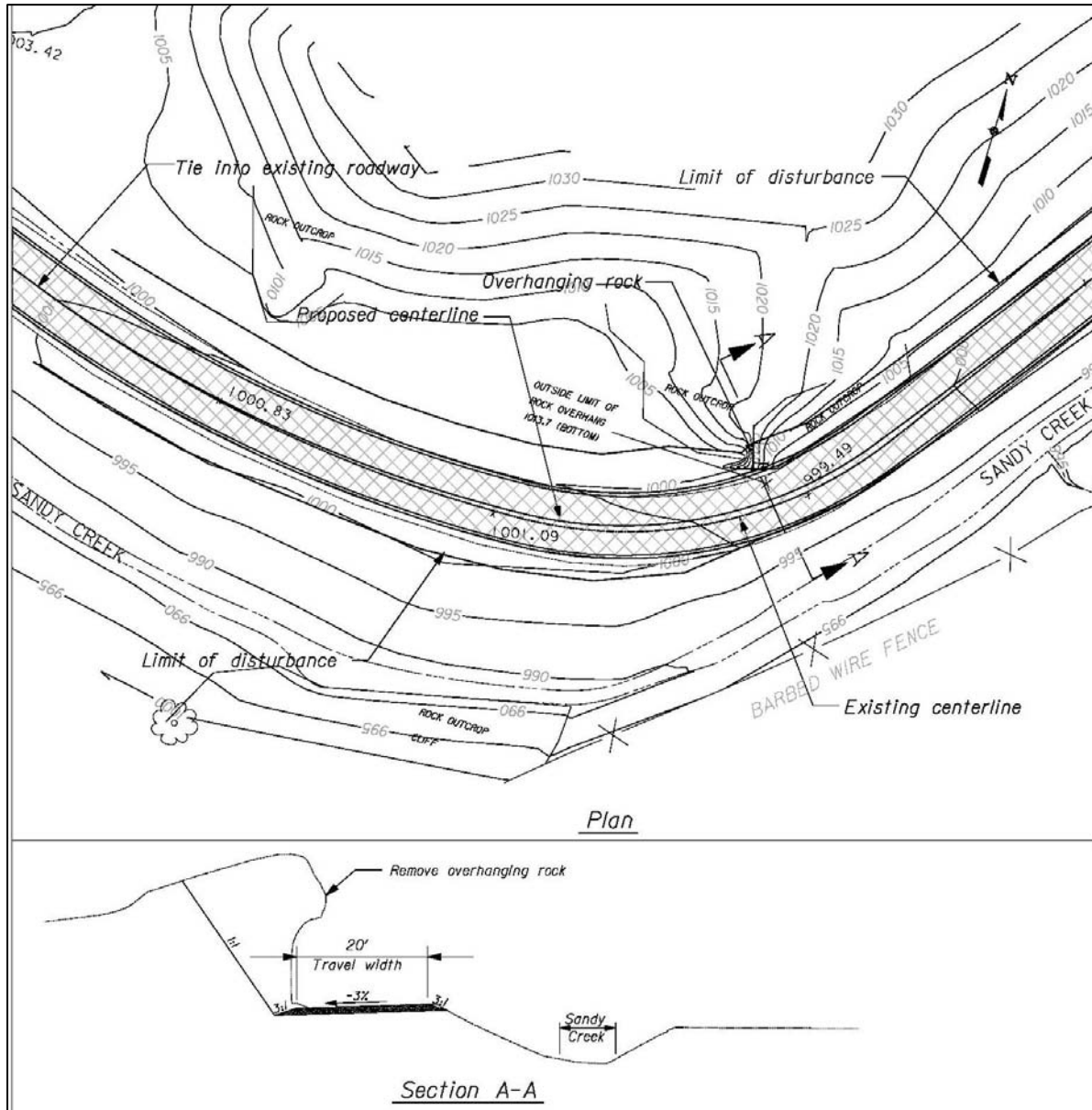
Under Alternative B, the following road surface, width, bank stabilization, and road drainage modifications would be made to the one- mile segment:

- Gravel road base material would be installed on the road surface along the sections of the road with high bentonite clay content on the surface and would be maintained as needed.
- The overhanging rock (or a large portion of it) would be removed and the road would be widened by 6 to 10 feet at mile point 0.65 (see Removal of Overhanging Rock – Alternatives B and C photo). The widening would occur on the north side of the road, eliminating the need for additional slope protection along the bank of Sandy Creek at mile point 0.65. The curve radius could be straightened with removal of the overhanging rock, and the line- of- sight distance would be increased.
- Slope protection would be added between mile points 0.75 and 0.85, as described for Alternative A.
- Drainage crossing structures along the road would be constructed to improve surface drainage at the four major and two minor crossings using corrugated metal pipe culverts that could pass 25- year and the 2- year storm floodwaters, respectively.
 - Corrugated metal pipes designed to pass the 25- year storm event floodwaters would be installed at mile points 0.10, 0.20, 0.50, and 0.60. These drainage structures would involve installing five 48- inch- diameter corrugated metal pipes with concrete headwalls and wingwalls and slope protection for the inlet and outlets. These major and minor crossing structures are illustrated in the Major Road Drainage Crossings, Typical 25- Year Storm Culvert Design – Alternative B and the Minor Road Drainage Crossings – Alternatives B figures, respectively.
 - The two minor drainage crossings would involve installing one 24- inch- diameter corrugated metal pipe culvert capable of passing 2- year storm event floodwaters, with slope protection at the inlet and outlet channels.
 - Outlet protection would be added to the existing 24- inch culvert at mile point 0.75.

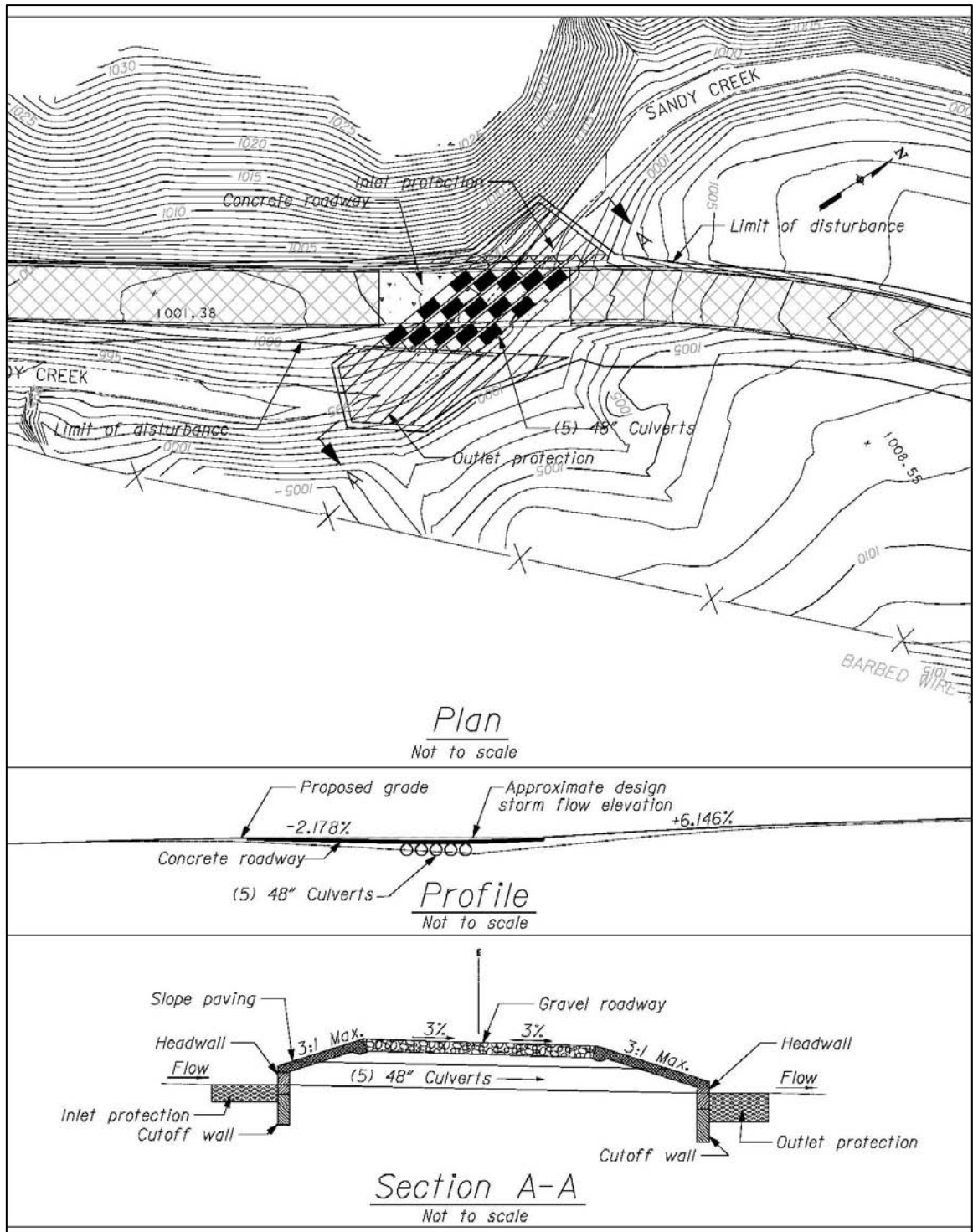


REMOVE THE OVERHANGING ROCK – ALTERNATIVES B AND C

- The Halls Creek drainage would be modified using eight 72- inch- diameter corrugated metal pipe culverts, a headwall and wingwalls, and erosion protection at the outlet. The culvert installation would create about 11,000 square feet of disturbance. This configuration, which would effectively pass 25- year design storm flows, is illustrated in the Halls Creek Crossing and Burr Canyon Realignment – Alternatives B and C figure.
- Culvert installation would require realignment of 300 linear feet of the Burr Canyon drainage channel in a northerly direction to intersect Halls Creek approximately 100 feet upstream of the Halls Creek crossing (see Halls Creek Crossing and Burr Canyon Realignment – Alternatives B and C).
- Drainage structures and road widening at a drainage near the base of the switchbacks in Burr Canyon would remain the same as described for Alternative A.
- The National Park Service would install a cattle guard on the Burr Trail at the eastern park boundary, as in Alternative A.

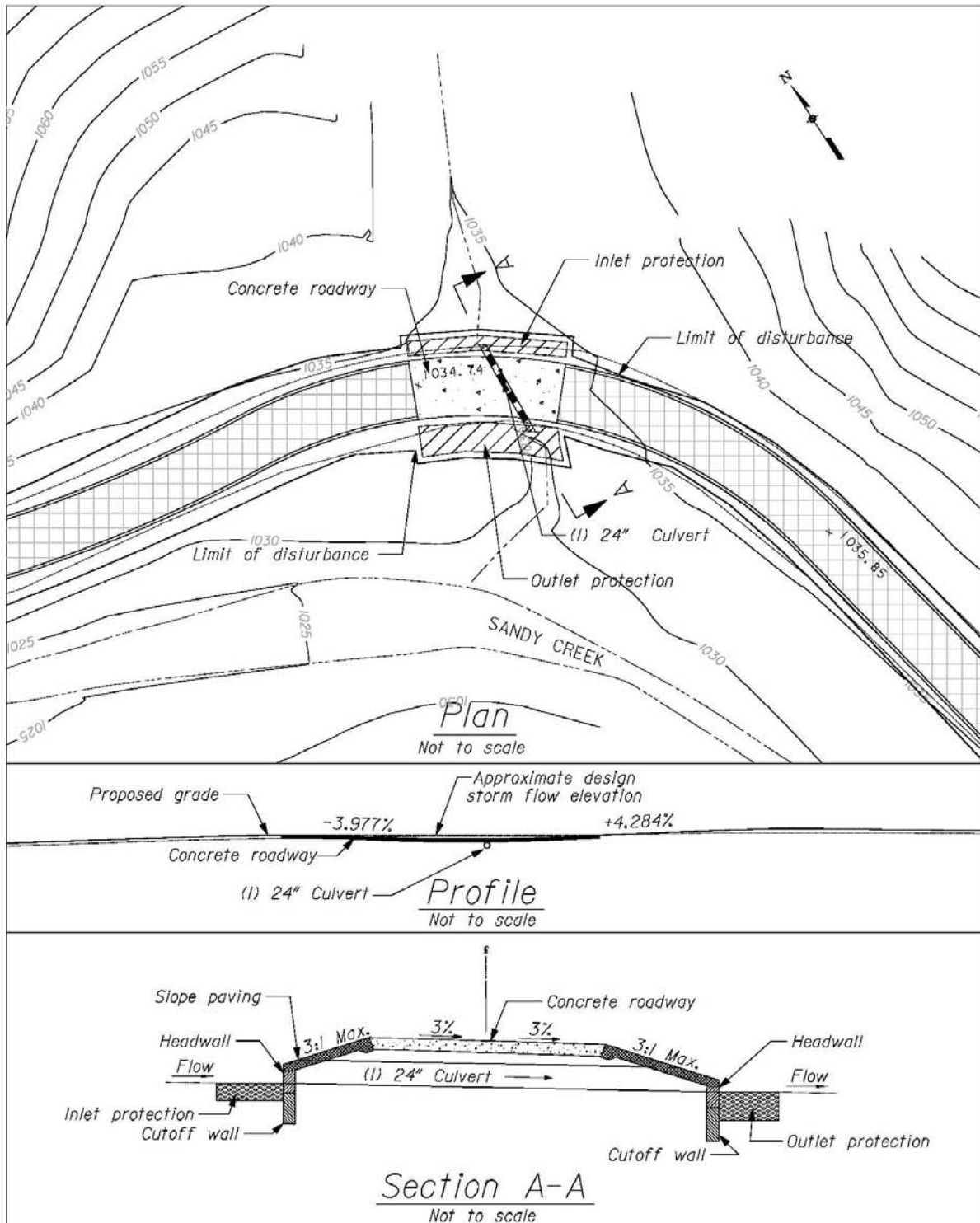


ROAD MODIFICATIONS AT THE OVERHANGING ROCK – ALTERNATIVE B

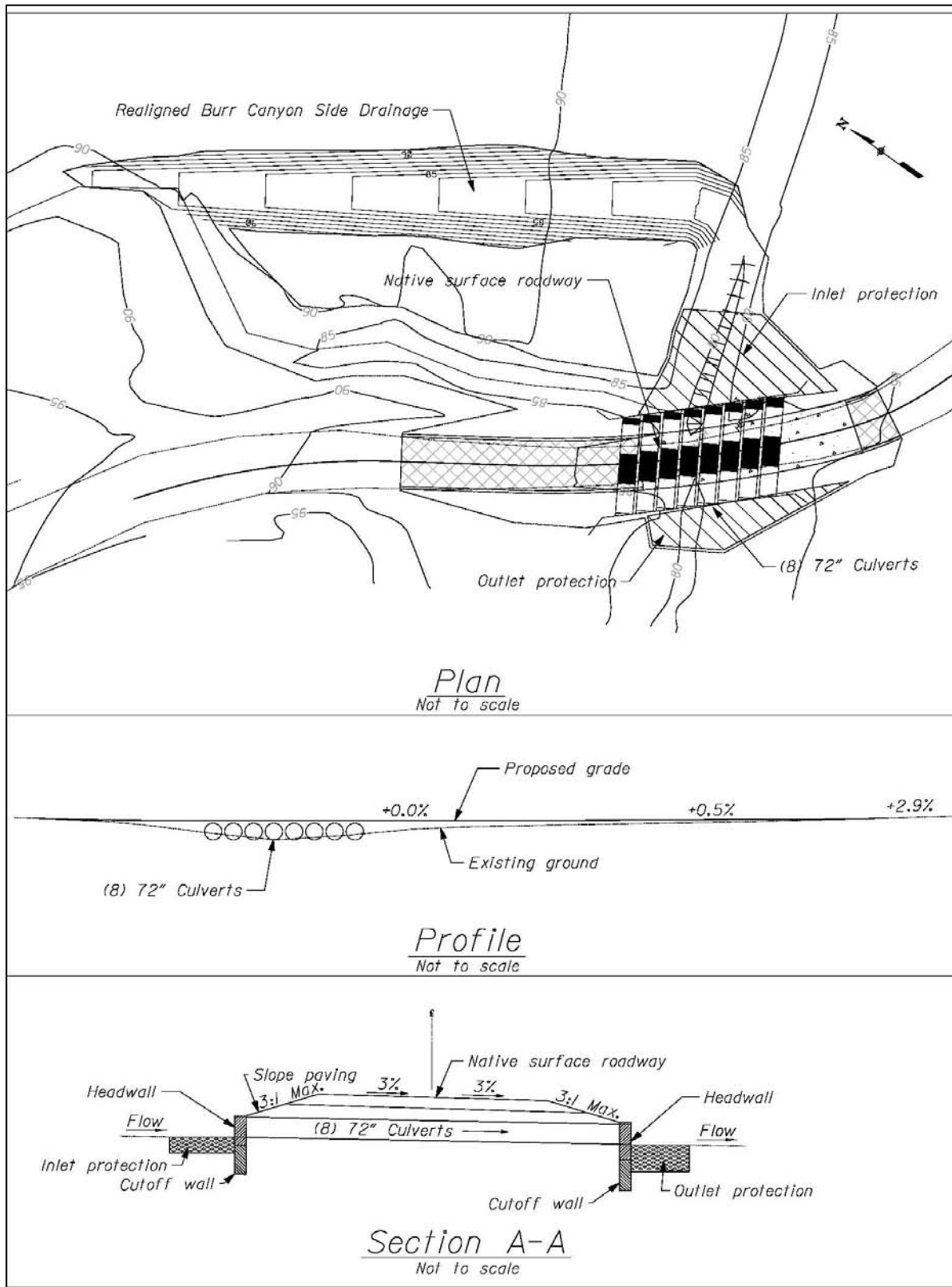


MAJOR ROAD DRAINAGE CROSSING, TYPICAL 25- YEAR STORM CULVERT DESIGN –
ALTERNATIVE B

PROPOSAL AND ALTERNATIVES



MINOR ROAD DRAINAGE CROSSINGS – ALTERNATIVE B



HALLS CREEK CROSSING AND BURR CANYON REALIGNMENT – ALTERNATIVES B AND C

ALTERNATIVE C

Alternative C would stabilize road surfaces and provide two- way passage for vehicles at the overhanging rock by removing the rock and realigning the road to the north, similar to Alternative B. Road elevations would increase at drainages to accommodate multiple 60- inch corrugated metal pipe culverts. In this alternative, visitors could expect to travel over a cattle guard, gravel surfaces, and pass easily over drainages with culverts. Natural undisturbed visual characteristics would be substantially changed by removing the overhanging rock. Stone and rock treated to blend into the surrounding landscape would be used to stabilize road banks, protect against erosion, and frame culverts.

Under Alternative C, there would be road surface, width, bank stabilization, and drainage crossing modifications to the Burr Trail. Road surfaces along the sections of the road with high bentonite clay content would be stabilized in the same manner described for Alternative B.

The overhanging rock would be removed, and the narrow sections of the road at mile point 0.65 would be widened in the same manner described under Alternative B.

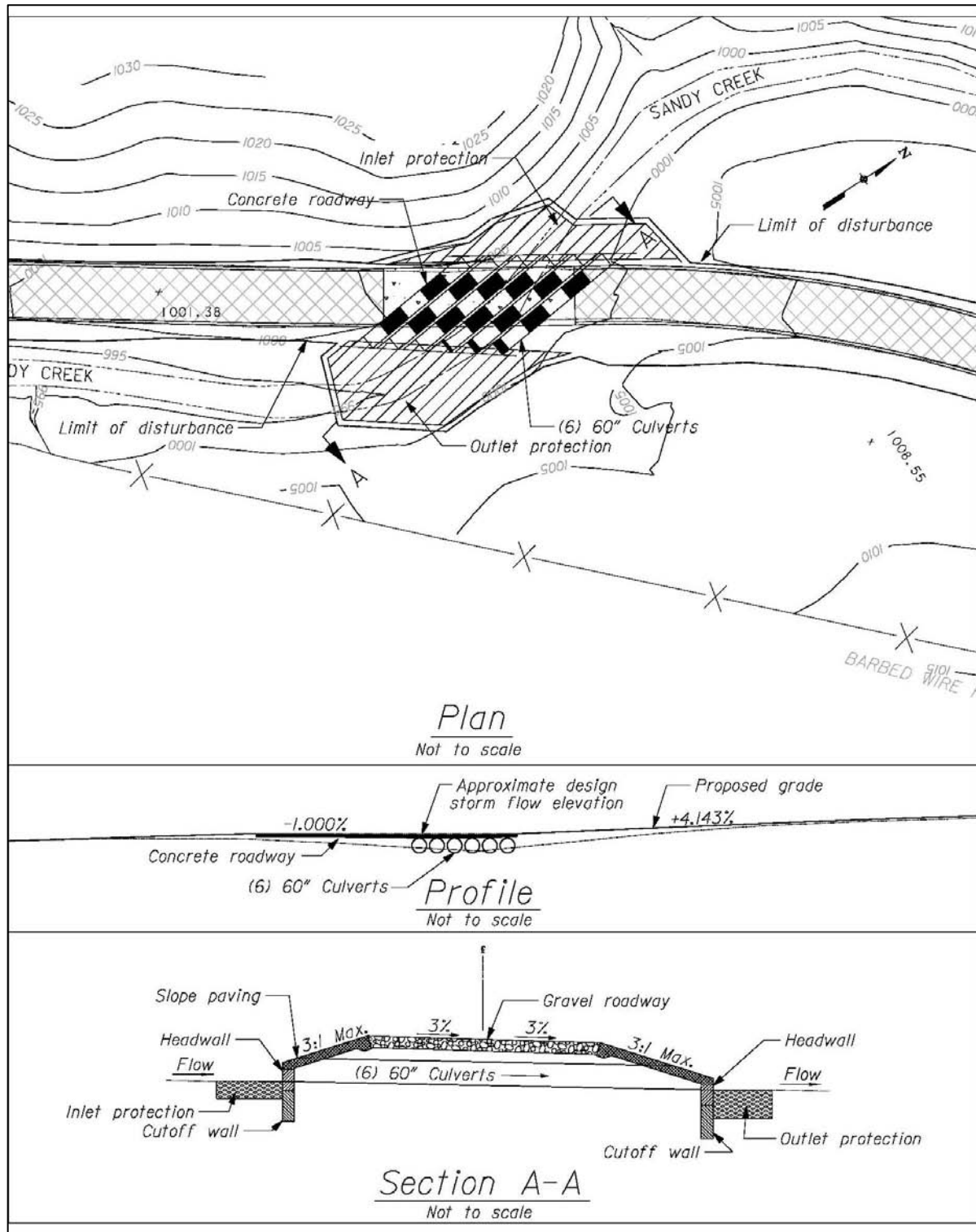
Slope protection would be added between mile points 0.75 and 0.85, as described for Alternatives A and B. Outlet protection would be added to the existing 24- inch culvert at mile point 0.75.

Drainage crossing structures would be constructed at the four major drainage crossings using corrugated metal pipes designed to pass 50- year storm event floodwaters. These drainage structures would include six 60- inch corrugated metal pipe culverts, concrete headwalls and wingwalls, and outlet erosion protection at mile points 0.10, 0.20, 0.50 and 0.60 (see Major Road Drainage Crossings, Mile Points 0.10, 0.20, 0.50 and 0.60 Alternative C). Modifications at the two minor drainage crossings would include installing one 36- inch corrugated metal pipe culvert to accommodate the 10- year storm event, with erosion protection and inlet and outlet protection to reduce and minimize erosion and scour.

Halls Creek would cross the road through a corrugated metal pipe culvert structure capable of passing 25- year storm event floodwaters, and the Burr Canyon drainage channel would be realigned as described for Alternative B.

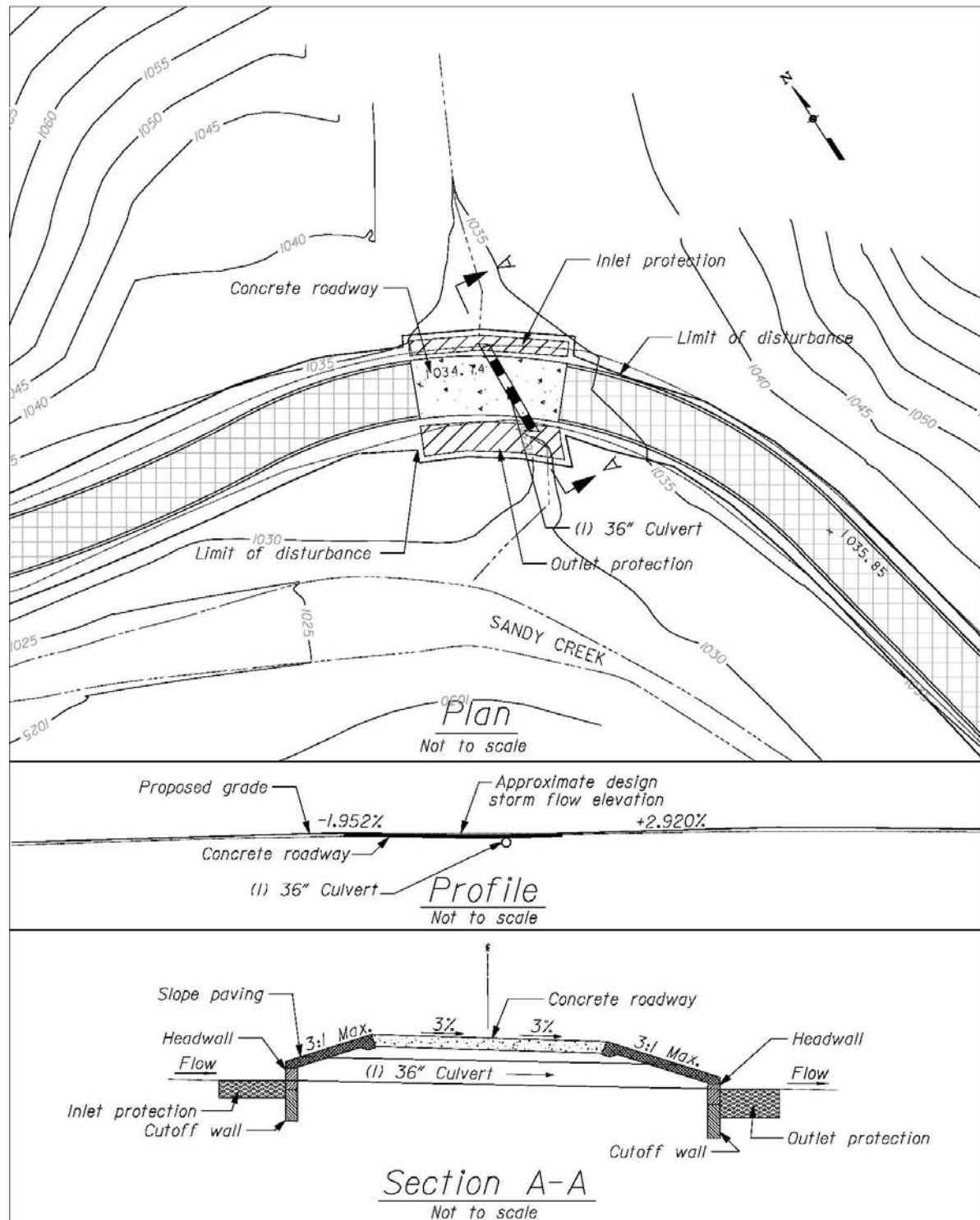
Drainage structures and road widening at the side drainage near the base of the switchbacks at Burr Canyon would be the same as described for Alternatives A and B.

The National Park Service would install a cattle guard on the Burr Trail at the eastern park boundary, as in Alternatives A and B.



MAJOR ROAD DRAINAGE CROSSINGS, MILE POINTS 0.10, 0.20, 0.50 AND 0.60
ALTERNATIVE C

PROPOSAL AND ALTERNATIVES



MINOR ROAD DRAINAGE CROSSINGS – ALTERNATIVE C

ALTERNATIVES CONSIDERED BUT DISMISSED

During the planning process, several road modification designs or mitigation techniques were considered but eliminated from further detailed analysis. These included the use of low- water crossings, over- sized drainage structures for minor drainage crossings, the use of reinforced concrete box culverts, stabilization of road embankments by re- grading or installing a check dam at a minor drainage crossing, and re- routing a portion of the one-mile road segment to avoid the overhanging rock.

PASSABLE LOW- WATER CROSSINGS

Passable low- water crossings were considered for the major and minor Burr Trail drainage crossings. The crossings would have allowed travelers to drive through the drainage during storm events up to the 10- year event. The crossing designs would accommodate floodwaters passing over the road approximately six inches deep. Use of passable low- water crossings was dismissed from consideration for the following reasons:

- Allowing passage through floodwaters would pose an unacceptable risk to drivers and vehicles. Floodwaters transport high loads of sediment and debris that could sweep a vehicle and its passengers from the crossing and into the flood. Although the design would maintain water depth at approximately six inches or less for floods up to the 10- year event, a traveler on the road would have no way to ascertain the magnitude of the storm event or the true depth of floodwaters on the road.
- Additionally, the construction of passable low- water crossings would require that relatively large areas be graded to accommodate the contour required to keep floodwaters at or below the six inch depth. The adverse impacts to soils and vegetation and to the natural topography would be too great.

OVERSIZED DRAINAGE STRUCTURES FOR MINOR DRAINAGE CROSSINGS

The upstream drainage areas affecting the minor drainage crossings are relatively small. The vegetative cover type at and in the vicinity of the minor drainage crossings is undisturbed desert- shrub. The soil classification, topographic survey, and precipitation data typical of the region indicate that sufficient drainage would be provided using a structure designed to handle the 10- year storm event (FHWA 2001). The use of oversized drainage structures (designed for the 25- year and 50- year storm events) for minor drainages would involve larger structures, require raising the road surface, involve more disturbance of adjacent land, and be more expensive to construct. Although they would require less maintenance, oversized culverts would not provide a greater drainage benefit sufficient to justify the higher cost of construction.

REINFORCED CONCRETE BOX CULVERTS

Reinforced concrete box culverts for the 2- year, 10- year, 25- year, and 50- year storm events at major drainage crossings would be more expensive to construct than corrugated metal pipe culverts sized to accommodate the same storm event. Concrete box culverts are wider, requiring more excavation of the natural drainage channel, removal of native vegetation, and displacement of adjacent soil resources to install them. Long- term maintenance costs would be less, but the adverse effects to resources would be greater than those caused by installing culverts.

STABILIZE ROAD EMBANKMENTS BY RE- GRADING OR INSTALLING A CHECK DAM AT A MINOR DRAINAGE CROSSING

Re- grading the road surface and road embankment at a minor drainage crossing at mile point 0.40 would not resolve surface and bank erosion over the long term. Soil erosion caused by surface water draining across the road would continue to make frequent maintenance necessary. Installing a check dam at the drainage outlet along the road embankment would re- direct the drainage and delay the need for maintenance. However, the check dam would not provide long- term protection against erosion, and frequent maintenance along the road embankment would still be necessary. A single check dam would provide less bank stabilization and erosion protection than other drainage structures.

RE- ROUTE A PORTION OF THE ROAD TO AVOID THE OVERHANGING ROCK

Rerouting the Burr Trail around the north side of the overhanging rock would result in more disturbances of native vegetation and soil resources, substantially changing the topography and alignment of the Burr Trail. Geotechnical analysis would be necessary to ensure that re- alignment could be accommodated without blasting and to determine the potential for adequate subgrade and sources for fill material. Per- mile maintenance costs along the Burr Trail would potentially increase over the long term.

SELECTION OF THE PREFERRED ALTERNATIVE

To develop the preferred alternative, the alternatives were evaluated by an interdisciplinary team that included representatives from each of the cooperating agencies and experts representing the relevant professional disciplines. Evaluation of the alternatives considered the advantages and the costs of each alternative.

The advantages of each alternative were described according to a set of evaluation factors. The factors represented those key areas and impact topics that clearly differentiated the alternatives from one another. The following factors were developed by the evaluation team and used to select the preferred alternative.

Area of disturbance – the types of natural or cultural resources that would be disturbed by the alternatives and the extent of the area of disturbance. The area of disturbance did not include the road surface or its shoulders. The goal was to minimize the area of disturbance.

Visual quality or effect – how the alternative would affect the scenic quality of the surrounding landscape of geological features and landforms or the views of the Waterpocket Fold. The goals were to maintain high scenic quality and unobstructed views.

Functional differences – how the design would handle a storm event, the amount of time that visitors would be delayed due to impassable road conditions, and traveler safety during storm events. The objectives were to maximize the ability of road drainage structures to handle storm events, maximize visitor safety, and minimize traveler delays.

Maintenance and operations – how the design would affect Garfield County's ability to clear debris and sediment from drainage structures and repair drainage structure failures over the lifetime of the proposed action. The goal was to have the simplest design to maintain and the easiest to repair/replace when needed.

Visitor use and experience – how well the park could achieve objectives for visitor use and experience of the natural processes and the forces of nature in a remote, primitive setting. The goal was to maximize the ability to achieve park visitor use and experience objectives.

EVALUATION OF DRAINAGE CROSSINGS

Major and minor drainage crossings were evaluated for the storm event for which the crossing structure would be designed and the type of crossing structure (vented and unvented paved fords or corrugated metal pipe culverts).

Paved Fords

Vented and unvented paved fords were selected for the preferred alternative. Both structures would be designed to withstand the force of a 10- year storm event. The unvented fords would not be traversable during storm events, as all water would flow over the road

surface. The vented paved fords would have culverts capable of conveying the flow of a 2-year storm event but would not be traversable in a larger storm. These were selected for inclusion in the preferred alternative because they would achieve a balance between the evaluated factors.

The paved fords would largely follow the natural contour of the drainage and would maintain the character of the road as it winds and dips through drainages. This would have a minimal effect on the scenic quality of the landscape, as well as keeping the area of disturbance to a minimum.

While most storms would cause visitors to stop for as long as water flowed through the drainage and over the fords, the experience of being forced to stop and wait would facilitate visitor understanding of the power and effect of storm events in canyon country and other important resources and themes of the park such as topography, geology, and hydrology.

Paving would stabilize the road surface across the drainage and would enable passage through the crossing soon after storm waters subsided. This would also improve maintenance of the crossing, making removal of mud and silt on the road surface easier. Paved fords would require little in post-storm maintenance compared to multiple culvert crossings that often need to be repaired or replaced following very large storms. Vented paved fords would be more simple structures to repair than 25- or 50-year culverted crossings.

Corrugated Metal Pipe Culverts

Crossings with corrugated metal pipe culverts that could accommodate 25- and 50-year storm events were not selected as the preferred alternatives, although they could have the advantage of providing more reliable passage. They would allow water flows up to the design storm event to pass under the road and not impede travel, although through travel on the Burr Trail may not be possible because of impassable conditions at minor crossings or other storm-impacted locations.

Crossings with culverts that would pass the 25- and 50-year storm event would be more costly, would be higher profile structures within the drainage than paved fords, would have a greater effect on local topography because they would require additional grading, and would create a more noticeable visual impact on the landscape.

Halls Creek

Realigning the roadway a short distance downstream from the confluence of Halls Creek and Burr Canyon drainage was selected for the preferred alternative. This would direct flow through the vented paved ford crossing at Halls Creek, reduce bank erosion and the impacts of large water flows on the crossing structure, reduce routine maintenance costs, and reduce the likelihood of structural failure of the crossing structure during a storm event. This would be accomplished with much less disturbance of surrounding soils and vegetation and at a lower cost than the option to realign about 300 linear feet of the Burr Canyon drainage channel.

Burr Canyon Side Drainage

The side drainage that empties into Burr Canyon near the base of the switchbacks has relatively low flows similar to other minor cross drainages in the project area. Three 36- inch culverts would conform to the slope of the embankment and adequately convey storm flows needed to flush sediments. Surface fill and a rock embankment to contain the backfill would be used to stabilize the eroding bank and protect the road with minimal impact on the scenic quality of the canyon.

EVALUATION OF ROAD SURFACE TREATMENT

The preferred alternative for treatment of the road surface would be to excavate those surface areas with high bentonite clay content to a depth of 1 foot and apply gravel over a geotextile fabric. This would improve traction on the road under wet conditions, the combination of surface excavation and fabric would keep gravel in place longer, and erosion and sedimentation would be reduced. Twenty- five percent less gravel would be needed during initial application over a geotextile fabric, and longer retention of gravel would reduce re-application and improve life- cycle costs.

Although gravel applied directly over clay soils without the application of geotextile fabric would improve traction on the road, it was not selected for the preferred alternative. Without excavation of the existing surface and with nothing to hold the gravel in place, road traffic would displace or embed the gravel and widen the road surface as gravel spread to the sides of the road. During wet periods, gravel would sink into the underlying clay, requiring frequent replacement and maintenance.

EVALUATION OF THE OVERHANGING ROCK

This issue was addressed in the Engineering and Landscape Architectural Assessment of the Burr Trail Road from the Post to the East Boundary (NPS 1998b). This document, a joint effort of the National Park Service and Federal Highway Administration, presented the following evaluation of the overhanging rock:

"This weathered rock appears gray in some light and golden in others. The weathered holes in its face give the impression of a medieval gargoyle. This character-defining feature provides both visual interest and a geographical place marker, and unless geotechnical evidence is presented that the rock feature represents a safety hazard, it should not be altered.

At this location [mile post 0.60], the existing roadway is narrow in width (approximately 14 feet wide), a horizontal curve is present and the stream channel is immediately adjacent to the toe of fill slope. Due to these roadway conditions and the presence of the overhanging rock, two vehicles traveling in opposite directions can not pass and improvements are warranted.

This is supported by the review of recent (1992- 1996) accident history for this roadway. Accident records indicate that two accidents occurred at this location and it appears that the combination of the rock overhang, sharp horizontal curve, reduced

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roadway width and steep fill slope drop-off partially contributed to each accident. No other accidents were noted on the remaining one mile portion of the Burr Trail road.

To the best of our knowledge, no work was done by Garfield County at this site in 1996."

This position was also supported in NPS and FHWA court testimony in February 1999.

EVALUATION OF BANK STABILIZATION

Slope protection is recommended to stabilize the stream banks in two locations. Rock used to stabilize slopes throughout the project would either be native rock that would blend with the local landscape or be treated (i.e., colored) to minimize contrast with native rock. This is particularly important between mile points 0.75 and 0.85, where the stream bank is visible to travelers on the road.

EVALUATION OF CATTLE GUARD

Installing a new cattle guard at the park boundary and removing the existing cattle guard at mile point 0.55 when the current in-park grazing allotment permit expires was recommended because the new cattle guard would fulfill all related resource protection needs.

MITIGATING MEASURES

The following mitigating measures would be implemented by Garfield County or the National Park Service under all action alternatives to reduce the impacts to park resources:

Surface Water, Hydrology, Vegetation, and Soil Resources. Best management practices to control erosion and sediment transport processes would be used during all construction activities. Generally accepted methods to protect soil, water, and vegetation resources would include, but would not be limited to:

- Limiting the area of disturbance. For example, heavy construction equipment would be kept on the road surface when placing slope protection or performing excavation adjacent to the roadway, to the extent possible.
- Removing and stockpiling topsoil for reapplication to disturbed areas when construction is complete.
- Avoiding construction during mid- to late- summer when heavy rainstorms would dislodge freshly disturbed soil, causing erosion and sedimentation.
- Restoring disturbed areas to natural contours to the extent possible and revegetating with native species to reduce the potential for erosion.
- Providing fuel and oil services for construction machinery in a designated area away from channels or drainages. This would include secondary containment for all fuel storage tanks and on- site availability of a specialized “spill kit” with capacity to contain a 95- gallon fuel spill.
- Biological soil crusts would be identified, staked, and flagged by NPS personnel to delineate areas near but outside the work areas that are not to be disturbed.
- Implementing best management practices and stormwater pollution prevention plan measures prior to, during, and following ground disturbing activities. The primary measure used to control sediment in the stormwater runoff would be installation of temporary silt fencing at the bottom of the drainage contours to trap sediments generated during construction.
- Obtaining all applicable state and federal permits for planned actions. Under permitting requirements, the state of Utah and/or the U.S. Army Corps of Engineers may need to determine jurisdiction of affected watercourses, as well as stability or feasibility of planned modifications. All permit requirements would be met.
- Obtaining gravel and fill for construction or maintenance from certified noxious weed-free sources. Gravel pits and fill sources would be inspected to identify weed- free sources. There would be no quarrying of construction materials from inside the park. Use of materials obtained during normal construction activities would be permitted.

Cultural Resources. Protective measures designed to avoid disturbance to cultural resource sites would be developed prior to construction. There are several cultural resource sites where care needs to be taken to avoid and protect the sites. Those areas would be identified in the construction operations plan. In addition, if previously undiscovered archaeological resources are uncovered during construction, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented, and an appropriate mitigation strategy developed in consultation with the Utah State Historic Preservation Office. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 United States Code §3001) of 1990 would be followed.

Geologic Features, Landforms, Public Health and Safety, and Visitor Use and Experience. Measures designed to maximize visitor use and experience and to avoid disturbance of the natural landscape would be developed prior to construction. Generally accepted methods to protect public health and safety while providing for visitor use and experience include but would not be limited to:

- Providing signs at all paved ford crossings to warn travelers not to cross if water is overtopping the roadway. Signs advising drivers that the general nature of the road changes from a paved, relatively straight road outside the park to a narrower, winding road when entering Capitol Reef National Park would be beneficial.
- Minimizing adverse impacts to visitor use and experience of the natural landscape. These measures could include the use of rock facing at culvert inlets or outlets, and the use of coloring on constructed elements to blend their appearance with the surrounding landscape.

THE ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in the National Environmental Policy Act. The environmentally preferred alternative would cause the least damage to the biological and physical environment, and would best protect, preserve, and enhance historical, cultural, and natural resources.

Section 101(b) of the National Environmental Policy Act identifies six criteria to help determine the environmentally preferred alternative. The act directs that federal plans should:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences.
- Preserve important historical, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

This discussion also summarizes the extent to which each alternative meets section 102 (1) of the National Environmental Policy Act, which stipulates that agencies administer their own plans, regulations, and laws so that they are consistent with the policies outlined above to the fullest extent possible.

Alternative A is the environmentally preferred alternative because it would provide the greatest balance in meeting the objectives set out in Section 101 of the National Environmental Policy Act. Alternative A would prevent the loss of natural and cultural resources, and would effectively provide for the primary functions for which the Burr Trail is intended. Paved fords at all major and minor drainage crossings and signs warning against crossing drainages when water is present on the road would enhance public safety while resulting only in minor adverse impacts on the geological landscape as the road dipped into and out of drainages. The paved fords would be small and would be at approximately the same grade as the stream bed. Their presence would result in negligible to minor adverse effects on the natural hydrologic conditions in drainages, or on water quality, vegetation, or wildlife.

Road surfaces with high bentonite clay content become extremely slippery when wet, and applied gravel typically would not remain on the surface. Under Alternative A, these areas would be stabilized with geotextile fabric covered with gravel to make the road safer and to reduce maintenance needs.

The road at the overhanging rock would be widened by reconfiguring the ditch alignment on the north side of the road so that there would be adequate travel width (two 9-foot lanes with 1-foot shoulders on each side). Bank stabilization would be used to protect the northern bank of Sandy Creek at this point. The overhanging rock would be retained as a geologic feature within the landscape, and soils and water resources would be protected.

Stream banks that are eroding and threatening to encroach on the road would be stabilized with erosion protection that would have a negligible to minor effect on the visitor appreciation of the visual characteristics of the natural stream channel and associated landscape. Soil, water, and vegetation resource protection would be enhanced by the bank stabilization efforts in the long-term.

The shift in the roadway at the Halls Creek crossing would allow the culverts in the vented paved ford to operate properly and efficiently, while minimizing erosion potential and additional disturbance to soils and vegetation.

Alternatives B and C were not selected as the environmentally preferred alternative because removal of the overhanging rock would alter a prominent geologic feature, an important element of the view of the Waterpocket Fold from the east.

Alternatives B and C would not include the use of geotextile fabric to treat the roadbed. Lack of geotextile fabric would not provide the safety and road maintenance benefits that are provided by Alternative A.

Alternatives B and C would provide somewhat greater protection of public health, safety, and welfare with corrugated metal pipe culverts designed, respectively, to accommodate 25- and 50-year storm events. The culverts would also increase the frequency and duration of times that the road would be passable during and immediately following storm events. However, neither alternative would be the environmentally preferred alternative because these crossing structures would adversely affect soils, vegetation, topography, and stream hydrology more than the paved fords associated with Alternative A. Additionally, Alternatives B and C would realign the Burr Canyon drainage channel, which would result in additional adverse effects to natural resources and potential adverse effects to ethnographic resources in the project area.

The corrugated metal pipe culvert crossing structures of Alternatives B and C would alter the characteristics of the natural landscape by elevating the road surface and separating it from the natural contour of the land, thus altering the geological landform and visitor appreciation of the visual character of the undulating landscape.

Based on this analysis, Alternative A is the environmentally preferred alternative. It best fulfills the National Park Service' responsibilities as trustee of the outstanding natural resources; ensures safe, healthful, productive, and aesthetically and culturally pleasing surroundings; and attains a wider range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

ALTERNATIVES SUMMARY

Table 4 provides a brief summary of the effects of each of the alternatives on the impact topics that were retained for analysis. More detailed information on the effects of the alternatives is provided in the “Environmental Consequences” section.

The objectives of Burr Trail modifications were provided in the “Purpose and Need for Action” section. Table 5 summarizes how each alternative meets each of the proposed action objectives.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Air Quality	The No Action Alternative would have local, short- term, negligible to minor, adverse impacts on air quality and visibility. Impacts to regional air quality would be negligible. Cumulative impacts would be negligible, short- term, and adverse.	Alternative A would have short- and long- term, negligible beneficial impacts on air quality and visibility because of a reduction in fugitive dust. Construction activities would create a short- term, negligible adverse impact on air quality and visibility from temporary emission of particulates. Cumulative impacts to air quality or visibility would be beneficial, but negligible.	Alternative B would have local, short- term, negligible adverse impacts on air quality or visibility due to fugitive dust and particulate emissions during construction activities. In the long- term, impacts to air quality or visibility would be negligible but beneficial. Cumulative beneficial impacts to air quality or visibility would be negligible.	Same as described for Alternative B.
Geological Features and Landform	The No Action Alternative would have no effect on geologic features due to the preservation of the overhanging rock and the park's natural topographic and geologic setting. Cumulative impacts to geological features and landforms would be negligible.	There would be no impacts to the overhanging rock as a result of the road reconfiguration at that location. Negligible to minor adverse impacts would result from bank stabilization, construction of the rock embankment, and slight surface grade changes to the geologic landscape. Cumulative effects to geological features and landforms would be inconsequential and barely detectable from a regional perspective.	Alternative B would have a local, long- term, minor, adverse effect on geologic features because the overhanging rock would be removed. Long- term, negligible to minor adverse effects would result from construction of the bank stabilization, the slope protection, and alterations to road embankments within the geologic landscape. Cumulative impacts to geological features and landforms would represent a minor adverse impact.	Same as described for Alternative B.
Biological Soil Crusts and Soils	The No Action Alternative would produce local, negligible to minor, short- and long- term, adverse effects on biological soil crusts and soils in the vicinity of the proposed actions. Cumulative impacts to soil resources would be negligible and adverse.	Alternative A would produce local, negligible to minor, short- and long- term adverse and beneficial effects on biological soil crusts and soils. Adverse impacts would include potential loss of soil resources associated with flooding in storms greater than	Similar to Alternative A, Alternative B would produce local, negligible to minor, short- and long- term, adverse and beneficial effects on biological soil crusts and soils. Additionally, the realignment of the Burr Canyon drainage would represent a moderate, long- term adverse effect. Ultimately, the modifi-	Same as described for Alternative B.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
		10- year events and the effects of construction, installing slope and bank protection, and shifting the road alignment at the Halls Creek crossing. For storm events up to 10- year magnitudes, the proposed modifications would represent beneficial effects as they would protect against erosion and restore aspects of natural sediment transport processes in the project area. Cumulative effects would result in negligible adverse effects to soil resources.	cations would represent a long- term, local, minor benefit to soil resources. Cumulative effects would result in negligible adverse effects to soil resources.	
Vegetation	The No Action Alternative would have local, short- and long- term, negligible to moderate adverse effects on vegetation. Cumulative effects would be negligible.	Alternative A would produce local, short- and long- term negligible to minor adverse effects on the desert- shrub and riparian vegetation along the Burr Trail. Overall, cumulative effects on vegetation would not likely be detectable.	Alternative B would produce negligible to minor, local, short- and long- term adverse effects on vegetation similar to Alternative A, plus minor to moderate, long- term, local adverse impacts resulting from the realignment of the lower Burr Canyon drainage. Cumulative effects would not likely be detectable.	Same as described for Alternative B.
Wildlife	The No Action Alternative would continue to have a temporary disturbance or displacement effect on wildlife, with rare instances of vehicle/wildlife collisions that would have negligible adverse effects on species' populations. Cumulative effects would be negligible.	There would be negligible to minor, short- term, local, adverse effects to wildlife and wildlife habitat associated with passing vehicles and construction of the road modifications. Effects would be long- term and beneficial, as the frequency of flood- damaged road repairs and surface maintenance, would lessen the potential for disturbance or displacement	Alternative B would have local, short- term, negligible to minor, adverse habitat disturbance effects on wildlife and their habitats. In the long- term, the effects would be beneficial, as the frequency of flood- damaged road repairs and the use of heavy construction equipment would be reduced, thus lessening the potential for disturbance or displacement of wildlife. Cumulative	Same as described for Alternative B.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Surface Water and Hydrology (including floodplains)	The No Action Alternative would have negligible to minor adverse effects on hydrology, water quality, and floodplain function during low flow storms. During flash flood events, the current road conditions impede flow, deliver added sediment, and hamper floodplain functions. These conditions would result in minor, short- and long- term, adverse effects. Cumulative impacts to surface water and hydrology are negligible.	of wildlife. Cumulative effects would be negligible. Under Alternative A, negligible, long- term, beneficial effects to surface water quality, hydrology, and floodplains would accrue. Modifications to the Burr Canyon drainage at Halls Creek would produce short- and long- term, negligible, adverse effects to water quality and hydrology. Short- term adverse effects resulting from construction activities would be negligible and local. Effects to natural floodplain functions would be negligible to minor and adverse. Overall, in the long- term, Alternative A would have negligible beneficial effects on water quality, hydrology and the floodplain. Cumulative effects would be negligible.	effects would be negligible. Under Alternative B, negligible to minor, long- term beneficial effects to hydrology and floodplains would occur. Bank stabilization would result in minor beneficial effects of reduced erosion of the bank, accompanied by the minor adverse effects of potential erosion of the downstream channel caused by narrowing the channel. Realignment of the Burr Canyon drainage would produce short- and long- term, moderate adverse effects to hydrology resulting from manipulation of natural channel-forming processes and the potential for substantial quantities of sediment production. Short- term adverse effects resulting from construction activities would be negligible to minor and local. Overall, Alternative B would produce minor, beneficial effects on hydrology and the floodplain. Cumulative effects to surface water, hydrology and floodplain would be negligible.	Same as described for Alternative B.
Natural Soundscapes	The No Action Alternative would have a short- term, local, negligible to minor, adverse effect on the natural soundscape, with the minor effects related to the frequency of road- damaging floods and the zone where the sound receptor would be located. Cumulative adverse impacts to the	Effects associated with Alternative A would be short- term, negligible, minor to moderate, and adverse as a result of vehicles passing along the Burr Trail and the road modification construction noise, respectively. Ultimately, this alternative would result in a beneficial effect to the	Same as described for Alternative A.	Same as described for Alternative A.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
	natural soundscape would be negligible.	natural soundscape, as recurrent repairs and the introduction of noisy construction equipment would be reduced. Cumulative effects on the natural soundscape would be negligible.		
Ethnographic and Ethnographic Landscapes.	No new adverse impacts or cumulative impacts on ethnographic resources or ethnographic landscapes would be anticipated under the No Action Alternative. Cumulative effects to ethnographic resources (including landscapes) would be negligible.	Adverse impacts on ethnographic resources from road and bank stabilization and drainage crossings would be negligible. Cumulative effects would be negligible.	Adverse impacts of the road surface, road bank and slope stabilization, channel realignment, and removal of the overhanging rock could have moderate, local, long- term, adverse impacts on ethnographic resources, including potential ethnographic landscapes. Cumulative effects to ethnographic resources (including landscapes) would be minor.	Same as described for Alternative B.
Public Health and Safety	The No Action Alternative would neither reduce nor enhance public health and safety, resulting in direct, negligible to minor, long-term, adverse impacts to visitor health and safety. Cumulative impacts would be negligible.	Alternative A would enhance public health and safety. The benefits would be negligible to minor. Short- term adverse effects on safety caused by construction activities would be negligible. When compared to the No Action Alternative, road widening and stabilization would provide minor benefits to public health and safety. Cumulative effects would be beneficial and of negligible to minor intensity.	Public health and safety would be enhanced by implementation of Alternative B. The benefits would be negligible to minor. Improving drainage crossings so that travel would still be possible during storms less than the 25- year storm event would yield long- term, moderate benefits to public health and safety. Short- term effects to safety caused by construction activities would be negligible. Cumulative effects would be beneficial and negligible.	Same as described for Alternative B.
Visitor Use and Experience	The No Action Alternative would produce long- term, minor to moderate beneficial and adverse effects on the visitor experience.	Alternative A would produce long- term adverse effects to the visitor experience by altering the natural terrain. These effects	Alternative B would result in long- term adverse effects to the visitor experience by altering the natural terrain and introduction of additional engineered	Same as described for Alternative B.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
	The visitor's perspective with regard to experiencing remote areas or to maintain a predetermined travel schedule are examples of how the effects could range from beneficial to adverse. Cumulative effects on visitor experience would be negligible.	would be local, and of negligible to minor intensity. Short-term adverse effects on visitor experience would occur from construction activities, and these would be minor and limited to construction sites. Cumulative effects would be negligible and range from adverse to beneficial, depending on the visitor's expectations and perspective.	elements to the Burr Trail. These effects would be local and of negligible to minor intensity. Short-term adverse effects associated with construction would be as discussed for Alternative A. Cumulative effects on visitor experience would be negligible and range from adverse to beneficial, depending on the visitor's expectations and perspective.	
Socioeconomics	The No Action Alternative would not produce detectable effects on the local economy. The county and local grazing permit holder would continue to use the road, and would not experience changes in economic benefits under this alternative. Cumulative effects to socioeconomics would be negligible.	Alternative A would produce negligible to minor, short-term beneficial effects on the local economy. The county and local grazing permit holder would continue to use the road, and would not experience changes in economic benefits under this alternative. Cumulative effects would be negligible.	Same as described for Alternative A.	Same as described for Alternative A.
Park Operations	The No Action Alternative would have short- and long-term, minor, adverse impacts on park operations. Cumulative effects would be negligible if detectable at all.	Alternative A would have long-term, negligible to minor beneficial impacts on park operations. Construction of modifications would have short-term, minor, adverse impacts. Cumulative impacts to park operations would be negligible.	Same as described for Alternative A.	Same as described for Alternative A.
Garfield County Road Maintenance Operations	The No Action Alternative would have minor adverse effects on road maintenance operations because of the continuation of ex-	Alternative A would have negligible to minor, beneficial impacts on road maintenance operations for the long-term because of de-	Alternative B would have negligible to minor, beneficial impacts on road maintenance operations in the long-term because frequency of maintenance	Same as described for Alternative B.

TABLE 4: COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
	isting conditions and the road maintenance operations needed to ensure that road surfaces are stabilized and drainages are cleared. Cumulative effects to road maintenance operations would be minor and adverse.	creased maintenance needs and operating costs. Cumulative adverse effects on road maintenance operations would be negligible to minor and beneficial overall and in the long- term.	activities would be reduced. Cumulative effects to road maintenance operations would be negligible and beneficial.	

**TABLE 5: OBJECTIVES OF THE BURR TRAIL MODIFICATIONS,
AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM**

Burr Trail Modification Objectives	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Provide for safer travel on an all- weather, maintained, variable- width, unpaved, gravel and native- material road, acknowledging that the road would occasionally be impassable, depending on weather conditions	Clay road surfaces are slick, making it difficult to travel when wet. Road widths range from 14 feet to 20 feet, and the road generally follows the natural topography. Narrow sections of the road near the overhanging rock make two- way passage difficult. During rainstorms, passage across washes and drainages is not always possible.	Safer travel on the Burr Trail would be provided under all weather conditions by excavating the clay, laying fabric and a gravel base, and installing paved fords designed to handle 10- year storm drainage. Stormwater draining through the paved fords would occasionally block vehicle passage. Sections of the road would be widened, resulting in a more uniform road width.	A roadbed consisting of a gravel road base combined with culverts designed for the 25- year storm would provide safer travel on the Burr Trail. All- weather travel would be improved. Existing road surfaces would be raised and narrow portions widened to 20 feet.	A roadbed consisting of a fabric and gravel road base combined with culverts designed for the 50- year storm would provide safer travel and increase all- weather drainage crossings on the Burr Trail. Existing road surfaces would be raised and narrow portions widened to 20 feet.
Retain the winding nature and adventuresome character of the Burr Trail through Capitol Reef National Park	The road follows the natural rolling terrain, slopes gently, and rises and falls below the natural contours with no alterations to the alignment.	The road would preserve the winding and adventuresome character of the Burr Trail, but narrow road sections at the overhanging rock and at the Burr Canyon side drainage crossing would be widened. Alternative A would preserve the overhanging rock.	This alternative would adjust the road alignment by removing the overhanging rock and widening the road at that location, and increasing the elevation of the road at drainage crossings by installing drainage culverts. Slope protection would minimize the visual impacts of road embankments but would be visible at drainage crossings. Re- alignment and bank stabilization of the Burr Canyon drainage would have an adverse visual impact the landscape.	Similar to Alternative B, with even greater elevation changes associated with more and larger culverts at the major drainage crossings.

**TABLE 5: OBJECTIVES OF THE BURR TRAIL MODIFICATIONS,
AND THE ABILITY OF THE ALTERNATIVES TO MEET THEM**

Burr Trail Modification Objectives	No Action	Alternative A: Preferred Alternative	Alternative B	Alternative C
Protect the natural and cultural resources of the park	There would be natural weathering of the natural and cultural resources of the park.	This alternative would protect cultural resources but would involve short- term and small scale impacts to natural resources. Natural weathering processes would continue.	There could be adverse impacts to ethnographic landscapes as a result of the realignment of the Burr Canyon drainage, and there would be long- term impacts to natural resources as a result of construction of the drainage crossings. Natural weathering processes would continue.	Similar to Alternative B.
Road safety, stabilization, and improved drainage	When wet, the slippery clay road surfaces make travel on the Burr Trail difficult. Erosion of the road bank undermines the road surface and eventually narrows the road. Accidents have occurred along portions of the road less than 20 feet wide (at the overhanging rock and at Halls Creek). Storm flooding impedes crossing drainages during storms and for several hours afterwards, and following storms, the road may remain rough until it is re-graded.	Safer travel would be maintained by stabilizing the road surface, road banks, and widening the road in select locations and by installing paved fords at all major and minor drainage crossings. Unvented paved fords would be impassable during storm flooding. Signs would warn travelers approaching paved fords not to cross when water is flowing over the road.	Same as Alternative A, except that culverts would be designed to pass 25- year storm floodwaters, allowing safe passage during storms of 25- year magnitude or less and reducing the need to re-grade the road.	Same as Alternative A, except that culverts would be designed to pass 50- year storm floodwaters, allowing safe passage during storms of 50- year magnitude or less and reducing the need to re-grade the road.

AFFECTED ENVIRONMENT

AIR QUALITY

Capitol Reef National Park is in the Colorado Plateau and includes portions of rural Emery, Garfield, Sevier, and Wayne Counties, Utah. This remote area has relatively little development and few major sources of air pollutants, and is over 200 miles away from the largest urban center, Salt Lake City.

The U.S. Environmental Protection Agency has designated Emery, Garfield, Sevier, and Wayne Counties as in attainment for all criteria pollutants (U.S. Environmental Protection Agency 2002). Air quality attainment is evaluated on the basis of National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), lead (Pb), particulate matter smaller than 10 microns in diameter (PM₁₀), and sulfur dioxide (SO₂) (U.S. Environmental Protection Agency 2001). The directly emitted criteria pollutants are CO, NO₂, SO₂, and PM₁₀. Ozone is a secondary air pollutant resulting from photochemical reactions involving nitrogen oxides (NO_x) and reactive organic gases.

Air pollutants of recent origin generally come from the few local point sources and area sources in and around the park. Local sources of air pollution within the park include fuel odors and exhaust from recreational and motor vehicles as well as fugitive dust that is wind- and vehicle- generated from naturally exposed ground surfaces (NPS 1998c). A point source of substantial size close to the park is the Nuclear Fuel Service near the Bullfrog area in Utah. Monitoring was conducted in 2001 in nearby Glen Canyon National Recreation Area for five of the criteria pollutants. Based on these data, all ambient air quality levels meet the national ambient air quality standards (NPS 2001a).

Capitol Reef National Park has been designated a Class I airshed and is therefore given the highest level of air quality protection (U.S. Environmental Protection Agency 1999a, 1999b). Ambient air quality in Class I airsheds exceeds the National Ambient Air Quality Standards.

Atmospheric visibility is a primary resource in many national parks. Visibility in Capitol Reef National Park is normally fairly high, ranging to 100 miles or more. However, poor visibility in Capitol Reef National Park can be caused by a combination of wind- generated dust from naturally exposed surfaces, locally generated particulate emissions, and regional emissions such as coal- fired plants in surrounding counties.

Capitol Reef National Park participates in a collaborative visibility monitoring effort known as the Interagency Monitoring of Protected Visual Environments (IMPROVE) program. A monitoring device was installed within the park in the year 2000 to help assess visibility conditions, sources, and trends. Evaluation of air quality data from this station would not provide information relevant to the project area because of its remoteness and the short-term nature of any impacts on visibility; however, in a general sense, measurements from nearby Canyonlands National Park revealed that aerosol concentrations were low and visibility has been improving (IMPROVE 2000).

GEOLOGIC FEATURES

The Burr Trail passes through canyons, cliffs, and geologic features that have been formed over millions of years, and the various colored rock formations and layers are quite evident along the route. The sedimentary rocks that outcrop in the region date back to the Cretaceous, Jurassic, and Triassic periods, or 65 million to 248 million years ago. These rocks are largely composed of deposits of mudstone and sandstone.

The Burr Trail crosses, and then follows, the southern extent of the most spectacular monoclinical flexure in North America, the Waterpocket Fold (NPS and BLM 1993). This primary geological feature of the park stretches for nearly 100 miles, from Thousand Lake Mountain in the north to Lake Powell in the south. The fold is a geological uplift, formed around 65 to 80 million years ago (NPS 1998c).

The one-mile Burr Trail segment passes through hilly terrain and enters a narrow north-south valley on the eastern side of the park that is bounded by the Waterpocket Fold on the west and steep cliffs on the east. Most of the spectacular scenery of Capitol Reef National Park was created by erosion of the various rock layers by wind and stormwater runoff during more recent geologic time (NPS 1998c).

A prominent overhanging rock that stands out along the Burr Trail at mile point 0.65 could be affected by various alternatives.

The Halls Creek drainage is composed primarily of Entrada Sandstone that is overlain with thick alluvial deposits. The Burr Trail winds west through Burr Canyon, which cuts through the Carmel Formation, the Navajo Sandstone, and the Kayenta Formation (NPS and BLM 1993).

BIOLOGICAL SOIL CRUSTS AND SOILS

The soils in and adjacent to the Waterpocket Fold are composed of fine- to coarse-grained sands. Just east of the Waterpocket Fold monocline and extending to the east boundary of the park, the soils are primarily alluvial, of the El Rancho- Henrieville- Ruinpoint series, comprised of a fine sandy-loam to sandy-clay-loam. These soils are very deep and well drained, with a clay content of 18 to 27 percent (NPS and BLM 1993). Predominant soil types along the Burr Trail are composed of well-drained, coarse-grained sands with some areas of silts and clays ranging in thickness from zero to tens of feet. Most of the soils are highly unstable and susceptible to erosion by wind and water. Bentonite clays shrink and crack when dry, and when wet they swell and become slippery. These soils may be redistributed under varying climatic conditions.

Biological soil crusts have been documented within 50 feet of the roadway. This material is found in areas of low landform gradients along the route (NPS and BLM 1993). The crusts are composed of cyanobacteria and nitrogen-fixing lichens. Crusts in this region commonly form pinnacles and serve to stabilize arid soils (U.S. Geographical Survey 2001). They also influence the organic matter content, soil acidity, and proportions of nitrogen, carbon, calcium, magnesium, potassium, and phosphorus in the soils. Areas containing biological soil

crusts typically have substantially higher infiltration rates and lower sediment production than similar soils uninfluenced by the symbiotic formation.

VEGETATION

Over 900 species of vascular plants have been documented at Capitol Reef National Park (NPS and BLM 1993). This variety of flora is the largest reported at any of the national parks on the Colorado Plateau. The large number of species is due to the numerous soils, substrates, and changes in elevation across the park.

There are 34 individual plant communities, 11 of which are unique to the park. These communities range from badlands, grasslands, and pinyon- juniper shrublands to five forest types found at higher elevations.

Four communities are of special concern because they are rare or vulnerable to disturbance. These include the bristlecone pine- cushion plant community, waterpocket community, hanging garden community, and hornbeam- boxelder- oak woodland (NPS 1998c). None of these sensitive plant communities are present along the Burr Trail where the proposed actions would be implemented.

The project area lies in a sparse desert- shrub vegetative community with riparian vegetation found at several drainages along the route. Vegetation cover in the desert- shrub community is generally very low with several feet of distance between individual plants. Shadscale is the dominant plant where the salinity of the soils dictates species composition and perennial plant cover. Four- wing saltbush, Mormon tea, matchweed, and greasewood are also found within the desert- shrub community. Galleta grass and needle- and- thread grass are somewhat common in the desert- shrub community, but stands of grass along the road are sparse.

Spring snowmelt leads to the temporary presence of a number of perennial forbs. These include Indian paintbrush, sego lilies, onions, larkspur, and numerous sunflowers. There are also a variety of spring and summer annuals adding to the vegetative cover (NPS and BLM 1993).

The riparian vegetation along the Burr Trail that grows in and adjacent to ephemeral and intermittent stream channels and washes has adapted to the sporadic hydrologic regime of the area. Generally low precipitation, thin rocky soils, and rapid runoff rates do not support dense riparian vegetation or trees.

The effects of livestock grazing on vegetation are evident on both sides of the fence, near the existing cattle guard (mile point 0.55), and just south of the road near a creek crossing. In these areas, the vegetation has been trampled or no vegetation is present at all.

Invasive, exotic vegetation has been identified within the park, but inventories of exotic plants have not been made. Plant species such as mustards, thistles, cheatgrass, and tamarisk can enter the park through a variety of mechanisms. Within the proposed action area, exotic vegetation species can be introduced by vehicles traveling the road, by wind and wildlife, and through fill material transported for road maintenance activities.

WILDLIFE

There are more than 300 species of mammals, birds, reptiles, amphibians, and fish found in Capitol Reef National Park (NPS 1998c). A wide variety of wildlife uses the diverse habitats that occur in the park. Springs, intermittent streams, riparian vegetation, desert vegetation, and rugged terrain, including cliff and talus habitat, contribute to the wildlife diversity.

Four of Utah's six big game species occur in the general vicinity of the Burr Trail. These include mule deer, elk, desert bighorn sheep, and bison. While mule deer and bison are relatively tolerant of human disturbance, desert bighorn sheep and elk are less tolerant, and in this region are more typically associated with undeveloped conditions.

Mule deer are abundant, with the highest densities primarily along the western portion of the Burr Trail. The Utah Department of Wildlife Resources rates all of the road area as year-long deer range. However, deer abundance decreases with decreasing elevation such that deer are relatively scarce from The Post to the east boundary of the park. These big game species have the potential to occur in areas that would be affected by the Burr Trail modifications, but the potential is relatively low because the generally sparse vegetation, lack of cover, and low water availability make the habitat less favorable.

The primary wildlife habitat in the vicinity of the Burr Trail is the riparian plant community found along the intermittent drainages and stream channels. This habitat provides food, cover, and occasional access to water.

In the 1970s, bighorn sheep were reintroduced into the Moody Canyon area of the Waterpocket Fold by the Utah Department of Wildlife Resources in cooperation with the Bureau of Land Management and the National Park Service. Post-reintroduction monitoring has shown that the sheep population is increasing and concentrated in the Moody Canyon area. Bighorn sheep have been sighted along the Burr Trail near the project area, but established populations are found primarily near Moody Canyon, about 15 miles south of the project area.

Bison have been established in the Henry Mountains for many years. The bison generally reside at elevations above the Burr Trail, to the east. Although their critical winter range does come close to the road at Swap Mesa, access to the lower elevations around the Burr Trail in the park is limited by steep terrain.

Predators such as the mountain lion, bobcat, badger, ring-tailed cat, coyote, and red and gray fox occur in relatively low densities, as do their prey. Mountain lions may pass through the Burr Trail area, but are most likely found near populations of large prey (for example, mule deer) along the western portion of Burr Trail. Bobcats can exist on large or small prey but usually prefer relatively undisturbed habitat outside the project area. Coyotes rely on numerous food sources and exist in all terrains despite the intensity of human activity. Red fox also exhibit this ability to adapt to any food source but are not as compatible with intense human activity, while gray fox are associated with pinyon-juniper habitat not found in the project area.

The cottontail is usually associated with riparian habitats or diverse rocky areas that support north- aspect vegetation. Black- tailed jackrabbits are more common in the open desert shrub vegetation. Smaller mammals are known to occur throughout the area.

Reptiles, including snakes and lizards, are common in the arid terrain associated with the lower elevations found in the project area.

The open, rocky terrain within the park provides good habitat for many raptors. The golden eagle lives on the benches and mesas, hunting for rabbits and rodents. The Cooper's hawk, American kestrel, and great horned owl nest and hunt in the riparian communities, where prey densities are highest. Raptor nest sites are known in Long, Surprise, and Muley Twist Canyons, located west of the proposed project area. Large trees in riparian and higher-elevation communities provide cavity and canopy nest sites for owls, falcons, and accipiters.

A wide variety of nongame birds are found throughout the area, with the greatest diversity and abundance associated with riparian habitats, especially those with developed canopy and understory. Chukar, Gambel's quail, and mourning dove are game birds with potential to occur along the Burr Trail. Chukars prefer rocky slopes with annual grasses and forbs. Quail live mostly along streams in close association with the riparian community. Neither chukar nor quail are common along the road. Mourning doves are found in riparian habitats and are not concentrated at any one site (NPS and BLM 1993).

Generally, reptiles, small mammals (such as rodents, cottontails, and hares), and passerine birds (belonging to the order Passeriformes or perching birds), including corvids (crow family, including jays, magpies, crows, and ravens), are the most common wildlife in the project area. Other wildlife species, including larger mammals, raptors, game birds, and amphibians, may occasionally be present along the Burr Trail. They are more likely to use Sandy Creek and the Burr Trail as movement or foraging corridors rather than as resident habitats.

SURFACE WATER, HYDROLOGY, AND FLOODPLAINS

The climate at Capitol Reef National Park is arid, dominated by hot summers and cool, dry winters. The weather station at Boulder, Utah, approximately 25 miles west of the proposed action area, reports an average total annual precipitation of 10.7 inches. August receives the most rainfall, with an average of 1.54 inches (DRI 2002). Summer precipitation generally occurs in the form of thunderstorms that can be intense. Spring is the driest season, with little snow or rain falling in the months of April through June. The area receives 26.9 inches of snow from November through April, but this contributes less than 3 inches to the total annual precipitation (DRI 2002).

Floods in the ephemeral drainages along and across the roadway occur periodically, mostly during the summer monsoon season of July to September. The most intense storms, which produce the highest runoff rates, occur as the result of local summer thunderstorms. These storms are highly variable, and produce differing amounts of rainfall in the park. On occasion, a storm can cause flooding in one portion of the park and produce no precipitation in

others (NPS, Kehrner, 2002e). Although intense, these thunderstorms are generally of short duration.

Table 6 presents the maximum quantity of rainfall expected to occur in the area for storm events of different time periods. These data reveal that a 1- hour storm event can generate about half as much rain as a full- day storm event.

**TABLE 6: MAXIMUM PRECIPITATION AND FREQUENCY DATA FOR
CAPITOL REEF NATIONAL PARK, GARFIELD COUNTY, UTAH**

Storm Duration	2- Year Recur- rence Interval (precipitation in inches)	10- Year Recur- rence Interval (precipitation in inches)	25- Year Recur- rence Interval (precipitation in inches)	50- Year Recur- rence Interval (precipitation in inches)
30 minutes	0.52	0.87	1.1	1.2
1 hour	0.66	1.1	1.4	1.5
6 hours	1.0	1.6	2.0	2.2
24 hours	1.4	2.2	2.6	3.0

Source: National Oceanic and Atmospheric Administration 1973 Precipitation- Frequency Atlas of the Western U.S. (NOAA 1978).

Heavy rainstorms cause water to rise quickly in the stream channels. Storm- related flows erode natural surfaces and wash out dirt roads and trails. Roads throughout the area, including the Burr Trail, are marked with warning signs about the danger of flash floods (NPS 1998c).

In 2001, a summer rainstorm produced a flash flood that carried an automobile about a half mile downstream when the vehicle was driven into the Halls Creek crossing during the flood runoff period. A second flash flood in 2001 carried an automobile about 25 feet downstream from the same crossing. Only one such dramatic event was previously reported; it occurred prior to 1983 (NPS, Kehrner, 2002e). Floods have washed out roads, including a 60-inch culvert previously located at the Halls Creek crossing (NPS, Kehrner, 2002e).

The Burr Trail traverses the Sandy Creek and Burr Canyon subwatersheds, which drain into the Halls Creek watershed and ultimately to Lake Powell on the Colorado River. The one-mile segment of the Burr Trail generally follows Sandy Creek, crossing the intermittent drainage four times. The road crosses two other minor drainage washes within the one-mile segment. A drainage at the Burr Trail/Halls Creek crossing and a drainage crossing the road near the base of the switchbacks in Burr Canyon would be affected by the proposed action.

Surface waters within Capitol Reef National Park generally flow in response to rainstorms and snowmelt. Precipitation patterns, coupled with the high potential for evaporation, prevent most of the drainages in the park from having perennial flow. These watersheds are susceptible to occasional, short- term high flows. Due to the large amount of exposed bed-rock and thin, undeveloped, coarse- grained soils, water storage is low and runoff peaks are high.

Transient flood conditions occur periodically in response to unusual precipitation events or during rapid spring snowmelt. Water levels in drainages rise quickly due to sparse vegetative cover, rocky terrain with thin or nonexistent soil cover, and steep topography. In this environment, the time for rainwater to concentrate in drainages is short, and flows peak promptly.

Sediment loading during flash flood events is the primary water quality- related problem for streams in the area. This is a natural phenomenon and results from the erratic nature of precipitation events, steep topography, and lack of vegetative cover to protect soils from erosive processes.

During storm events or periods of high snowmelt, surface flows are generally characterized by high sediment loads, as is typical of the arid environment. The sparse vegetation provides little protection for exposed soils when rains come. Stream channels usually consist of exposed bedrock and thin, undeveloped, coarse- grained soils. Soil particles are easily dislodged and carried to nearby drainages and stream channels. When flows are moving rapidly through the channel, suspended sediment is transported in the water column. When flows slow in response to decreasing gradient or decreasing precipitation, the sediment load is quickly dropped. Little actual data on flow quantities or water quality are available for the watersheds that the road traverses.

The park also contains numerous small seeps and springs. Seeps are generally present at the base of hillsides or on canyon walls (NPS 1998c). No springs or seeps are known to exist within the vicinity the project area.

The park has mapped the 100- and 500- year floodplains for larger drainages in the park, such as the Fremont River and Sulphur Creek. Floodplains for smaller drainages such as Sandy Creek, Burr Canyon, and Halls Creek have not been mapped.

Floodways in the project area are generally 5 to 10 feet deep and range from 10 to 20 feet wide. A floodway is where the water is likely to be deepest and fastest and should be reserved (kept free of obstructions) to allow floodwaters to move downstream (FEMA 2004).

Much of the floodway lies in steep topography and is constrained within a 10- to 20- foot width. In portions of the proposed action area, high storm flows overtop the stream banks and flow into the adjacent low- lying valley. These occasional high- water floods generated by spring snowmelt and summer thunderstorms erode and wash out sections of the Burr Trail.

NATURAL SOUNDSCAPES

The natural soundscape can be defined as the natural ambient sound level of a park. "It is comprised of the natural sound conditions in a park which exist in the absence of any human- produced noises. These conditions are actually composed of many natural sounds, near and far, which often are heard as a composite, not individually" (NPS 2000a).

Noise, an element that can degrade the natural soundscape, is defined as "...unwanted or undesired sound, often unpleasant in quality, intensity or repetition. . . . In a national park setting, noise is a subset of human- made noises" (NPS 2000a).

In general, parks and wilderness areas in the Colorado Plateau region are characterized by exceptionally low ambient sound levels. The primary human-made sound that is present in the project area is noise associated with passing vehicles.

CULTURAL RESOURCES

As discussed in the “Purpose and Need for Action” section, archeological resources, historic resources, and cultural landscape all were dismissed from consideration. Therefore, the description of the affected environment is limited to ethnographic resources, including potential ethnographic landscapes, traditional cultural properties, and Native American concerns.

No cultural landscapes have been formally determined for the project area. However, there appear to be one or more possible ethnographic landscape(s).

Ethnographic resources include traditional cultural properties or places; this class of cultural resource was specifically addressed in the 1992 amendments to the National Historic Preservation Act. Traditional cultural properties or places are places of special heritage value to contemporary communities (often, but not necessarily, Native American groups) because of their association with the cultural practices or beliefs rooted in the histories of those communities. Thus, they are important in maintaining the communities' cultural identities.

During the previous planning phases conducted in 1993, extensive discussions were held with potentially affiliated American Indian tribes to identify possible ethnographic resources. Three surveys of the Boulder- to- Bullfrog Road were conducted to acquaint the American Indian tribes with the project area, and two ethnographic resource inventory and assessment reports were completed (NPS 1996b, 1996c).

No discrete resources were identified as traditional cultural properties within the area of potential effect for this project. However, tribal consultants asserted cultural ties to the area, ascribed religious significance to the entire viewshed between the Burr Trail and the Henry Mountains and beyond, and identified plant species and mineral types traditionally used by their peoples. They also considered all archeological resources to be ethnographic properties. Tribal consultants generally preferred that road modifications to the Burr Trail be kept to a minimum. See the “Consultation and Coordination” section for a list of the tribes consulted.

The National Park Service recognizes four categories of cultural landscapes: historic designated landscapes, historic vernacular landscapes, ethnographic landscapes, and historic sites. Ethnographic landscapes represent a complex subset of cultural landscapes within a discrete geographic area. Their natural and cultural elements reflect human adaptation and resource use associated with a historic activity, event, or person. These landscapes may be expressed in a variety of ways, such as patterns of settlement or land use, systems of circulation and transportation, buildings and structures, or parks and open space. Ethnographic landscapes associated with contemporary groups typically are used or valued in traditional ways.

Although no cultural landscapes have been formally defined for the Burr Trail, the spectacular viewsheds that lie between the Burr Trail and the Henry Mountains have religious significance to American Indian tribes and contain plant species and mineral types important to these groups. For these reasons, when discussing possible project impacts, the road corridor and surrounding areas will be considered a potential ethnographic landscape, and discussions of the ethnographic resources and landscapes will be combined in the impact analysis sections of this document.

PUBLIC HEALTH AND SAFETY

Travel in the remote and less frequently visited areas of Capitol Reef National Park includes risks associated with use of gravel or dirt roads that are susceptible to changing environmental conditions. In keeping with the remote nature of the Burr Trail, very few road signs, other than occasional warning signs, are present.

In this arid environment, summer thunderstorms occur, bringing transient torrential rains and causing occasional flash floods. For details, see the “Surface Water, Hydrology, and Floodplains” section. Summer thunderstorms have washed out the Burr Trail as well as other park roads, on occasion stopping safe passage. In addition, when wet, the clay soils can be very slippery and can make passage difficult or impossible in wet conditions. Attempting travel under these conditions has been likened to “driving on grease.” There are reports of travelers being stranded overnight on bentonite (clay) stretches, awaiting drier driving conditions (NPS, Kehrer, 2002i).

During the summer of 2001, two separate incidents of vehicles being carried downstream by flood washout were reported on the Burr Trail. The incidents were approximately three weeks apart, both were at the Halls Creek crossing, and both occurred during flash floods generated by thunderstorms. Substantial quantities of water were running through the crossing, and the drivers entered, only to be carried downstream in the Halls Creek drainage. No one was injured in either incident, but one vehicle was carried a half mile downstream in Halls Creek (NPS, Kehrer, 2002i).

No other incidents this dramatic have been reported along the Burr Trail in the park. However, there were two accidents reported at the overhanging rock in the last 10 years (NPS 1998a). Travel for vehicles passing in opposite directions is difficult at this location, and the overhanging rock has the potential to damage high profile vehicles such as large campers, recreational vehicles, and trailered boats that pass too closely.

VISITOR USE AND EXPERIENCE

Capitol Reef offers a diversity of recreational opportunities, along with spectacular landscape views. Visitor uses of the park include camping, hiking established trails, sightseeing from motor vehicles, picnicking, and backcountry exploration.

The Burr Trail provides access to the Waterpocket Fold and other geologic features of interest. Areas within Capitol Reef National Park that are accessed from the Burr Trail include Muley Twist Canyon, a premier backcountry hiking opportunity; Headquarters and

Surprise Canyons, which are narrow slot canyons; and the superb view from the Strike Valley Overlook. The Burr Trail also provides access to portions of Glen Canyon National Recreation Area and adjacent lands administered by the Bureau of Land Management.

A total of 606,146 visitors came to Capitol Reef National Park during calendar year 2002. The park is open all year, with the majority of visitor use occurring from March through October. Visitation peaks during the spring and fall, with somewhat reduced travel during the warmest months of mid- summer.

A substantial majority of the total annual visitor use occurs in the vicinity of the Fruita Rural Historic District, including the Scenic Drive, the main park campground, and park headquarters. A significantly smaller percentage of park visitors travel to the more remote portions of the park, including those areas accessed along the Burr Trail.

The Burr Trail serves as a rural, all- season, 2- wheel- drive- accessible road. The travel surface within the project area is native material and gravel, and is passable by most vehicles for the vast majority of the year.

Table 7 shows the average daily travel usage of the Burr Trail from 2001 through 2002. As shown in the table, typical use over the 3- year period was 20 to 30 vehicles per day. Travel along the Burr Trail within the park represents less than 5 percent of the total park visitation. Road users are typically park visitors, park staff, and county road maintenance personnel.

TABLE 7: BURR TRAIL ANNUAL AVERAGE DAILY VEHICLES PER DAY

Year	2003	2002	2001
Count	7,127	9,907	9,429
Average/day	20	27	26

Peak traffic volume was 2186 (71/day) in May of 1999.

Source: Capitol Reef National Park

As shown in Table 8, visitor use along the Burr Trail within the park is similar to the overall park visitation trend. It is greatest in the spring and fall, with a slight reduction during the mid- summer months. Extremely low travel usage of fewer than 10 vehicles per day occurs during the winter months. The peak recorded traffic volume was an average 71 vehicles per day in May 1999. The current design capacity of up to 400 vehicles per day is well in excess of the past and current usage.

TABLE 8: BURR TRAIL VEHICLE USE BY MONTH AND YEAR

Month					
Month	2003	2002	2001	Three- Year Mean	Daily Mean
January	178	220	264	220.7	7.1
February	192	401	94	229.0	8.2
March	408	646	401	485.0	15.6
April	922	1302	1084	1102.7	36.8
May	1116	1810	1531	1485.7	47.9
June	874	874	1315	1021.0	34.0
July	651	994	1014	886.3	28.6
August	621	959	1350	976.7	31.5
September	908	1454	1035	1132.3	37.7
October	801	753	746	766.7	24.7
November	277	344	351	324.0	10.8
December	179	150	244	191.0	6.2
Annual Total	7,127	9,907	9,429	8,821.0	24.2
Year (through June 2004)					
	Cedar Mesa Notom Road Park Boundary	Burr Trail West Boundary	Burr Trail East Boundary		
1993	4,621	8,659	6,130		
1994	6,506	11,099	6,470		
1995	7,442	9,924	8,455		
1996	7,920	9,981	10,386		
1997	8,911	10,465	10,281		
1998	8,667	11,101	10,697		
1999	16,231	11,530	13,129		
2000	12,649	9,544	8,453		
2001	8,647	9,300	9,429		
2002	11,106	9,141	9,907		
2003	11,198	10,973	7,127		
YTD- 2004	4,845	5,455	3,487		

Source: Capitol Reef National Park

VISITATION PROJECTIONS

Previous assessments of visitation at Capitol Reef National Park have reported and predicted steady increases in visitation rates. From 1984 to 1991, park visitation increased approximately 10 percent each year (NPS and BLM 1993). The 1998 general management plan used a continued growth estimate of 3.6 percent for planning purposes. However, visitation in 2001 was less than that of previous years. The most recent trend appears to indicate level to slightly decreasing visitation rates over the past few years. When overall park visitation declines, fewer visitors travel on the Burr Trail. Specific trends or projections for visitation are not addressed in this document.

BURR TRAIL EXPERIENCE

The lands adjacent to the Burr Trail in Capitol Reef National Park are among the most colorful and rugged of the Waterpocket Fold, the primary geologic feature of the park. The heights above Strike Valley near the Burr Trail have high potential as a site for experiencing the park's primary geological theme. The primitive character of the land, aesthetics, quiet, and solitude make traversing the Burr Trail a special visitor experience.

No visitor use studies of the Waterpocket District or the Burr Trail have been conducted by the park; however most would agree that the experience varies by individual. Some visitors would find the unimproved sections of the road a challenge, while others may object to the sometimes jarring, bumpy ride experienced when the road is “washboarded.” The existing primitive feel of the road allows visitors to experience what the area was like for the early settlers in the area.

The overhanging rock at mile point 0.65 appears gray in some light and golden in others, and has holes in its face that give the impression of a medieval gargoyle. This character-defining feature provides both visual interest and a geographical place marker (NPS 1998a). Travel along the Burr Trail offers the visitor a “picture frame” view to experience and understand the geologic significance of this and several features throughout the park.

Muley Twist Canyon, one of the premier backcountry hiking locations in the park, is in the Waterpocket District along the Burr Trail. Park staff estimate that up to half of all recreational travelers to the park engage in hiking activities. Many of these hikers appreciate the area's solitude and quiet and hold strong opinions concerning environmental preservation. However, backcountry recreational use of the park represents only a very small percentage of the total recreational use of the park (NPS 1998c).

SOCIOECONOMICS

The Burr Trail project area and adjacent portions of Capitol Reef National Park are located in south central Utah's rural Garfield County. According to the 2000 census, Garfield County had a total population of 4,735 (U.S. Census Bureau 2002). The primary economic activities in the county are tourism, cattle ranching, service industries, and government (Five County Association of Governments 2002).

Land ownership within the county is largely federal. The Bureau of Land Management, U.S. Forest Service, National Park Service, and Bureau of Reclamation administer 88 percent of the acreage within Garfield County. Utah State Trust Lands make up another 8 percent, and private land ownership comprises only 4 percent of the total (Utah State University Extension Governor's Rural Partnership Office 2001). To address this situation, the county has included public lands management as a specific planning topic in the 1998 amendment to the general plan (Five County Association of Governments 1998).

Non- agricultural jobs represented 80 percent of employment in Garfield County in 1999 (U.S. Census Bureau 2002). More than a thousand people in Garfield County are employed in travel- related industries (Five County Association of Governments 1995, NPS 1998c). Tourism is a vital component of the Garfield County economy and provides substantial revenue, with annual estimates of traveler spending ranging from \$20 million (Five County Association of Governments 1995) to over \$60 million (NPS 1998c). Visitor services that support the tourism industry generate revenues for local, county, and state governments through taxes.

Median annual household income is \$30,149, which is less than the Utah state average of \$38,884. The county poverty rate is 13.5 percent, compared to Utah's average of 10 percent (U.S. Census Bureau 2002). Table 9 describes the general demographic and economic profile for Garfield County and the state of Utah.

Major land uses in the vicinity of Capitol Reef National Park include recreation, agriculture, and cattle ranching. Mining and hunting also occur in the area, but are of decreasing economic importance (NPS and BLM 1993).

Within the park, an active grazing allotment continues to be utilized by a local rancher. This allotment, known as Sandy 3, is permitted for 410 animal unit months of winter grazing. That is, cow/calf pairs or steers may be grazed on the allotment for a cumulative total not to exceed 410 months (100 head x 4 months = 400 animal unit months). The allotment generally follows the Notom Road, with its southern end near the park's eastern boundary, at The Post Corral along the Burr Trail (NPS Clark 2002g).

**TABLE 9: DEMOGRAPHIC AND ECONOMIC SUMMARY
FOR GARFIELD COUNTY AND UTAH**

	Utah	Garfield County
Population 2000	2,233,169	4,735
Population 1990	1,722,850	3,980
Percent change 1990 to 2000	29.6	19.0
Per capita income, 1997	\$20,185	\$16,392
Civilian labor force 1999 (percent of population)	1,083,912 (49 percent)	2,698 (57 percent)
Employed by government	17.2 percent	19.2 percent
Unemployment	3.7 percent	8.3 percent
Retail sales per capita, 1997	\$9,666	\$4,021
Land area, square miles	82,144	5,174
Persons per square mile	27.2	0.90

Source: U.S. Census Bureau 2002.

Twice each year, a permit is granted for the allottee to move cattle to and from the grazing allotment along park roads. Cattle are driven by cowboys along the Burr Trail (below the switchbacks) and over the Notom Road. The timing and number of cattle vary. This road use is likely to continue until the grazing permit expires or until the permittee participates in the ongoing “willing seller buyout program” offered by the park (NPS, Clark, 2002g).

State economic development and transportation improvement programs are used to support and stimulate growth and provide employment opportunities in the county. The Utah Quality Growth Commission provided \$7,000 to the county in 1999 to conduct growth surveys and open houses (Utah Quality Growth Commission 2002). The *Statewide Transportation Improvement Plan 2002- 2006* includes funding for construction of a bridge and visitor center, and plans for conceptual design for two additional future transportation facilities in the county; however, none of these plans include upgrades to the Burr Trail (Utah Department of Transportation 2002).

Garfield County is responsible for road maintenance of the Burr Trail, including those portions on Bureau of Land Management and National Park Service lands. The county receives state and federal funding for road maintenance through agreements with partial funding from the Utah Department of Transportation and the state's Community Impact Board (Five County Association of Governments 1995). County maintenance trucks use the Burr Trail to transport road materials (gravel and rock) to and from fill and borrow sites outside the park to conduct road maintenance on the Burr Trail and other county roads. Persons traveling from the Boulder area (west of the park) to Glen Canyon National Recreation Area (southeast of the park) also use the road. The Burr Trail is rarely used as a commuter or business route.

PARK OPERATIONS

The superintendent at Capitol Reef National Park is responsible for the full scope of managing the park, its staff, all of its programs, and its relations with persons, agencies, and organizations interested in the park. Park staff members provide the full scope of functions and activities to accomplish management objectives and meet requirements in law enforcement, emergency services, public health and safety, science, resource protection and management, visitor services, interpretation and education, community services, utilities, housing, fee collection, and management support.

For administrative purposes, the park is divided into three districts: the Fremont River District (headquarters/Fruita), the Waterpocket District (formerly South district), and the Cathedral District (formerly North District). The Fremont River District includes the primary automobile access to Capitol Reef National Park, SR 24, which parallels the Fremont River and bisects the northern segment of the park. Most of the existing park facilities and developments are in this district. The Waterpocket District, in which the Burr Trail is located, and the Cathedral District have few visitor facilities, and in-park access is by dirt roads. Small, primitive campgrounds are located in both of the outlying districts (NPS 1998c).

An entrance fee of \$5 per vehicle is collected for those traveling the park's Scenic Drive beyond a campground in Fruita (NPS 2002b). There is currently no fee for visitors to enter the park in either the Waterpocket or Cathedral Districts.

The Bureau of Land Management administers lands adjacent to the park. Cattle trespass into the park from Bureau of Land Management lands across unfenced portions of the park boundary during the winter grazing season is a regular concern.

In the park's general management plan, the Burr Trail is zoned as a road corridor that is an "all- weather, maintained, variable- width dirt road" (NPS 2001c). Access to the road is by two- wheel- drive vehicles and may be occasionally impassable due to weather conditions. Along the Burr Trail, visitors may find directional and interpretive signs, cattle guards, well-defined turnouts, trailhead parking areas, and picnic sites (NPS 1998c). The road is maintained by Garfield County. During a normal precipitation year, significant storms that require follow- up maintenance may occur several times a month, typically in late summer.

As previously described, the drainage crossings along the Burr Trail are susceptible to flash floods, and the road can become slippery in wet conditions because of the composition of the road surface. Accidents have occurred, and park rangers patrolling the road are responsible for responding to emergencies.

GARFIELD COUNTY ROAD MAINTENANCE OPERATIONS

Garfield County is responsible for maintenance of the county roadway system, which includes the Burr Trail. County road crews perform the functions and activities necessary to meet requirements in road maintenance within the Burr Trail right- of- way.

Garfield County has paved portions of the Burr Trail passing through adjacent Bureau of Land Management lands to the park's western entrance and within 8 miles of the park's eastern entrance. Access from the north is provided on the Notom Road, which Wayne County has paved to the Garfield County line 8 miles north of the park boundary. Within the county's RS 2477 right- of- way inside park boundaries, the county is responsible for road maintenance.

The width of the Burr Trail varies. The road narrows at the overhanging rock, impeding two- way traffic, and there have been reports to the National Park Service of two accidents in the mid- 1990s. However, no accidents involving damage to vehicles or damage to the overhanging rock have been reported to Garfield County (Garfield County, Bremner, 2003).

Along the Burr Trail, visitors may find road maintenance equipment and vehicles in transit or conducting routine grading within the road right- of- way two or three times a year (typically in the spring and fall) to stabilize the road surface and one to two times a year to remove sediment at drainages. During wetter conditions, the frequency of maintenance may increase to two or three times a week for one to three weeks to remove sediment at drainages such as Halls Creek. Typically, road crews grade and clear the drainages for safe transit within 48 hours of a storm (Garfield County, Bremner, 2003).

Annual road operations include acquisition of surface material used to repair and stabilize the road surface. Road operation equipment is stored at the maintenance facility in Boulder,

about 30 miles west of the park boundary. Materials are obtained from an established borrow pit 12 to 15 miles east of the park boundary on Bureau of Land Management lands. Occasionally, surface material is obtained from the Wagonbox Pit west of the park on Grand Staircase- Escalante National Monument lands. Travel times and distances influence road operations and maintenance activities.

The Burr Trail is susceptible to flash floods, and can become slippery in wet conditions because of the composition of the road surface. Surface grades on portions of the road composed of bentonite clays are graded away from the drainage to improve transportation safety (Garfield County, Bremner, 2003). Road crews have responded to emergency calls from travelers whose vehicles have become stuck in deep, wet clays along the road. After large storm events, road crews conduct emergency maintenance to clear sediment that has clogged the Halls Creek and other drainage crossings.