National Park Service
Cultural Landscapes Inventory
2000

Lassen Volcanic National Park Highway

Lassen Volcanic National Park

Level II
Cultural Landscape Inventory
Lassen Volcanic National Park

Lassen Volcanic National Park concurs the findings of the Level II inventory for the Lassen Volcanic National Park Highway Historic District including the following specific components:

MANAGEMENT CATEGORY A: **Must be preserved and maintained**

CONDITION ASSESSMENT: **Fair**

The Level II Cultural Landscape Inventory for the Lassen Volcanic National Park Highway Historic District is hereby approved and accepted.

Superintendent, Lassen Volcanic National Park — Date: 04/30/01

Please return this form to the attention of:
Kimball Koch, CLI Coordinator
National Park Service
Pacific Great Basin Support Office
600 Harrison Street, Suite 600
San Francisco, CA 94107-1372

LASSEN VOLCANIC NATIONAL PARK HIGHWAY
LASSEN VOLCANIC NATIONAL PARK

California SHPO Eligibility Determination

Section 110 Actions Requested:

1) SHPO concurrence with the findings of the draft nomination including the boundary established for the Lassen Volcanic National Park Highway.
2) SHPO concurrence with the addition of structures to the List of Classified Structures (LCS) (See chart below.)

______X___ **I concur,** _________ **Additional information is needed to concur,** _________ **I do not concur** with the proposed boundary for the Lassen Volcanic National Park Highway.

__X_______ **I concur,** _________ **Additional information is needed to concur,** _________ **I do not concur** that the **Setting** as described in the nomination contributes to the Lassen Volcanic National Park Highway.

The following structure, located within the proposed historic district is already listed on the National Register (no concurrence required):

LCS number	Structure Name
14030	Summit Lake Ranger Station

The following structures, located within the proposed historic district, are already determined eligible for listing on the National Register as contributing elements of the Lassen Volcanic National Park Highway:

LCS number	Structure Name
5464	Ranger Residence (Northwest Entrance Station Ranger Station)
5465	Park Entrance Station (Northwest Entrance Kiosk)
56778	Raker Peak Sign
56779	Diamond Peak Sign
56780	Manzanita Lake Sign
56781	Hat Lake Sign
56782	Manzanita Lake Hanging Sign
56783	Hat Creek Culvert-Bridge
56784	Lost Creek Culvert-Bridge
56785	National Park Service Route 1 (Lassen Volcanic National Park Highway)
56786	National Park Service Route 1 Culverts
56787	National Park Service Route 1 Retaining Walls
56789	Northwest Entrance Pylon

Based on the information provided in the nomination, the following previously unevaluated structures have been identified as **contributing** to the Lassen Volcanic National Park Highway:

LCS number	Structure Name	Date	Concur	Do not Concur
254359	Kings Creek Culvert Bridge	1928-1929	X	
332560	Lassen Volcanic National Park Highway Pullouts at: Diamond Peak, Emerald Lake, Lake Helen, Kings Creek Meadows, Summit Lake, Devastated Area, Hot Rock and Chaos Crags (8)	ca. 1925 - 1939	X	
332563	Lassen Volcanic National Park Highway Side Roads access to: Sulphur Works, Lake Helen, Kings Creek, Summit Lake, Old Boundary Springs, Lost Creek and the Naturalist's Residence (7)	ca. 1925-1931	X	

Based on the information provided in the nomination, the following previously unevaluated structures have been identified as **not contributing** to the Lassen Volcanic National Park Highway:

LCS number	Structure Name	Concur	Do not Concur
N/A	Sulphur Works Boardwalk	X	
N/A	Raker Memorial Gateway	X	
N/A	Emerald Sidehill Road Section	X	
N/A	Lassen Peak Trailhead Section	X	
N/A	Lassen Volcanic National Park Highway Parking Lots	X	
N/A	Northwest Boundary Road Section	X	
N/A	Southwest Developed Area Road Section	X	
N/A	Sulphur Works Road Section	X	
N/A	Sulphur Works Bridge	X	
N/A	Plastic Pipe Culverts (24)	X	
N/A	Southwest Entrance Kiosk	X	
N/A	Lassen Chalet	X	
N/A	Modern Comfort Stations (6)	X	

Reasons/comments why 'Additional Information Is Needed To Concur' or 'Do Not Concur' were checked:

No Comments

18 AUG 2004

California State Historic Preservation Officer — Date

Milford Wayne Donaldson

Please return forms to the attention of:
Kimball Koch
Cultural Landscape Program Lead-Oakland
National Park Service
Pacific West Regional Office-Oakland
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Executive Summary

General Introduction to the CLI

The Cultural Landscapes Inventory (CLI) is a comprehensive inventory of all historically significant landscapes within the National Park System. This evaluated inventory identifies and documents each landscape's location, physical development, significance, National Register of Historic Places eligibility, condition, as well as other valuable information for park management. Inventoried landscapes are listed on, or eligible for, the National Register of Historic Places, or otherwise treated as cultural resources. To automate the inventory, the Cultural Landscapes Automated Inventory Management System (CLAIMS) database was created in 1996. CLAIMS provides an analytical tool for querying information associated with the CLI.

The CLI, like the List of Classified Structures (LCS), assists the National Park Service (NPS) in its efforts to fulfill the identification and management requirements associated with Section 110(a) of the National Historic Preservation Act, NPS Management Policies (2001), and Director's Order #28: Cultural Resource Management (1998). Since launching the CLI nationwide, the NPS, in response to the Government Performance and Results Act (GPRA), is required to report on an annual performance plan that is tied to 6-year strategic plan. The NPS strategic plan has two goals related to cultural landscapes: condition (1a7) and progress on the CLI (1b2b). Because the CLI is the baseline of cultural landscapes in the National Park System, it serves as the vehicle for tracking these goals.

For these reasons, the Park Cultural Landscapes Program considers the completion of the CLI to be a servicewide priority. The information in the CLI is useful at all levels of the park service. At the national and regional levels it is used to inform planning efforts and budget decisions. At the park level, the CLI assists managers to plan, program, and prioritize funds. It is a record of cultural landscape treatment and management decisions and the physical narrative may be used to enhance interpretation programs.

Implementation of the CLI is coordinated on the Region/Support Office level. Each Region/Support Office creates a priority list for CLI work based on park planning needs, proposed development projects, lack of landscape documentation (which adversely affects the preservation or management of the resource), baseline information needs and Region/Support office priorities. This list is updated annually to respond to changing needs and priorities. Completed CLI records are uploaded at the end of the fiscal year to the National Center for Cultural Resources, Park Cultural Landscapes Program in Washington, DC. Only data officially entered into the National Center's CLI database is considered "certified data" for GPRA reporting.

The CLI is completed in a multi-level process with each level corresponding to a specific degree of effort and detail. From Level 0: Park Reconnaissance Survey through Level II: Landscape Analysis and Evaluation, additional information is collected, prior information is refined, and decisions are made regarding if and how to proceed. The relationship between Level 0, I, and II is direct and the CLI for a landscape or component landscape inventory unit is not considered finished until Level II is complete.

A number of steps are involved in completing a Level II inventory record. The process begins when the CLI team meets with park management and staff to clarify the purpose of the CLI and is followed by historical research, documentation, and fieldwork. Information is derived from two efforts: secondary sources that are usually available in the park's or regions' files, libraries, and archives and on-site landscape investigation(s). This information is entered into CLI database as text or graphics. A park report is generated from the database and becomes the vehicle for consultation with the park and the

SHPO/TPO.

Level III: Feature Inventory and Assessment is a distinct inventory level in the CLI and is optional. This level provides an opportunity to inventory and evaluate important landscape features identified at Level II as contributing to the significance of a landscape or component landscape, not listed on the LCS. This level allows for an individual landscape feature to be assessed and the costs associated with treatment recorded.

The ultimate goal of the Park Cultural Landscapes Program is a complete inventory of landscapes, component landscapes, and where appropriate, associated landscape features in the National Park System. The end result, when combined with the LCS, will be an inventory of all physical aspects of any given property.

Relationship between the CLI and a CLR

While there are some similarities, the CLI Level II is not the same as a Cultural Landscape Report (CLR). Using secondary sources, the CLI Level II provides information to establish historic significance by determining whether there are sufficient extant features to convey the property's historic appearance and function. The CLI includes the preliminary identification and analysis to define contributing features, but does not provide the more definitive detail contained within a CLR, which involves more in-depth research, using primary rather than secondary source material.

The CLR is a treatment document and presents recommendations on how to preserve, restore, or rehabilitate the significant landscape and its contributing features based on historical documentation, analysis of existing conditions, and the Secretary of the Interior's standards and guidelines as they apply to the treatment of historic landscapes. The CLI, on the other hand, records impacts to the landscape and condition (good, fair, poor) in consultation with park management. Stabilization costs associated with mitigating impacts may be recorded in the CLI and therefore the CLI may advise on simple and appropriate stabilization measures associated with these costs if that information is not provided elsewhere.

When the park decides to manage and treat an identified cultural landscape, a CLR may be necessary to work through the treatment options and set priorities. A historical landscape architect can assist the park in deciding the appropriate scope of work and an approach for accomplishing the CLR. When minor actions are necessary, a CLI Level II park report may provide sufficient documentation to support the Section 106 compliance process.

Park Information

Park Name:	Lassen Volcanic National Park
Administrative Unit:	Lassen Volcanic National Park
Park Organization Code:	8400
Park Alpha Code:	LAVO

Property Level And CLI Number

Property Level:	Landscape
Name:	Lassen Volcanic National Park Highway
CLI Identification Number:	725063
Parent Landscape CLI ID Number:	725063

Inventory Summary

Inventory Level: Level II

Completion Status:

Level 0

Date Data Collected - Level 0:	7/1/1998
Level 0 Recorder:	Bright Eastman
Date Level 0 Entered:	7/1/1998
Level 0 Data Entry Recorder:	Bright Eastman
Level 0 Site Visit:	Yes

Level II

Date Level II Data Collected:	8/10/2000
Level II Data Collection	Shaun Provencher, Len Warner
Date Level II Entered:	8/10/2000
Level II Data Entry Recorder:	Shaun Provencher, Len Warner
Level II Site Visit:	Yes
Date of Concurrence	4/30/2001

Explanatory Narrative:

The Level 0 Cultural Landscape Inventory for the Lassen Volcanic National Park Highway was entered into the national CLAIMS database on July 7, 1998 as the NPS Route 1 Corridor. The name was subsequently changed to the Lassen Volcanic National Park Highway. Lassen Volcanic National Park has not yet reviewed this draft Level II inventory for Lassen Volcanic National Park Highway and the data has not been transmitted to the National Center.

No future inventory efforts for the Lassen Volcanic National Park Highway have been identified.

The Lassen Volcanic National Park Highway Level II inventory has been compiled by Shaun Provencher (PGSO CLI technician), Len Warner (PGSO CLI technician), the aid of the staff of Lassen Volcanic National Park and the archival staff of the Western Archeological and Conservation Center (WACC). At the beginning of this project, Len Warner was employed by the Historic American Engineering Record (HAER) which was producing a concurrent HAER documentation project with a similar scope scheduled for completion in FY 2001. This provided the opportunity to share resources, research, and product. As a result, most historical information in this inventory is a product of the HAER research.

Due to an ongoing archival inventory effort, nearly all park materials are currently located at the Western Archeological and Conservation Center in Tucson, Arizona. This situation required one research trip to WACC by Shaun Provencher and two by Len Warner in order to more completely research the road.

Landscape Description

The Lassen Volcanic National Park Highway is a linear landscape that extends 29.86 miles between the southwest and northwest entrance stations of Lassen Volcanic National Park. From the southwest entrance (elevation 6,646 feet) the road climbs to an elevation of 8,511 feet at its summit near Lassen Peak, and descends toward the northwest entrance (elevation 5,808 feet) near Manzanita Lake. The road traverses active geothermal areas, sub-alpine forests, mountain meadows and lava fields. Designed in the early 1920s as a recreational pleasure drive, the Lassen Volcanic National Park Highway remains the primary means by which most visitors experience the park.

The road alignment was designed to display the park's most scenic and geologically interesting areas to automobile tourists. Although the mountainous terrain required extensive use of cut and fill road building techniques to provide scenic vistas, designers ensured that, where possible, existing landscape features were carefully preserved. Preservation of the landscape, an essential component of the project landscape architect's design philosophy, improved the naturalistic design of the road corridor. Roadside amenities, including scenic pullouts, trailhead parking areas, and roadside markers were designed and located to enhance the motorists' experience, to allow hikers access to the park's extensive backcountry trail system, and to add to the visitor's understanding of the dramatic geological processes that created the diverse volcanic landscape. The road offers distant views of the surrounding countryside within and beyond park boundaries, as well as a variety of distant and intimate views of the park's major natural landscape feature, Lassen Peak.

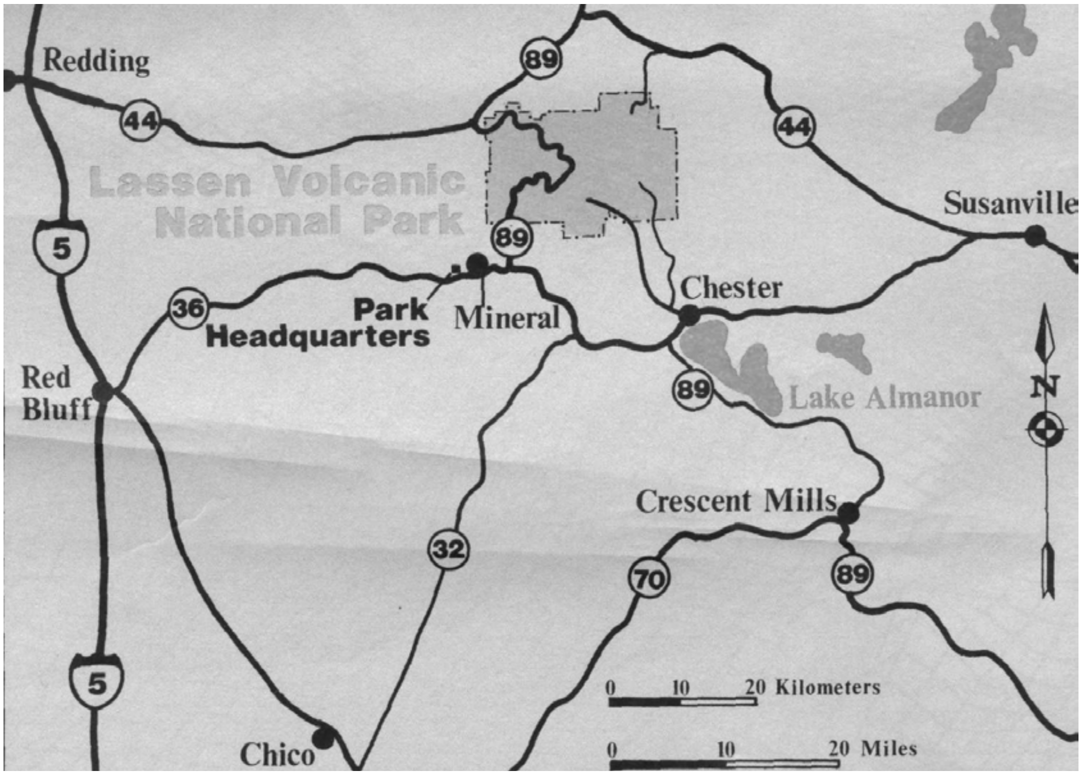
The Lassen Volcanic National Park Highway is a historic designed landscape, and is significant as an intact example of early road design in the National Park Service. Significant features include the road's route and alignment, scenic overlooks, headwalls, bridge culverts, entrance pylons, and northwest entrance station. These features utilize native materials and naturalistic design to blend the road with its setting. The periods of significance are 1925 to 1941 and 1948 to 1951, reflecting major construction efforts. The first period reflects the original National Park Service and Bureau of Public Roads construction in the 1920s and continues through the end of the Civilian Conservation Corps (CCC) work projects in 1941. The second period reflects road paving and widening projects that brought the road to its current width.

The Lassen Volcanic National Park Highway retains its original route and function as a touring road through the park. It is in fair condition and retains integrity in relation to both periods of significance.

Cultural Landscapes Inventory Hierarchy Description

The Lassen Volcanic National Park Highway (to be referred to as the "road" throughout the remainder of the document) is being documented as a single designed landscape district with no component landscapes. Although the road is composed of a number of associated features including parking lots, overlooks, and entrance stations, these elements are considered as parts of the overall district. Other developments have occurred adjacent to the highway and will be inventoried as separate cultural landscapes. These include: the Loomis Museum and Seismographic Station, Manzanita Lake / Reflection Lake (including the Naturalist's Residence), and Summit Lake Ranger Station and Campground.

Location Map



Location Map: Lassen Volcanic National Park.

Boundary Description

The boundary of the Lassen Volcanic National Park Highway Historic District encompasses all aspects of the immediately surrounding environment physically affected by the road's construction. This includes all land and features within forty feet on both sides of the centerline (an impact area delineated in original construction documents) for the entire length of the 29.98-mile highway. Exceptions to this are made for those parking lots considered contributing features, at which point the boundary extends to the edges of the constructed area.

Regional Context

Political Context

The park encompasses parts of Shasta, Tehama, Plumas and Lassen counties. The road itself traverses territory in Tehama and Shasta counties, in Congressional Districts 2 and 3. Lassen Volcanic National Park is entirely surrounded by the Lassen National Forest. The Caribou Wilderness, a 20,000-acre tract of wilderness preserve established by the U.S. Forest Service in the early 1930s, is contained within the Lassen National Forest and abuts the park's eastern boundary.

Cultural Context

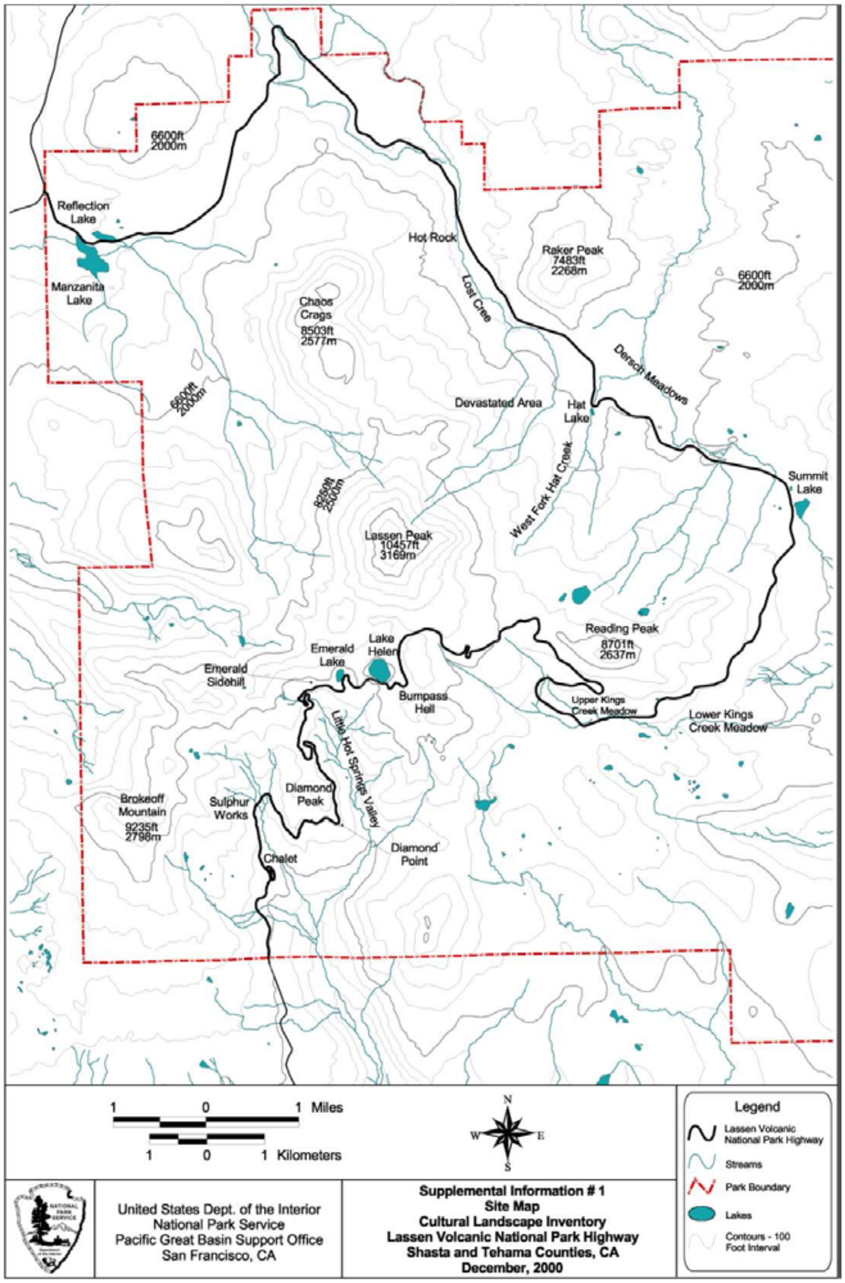
Before the arrival of Europeans in the region, four Native American tribes occupied the land now designated as Lassen Volcanic National Park: the Atsugewi, Maidu, Yana, and Yahi. The last members of the Yahi tribe occupied lands in the southwest part of Lassen until the early twentieth century. Archeological sites associated with these and other, earlier groups are found throughout the park. Later, European cultural groups are also associated with the Lassen area during the nineteenth century. Although the bulk of westward European emigration in the mid-nineteenth century was carried out along the Oregon and California trails, a number of spur routes arose in the 1840s and 1850s. Two of these, the "Lassen route" and the Nobles Emigrant Trail, passed through part of what is now Lassen Volcanic National Park.

Physiographic Context

Lassen Volcanic National Park is at the southern end of the Cascade Range, north of the Sierra Nevada, and west of the Great Basin. The western part of the park where the road is located is the more rugged, defined by lava pinnacles, craters, and sulphur vents. The eastern part of the park is predominantly a lava plateau over one mile above sea level and punctuated by three cinder cones.

Site Plan

Site Plan: See Supplemental Information for full scale image.



Chronology

Year	Event	Description
1865 - 1885 AD	Developed	Mathias Supan develops a wagon trail from the Red Bluff-Susanville Road near Morgan Springs to his small-scale sulphur mine along the Sulphur Creek.
1907 AD	Established	President Theodore Roosevelt declares Lassen Peak and Cinder Cone National Monuments on May 6th. [35 Stat., 2131]
1916 AD	Established	President Woodrow Wilson establishes Lassen Volcanic National Park on August 9th. [39 Stat., 442]
1922 - 1923 AD	Reconstructed	The U.S. Forest Service, using Lassen road funds, improve and reconstruct the southwest entrance road, following Supan's wagon trail into the park.
1923 - 1924 AD	Designed	The route is established and located to extend around the southeast flank of Lassen Peak to Hat Creek. Engineer: Frank C. Hewitt; George E. Goodwin Landscape Architect: John Wosky; Merle Sager; Thomas C. Vint
1925 AD	Built	Under NPS direction, contractors begin construction on the road between the Southwest Entrance and the Sulphur Works (.5 miles) and six (6) miles from Hat Creek to Devastated Area .
1925 - 1927 AD	Built	The Loomis House and museum is constructed.
1926 - 1929 AD	Built	Inter-bureau agreement between the NPS and Bureau of Public Roads transfers technical oversight of road construction in the national parks to BPR. Rough grading and structures (drainage systems) is completed between Sulphur Works and Hat Creek.

1927 AD	Land Transfer	Forest Highway 71 (from Mineral to the south boundary of the park) is designated part of the California Forest Highway system.
1929 AD	Expanded	The park boundary expansion takes in Chaos Jumbles, the Loomis residence and museum, Manzanita Lake, portions of Hat and Lost Creeks, Lee's Camp, Kelly's Camp and Drakesbad. New park boundaries add approximately 25,000 acres. [45 Stat. 1081]
1930 AD	Designed	The BPR surveys, prepares plans, and lets contracts for approximately 7.5 miles of road construction ending in a .5 mile long "Y" configuration at the northwest boundary to connect the park highway with the current State Route 44.
1930 - 1931 AD	Built	Northwest and southwest checking stations and ranger residences are constructed.
1931 AD	Built	The Raker Memorial Gateway, designed by NPS landscape architect Merle Sager, is erected at park's southern boundary. Landscape Architect: Merle Sager
1931 AD	Land Transfer	The Leavitt Approach Road Act of 1931 (Public Law No. 592) designates Morgan Summit-southwest boundary road "Southwest Approach Road to LVNP."
1931 AD	Memorialized	Lassen Volcanic National Park and "Lassen Peak Loop Highway" are officially dedicated July 24-26.
1931 AD	Reconstructed	The original 1927 log stringer bridge over Hat Creek is washed out, and a new culvert bridge, designed by the NPS landscape engineering staff in the Branch of Plans and Design, San Francisco, is constructed by Park Service laborers. Landscape Architect: Merle Sager
1931 - 1932 AD	Paved	The entire road is paved with bituminous asphalt and seal-coated.
1933 AD	Established	The Civilian Conservation Corps (CCC) establishes camp at Old Boundary Springs.

1933 - 1941 AD	Built	The CCC builds many features along the road, including at least five drinking fountains and several hand-laid retaining walls. CCC labor is also used for maintenance and roadside cleanup projects.
1934 AD	Established	The Park Approach Road Act establishes NPS authority to construct and maintain park approach roads.
1934 - 1936 AD	Reconstructed	The Red Bluff-Susanville Highway (State Route 36) is reconstructed between Mineral and Morgan Summit and the road between Morgan Summit and park boundary is realigned and constructed.
1935 AD	Built	The Lassen Park Company concessioner builds a rope tow ski lift near southwest entrance: known as "Sulphur Works Ski Slope."
1935 AD	Built	The northwest entrance pylon is constructed.
1939 AD	Built	A warming hut is built at Sulphur Works Ski Slope.
1939 - 1941 AD	Reconstructed	The corrosive action of sulfuric hot springs causes a section of road to collapse near the Sulphur Works. A section of road is removed, and new fill, culverts, and pilings are installed.
1940 - 1952 AD	Built	The Supan family erects several wood frame buildings—a lunch counter, guest rooms, and a bathhouse—on their private property adjacent to the road at the Sulphur Works area. Owner: Supan Family
1947 AD	Built	A new rope tow and 200-car parking area constructed for Sulphur Works Ski Slope.
1948 - 1953 AD	Expanded	The entire Lassen road is widened from sixteen feet to twenty feet, with two- to three-foot shoulders. BPR and NPS crews flatten curves, finish slopes, and improve drainage, by installing additional culverts and tile underdrains.

1952 AD	Land Transfer	The Supan's Sulphur Works Inn, and property across the road in the Little Hot Springs Valley is condemned, and the property is turned over to the NPS.
1952 AD	Paved	An eight mile section between Sulphur Works and the summit is paved with bituminous concrete, or "asphalt."
1952 AD	Removed	Supan's buildings adjacent to Sulphur Works are removed.
1955 AD	Altered	The Raker Memorial Gateway pylons are reconfigured and a new park sign is installed.
1963 AD	Altered	The road at the Winter Use Area is realigned.
1963 AD	Altered	The road at Winter Use Area is realigned.
1963 - 1964 AD	Built	The southwest entrance station and the ski chalet are constructed—and are known as the "Winter Use Area."
1964 - 1966 AD	Built	A concrete deck steel girder bridge is erected over the west fork of Sulphur Creek, altering the road alignment, and replacing a fill section and culverts. An enlarged parking area for Sulphur Works is added.
1971 - 1972 AD	Altered	The road at Lassen Peak trailhead parking lot is realigned to the south to create an enclosed parking area.
1971 - 1973 AD	Altered	Barrier rocks are installed at lookouts and at switchbacks between Diamond Point and the road summit. The entire road is paved with bituminous concrete, and striped with center- and fog-lines.
1971 - 1973 AD	Built	Copper wire road locating transmitters are installed during repaving to assist in snow removal operations.

1974 AD	Removed	On the recommendation of the U.S.Geological Survey, the park closed the lodging and camping facilities at Manzanita Lake because of the potential danger of a rockslide or avalanche from nearby Chaos Jumbles.
1978 AD	Altered	The road at the park's northwest boundary is realigned from a "Y" intersection to a "T" intersection with State Route 44.
1982 - 1983 AD	Built	A triple-chair ski lift is erected at ski area.
1982 - 1983 AD	Built	Parking area perimeter rock wall, sidewalk, and cable railing are installed at Sulphur Works.
1982 - 1983 AD	Built	The gabion retaining walls are installed in numerous locations to stabilize slopes and fill sections.
1984 AD	Built	The original wooden boardwalk is built at Sulphur Works.
1986 AD	Built	Concrete crib system retaining wall added below Diamond Sidehill following winter washout of the road at this location.
1995 AD	Altered	A culvert replacement project removes/reconstructs drainage culvert pipes/headwalls.
1995 AD	Moved	Approximately 1000 feet of road is realigned around Emerald Sidehill.
1997 - 1998 AD	Reconstructed	Following severe winter storms, culverts are replaced along Dersch Meadows, Diamond Sidehill crib wall is rebuilt, and the slope is stabilized at Brokeoff Mountain trailhead.

Statement Of Significance

SUMMARY

The Lassen Volcanic National Park road was built during the early years of the National Park Service through cooperative agreements with the U.S. Forest Service and the Bureau of Public Roads. The Civilian Conservation Corps provided additional labor. As a result, the Lassen Volcanic National Park road is significant under Criteria A and C for the period of 1925 to 1941 and Criterion C for the period 1948 to 1951. The later period of significance (1948-51) reflects the second phase of the road's construction, when the entire route was widened and a portion of it (between the southwest entrance and the summit) was paved. This modernization project was a response to the increase in recreational travel to the national parks in the years following World War II. While historic fabric was lost during the second era of construction, as the crushed gravel surface was replaced with asphalt, the road's route, alignment, and topography were retained intact. Thus, this second period of construction continued the objectives of the road's original designers and contributes to the road's significance under Criterion C.

Under Criterion A, the road is significant for its association with the development of the National Park system, the development of early National Park Service landscape architectural design styles, and the craftsmanship of the Civilian Conservation Corps. Under Criterion C the road is significant for its design and construction in accordance with the naturalistic style that defines early National Park Service landscape design.

The National Park Service began construction of the road in 1925. In 1926, the NPS and the Bureau of Public Roads (BPR) entered into an interbureau agreement to design and build roads in the national parks. The Lassen Volcanic National Park road was one of the first roads constructed under this cooperative agreement. Major National Park Service road building projects contemporaneous with the Lassen Volcanic National Park road include the Wawona Road and Tunnel (Yosemite National Park), Trail Ridge Road (Rocky Mountain National Park), Going-to-the-Sun-Highway (Glacier National Park), and General's Highway (Sequoia National Park).

Designed to "lay lightly on the land," park roads blended with the surrounding environment, followed natural topographic contours, and were located with a minimum of cuts and fills. Materials for surfaces, shoulders, bridges, culverts, and signage were acquired locally and were compatible with the surrounding colors and textures. Perhaps most importantly, scenic areas were made accessible while minimizing the detrimental effects of construction on views and vistas. These principles of landscape design traced their roots to the pioneering work of 19th century horticulturist Andrew Jackson Downing and landscape architect Frederick Law Olmsted who stressed design in harmony with nature. Downing recommended that park roads follow the natural curves of the landscape, present a planned sequence of views, and provide access to precise points of interest to disclose particular vistas or natural features. Using onsite, natural materials and curvilinear road alignments, all design decisions subordinated the built environment to the natural environment. (McClelland, 1994: 20-27)

The National Park Service began construction of the road in 1925. In 1926, the NPS and the Bureau of Public Roads entered into an interbureau agreement to design and build roads in the national parks. The 1926 agreement provided the framework for decades of cooperation between the NPS and the BPR. Park superintendents and NPS landscape engineers determined the location and character of park roads, and allowed the NPS to use the BPR's expertise and organization to conduct surveys, determine contract specifications, and manage the construction projects. NPS landscape architects had the right to review and change contract specifications to assure that construction met strict NPS standards for landscape preservation. Construction of the road followed many of the classic road building policies that were used in national parks throughout the nation. Borrow pits were located out of sight of the road, construction was carried out within a narrow right-of-way to preserve existing vegetation, and roadside banks through cut sections were sloped to prevent erosion and to present a more naturalistic appearance. (Carr, 174-175).

Some of the most prominent names in NPS park development and road construction were involved in the road's design. NPS chief engineer George Goodwin conducted surveys and assisted in road location decisions in the early 1920s. Frank Kittredge, who became NPS chief engineer in 1927, carried on the work initiated by Goodwin throughout the late 1920s and 1930s. NPS chief landscape architect Thomas Vint consulted on park road landscape development. Vint's contribution during the planning and construction of the road ensured that the park road would be located, engineered and designed to enhance scenic opportunities while preserving adjacent landscape features. According to historian Ethan Carr, "No individual influenced Park Service planning process and design details in the late 1920s and 1930s more than Thomas Chalmers Vint." Landscape architect Merel Sager (who worked on Crater Lake and Sequoia Park roads) supervised construction projects and designed the park's gateway structures. Sager, who had trained under Vint, helped define the role of NPS landscape architects; in 1928 he worked with Vint to draft the civil service job description for the profession. (Carr, 190, 193)

The road is also significant for the role played by the Civilian Conservation Corps (CCC) in its construction and maintenance. The CCC and its work represent the most concentrated and far-reaching social program ever undertaken in the United States to promote economic recovery and the welfare of American society by providing conservation service jobs for unemployed, single young men during the Great Depression. The CCC was an important, innovative aspect of President Franklin Delano Roosevelt's New Deal, designed to provide both on-the-job training for a specific segment of the population and some financial security for their families in a time of economic crisis. The CCC program boosted the morale, improved the health, and developed the technical skills of numerous young men and helped shape the landscape of America's national and state parks. Arriving at the park in the spring of 1933, CCC laborers began post-construction clean-up, including hand-finishing slopes, and clearing dead and downed timber within the cleared right-of-way. CCC crews also contributed to the construction of park infrastructure, including most of the hiking trails, footbridges and campgrounds in Lassen Volcanic National Park.

HISTORY SUMMARY

When Lassen Volcanic National Park was established in 1916, existing roads within and around the park were of a very low standard and were barely passable to private passenger vehicles. In order to reach the park via automobile, visitors were forced to travel long distances over rough roads which led to the various existing wagon roads and cattle trails leading into the park. Lassen's scenic attractions, panoramic views, and volcanic landscapes could then be accessed only via horseback or on foot.

In the summer of 1920, National Park Service Director Stephen Mather brokered an agreement to develop roads for the park with Paul Redington, the San Francisco-based District Supervisor of the National Forest. The priority assigned to developing a road system turned nearly all park funding over to the U.S. Forest Service road crew, and as a result, no funds were available to provide an on-site park administration or protective ranger force. As a result, Washington Lewis, Superintendent of Yosemite, served as the park's nominal superintendent until a permanent ranger was hired in 1923. Prior to the appointment of a full-time ranger, U.S. Forest Service fire lookouts and boundary patrols did their best to protect the park's resources. These ad hoc arrangements for park supervision and road development reflected the National Park Service's developing role in the late 1910s and early 1920s as custodian of the nation's scenic resources. Lassen Volcanic National Park had been created within the boundaries of the Lassen National Forest, and compromises were written into the park's establishing act that allowed grazing and limited timber harvesting to continue. The economic interests behind these compromises, including cattle and sheep ranching, the lumber industry and water reclamation projects, represented powerful political forces that challenged the new service's goals of scenic and wilderness preservation. (Runte, 1997: 106-138) The compromise arranged between Mather and Redington was a practical, if impermanent, solution to open the area up to tourism.

In the summer of 1921, Superintendent Lewis inspected the road work being conducted by the U.S. Forest Service to the south of the park. Redington's crews had improved the southwest approach road only to the park's southern boundary but had made no improvements within the park. Lewis raised the possibility of exploiting local interest to assist in developing a road system that would extend within the park. Lassen National Forest Supervisor, C.E. Dunston, had already approached the Tehama County Board of Supervisors who seemed, according to Lewis, "favorably inclined" towards assuming responsibility for maintenance of the newly improved southwestern approach road. Lewis thought that the county's interest in establishing Red Bluff as a park gateway could be leveraged, and he suggested that the county could be "induced to expend at least as much on a road inside of the park as we have expended on the one outside." (Lewis to Mather, 1 November 1921, LVNP)

While Tehama County officials had been approached to consider funding road construction in the park, Shasta County interests centered in Redding had taken a decisive step toward asserting their concerns. In 1921 the Redding Chamber of Commerce allotted $500 to fund a park road survey. Lewis suggested that it might be possible to convince the two counties to work together, and outlined a plan to continue the road just completed by the U.S. Forest Service to traverse the east shoulder of Lassen Peak, continue to Manzanita Lake, and connect to the state road to Redding. Lewis characterized this plan as providing a "loop," which would benefit both Red Bluff and Redding. Lewis asserted that it would offer "far more attraction to motorists" than would a single, dead-end road into the park which would make it necessary to traverse the same road in both directions. Lewis' strategy to solicit cooperation from area communities was based on his perception that the park would be "more or less a local proposition for some time to come."

Park Road Planning: 1924-31

Lewis had implied that the principal obstacle to the park's development was its remote locale which made it an improbable destination for residents outside of the immediate region. Without adequate access Lassen would remain isolated from the majority of its prospective patrons. Park budgets remained tied to visitation numbers in the early 1920s, consequently, roads became the key to the park's future. Because the majority of the park's potential patrons resided in the metropolitan San Francisco Bay Area, local promoters organized as the Lassen Volcanic National Park Association to initiate a statewide park publicity campaign.

In 1922, California Division of Highways Engineer C.T. Dozier mapped a "Scenic Boulevard" based on a proposed park road system advanced by area journalist Michael Dittmar, using funds provided by the Redding Chamber of Commerce.
Dittmar proposed a scenic boulevard linking the southwest and northwest park entrances, using the existing U.S. Forest Service roads surrounding the park and part of the Nobles Emigrant Trail along the northern boundary. Instead of a single scenic route traversing the flanks of Lassen Peak, Dittmar's plan delineated a network of lateral roads, which would provide a grand circuit tour reaching to the four corners of the park, and would incorporate the proposed park road system into a larger, regional scenic automobile tour. Dittmar's proposal, supported by the park association, echoed Lewis' strategy for park

development; that a loop road connecting the southern and northern entrances would serve the interests of both Tehama and Shasta Counties to be park gateway communities, while providing an extraordinary motoring experience on a scenic mountain road around Lassen Peak.

In perhaps its most significant contribution to the park's development planning, the park association secured state support from the California legislature, which voted to appropriate $8000 in the state's 1923 budget for a road and park development program in the park. These state funds would be used for a detailed road survey. This appropriation, made possible by the organized lobbying efforts of the park association represented a milestone in the history of the development of the national parks. While local park booster organizations had often spurred park development, Assistant Director Horace Albright stated that the state appropriation facilitated by the park association was historic, claiming, "This was the first time cooperation of this character ha[s] ever been tendered to our bureau." (Albright to Dittmar, 19 April 1924, LVNP)

By 1922, no high-level NPS official had yet visited the park. Nothing had been done by the NPS in the way of articulating a park development plan, beyond improvements made by the U.S. Forest Service to the road leading to the southwest entrance. The "Scenic Boulevard" proposal, fostered by Dittmar and the park association, forced the issue, and required an official response. Albright realized that "in view of the great activity out here in behalf of Lassen Park, the park service should take a hand in the work." (Albright to Mather, 7 March 1922, LVNP) On Albright's recommendation, NPS Chief Engineer George E. Goodwin traveled to the park in September 1922 to investigate the merits of Dittmar's proposed park road program. His ensuing report drew heavily from Dittmar's plan but established Summit Lake as the intersection for roads to the northeastern part of the park. Goodwin also brought the route closer to the shore of Lake Helen and to a higher elevation near Lassen Peak. Goodwin asserted the adjusted location would make the road one of the most scenic drives in the West.

In June of 1923, Goodwin directed NPS Assistant Engineer Frank C. Hewitt to conduct final surveys on the routes Goodwin had located the previous year. While Hewitt was continuing his road location survey during the summer of 1923, Lewis returned to the park in order to report to Mather on conditions in the park relative to Goodwin's road development plans. Spending several days hiking and on horseback tours of the region, Lewis realized that Goodwin's recommended road system would "give this small area a veritable network of roads." Noting that the territory traversed through the center of the park "has nothing of particularly scenic interest but is merely attractive timber country," Lewis charged that Goodwin's plan "would make practically everything in the park accessible by automobile and leave nothing for the explorer and camper." (Lewis to Mather, 9 August 1923, LVNP)

High standard roads were essential to transport the public to the parks, but within the parks road construction would be strictly proscribed by wilderness preservation goals. The principal design challenge centered on how to balance the demand for auto access while maintaining park scenic and wilderness areas in as pristine a natural state as possible. In his 1922 annual Report to the Secretary of the Interior, Mather warned "there is danger to our parks through injurious road building" and that roads should "contribute solely toward accessibility of the major scenic areas by motor without disturbing the solitude and the quiet of the other sections." (Mather, Department of Interior, National Park Service, Annual Report, 1922, p. 21, quoted in Carr, p. 155) In light of Mather's published philosophy of appropriate road development in the national parks, Goodwin's plans appeared unnecessarily elaborate for such a small park. In October of 1923, he wired instructions to Goodwin directing that, "[it is] essential principle points of interest be made accessible [but] care must be taken that road situation not overdone. Think your road through center of park should be eliminated. Make outer road surveys at this time only." (Telegram from Mather to Goodwin, 5 October 1923, LVNP)

This brief telegram decisively settled the ongoing debates surrounding the extent of roads proposed for the park. Mather had effectively combined the best aspects of the Dittmar and Goodwin proposals by using Dittmar's plan to appropriate the existing U.S. Forest Service roads as a "Grand Circuit Tour" encircling the park, and Goodwin's recommendation for the Scenic Boulevard traversing the eastern flank of Lassen Peak. This combination connected the north and south boundary forest highways with a scenic mountain road.

Park Road Construction: 1925-26

In 1924 and 1931, Congress passed the Roads and Trails Act and the Leavitt Approach Road Act respectively, representing its commitment to construct and improve roads, trails and bridges in the national parks. These two pieces of legislation enabled construction to begin on the road, and to connect the park road to improved roads within the larger transportation network in northern California.

In 1925, with $110,000 in funding provided by the NPS, engineers in the Portland Field Office prepared road plans and profiles for what became known as the "Lassen Loop Highway" based on Hewitt's more detailed survey of Goodwin's earlier reconnaissance. These plans included four contract sections extending from the southwest entrance (including a portion of the approach road outside the park boundary) to the northwest park boundary near Hat Creek. Chaos Jumbles, Manzanita Lake, Brokeoff Mountain and the Warner Valley were included in the park, following a 1929 boundary expansion initiated by the park association, which added approximately 25,000 acres to the park. This expansion of the park extended the boundary line along the southwest to encompass approximately one and a half miles of the Mineral approach road, extended the road approximately seven and a half miles from Hat Lake to Manzanita Lake, and extended it another mile and a half to the relocated southwest boundary. The adjusted boundaries were necessary, NPS Chief Landscape Architect Thomas Vint wrote, "to properly show the volcano as an intrusion into older formations." (Vint to Mather, 20 January 1928, LVNP)

Official road construction began with contracts for the southwest and northwest portions of the road in the 1925/26 construction seasons. Contract specifications prepared by the Branch of Plans and Design in San Francisco included thirty-eight pages of textual information and ten pages of drawings, with precise information outlining approved construction practices. These included a forty-foot right-of-way limit on either side of the road which was intended to protect the landscape during construction operations. Detailed instructions addressed methods of excavation, including limits to blasting, proper disposition of merchantable timber encountered in clearing operations, desired finished slope characteristics, side ditches as well as drainage channel construction. (Proposals and Specifications for Road Work in Lassen Volcanic National Park, George S. Goodwin, June 1925, LVNP) Prohibitions against "coyote holes," a particularly destructive method of excavating with explosives, ensured protection of adjacent natural features as did select overcasting, provided it did not mar the adjacent landscape, was hidden from view, and was first approved by the engineer. Restrictions on methods of removal ensured minimal disruption to, and protection of, the existing landscape. In addition to outlining road construction methods, measured drawings of "rustic" culvert headwalls, log trestle bridges, and guardrails were prepared for such structures to be built in association with the road.

While the character of the topography differed on the contract sections, both the northwest and southwest stretches of the road were located so as to display the effects of recent volcanic activity on the shaping of the landscape. On the north side of Lassen Peak, the destruction wrought by the catastrophic eruptions between 1914 and 1921 was most visible in the Devastated Area, a vast area denuded of vegetation. Soils consisting of a mixture of volcanic sand and gravel, as well as large and small fixed and loose boulders, characterized the landscape throughout the Devastated Area. The remainder of the northwest contract section passed through light loam, clay and sandy loam, with several stretches of outcropping ledge rock.

Bureau of Public Roads: 1926-31

Before the 1926 spring construction season began, an inter-bureau programmatic agreement between the NPS and the Bureau of Public Roads (BPR) transferred road building authority in the national parks to the BPR, the nation's chief technical agent of highway construction. This agreement allowed the NPS to retain aesthetic control over the character of park roads and to locate and design them in order to limit disturbance to the natural landscape. Conversely, BPR technical expertise ensured the roads would be built to the highest standards, using the latest construction technology. C.W. Swetser was assigned to supervise construction as the BPR District Engineer, while engineer Bert Burrell represented the NPS, following Goodwin's departure as NPS Chief Engineer in 1925.

With the assumption of BPR technical oversight, more exacting standards of safety and alignment were instituted, including extending the length of horizontal curves and establishing a maximum grade of five percent, though steeper grades to eight percent were at times allowed. "Park road designers endeavored to eliminate the hazardous curves, sharp turns, and steep inclines that characterized mountain roads." (McClelland, 1993: 103) During this period, road design moved away from tangents and radial curves towards curvilinear stretches connected by radial curves. Superelevations began to be incorporated, and in the 1930s smooth transitional curves based on spirals were introduced. The southwest contract, traversing Mill Creek and ascending the face of Diamond Peak, included several curves under 100 feet in length. When work resumed in June of 1926, the BPR flattened these curves and maintained a minimum radius of 200 feet for blind curves with two exceptions: as the road rounded Diamond Peak, 130 foot and 100 foot curves were used. Though the general location of the road was slightly altered to conform to BPR standards, the alignment remained essentially the same as that drawn by NPS engineer Hewitt, based on the 1922 Goodwin survey.

The majority of road construction under the BPR took place between 1926 and 1931. Although numerous contractors were used for different grading and surfacing projects and a number of site-specific construction problems arose that required additional design solutions, road features were consistent throughout. Drainage structures consisted of eighteen inch and twenty-four inch corrugated metal culvert pipes and twenty-four inch vitrified clay pipes. Rubble masonry headwalls were placed at the inlet ends and at select outlets of all pipe culverts.

In addition to these smaller culverts, three bridge culverts were constructed over creeks. In September of 1928 or 1929, a large culvert featuring a four-foot by four-foot concrete arch with rubble headwalls was installed where the road crossed over the perennial Kings Creek. Architectural details included ringstones and a lintel on lava rock masonry headwalls. In addition, two large box culverts with rustic rubble masonry wingwalls were erected over Lost Creek and Hat Creek in 1931. The Lassen Volcanic National Park road was formally dedicated to the public in July 1931.

In 1933, with the establishment of the Civilian Conservation Corps, trail construction, campground development and road maintenance projects benefited from hundreds of laborers who accelerated the pace of park development. The first CCC camp was located immediately off the road at Old Boundary Spring (near the Devastated Area) in 1933. On May 16, Captain Erickson of Fort Baker arrived, bringing Lt. Walter Stone, a sergeant, a private, and forty-eight CCC enrolled men, twenty-five of whom were locals. By June, eighty-nine enrollees were working on truck trails, erosion control, roadside cleanup and campground improvement. In its first year at the park, CCC laborers were put to work on roadside cleanup. The width of cleanup sites was variable, depending on the visibility from the road. In some cases it extended for several hundred feet. Roadside cleanup had aesthetic as well as practical value. It improved the appearance of the landscape adjacent to the construction zone while reducing fire danger by clearing downed wood, brush, and other combustibles.

Between 1933 and 1941, the road was maintained and improved largely through labor provided by the ranks of CCC laborers. Funded by Emergency Conservation Work appropriations, CCC labor was used for routine maintenance of bank sloping, for spring cleanup and clearing the right-of-way. Log bridges on hiking trails and park road signs were also constructed by CCC workers. Eventually, a camp was established across the road from park headquarters in the town of Mineral, in addition to camps already established at Lost Creek and Old Boundary Springs within the park. The CCC enrollees arrived at the park at a propitious time. Following completion of the surface oiling work, the limitations of the road's design—the inadequate subgrade and drainage design—and the extent of damage the extreme weather conditions exacted on the road had become apparent. In some cases, complete reconstruction was required, and CCC labor was routinely used to make road repairs. In addition to reconstruction of the subgrade in the sections of the worst failure, drainage systems were introduced in order to channel groundwater, rain, and snowmelt away from the surface of the road. Culverts with either ten-inch or eighteen-inch corrugated metal drain pipes were installed in several locations, and were dressed with rubble masonry headwalls.

After the 1941 season, CCC labor was no longer available to assist in the clean-up details. By 1941, only one camp remained, at Old Boundary Springs near the Devastated Area. The Corps was abolished the following year, and many of the enrollees accepted the call to service in World War II. Their contribution had been considerable at the park. In addition to providing most of the labor on spring clean up and road construction projects, including gutter line cleaning and slope stabilization, CCC labor built facilities at the park's developed campgrounds, as well as many of the park's 150 miles of hiking trails. By the mid-1940s, the park's chief of maintenance, Theodore Rex, lamented, "About all that can be done on the highway this year is gutter work for drainage, and then we may not get the best job done." (Report of the Work Done in the field for the month of August 1944, LVNP)

The construction of the Lassen Volcanic National Park road reflects the early NPS themes of visual compatibility with the environment, the naturalistic style of design, the sympathetic use of materials, and a high level of craftsmanship. As a result, the Lassen Volcanic National Park Highway is significant under Criteria A and C for the periods of 1925 to 1941 and 1948 to 1951. These two periods reflect the eras of major road construction, when the principles of park road landscape design were being systematically implemented in the national parks. Its significance lies in its association with the development of the National Park system, the development of early National Park Service landscape architecture, the craftsmanship of the Civilian Conservation Corps, and its construction in accordance with the naturalistic style that defines early National Park Service design.

Physical History

1916-1922: Roads in the Park

When Lassen Volcanic National Park was established in 1916, existing roads in the area were of a very low standard, and were barely passable to private passenger vehicles. In order to reach the park via automobile, visitors were forced to travel long distances over rough roads that led to the various existing wagon roads and cattle trails leading into the park. Lassen's scenic attractions, expansive views, and volcanic landscapes could be accessed only via horseback or on foot.

When the park boundaries were drawn, they encompassed numerous private inholdings. Several of these properties were reached by means of privately constructed truck trails and wagon roads. A rough road constructed in the late nineteenth century led from the Plumas County town of Chester to several homesteads, including the Lee and Sifford ranches, in the scenic Warner Valley. Upon establishment of the park, these ranches provided pack animals and offered overnight tent lodging for tourists intending to explore the new national park. Though these properties were originally excluded from the park, an expansion in the late 1920s included both of these ranches, or camps, within the re-drawn boundaries.

On the park's northern front, a truck trail led through the Lassen National Forest to Butte Lake, a spot popular with local fisherman. This rough road also served as a means to reach the nearby Cinder Cone. Following the 1915-17 eruptions of Lassen Peak, laborers hired by Benjamin Loomis built a rough spur road or wagon trail from Loomis' property near Manzanita Lake as far eastward as the Devastated Area, east of Hat Creek.

Lastly, on the park's southern boundary, a rough wagon road led from the county road (the old Tehama Wagon Road) into the Little Hot Springs Valley. Mathias Supan, an Austrian immigrant who began a sulphur extraction and refinery operation in the1860s, had developed a small-scale sulphur mine in the valley. His entrepreneurial endeavors included making dyes out of salts extracted from the active fumerole and hot springs area. The road to Supan's property crossed through approximately ten miles of the Lassen National Forest, and extended into the park approximately one mile beyond the southern boundary. With the exception of the Butte Lake road, each of the four different rough roads or wagon trails traversed and led to private property. These properties, and the roads to them, later became focal points in park development plans.

While roads led into the park from all sides, none were capable of supporting the traffic of automobile tourists. In addition, before any park development projects could begin, a serviceable approach road would have to be constructed from outside the park to its boundary to accommodate road construction equipment. The highest quality highway in proximity to the park boundary in the early 1920s was the old Tehama Wagon Road, now State Route 36 between Red Bluff and Susanville. The rough wagon road leading to Supan's property left this highway near the town of Mineral to reach the park's southwestern boundary. Despite the higher elevation at the southwest boundary, where greater amounts of snow fell than at the northwest corner of the park, the Supan Wagon road was otherwise preferable to the existing Butte Lake, Warner Valley and Manzanita Lake roads. Appropriately, this approach brought visitors directly to the park's active volcanic landscape in the Little Hot Springs Valley. In addition, private property holdings were less extensive in the southwest corner than in other areas of the park.

In the summer of 1920, NPS Director Stephen Mather brokered an agreement to develop roads for the park with Paul Redington, the San Francisco-based District Supervisor of the National Forest. Mather's assistant in Washington, Arno Cammerer, formalized the agreement in a letter to the Chief Forester of the U.S. Forest Service, E.A. Sherman. This agreement stipulated that the park's annual budget would be turned over to the U.S. Forest Service in order for Redington's road crews to "undertake and supervise necessary road and trail construction work in the park." (letter, Camerer to Sherman, LVNP administrative files, 31 July 1920) The priority assigned to developing a road system left no funds for an on-site park administration or protective ranger force. Washington Lewis, Superintendent of Yosemite, served as the park's nominal superintendent until a permanent ranger was hired in 1923. Prior to the appointment of a full-time ranger, U. S. Forest Service fire lookouts and boundary patrols did their best to protect the park's resources.

These ad hoc arrangements for park supervision and road development reflected the National Park Service's developing role in the late 1910s and early 1920s as custodian of the nation's scenic natural resources. Lassen Volcanic National Park had been created within the boundaries of the Lassen National Forest, and compromises were written into the park's establishing act that allowed grazing and limited timber harvesting to continue. The economic interests behind these compromises, including cattle and sheep ranching, timber harvesting and water reclamation projects, represented powerful political forces that challenged the new service's goals of scenic and wilderness preservation. (Runte,1997: 106-138) The deal struck between Mather and Redington was a practical, if impermanent, solution to open the area up to tourism, and represented an important first step in providing the motoring public with access to the newly established park and its diverse and unique volcanic landscape.

In the summer of 1921, Lewis inspected the road work being conducted by the U.S. Forest Service. While Redington's crews had improved the southwest approach road, no work was done on this road within park boundaries. Lewis raised the possibility of exploiting local interest to assist in developing a park road system. Lassen National Forest Supervisor, C.E. Dunston, had already approached the Tehama County Board of Supervisors who seemed, according to Lewis, "favorably inclined" towards assuming responsibility for maintenance of the newly improved approach road to the park's southwestern boundary. Lewis thought that the county's interest in establishing Red Bluff as a park gateway could be leveraged, and he suggested that the county could be "induced to expend at least as much on a road inside of the park as we have expended on the one outside." (Lewis to Mather, LVNP, 1 November 1921)

While Tehama County officials had been approached to consider funding road construction in the park, Shasta County interests centered in Redding had taken a decisive step toward asserting its claim on park development planning. In 1921, the Redding Chamber of Commerce allotted $500 to fund a park road survey. Lewis suggested that it might be possible to convince the two counties to work together to develop a park road system for Lassen. He outlined a plan to continue the road just completed by the U.S. Forest Service into the park where it would traverse the east shoulder of Lassen Peak, continue to Manzanita Lake, and connect to the state road (the "Redding-Alturas Highway") to Redding. Lewis characterized this plan as providing a "loop," which would benefit both Red Bluff and Redding. Lewis emphasized that it would offer "far more attraction to motorists" than would a single, dead-end road into the park which would make it necessary to traverse the same road in both directions. Lewis' strategy to solicit cooperation from area communities in northern California was based on his perception that the park would be "more or less a local proposition for some time to come."

1922-25: Park Road Planning and Construction

Lewis had implied that the principal obstacle to the park's development was its remote locale, which made it an improbable destination for residents outside of the immediate region. Without adequate access roads Lassen would remain isolated from the majority of its prospective clientele. Consequently, roads became the key to the park's future. Since the majority of the park's potential patrons resided some two hundred miles south in the metropolitan San Francisco Bay Area, local promoters organized as the Lassen Volcanic National Park Association to initiate a statewide park publicity campaign.

In 1922, with funds provided by the Redding Chamber of Commerce, California Division of Highways Engineer C.T. Dozier mapped a “Scenic Boulevard,” based on a proposed park road system advanced by area journalist Michael Dittmar (see Proposed Scenic Boulevard map, Supplemental Information #9A and #9B). Dittmar proposed a scenic boulevard linking the southwest and northwest park entrances using the existing U.S. Forest Service roads surrounding the park and part of the Nobles Emigrant Trail along the northern boundary. While Dittmar’s proposal mirrored Lewis’ suggested loop route, Dittmar’s road development scheme identified more than a single scenic route traversing the flanks of Lassen Peak. In Dozier’s map, Dittmar’s plan was delineated as a network of lateral roads, a grand circuit tour reaching to the four corners of the park and would incorporate the proposed park road system into a larger, regional scenic automobile tour. (See graphic, Supplemental Information #9A)

As Dittmar was advancing his development plan for the park in the early 1920s, an improved highway infrastructure, developing in response to the increase in automobile ownership nationally, was under construction throughout the Lassen region in northern California. County highway authorities were adapting forest highways oriented and designed to support the area logging industry for use as private passenger automobile routes. In letters to National Park Service officials, Dittmar described the growing network of state and county highways as “a great outer circle highway…. 140 miles in length and . . . in itself a scenic drive.” Dittmar touted his road development plan for Lassen as a means to make the park “the scenic crossroads of northern California.” (Dittmar to T.C. Vint, LVNP, 12 September 1925) Dittmar’s proposal, which was supported by the park association, echoed Lewis’ strategy for park development; a loop road connecting the southern and northern entrances could establish both Red Bluff (Tehama County) and Redding (Shasta County) as park gateway communities while providing an extraordinary motoring experience on a scenic mountain road around Lassen Peak.

In the early 1920s, the park association actively pursued its proposed park development plan among San Francisco Bay Area business and social groups, and lobbied heavily for support in Sacramento. In perhaps its most significant contribution to the park’s development planning, the park association secured state support from the California legislature, which voted to appropriate $8000 in the state’s 1923 budget for a road and park development program at Lassen. The state funds would be used for a detailed road survey. This appropriation, made possible by the organized lobbying efforts of the park association, represented a milestone in the history of the development of the national parks. While local park booster organizations had often spurred park development, according to Assistant Director Horace Albright, the state appropriation facilitated by the park association was historic. Albright claimed “This was the first time cooperation of this character ha[s] ever been tendered to our bureau. (Albright to Dittmar, LVNP, 19 April 1924)

In 1922, no high-level NPS official had visited Lassen. Nothing had been done by the NPS in the way of articulating an official park development plan, beyond improvements made by the U.S. Forest Service to the road leading to the southwest entrance. The “Scenic Boulevard” proposal, fostered by Dittmar and the park association, forced the issue, and required an official response. Albright realized that “in view of the great activity out here in behalf of Lassen Park, the NPS should take a hand in the work.” (Albright to Mather, LVNP, 7 March 1922) Albright recommended that National Park Service Chief Engineer George E. Goodwin and Landscape Engineer Daniel Hull travel to to the park to make a study of its possible future road and trail development. The $8000 allotted by the State of California provided the necessary survey funds. Goodwin traveled to Lassen in September 1922 to investigate the merits of Dittmar’s proposed park road program. The perspective of the park association continued to loom large in park development plans, as Goodwin’s report to Mather, a detailed 28-page narrative outlining his vision of an appropriate development plan for the park, drew liberally from the Dittmar plan. However, there were two chief differences between the Goodwin and Dittmar plans. In Goodwin's proposed road system, Summit Lake, rather than Manzanita Lake, was identified as the main circulation point for automotive touring; lateral roads toward the northern and eastern sections of the park were located to take off from the main loop highway at Summit Lake. In addition, the road around the eastern flank of Lassen Peak was located at a higher elevation than where Dittmar had first proposed it. Goodwin's adjustment placed the road near the shore of Lake Helen and nearer to the summit of the mountain. Goodwin asserted the adjusted location would make the main park road one of the most scenic drives in the West.

In June of 1923, Goodwin directed NPS Assistant Engineer Frank C. Hewitt to conduct final surveys on the routes Goodwin had located the previous year. While Hewitt was continuing his road location survey during the summer of 1923, Lewis returned to the park in order to report to Mather on conditions in the park relative to Goodwin's road development plans. Spending several days hiking and on horseback tours of the region, Lewis realized that Goodwin's recommended road system would "give this small area a veritable network of roads [see map, Supplemental Information #6]." Though Goodwin's planned main road promised to provide a unique motoring opportunity as it conducted visitors through diverse scenery and displayed the effects of volcanic activity on the shaping of the landscape, Lewis challenged Goodwin's proposed feeder or lateral roads leading to the lakes in the park's eastern section. Noting that the territory traversed through the center of the park "has nothing of particularly scenic interest but is merely attractive timber country," Lewis charged that Goodwin's plan "would make practically everything in the park accessible by automobile and leave nothing for the explorer and camper." (Lewis to Mather, LVNP, 9 August 1923)

By 1924, the state of California had spent more public funds on road development at Lassen than had the federal government. From a system-wide perspective, other parks also suffered from inadequate road construction budgets. Congress allocated only $180,000 in the 1924 federal budget for road construction in all the national parks. (Carr, 1998:151) Considering that 1924 was the year the ten millionth car rolled off Ford's assembly line, this relatively meager expenditure was clearly insufficient to meet the public demand for automobile access to the national parks. Recreational automobile touring was becoming a popular pastime of the middle classes, but without adequate roads within the parks, large sections of the public would never see them.

High standard roads were essential to transport the public to the parks but within the parks, road construction would be strictly proscribed by wilderness preservation goals. The principal design challenge centered on how to balance the demand for access to the parks while maintaining scenic and wilderness areas in as pristine a natural state as possible. In his 1922 Annual Report to the Secretary of the Interior, Mather had warned "there is danger to our parks through injurious road building." Park roads, Mather wrote, would be located only insofar as they would "contribute solely toward accessibility of the major scenic areas by motor without disturbing the solitude and the quiet of the other sections."

In light of Mather's published philosophy of appropriate road development in the national parks, Goodwin's plans for the park appeared unnecessarily elaborate. His ambitious development plan faced several significant obstacles. Mather had indicated his desire to conserve the wilderness areas in the parks, to protect them from "injurious road building." Further, the extent of private property located in the Warner Valley and at Juniper Lake, the value of which would be increased by improving access to them, caused Mather to instruct Goodwin to scale back his plans. Mather rejected Goodwin's proposed system of east-west connecting roads in favor of the single scenic route around Lassen Peak and directed that, "[it is] essential principle points of interest be made accessible [but] care must be taken that road situation not overdone. Think your road through center of park should be eliminated. Make outer road surveys at this time only." (Telegram, Mather to Goodwin, LVNP, 5 October 1923)

This brief telegram effectively and decisively settled the ongoing debates surrounding the extent of roads proposed for the park. Mather had combined the best aspects of the Dittmar and Goodwin proposals. Using Dittmar's plan to appropriate the existing forest highways as a "Grand Circuit Tour" encircling the park, Goodwin's recommendation for the Scenic Boulevard traversing the eastern flank of Lassen Peak was adopted to connect the north and south boundary forest roads.

Mather's direction to Goodwin, that he limit the scope of road construction within Lassen, was consistent with his expressed policy for all park road construction projects. Writing in his Annual Report to the Secretary of the Interior for 1924, he reiterated his position on appropriate park road planning:

It is not the plan to have the parks gridironed with roads, but in each it is desired to make a good sensible road system so that visitors may have a good chance to enjoy them. At the same time large sections of each park will be kept in a natural wilderness state without piercing feeder roads and will be accessible only by trails by the horseback rider and the hiker. Particular attention will also be given to laying out the roads themselves so that they will disturb as little as possible the vegetation, forests, and rocky hillsides through which they are built.

1925-26: Park Road Construction

In 1924, Congress passed the Roads and Trails Act, representing its commitment to construct and improve roads, trails and bridges in the national parks. Over a three-year period between 1925 and 1928, it appropriated $7.5 million in park construction funds. In 1931, the Leavitt Approach Road Act authorized the NPS to oversee and fund construction of roads outside the park that were necessary to provide access to the parks. (McLelland, p. 108) These two pieces of legislation enabled construction to begin on what was called at the time the "Lassen Peak Highway," and to connect the park road to the larger transportation network in northern California.

In 1925, the congressional appropriation to the NPS provided $110,000 for the first year's construction of a road system in Lassen. Engineers in the Portland Field Office, based on Hewitt's more detailed survey of Goodwin's preliminary reconnaissance, prepared road plans and profiles for what became known as "the Lassen Loop Highway." Contract specifications and invitations to bid, also prepared by the engineering staff in the Portland office, were approved by the Director in June 1925.

Four contract sections were originally identified and approved in a three-year road construction program submitted by Goodwin. These four sections extended from the southwest entrance (including a portion of the approach road outside the park boundary) to the northwest park boundary near Hat Creek. Goodwin had recommended an extension of the northwest boundary in his 1923 survey and, in 1925, when the park received its first allotment for road construction and plans were prepared for the Loop Highway, the park association proposed a similar, though more extensive, boundary expansion. (Conard to Raker, LVNP, 7 November 1925, and Lewis to Conard, 2 November 1925) The proposed enlargement would include the Chaos Jumbles, Manzanita Lake, Brokeoff Mountain and the Warner Valley, expanding park boundaries to the north, southwest and east by several miles. The proposed expansion led Mather to dispatch Thomas Vint, Chief Landscape Architect of the National Park Service, to make a field examination of the proposed boundary adjustments. After touring the area in August of 1927, Vint supported Conard and Goodwin's recommendations. The adjusted boundaries were necessary, Vint wrote, "to properly show the volcano as an intrusion into older formations." (Vint to Mather, LVNP, 20 January 1928)

Representative Englebright introduced a bill in Congress to enlarge the park in accordance with Vint's recommendations. Englebright's bill was passed, with minor revisions, and became law January 19, 1929. The expansion added some 25,000 acres to the park, and shifted the proposed northwest entrance from Hat Creek to Manzanita Lake. It also extended the boundary line along the southwest to encompass approximately one and a half miles of the Mineral approach road. Upon passage of Englebright's bill, two more contract sections were added to the road construction program: the road was extended approximately seven and a half miles from Hat Lake to Manzanita Lake and stretched another mile and a half to the relocated southwest boundary.

Two contract sections were approved for the 1925-26 construction seasons. The southwest project involved reconstruction and construction of approximately three miles of the entrance road that had been improved between 1921-24 by the U.S. Forest Service, and new construction between the southwest entrance and Lake Helen. The other section extended approximately six miles from the northwest entrance near Hat Creek to Summit Lake. These two sections would ultimately be extended to complete the Scenic Boulevard, or Loop Highway, traversing the eastern flanks of Lassen Peak.

While these two contract sections were under construction, a log frame ranger station was built near the shore of Summit Lake, marking the first building designed and built in the park by the NPS. Although the ranger station was built concurrently with park road development, Manzanita Lake, rather than Summit Lake, had been identified as the main developed area in the park, based on Mather's rejection of Goodwin's east-west road system. The rustic design for the Summit Lake ranger station included a lava rock foundation and chimney, casement windows, and a small enclosed porch. Construction on the building began in 1926 and was completed the following year. Eventually a campground was developed at Summit Lake, which was, in addition to being located mid-point on the scenic park road, also the point of convergence for a number of hiking trails reaching to the eastern section of the park.

The contract specifications included thirty-eight pages of textual information and ten pages of drawings, with precise information outlining approved construction practices intending to protect the landscape during construction operations. Detailed instructions addressed methods of excavation, including limits to blasting, disposition of merchantable timber encountered in clearing operations, desired finished slope characteristics, side ditches as well as drainage channel construction. Examples of desirable designs for structures including culvert headwalls, log trestle bridges, and guardrails were illustrated in measured drawings. Three classes of excavation were identified in the contract specifications. Restrictions on methods of removal ensured minimal disruption to, and protection of, the existing landscape. Sections of earth, clay, loam, gravel and all other material measuring less than one half of a cubic yard would be plowed by teams of horses attached to a railroad plow. Larger materials, rocks and boulders, including shale, slate, laminated rock, cemented gravel, and hard pan more than one foot in diameter that could not be picked, mattocked or plowed loose was blasted through with dynamite. However, prohibitions against "coyote holes," a particularly destructive method of excavating with explosives, ensured protection of adjacent natural features. Overcasting of excavated material was allowed, provided it did not mar the adjacent landscape, was hidden from view, and was first approved by the engineer.

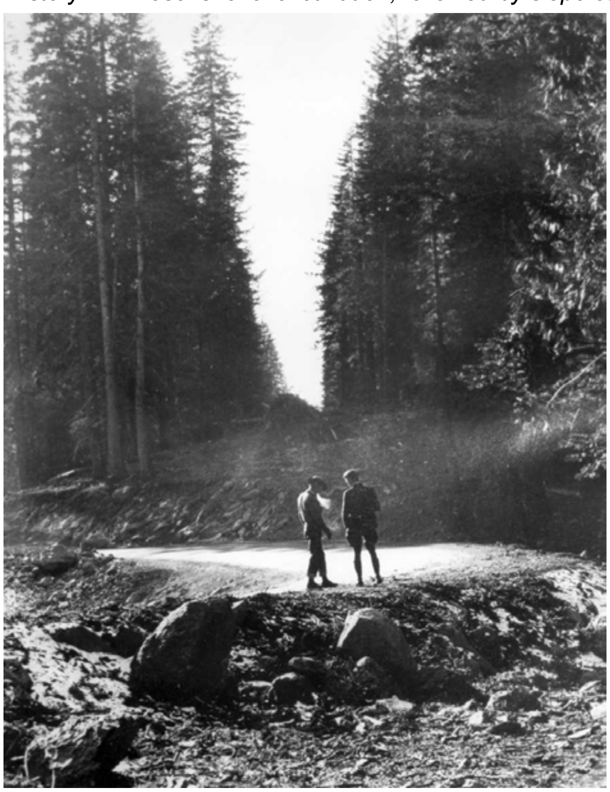
When road construction began in the late summer of 1925, a steam shovel assisted in excavation, but the crossing of Mill Creek was worked out entirely by hand as the small hot springs and fumeroles prevented the use of the large shovel. Once the fill was in place over the Mill Creek crossing, the shovel advanced toward the curve around Diamond Peak. Here, excavation was accomplished using picks, axes, and blasting. More than 22,000 pounds of explosives were used and between twenty-five and thirty laborers worked the rock out by hand. A team of sixteen horses dragging blades shaped up the rough grading prior to finishing.

Of the two projects, the southwest contract section was the more expensive and difficult to build. Traversing the geothermal area near the Sulphur Works, ground conditions were characterized by sandy clay and volcanic soils alternating with solid rock. In addition, as the road climbed up the side and around the east face of Diamond Peak it was benched into a steep cliff. Stump blasting and clearing began in August using day laborers working with teams of horses. In September, the contractor, T.E. Connelly Construction Company of San Francisco, brought an Erie steam shovel on site to begin rough grading (see photo, History #1). The National Park Service approved the contractor's request to use the "coyote hole" method of blasting at Diamond Point, and it took more than a week of drilling and shooting before a steam shovel could backhaul or overcast the excavated rock. Material for the subgrade was quarried from an approved pit located nearby, north of Diamond Point.

In contrast to the steep open terrain of the southwest section, the northwest project site traversed a very different landscape. A generally level elevation (transverse slopes did not exceed twenty degrees), light and medium timbered forests interspersed with open areas made construction on the northwest project much less expensive, difficult and dangerous than the work underway on the Connelly contract. However, precise instructions were included to ensure protection of the adjacent landscape, and reflected the care with which the road was designed to limit its intrusion on the land; the contractor was required to limit construction operations to within a forty-foot right-of-way (see photos, History #2 and #3).

While the character of the topography differed, both the northwest and southwest sections were located so as to display the effects of recent volcanic activity on the landscape. On the north side of Lassen Peak, the destruction wrought by the 1915-17 catastrophic eruptions was most visible in the Devastated Area. A vast area denuded of vegetation, with soils consisting of a mixture of volcanic sand and gravel, as well as large and small fixed and loose boulders characterized the topography through the Devastated Area (see photo, History #4). The remainder of the northwest contract section passed through light loam, clay and sandy loam, with several stretches of outcropping rock. The Nat Lovelace Construction Company of Berkeley, California was awarded the contract for the six-mile stretch between Hat Creek and Summit Lake and began rough grading in August. In addition to drainage culverts and tile underdrains along this section of the road, Lovelace built a log trestle bridge at Hat Creek.

History #1: Diesel shovel excavation, followed by slope cutters. (PGSO, CLI, LAVO-N-0007-07, 1930)



History #2: Construction operations were contained within a forty-foot right-of-way, ensuring protection of adjacent landscape features. (LAVO archives, WACC, ca. 1930)

History #3: Rough grading with a steam shovel within the cleared right-of-way. (PGSO, CLI, LAVO-N-0007-24, 1931)

History #4: Historic view of the Devastated Area, north of Lassen Peak, looking southwest. (PGSO, CLI, LAVO-P-0023-35, n.d.)

1926-31: Bureau of Public Roads

The onset of winter weather in the middle of October delayed completion of both contracts and work resumed the following June. Owing to the late start—construction seasons at Lassen were extremely short, as winter conditions could extend into July and resume in September—less than half of the work was completed before the job was halted. However, before the spring construction season began in 1926, an interbureau programmatic agreement between the NPS and the Bureau of Public Roads (BPR) transferred road building authority in the national parks to the BPR, the nation's chief technical agent of highway construction. The agreement allowed the National Park Service to retain aesthetic control over the character of park roads, to locate and design them in such a way that limited disturbance to the natural landscape, while BPR technical expertise ensured the roads would be designed and built to the highest standards, using the latest construction technology. C.W. Swetser was assigned to supervise construction as the BPR District Engineer, while engineer Bert Burrell represented the NPS, following Goodwin's departure as NPS Chief Engineer in 1925. Beginning with the 1926 construction season, BPR Associate Highway Engineer J.L. Mathias was in charge of surveys and construction and remained the supervising BPR engineer on the park road until its completion in 1931.

With the assumption of BPR technical oversight, more exacting standards of safety and alignment were instituted, including extending the length of horizontal curves. The southwest contract, traversing Mill Creek and ascending the face of Diamond Peak, included several curves under one hundred feet in length on road plans prepared by NPS Engineer Frank C. Hewitt in 1925. The BPR flattened these curves, and maintained a minimum radius of 200 feet for blind curves, with two exceptions. At stations 118 and 130, as the road rounded Diamond Peak, 130-foot and 100-foot curves were used. While the original contract specifications indicated a log trestle bridge to cross Mill Creek, 36-inch reinforced concrete pipe culverts with cement rubble headwalls were substituted. Though the general location of the road was slightly altered to conform to BPR standards, the alignment remained essentially the same as that drawn by NPS engineer Hewitt, based on the 1922 Goodwin survey.

The 1927 construction season began with the letting of two rough grading and structures contracts. These sections extended north from the end of the Connelly section and south from the Lovelace contract, reaching toward the summit of the road near Lassen Peak. The southern section stretched from Diamond Point to Pilot Pinnacle, a distance of just over two miles, and was awarded to Young Brothers Contractors from Berkeley. The northern section traversed approximately five and a half miles, from the Devastated Area to Upper Kings Creek Meadows and was awarded to Lovelace.

The southern contract section had originally been surveyed (by NPS engineers Goodwin and Hewitt) in 1924, and included several short-radii curves as it ascended toward Pilot Pinnacle on a six percent grade. The BPR made a location survey of the contract section in 1926 and ran a preliminary line to maintain a grade "to as near five percent as possible." (BPR Final Construction Report, Young Brothers Contract, LVNP, 1928) Designed to 1926 U.S Forest Service Highway standards, the BPR flattened curves on the sixteen-foot wide roadway to a minimum of one hundred feet on open curves and two hundred feet on blind curves. Young Brothers began rough grading July 11, 1927. The topography was rocky, open and steep and required extensive blasting during rough grading. Material for the subgrade was quarried from an approved pit located north of Diamond Point. These on-site sources for fill and subgrade materials were known as "borrow pits." Young Brothers subcontracted the rock crushing work to Cuffe and White Contractors of San Rafael, California, who erected a crusher plant about thirty-five feet above the roadway. Two crushers—a #10 Telsmith gyratory crusher and a #2 Telsmith secondary crusher driven by a seventy-five horsepower motor—produced material for the subgrade. The process involved hoisting quarried material in a dragline bucket to the primary crusher (see photos, History #5 and #6). Once the rock was crushed in the primary crusher, it passed through a revolving screen. Oversized rock was then re-crushed and sent a second time through the screen and was then placed into a bunker at the base of the cliff before being spread on the graded roadbed. Sections through solid rock were subgraded to a depth of six inches and backfilled with crushed rock.

Along a series of switchbacks, the soils consisted of blue mud and humus, the depth of subgrade excavation varied from fifteen inches to three feet. Drainage structures consisted of eighteen- and twenty four-inch corrugated metal culvert pipes and twenty four-inch vitrified clay pipes. Cement rubble masonry headwalls were placed at the inlet ends of all pipe culverts. The Young Brothers contract extended over two construction seasons, beginning in July of 1927 and completed in October of 1928.

Work began on the section between the Devastated Area and Upper Kings Creek Meadows in July 1927. An approved borrow pit, located well off the roadway and out of sight, provided the rock required for the fill section over the seasonal wetlands along Kings Creek Meadows. As the subgrade was being prepared, a deep trench was dug parallel to the centerline of the roadway, to drain excess groundwater where the road passed through the wet meadow. Corrugated metal pipe culverts with rubble masonry headwalls were installed along the length of the contract to assist in drainage. In addition to these smaller culverts, a large culvert featuring a four-foot by four-foot concrete arch with rubble headwalls was installed where the road crossed over Kings Creek. It was a substantial structure, necessary to carry the perennial creek under the road. Architectural details included ringstones and a lintel on the lava rock masonry headwalls. Through cut sections, the subgrade was extended an extra foot in width to accommodate drainage ditches. Reflecting the mountainous terrain, bank slopes were staked 1:1. However, the slopes tended to ravel as they were largely composed of unstable material, principally volcanic ash and sand. In an attempt to stabilize the raveling volcanic sand slopes, laborers flattened the slopes and set them back from the edge of the road. Like the Young contract between Diamond Point and Pilot Pinnacle, work on this section extended over several construction seasons, and was completed in the fall of 1930.

As the Young and Lovelace contact sections were under construction, the rough grading and structures contract for the stretch of road between Pilot Pinnacle and the summit, elevation 8511 feet, was awarded to Arthur Jones Contractors of Montague, California in June 1928. Jones completed the contract in September 1929. The mountainous, rocky terrain made excavation difficult and extensive blasting of sound rock was required. Sections in solid rock and boulders were subgraded to an average depth of six inches and backfilled with borrow material from a pit established near Lake Helen. A parking area was constructed for the Bumpass Hell trail, using sand from the slope at the base of Lassen Peak. In an unusual instance of disposal of excavated material, which was often used for subgrade foundations, the rock excavated in the heavy cut past Pilot Pinnacle, between Stations 272 and 278, was overcast out of sight of the road. The topography permitted such disposal, as the steep drop on the downslope was an area of boulders spilled from rockslides. Dumping the excavated rock in this location did not mar the landscape.

Culvert drains were installed using corrugated metal pipes, between twenty-four and thirty-six inches in diameter; however, an analysis of the ground water disclosed a high level of sulphur and mineral deposits in several places. In these locations, vitrified clay pipe was substituted for corrugated metal pipes.

In 1929 and 1930, the final two construction contracts were let, extending the Loop Highway from the southwest entrance near the Sulphur Works to the northwest entrance near Manzanita Lake. The northwest section stretched for approximately four and a half (4.556) miles from the end of the Jones contract at the summit to Upper Kings Creek Meadows. This contract was awarded in July 1929 to the Fairbanks Brothers Contractors of South San Francisco. In 1930, the section between Hat Creek and Manzanita Lake, a distance of approximately seven and a half (7.706) miles was awarded to the Mathews

Construction Company of San Francisco. These two sections were constructed to revised Forest Highway Standards of 1929. While the width of the road remained at 16 feet, radial curves connected to tangent sections allowed the road to stretch out on its relatively level course between Hat Creek and Manzanita Lake. Through the mountainous terrain between the summit and Upper Kings Creek Meadows the Fairbanks contract section descended on a series of curves with a minimum length of one hundred feet, and at a maximum grade of six percent.

The Fairbanks contract traversed high altitude (between 6325 and 8511 feet) topography, featuring bare, rocky, steep slopes with very little topsoil. The excavation work was difficult and time consuming, and caused the contractor, who had established a camp at Kings Creek Meadows, to run twenty-four hour operations during the summer of 1929. In addition to the bedrock and massive boulders encountered in excavation, the territory covered by the Fairbanks contract featured attractive hemlock forests, and expansive views to the north and south, encompassing the Plumas and Lassen National Forests.

Fairbanks was required to take extra steps to protect the adjacent landscape from damage. A special class of excavation, known as "Type B excavation," was ordered by NPS landscape architects John Wosky and Thomas Vint for approximately 30,000 cubic yards of material to be moved in this section. Light shooting of the rock, using one-quarter to three-eighths pound of forty percent dynamite protected adjacent trees and ensured blasted rock would not be strewn outside of the right-of-way. Despite double shifting of the steam shovel, Fairbanks had to shut down operations in late October due to snow. On July 10, 1930, work resumed and rough grading was completed on October 1.

The Mathews contract, covering grading and structures for the section between Hat Creek and the northwest entrance was let in June 1930. Using two 1-1/4 yard Northwest gasoline shovels, one Ingersoll-Rand compressor, two 30-horsepower Caterpillar tractors, a twelve foot grader and a scarifier, Mathews began work in early July. Both the shovels were double-shifted from the start of operations, and no shut downs were allowed for Sundays or holidays. This contract section, added when the park boundary was expanded following passage of Engelbright's bill in 1929, traversed the area known as the Chaos Jumbles. Characterized by large boulders created by an earlier eruption of Lassen Peak and interspersed with dwarf trees, the terrain caused difficulty in excavating and required borrow material to build up the finished surface. Rock for the fill material was hauled from borrow pits located along the road—near Lake Helen, near the Jones cut, and near the summit.

Fortunately, there was an abundance of excellent surfacing material, volcanic ash and cinders, which would assist in obtaining a well-compacted rock surface. In addition, some borrow material was provided by daylighting cuts (see photo, History #7).

With the completion of the Mathews grading contract, plans were prepared to surface the stretch of road between the Devastated Area and Manzanita Lake. Due to the boundary expansion enacted by Congress in 1929, a short spur connection, known as Lassen Route 6, North Entrance Approach Road, to join Forest Highway 77 (now, State Route 44) was included in construction plans in 1931. As the entire road lacked a seal coat surface, bids were let in April to construct the short spur connection, as well as to lay down a seal coat along the length of the entire park road. This contract was let to the lowest bidder, Irving Ryder Company of San Jose. Numerous change orders expanded the scope of Ryder's contract, however, as the contractor discovered unanticipated difficulties in constructing a stable, smooth-riding asphaltic oiled surface.

With plans to dedicate the park to the public in July, Ryder accelerated the pace of his oil surface contract in order to complete the work in time for the anticipated traffic. Ryder worked seven days a week through the 1931 construction season, stopping only for the three-day public dedication ceremonies. The slow progress of the Ryder surfacing contract threatened to undermine the success of park dedication ceremonies scheduled for the weekend of July 24. Less than half of the road had been treated with seal coat, and the dry, compacted rock surface was in unsatisfactory condition to provide a smooth, dust-free ride. In anticipation of the crowds, Albright directed that a special contract be let to spread a light coat of surface oil as a dust palliative, an essentially cosmetic and impermanent solution. In addition, the State of Division of Highways agreed to spread oil on both park approach roads especially for the weekend crowds.

Several improvement projects were undertaken in preparation of the dedication weekend. Rustic split log and lava rock checking stations had been completed at both the Sulphur Works and Manzanita Lake entrances. Parking lots along the road at Bumpass Hell and at the Lassen Peak trailhead were oiled and rolled. Expanded visitor services were also guaranteed by the employment of a full-time ranger, in addition to a seasonal ranger. A dozen rangers from Yosemite and Crater Lake, assigned to the park for the weekend ceremonies, complemented the park's own ranger force. A naturalist, hired in June, established an educational program in the park to supplement the "School of Lassen" that Collins had been conducting in the valley towns over the past year. The California Chamber of Commerce organized the dedication ceremonies, establishing a special Lassen Park Dedication Committee headed by A.J. Conard. Unfortunately, in 1931 there was only one developed campground in the park, at Manzanita Lake, along the south shore of the lake in the vicinity of the Loomis Museum. The chamber paid for temporary camping facilities, including raising canvas tents on wood platforms and seventy-five picnic tables in areas of congregation at Summit Lake, and at Kings Creek Meadows.

The chamber planned to commemorate Congressman Raker's contribution to the establishment of the park, and provided funds for an entrance marker to be erected in his memory. Designed by NPS landscape architect Merle Sager in 1931, a 15-foot 6 inch-tall lava rock masonry pillar was matched on the opposite side of the road by a smaller pier of the same construction. The Raker Gateway featured a copper sign, forged in San Francisco, hung from wrought iron chains on a peeled timber post . A brass plaque embedded on the inside of the pier honored Congressman Raker as the driving force behind the establishment of the park (see photo, Buildings and Structures #1). Along the road, with funds provided by the chamber, park laborers built several lava rock masonry "fountains:" low-rising, square wells with catch basins behind invited motorists to stop for a drink, fill canteens, or to collect water to cool overheated radiators.

Governors Rolph of California and Balzar of Nevada, Congressman Englebright and Secretary of the Interior Ray Lyman Wilbur were in attendance, and more than 21,000 members of the public enjoyed the wide range of scheduled activities intended to showcase the newly accessible park. Natural history lectures, including Dittmar's "Story of Lassen Peak" told of the volcanic history of the region. Capping off the events was a Saturday night dance followed by a fireworks show from Lassen Peak, making, in the words of Superintendent Collins, "the world's largest firecracker."

After the dedicatory weekend, surfacing work continued. The contractor, Irving Ryder of San Jose, California, encountered damage to the existing crushed rock surface in numerous locations, since most of the road had been surfaced several years earlier,. Traffic, as well as weather conditions—extreme cold and heavy wet snowfalls followed by dry and hot summer weather—had undermined the unsurfaced roadbed. These failed sections required re-spreading crushed rock and, in some cases, excavating and reconstructing the subgrade to install additional culvert drains. Additional drainage was provided by six-inch vitrified tile underdrains and eight-inch perforated corrugated metal culvert pipes.

Along the Kings Creek Meadow, additional springs had developed following a heavy rainfall in September 1930. The action of the springs caused a failure of more than 300 feet of roadbed. To drain the excess moisture, 350 linear feet of six-inch vitrified tile drains were placed in a gutter ditch at a depth of three and one half foot. Pressed for time due to the impending winter snows, Ryder finished the surface with a double thickness application of asphaltic seal coat, rather than attempting to windrow, mix and re-spread the crushed rock surface.

Particularly troublesome conditions were discovered along the road in the vicinity of the Sulphur Works. In several locations the road surface had cracked and its appearance, according to BPR Resident Engineer Mathias, was similar to "dried adobe." The road was dug up, and several previously unidentified sulphur springs were discovered, which were tapped and drained to the side of the road via culvert pipes. As at Kings Creek, a double seal coat of hot bitumen was applied to protect the reconstructed surface.

Ironically, Ryder's effort to finish the surfacing contract during the 1931 construction season only served to delay completion of the work. A recurrent problem existed where surface mixing and seal coat surfacing sections met. In these sections of overlap the grader, turning around to pass repeatedly over the mixed surface, would leave depressions on the newly spread seal coat. The weight of the grader machinery compacted the surface rock, causing corrugations to the road. Further, when Ryder began the oiling contract in the 1930 construction season, some sections of the road had been surfaced for several years and the mixing process tended to pick up subgrade foundation rock intermixed with surface fines.

Ryder's rush to complete the seal coat surfacing, however, was only part of the problem. Upon inspecting the contractor's work, Mathias suggested that the road mix method of oil surfacing, as well as the method of shoulder construction, was unsuitable for the extreme weather conditions to which the road was subjected. Winter storms dropping tens of feet of heavy wet snow, followed by spring run-offs and increased groundwater activity, regularly exposed the surface and the subgrade to excessive amounts of water. During blading, the crushed rock shoulders became incorporated into the pavement. Lacking the appropriate quantity of fines and binder, the rock from the shoulders made an inadequate surfacing material. Mathias proposed that subgrades should be constructed to a depth of six inches, rather than the standard depth of four inches with a three-inch top course. Mathias' assessment of the problems encountered in obtaining a sufficiently smooth, compacted oiled surface was accepted, and future reconstruction projects followed his proposed changes to the road's design. (Superintendent's Monthly Report, LVNP, July 1929)

History #5: Approved borrow pits provided a ready source of rock material for road construction. A dragline bucket hoisted excavated rock to a crusher plant. (PGSO, CLI, LAVO-N-0004-18, n.d.)

History #6: Rock crusher in operation. (PGSO, CLI, LAVO-N-0004-16, n.d.)

History #7: Comparison view showing results achieved through daylighting cuts. (PGSO, CLI, LAVO-P-0023-25; LAVO-P-0023-26, n.d.)

1931-1948: Park Road Reconstruction

With the completion of the surfacing contract and the final construction accomplished on the crossing of Lost Creek in October 1931, the road extended the length of the route originally located in 1924-25 by NPS engineer Hewitt. It traversed a variety of volcanic landscapes and provided a sequence of intimate and distant views of Lassen Peak, passing within two miles of the summit of the volcano. Approach roads from both the southwest and northwest entrances allowed motorists to traverse the park in a thirty-mile scenic loop.

The rush to celebrate completion of the road and to dedicate the park to the public was somewhat premature, as road construction and park development projects continued throughout the 1930s. Road widening, including daylighting cuts and slope banking, road surfacing contracts and the construction of additional drainage structures were ongoing projects for several construction seasons. In 1933, with the establishment of the Civilian Conservation Corps (CCC), trail construction, campground development and road maintenance benefited from hundreds of laborers, who accelerated the pace of park infrastructure development. The first CCC camp was located at Old Boundary Spring (near the Devastated Area) in 1933 (see photo, History #8). On May 16, Captain Erickson of Fort Baker arrived, bringing Lt. Walter Stone, a sergeant, a private and forty-eight CCC enrolled men, twenty-five of who were locals. By June eighty-nine enrollees were working on truck trails, erosion control, and campground improvement. However, the majority of CCC labor in 1933 was devoted to roadside cleanup. The width of cleanup was variable, depending on the adjacent landscape's visibility from the road, in some cases it extended for several hundred feet, while in others it was necessary to go back only about fifty feet. Roadside cleanup had aesthetic as well as practical value. It improved the appearance of the landscape adjacent to the construction zone, and it also reduced fire danger, by clearing downed wood, brush, and other combustibles.

CCC labor was used for routine maintenance projects such as bank sloping and stabilization, spring cleanup and right-of-way clearing, while Emergency Conservation Work appropriations provided the funding. Between 1933 and 1941, the road was maintained and improved largely through labor provided by the ranks of CCC laborers. CCC workers built structures throughout the park, including log bridges on hiking trails, as well as park road signs. Eventually, a camp was established across the road from park headquarters in the town of Mineral, in addition to camps within the park at Lost Creek and Old Boundary Springs. It is not known whether the ranks of CCC enrollees contributed to the construction of the Northwest Entrance Pylons, erected at each arm of the "Y" intersection of the park road and State Route 44. These pylons were of a nearly identical design to the Raker Gateway. Like the Raker Gateway, the Northwest Entrance Pylons were designed as monumental features announcing the entrance to the park, with two rustic stonemasonry piers in each location flanking the road. (see photo, Adjacent Lands #1)

The CCC enrollees arrived at the park at a propitious time. Following completion of the surface oiling work, the limitations of the road's design—the inadequate subgrade and drainage construction—and the extent of damage the extreme weather conditions exacted on the road had become apparent. In some cases, complete reconstruction was required, and CCC labor was routinely used to make road repairs. In addition to reconstruction of the subgrade in the sections of the worst failure, drainage systems were introduced in order to channel groundwater, rain and snowmelt away from the surface of the road. Investigations of the existing drainage structures revealed that many drain tiles were completely filled with sediment. Drainage ditches were excavated to an approximate depth of three and one half feet. Once the tiles were cleaned and relaid, the ditches were backfilled with crushed rock (see photo, History #9). The surface of these drainage trenches was then spread with crushed rock which had passed through a fine screen. Culverts with either ten- or eighteen-inch corrugated metal drainpipes were installed in several locations, and were dressed with cement rubble masonry headwalls. This work focused on the areas of the worst subgrade failure, between the southwest entrance station and the summit, where the road ranged in elevation from 6,565 to 8,512 feet, and loose volcanic soils interspersed with solid rock caused seasonal fluctuations in spring run-off patterns.

While sloughing slopes, seasonal springs and heavy spring run-off had caused considerable damage to the section of the road between the southwest entrance and the summit, along Kings Creek Meadows excessive groundwater under the road undermined the stability of the subgrade. Reconstruction of failed sections of this stretch of the road began with tearing up the existing surface; excavating to a depth of eighteen inches, and replacing the excavated material with rock ballast and pervious material. The surface was laid in a six-inch course of crushed gravel, followed by a three-inch course of road-mixed asphaltic material and was then sealed with a seal coat of asphaltic oil.

Poorly designed drainage systems, combined with heavy rain and rapid snowmelt accelerated road deterioration. Torrents of water would flood the gutter lines, cutting deep trenches and undermining the shoulders. Slope raveling also posed a threat to the surface of the road. Maintaining a natural appearing slope, a standard design policy on national park roads, proved difficult along many sections of the road and slope repairs were a constant maintenance problem. In his report to Vint for the summer of 1936, resident landscape architect Theodore G. Meier realized that "the loose rocky nature of the banks" were resistant to stabilization. He anticipated that "repeated sewing of the banks with seed of the plants forming the ground cover in the area should be undertaken to help hold them from constant sloughing off (see photo, Vegetation #6). (Meier to Vint, LVNP 28 August 1936)

It proved a particularly difficult challenge to engineers to devise a method of construction that would protect the road from the corrosive effects of active sulfur springs in the vicinity of Sulphur Creek. Brief construction seasons, inconsistent appropriations and private property adjoining the road near the Sulphur Works further complicated plans for adequate repairs. The BPR began work on repairing the fill over Sulfur Creek in 1938 after a severe winter storm in 1937 washed out a section of the fill, but ran out of funds and favorable weather before the work could be completed. In May of 1940, a "disastrous" slide occurred near the Sulphur Works, forcing the road to remain open to one-way travel. (Final Construction Report on Lassen Peak Highway Improvements at Sulphur Works." LVNP, 5 December 1941) The destructive force of the boiling sulfuric springs gradually ate away at the steep banks, finally engulfing a large tree on a knoll between the road and the main fumerole.

NPS associate engineer George Reed was put in charge of a special highway protection program and considered several alternative design solutions to reconstruct this section of road. Proposals included erecting a bridge to carry the road on the same alignment over the steam vents, changing the alignment of the road away from the destructive fumeroles, and building a reinforced concrete wall between the fumeroles and the road. While a "long high bridge" over a new alignment crossing the West Fork of Sulphur Creek, would have cost, in Reed's estimation, $100,000 (nearly one-sixth of the expense of the entire road), this would be only one part of a greater expense. Unfortunately, the Supan family still maintained private property adjacent to the Sulphur Works, as well as several hundred acres to the east of the road, where cattle grazed in the Little Hot Springs Valley. A new alignment would mean acquiring the right-of-way over private property, an unlikely success due to the fact that the Supan's had resisted earlier attempts by the government to purchase their property within the park. Making matters worse, the owners operated a tourist facility and were in the process of raising a primitive, unplanned, crudely built collection of wood frame buildings including a curio shop, a bathhouse and eventually a gas station and roadside diner.

Though Reed had recommended a retaining wall to protect the road, on an inspection of the location with NPS Assistant Regional Engineer Homer C. Crowley, Crowley suggested that, rather than a retaining wall, pilings should be erected to stabilize the road banks.

In 1940, work began on road repairs near the Sulphur Works. Crowley's proposed solution to mitigate the action of steam vents near the Sulphur Works required extensive construction and extended throughout the 1940-41 construction season. A total of twenty-two red fir pilings, spaced on 4 foot centers and varying in length from 20 feet to slightly more than 40 feet, were driven to depths between 16.5 feet and 20 feet below grade. The pilings were secured by ¾-inch galvanized steel cables tied to cedar deadmen on the opposite side of the road and attached to the pilings with clamps. A 16-foot clearance was maintained for road traffic to pass under the cable ties. The cedar deadmen were then leveled off and the cut sections were used as horizontal rails on the top of the cedar posts, forming a post and beam handrail system adjacent to the road. The handrail was built on a 6-foot graveled sidewalk that was constructed on the inner side of the road. A 10-inch timber guardrail served as a safety barrier between the highway and the sidewalk. The pilings, wales, siding, and guardrail were treated with creosote.

In order to protect the banks in which the pilings were driven, a system of six- by eight-inch walers (horizontal timbers bracing the walls of the excavated trench) and three- by eighteen-inch sheeting was installed in the excavated trench. The walers were installed in two parallel rows, one at the bottom of the excavation and the other near the top of the piling, and bolted to the piling. The sheeting was spiked to the inner side of the piling. The individual lengths of walers were overlapped, while the sheeting was butt-ended. The unstable ground posed a dangerous threat to both the workers and the road stabilization system they were building. Engineers anticipated the vibrations caused by the 1000-pound hammer driving the piles could cause the sides of the banks to slough and fill in the excavated area, so the excavation for the walers was worked out by hand. The engineer made special note of the unusual character of the ground in the project area; the "bluish colored clay" was so warm that workers could not withstand more than five or six minutes standing in it while shoveling out the waler trench. The heat, Reed reported, "went completely through their boots." By the end of the 1941 construction season, the road improvement program at the Sulphur Works was completed.

Maintenance crews attempted to stay ahead of any culvert back-ups, clearing and dredging blocked culverts during spring clean up and after summer storms. Nothing could be done to clear out the culverts in the winter season, as snow depths on the road near the summit routinely reached more than twenty feet of heavy pack. The park's snow removal machinery, the Snogo, could cut through deep snow, but when the height of the snow pack exceeded the height of the machine itself, it was impossible to throw the snow over the side of the steep snow banks. In these cases, the steam shovel led the Snogo to clear a route for its passage, and the gyrating blades of the Snogo would cast the snow aside, off the surface of the road.

Bulldozers and dump trucks assisted the Snogo, as crews worked around the clock to open the road to the public (see photo, History #10). In an effort to expedite snow removal in the spring of 1940, the maintenance crew spread a thin layer of coal dust on the deepest drifts along the road to enhance the melting action of the sun. This method had been used with some success in Yosemite, but was only occasionally employed at Lassen; it was effective at reducing the depth of snow at the end of the season, but failed to facilitate snow melt if the dust were spread between storms.

Severe winter storms, dropping heavy, wet snow, often followed each other in succession, and could extend into late spring. A telling indicator of the unusually heavy snow at the park was the popularity of the Fourth of July Ski Meet, held on the hillside near the southwest entrance station where a rope tow, a poma lift, and a warming station were built in the 1930s. The ski meet attracted skiers from all over the state for the premier late season conditions.

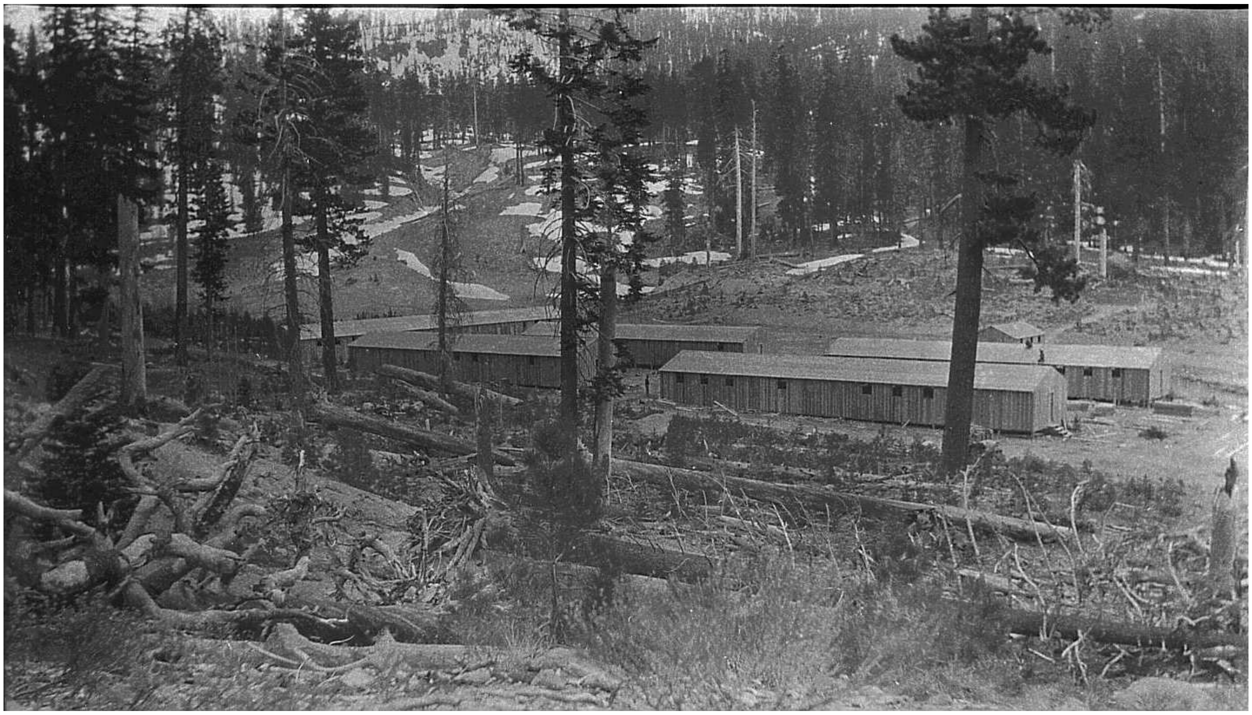
Throughout the 1930s and 40s, the resurfaced road required regular oiling in order to maintain a smooth riding surface, to protect the sub-grade from water infiltration, and to keep the dust down in the summertime. The road was subject to heavy snow loads, and the repeated freezing and thawing invariably caused deterioration of the rock-surfaced road. Often, damage to the surface due to winter storms and the abrasive action of the snowplow required surface rock to be re-spread. So constant was the need to treat the surface with a coating of oil that the park requested and received special funds to purchase an oil spreader of its own, rather than continuing to rent one from an area contractor. Unfortunately, after the 1941 season, CCC labor would no longer be available to assist in the clean-up details. By 1941, only one camp remained at the park, at the Old Boundary Springs near the Devastated Area. The CCC was abolished the following year, and many of the enrollees accepted the call to service in World War II. Their contribution had been considerable at the park.

CCC workers provided most of the labor on spring clean up and road maintenance projects, including gutter line cleaning and slope stabilization. They built facilities at the park's developed campgrounds, as well as many of the park's 150 miles of hiking trails. Following the departure of the CCC, little work was done on the park road for the next several years. The majority of the maintenance budgets between 1942 and 1948 were committed to snow removal. By the mid-1940s, the park's chief of maintenance, Theodore Rex, lamented, "About all that can be done on the highway this year is gutter work for drainage, and then we may not get the best job done." (Report of the Work Done in the Field for the Month of August 1944, LVNP)

Repairs to the crushed gravel surface, completely re-oiled and extensively patched every year was an expensive, labor-intensive project, using a large portion of annual maintenance budgets. The road, plagued by excess moisture especially between the southwest entrance and the summit, as well as along the seasonal wetland areas near Kings Meadows and Dersch Meadows, would inevitably reveal damage once the snow was removed. The exact extent and specific location of water damage, however, could never be accurately predicted. Because of the frequency and severity of storms, safety features such as guardrails were never installed on the highway; the combination of a heavy snow pack and spring plowing would have quickly destroyed them.

In order to open the road to the public at the earliest possible date, spring snow removal operations often began weeks before the anticipated park opening date. Snow removal was an arduous and, at times, dangerous proposition. Near the summit of the highway, where drifts regularly exceeded 40 feet and where steep drop-offs allowed little room for error, snow plow operators originally relied on small wooden signs mounted on trees adjacent to the road to located the edge of the road under the deep snow. These wood markers served as visual cues to lead the plow operator along the proper route, and enhanced the safety and efficiency of plowing operations. "Redheads," snowpoles painted red on the top, were also placed along the road prior to the snow season.

The twin tasks of plowing the road and repairing damage resulting from the plow, as well as repairing the damage wrought by the winter snow and ice amounted to the majority of maintenance expenditures. Following particularly severe winters, the budget for road maintenance was quickly depleted, and work orders for repair jobs would routinely escalate. By the end of the 1940s, the Bureau of Public Roads (now called the Public Roads Administration [PRA]) recommended an annual survey of winter storm damage in order to more accurately plan and budget for the road's on-going maintenance needs.



History #8: View of Old Boundary Springs CCC camp, looking south. (PGSO, CLI, LAVO-P-0023-02, n.d.)

History #9: Laborers spread crushed rock during repairs to stretches of water-damaged roadbed. (PGSO, CLI, LAVO-N-0004-04, 1934)

History #10: Steam shovel leading park Snogo in spring snow removal operations. (PGSO, CLI, LAVO-P-0023-29, n.d.)

1948-55: Post-War Construction

A meeting in the fall of 1948 between PRA engineers, park superintendent Daniel Tobin, the park's chief of maintenance Theodore Rex and NPS landscape architect Thomas Carpenter resulted in a plan to place a final surface on the road. By 1948, the park had purchased a 1,500-gallon oiling tank on a ten-ton truck chassis to handle what had become routine surface oiling applications. Bituminous concrete, or asphalt, would minimize the routine maintenance expenses required of an oiled gravel road. Before plans were prepared for a new asphalt surface, however, the PRA required a report on soil conditions and road width data. The park originally proposed an eighteen foot-wide asphalt surface, while the PRA recommended a width of twenty feet, plus two- or three- foot shoulders. (Letter, Morris to Tobin, LVNP, 2 November 1948) Superintendent Tobin concurred with the PRA's recommendation, stating that "we definitely agree on a minimum width of twenty feet plus the shoulders. A more established pavement line is needed on both the inside and outside edges (and is) desirable for both appearance and maintenance." (Letter, Tobin to Morris, LVNP, 23 November 1948)

Construction began in the fall of 1948 to expand the width of the entire road to the full 20 feet, plus shoulders. With the short construction seasons at the park, the first priority was given to the troublesome eight-mile section between the southwest entrance and the summit.

Typical sections were constructed to a width of 26 feet, shoulder-to-shoulder. The pavement contract called for scarifying the existing oiled rock surface, then blading and rolling the full 26 feet width. Trench shoulders were excavated to an average depth of 6 inches below the top of the existing surface. The outside shoulders were constructed to a 2.5 feet width, while the width of the inside shoulder was variable, constructed between 2 feet- and 3 feet-wide. A base course of crushed gravel or stone was built up to a depth of 3 feet 5 inches, and to a width of 21 feet, which was then spread with a prime coat of bitumen. The surface course of Class C-1 dense graded road-mix was spread in two layers, to a depth of 3 inches over the improved and primed base course before a seal coat was spread.

The work was inspected regularly by NPS landscape architects to ensure the adjacent landscape was protected from damage. By the end of the 1950 construction season, the road had been widened between the southwest entrance and the summit; the alignment remained essentially unchanged, with the exception of the tightest curves, which were widened the recommended minimum two-foot width. In October 1950, bids were let for the paving contract for this section, and the low bid (only two were received) of $223,917 was accepted. This eight-mile section was paved in 1951. Once the pavement job was completed between the southwest entrance and the summit, the PRA recommended bituminous concrete (asphalt) surfacing for the remaining mileage, at an estimated expense of approximately $500,000. (Letter, Morris to Johnston, LVNP, 6 February 1953)

PRA and NPS continued during the next several seasons to finish the widening between the summit and the northwest entrance, using gravel quarried from the borrow pits near Lost Creek and in the Devastated Area. The road-widening project was completed in the fall of 1953. In 1959, the 13.7-mile stretch of road between the summit and Hot Rock was paved with asphalt. While primary documents (official correspondence, maintenance reports) record the road widening project along the length of the park road, as well as the paving work accomplished between the southwest entrance and the parking area for Hot Rock, more research is required to determine when the section between the Hot Rock and the northwest entrance was originally paved with asphalt.

Vint approved the PRA's recommendation to pave the entire road with asphalt. Noting that the road had been top surfaced (with oiled, crushed rock) more than twenty years earlier, Vint stated "in order to protect our investment, reduce maintenance costs and provide a safe and comfortable traveling surface for the heavy traffic now using this road, this section should be surfaced." (Letter, Vint to Regional Director, NPS Region 4, LVNP, 14 April 1953)

The park was seeing a steady increase in visitation in the years following the war. Between 1949 and 1950, for example, the number of cars entering the park increased from 45,177 to 47,774, with more than 152,000 visitors. (Superintendent's Monthly Report, LVNP, 12 September 1950) Despite this increase in visitation, important maintenance work was deferred during most of the 1940s. In 1947, the park's maintenance chief was happy to report that "for the first time in many years the gutters have been cleaned from one end of the highway to the other." (Field Report, LVNP, July 1947) The section north of the summit was the most neglected; the gutters had not been cleaned, in Rex's estimation, for more than eight years.

Vint's recommendation to surface the remainder of the road—from the summit to the northwest entrance—was planned to supplement day labor work currently underway. These projects included repairs to the Diamond Point retaining wall, building up the outside shoulder between the ski area and the Sulphur Works, extending a 24-inch corrugated metal culvert pipe under the road at the summit, and reconstructing the southwest entrance pylon (Raker Memorial Gateway). From the summit north, improvement projects during the early 1950s included placing guard rocks at the Lake Almanor view point, shoulder and slope dressing and general cleanup, and a slight grade change at the approach to the Lost Creek culvert crossing to improve sight distances. In addition, the BPR proposed that the old Hat Creek truck trail intersecting with the highway should be scarified, obliterated and camouflaged from view.

1955-1972: Mission 66 and Park Road Reconstruction

The improvements contemplated for the park road in the late 1940s initially anticipated, and ultimately coincided with, a service-wide initiative known as Mission 66, instituted by NPS Director Conrad Wirth. Planned as a wide-scale program of park improvement and restoration projects, the 10-year program was targeted for completion in 1966, the 50th anniversary of the NPS. The neglect suffered by the parks during the war years, and the increase in recreational travel following the war, called for a new way of thinking about park development. While "protection and preservation of park values" was of paramount importance, Wirth also noted "substantial and appropriate use of the NPS is the best means by which its basic purpose is realized and is the best guarantee of perpetuating the System." (Wirth, pp. 257-58) The program attempted to manage development, including planning for expanded visitor services, while preserving the natural and scenic resources for which the parks were established, consistent with the original mission articulated by Mather in the early days of the NPS.

In 1952, the title to the Supan property at the Sulphur Works (and some 200 acres the Supans owned across the road in the Little Hot Springs Valley) was transferred to the government in a final court decision. The private roadside property had been a blight on the park landscape for many years, as the Supans continuously expanded their commercial enterprises, degrading the natural environment with a haphazard collection of shoddily built wood-frame buildings adjacent to the park highway (see photos, History #11 & #12). The damage to the landscape was such that the park's first published road guide, issued in 1950, explained that "the natural landscape (near the Sulphur Works) was severely disturbed by excavations in 1949 for the building of a roadhouse and lodgings." The guide continued, asserting "it will take considerable expense and scores of years for this area to resume any semblance of its original contour, soil, plants, and animals." The Sulphur Works lodge was an object lesson to park visitors, the road guide stated, signifying "the problems that threaten parts of national parks containing privately owned lands. Buildings and hotdog stands of any description or architecture, the cutting of the forest, the erection of large advertising signs . . . and other nuisance and harm may result from the rightful activities of owners of such areas." (Schultz, 1950: 7)

In addition to repair of the Supan property, plans for the southwest entrance area concentrated on developing a "winter use area." The park had always plowed out the first mile of the highway, in order to allow winter visitors access to the ski area. A new ski chalet was planned to replace the existing warming hut and an expanded parking area was designed to serve both the southwest campground and the winter use area. In addition, two modern checking stations for the southwest entrance were included in the development plans.

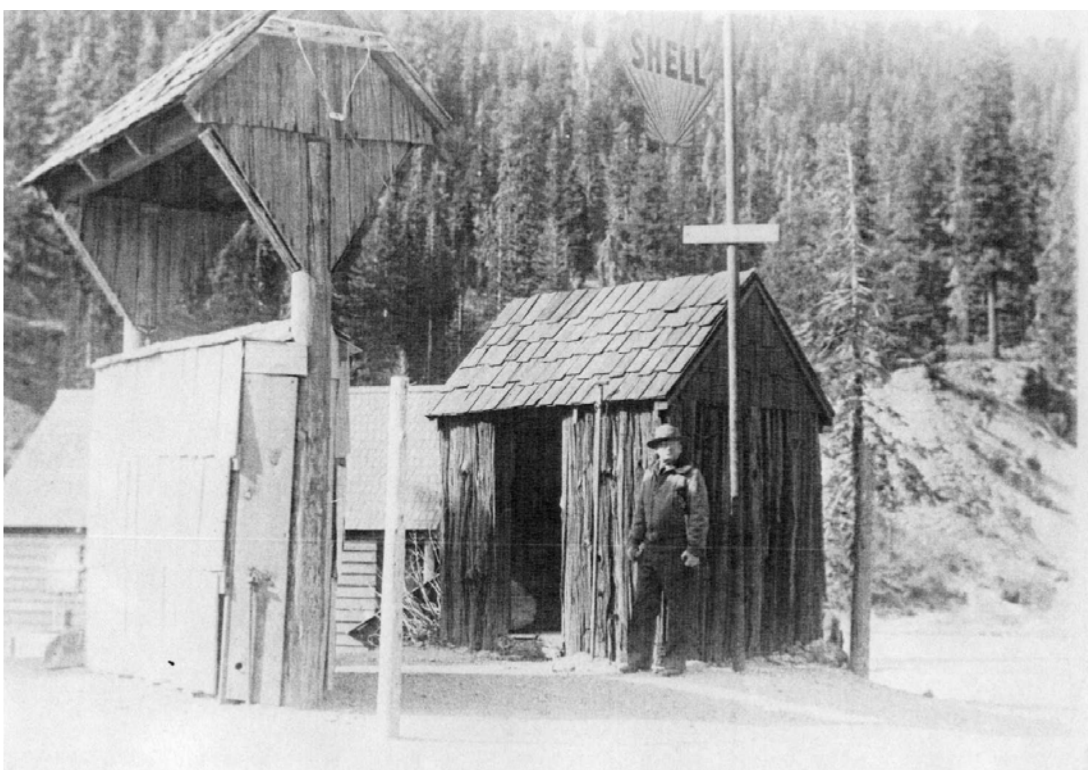
Plans for the improved winter use area were expanded to encompass improvements to the Sulphur Works area, and to totally reconstruct the park highway over the West Fork of the Sulphur Creek. The widening and surfacing project of the early 1950s had improved the alignment of the road by removing the tightest curves, however, the road still crossed the creek on fill, and a pair of culverts carried the creek under the road. The BPR prepared plans for a 214 feet -3 inches abutment-to-abutment continuous deck steel stringer bridge for the creek crossing. The design was based on the prevailing (1961) AASHO standards for highway bridges. The concrete used for the footings and pier was classed as Type V Portland cement, a sulphate-resistant cementing material. Construction began in 1964, and the bridge was completed and opened to traffic during the 1966 season (see photo, Buildings and Structures #8).

Unfortunately, another heavy winter season hit the park in the winter of 1966-67, causing damage to the new bridge. An accumulated snow pack of sixteen feet with a weight of forty pounds per cubic foot exceeded the bridge's design standards. A buckling failure of several girders, due to heavy wet snow loads, required the bridge to be closed until it could be repaired. In the meantime, a detour was constructed for one-way travel around bridge construction site. In October 1968, following inspections by the BPR (now the U.S. Dept. of Transportation, Federal Highway Administration), the contractor, San

Jose Steel Company, began bridge repairs and was completed by the end of the month.

The extreme winter conditions required special solutions to enhance the safety and efficiency of snow plowing operations. In 1969, an electronic road edge locator system was introduced at the park. Modeled on the same principle as metal detectors, the system relied on a wire cable to transmit electromagnetic signals. Buried beneath the surface of the road, along the outside shoulder, a single, stranded, insulated copper wire was installed a minimum depth of eight inches along the edge of the road. Transmitters were placed on adjacent trees along the road, at two or three mile intervals. It allegedly was able to locate the road under more than sixty feet of snow. The system proved to be quite successful, and was certainly an improvement over the metal pole rodding method used for years.

By the early 1970s the effects of winter storms were causing a “steady deterioration” of the road, according to park superintendent Dick Boyer. Writing to the Director of the NPS Western Region in San Francisco, Boyer urged that a proposed road improvement project at Sequoia Park be deferred, in favor of “urgently needed” protective measures on the Lassen road. “When visitor safety and/or a loss of our major capital investment is involved,” Boyer wrote, “unusual steps must be taken to insure a prompt remedy.” (Letter, Boyer to Director, Western Region, LVNP, 29 February 1972) Boyer’s plea did not go unheeded, as a contract was let in June 1972 for repaving the section of road between the southwest entrance and the summit. In addition, two trailhead parking areas were expanded, at Bumpass Hell and at the Lassen Peak Trail. At the Lassen Peak Trail parking lot, the road was realigned, moved to the east of the lot so that hikers would no longer be forced to cross the highway to access the summit trail. Boyer also requested a slight expansion of the parking area at the “Jones cut,” a heavy cut and fill at Diamond Point, where a view of the Little Hot Springs Valley and the forest to the east of the park attracted many cars.



History #11: Supan's gas station and roadhouse. (PGSO, CLI, LAVO-P-0023-22, n.d.)

History #12: Supan's Sulphur Works Lodge. (PGSO, CLI, LAVO-P-0023-23, n.d.)

1972 – Present

As the road entered its sixth decade in the 1980s, a culvert replacement and surfacing contract improved drainage and protected the road from snow and water damage, involving gabion retaining walls to stabilize slopes, and culvert construction. In 1984-85, a new boardwalk path was constructed at the Sulphur Works. In 1995, another project replaced culverts between the Southwest Entrance and Dersch Meadows. Storm damage in the winter of 1986 called for the construction of a concrete crib wall at Diamond Sidehill to repair slope failure.

In 1997-89, repairs were conducted where washouts had occurred along the road at Dersch Meadows and at Diamond Sidehill. In addition to the culvert replacement and concrete crib retaining wall construction, paving and centerline and fogline striping was completed. In an attempt to minimize the intrusion of newer drainage structures in the road landscape, the newly installed or repaired culverts were dressed with rustic stone cobble headwalls.

In 1998, a GPS-enabled snowplow was added to the park's snow removal equipment inventory. A computer screen in the cab guides the operator on a precise course (accurate to within centimeters of the road's edge) along the mapped route of the road. Its arrival at the park marked the first time this technology was used for snow removal in the national parks, and has improved safety and efficiency on the arduous process of clearing out the road from winter storms.

A repaving project, scheduled for design in 2001, is presently underway with the Federal Highways Administration (FHWA). The project encompasses three areas of construction, and has a projected budget of nearly $6.5 million. Focusing on approximately twelve miles between the southwest entrance and the parking lot for Bumpass Hell, the project includes rehabilitating all pavement, curbs and drainage structures, as well as "spot repairs" to the Diamond Sidehill. Two other sections, from the junction with State Route 44 to the Manzanita Lake campground road, approximately 1.2 miles in length, and approximately one-half mile of the Manzanita Lake campground road, are included in the present FHWA project.

History #13: Raker Memorial Gateway, the park's southern entrance, looking north. (PGSO, CLI, LAVO-P-0023-24, n.d.)

Analysis And Evaluation

Summary

The Lassen Volcanic National Park Highway retains integrity as determined by the seven aspects, or qualities that in various combinations define integrity according to National Register standards: location, design, setting, materials, workmanship, feeling and association. Contributive elements which date from within the 1925-1941 and 1945-1951 periods of significance include the road route itself, scenic overlooks, masonry culvert headwalls, bridge culverts, the northwest entrance station and ranger residence, and other associated landscape features.

The Lassen Volcanic National Park Highway historic landscape characteristics that retain integrity include natural systems and features, spatial organization, topography, circulation, views and vistas, vegetation, land use, and constructed water features. However, some buildings and structures and small scale features do not retain integrity due to the loss of a significant amount of their original fabric. These two characteristics are further compromised by the addition of many non-contributing elements including contemporary buildings and signs. Yet, the majority of land use characteristics retain integrity, particularly topography, views and vistas, and land use. The road configuration remains much as it was during the period of significance, with the views it was laid out to showcase intact and its original use as a touring route still active.

The designed landscape contributes as a whole to the historic significance of the Lassen Volcanic National Park Highway Historic District under Criteria A and C for the period 1925-1941 and Criterion C for the period 1945-1951.

Landscape Characteristics And Features

Archeological Sites

Although no recent archeological studies except for compliance purposes have been done in Lassen Volcanic National Park, four studies were completed between 1962 and 1988. These are more general in nature and only one, a 1972 study, focused on the road corridor. “An Archeological Survey of Route 1 and Vicinity of the Park Road, Lassen Volcanic National Park, California” identifies eight pre-contact sites within one half mile from the road along Sulphur Creek. Although these sites are significant as archeological resources, they are not associated with the Lassen Volcanic National Park Highway and do not contribute to its significance. Excavations conducted at Drakesbad locality recently were not associated with the park’s highway system.

Two further elements, the former route of the road around the Lassen Peak trailhead parking lot and the former location of the intersection of the road with the Forest Highway to the northwest are road remnants and should be considered as archeological features. Further investigation into these road traces could reveal further information about the original alignment of the road.

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
Lassen Peak Trailhead Road Remnant	Contributing			

Northwest Entrance Road Trace	Contributing

Buildings And Structures

Extant buildings and structures dating from the periods of significance include the Raker Memorial Gateway, the northwest entrance checking station and ranger residence, and the remaining original retaining walls along the road.

CONTRIBUTING BUILDINGS AND STRUCTURES
Raker Memorial Gateway
The Raker Memorial Gateway was designed by NPS landscape architect Merle Sager and is located on the road at the park's southern boundary. Park laborers constructed the gateway in 1931 with funds provided by the California State Chamber of Commerce (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #1). Constructed of two pylons flanking the road, the larger of the two reached a height of fifteen feet, seven inches while the smaller pylon was built to a height of seven feet, nine inches. A light buff-colored lava rock, quarried nearby, was roughly dressed and laid with wide, recessed mortar joints. A copper sign, featuring white enameled borders and lettering, announced the park entrance and hung from copper chains off a projecting seasoned, peeled wooden post extending from the inside wall of the pylon. The smaller pylon was unadorned. A small rectangular brass plaque, approximately twelve by eight inches, honoring the park's congressional sponsor, Representative John E. Raker, was mounted on the inside wall of the large pylon. The plaque, which has been removed, read: "Raker Memorial Gateway-Congressman John E. Raker fathered the establishment and development of this park."

The Raker Memorial Gateway pylons and sign have been reconfigured at least three times since approximately 1955 when the original copper sign was replaced with a wooden sign and both pylons lost two to five courses of masonry. By 1996, a new wooden plank sign was placed on the face of the pylon, and by 2000, yet another wooden sign was attached to the face of the pylon (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #2).

Northwest Entrance Pylon
Like the Raker Gateway, the Northwest Entrance Pylon was designed as a monumental feature announcing the park entrance (see photo, Adjacent Lands, #1). Original plans refer to a copper sign hanging from a horizontal wooden post and a rubble masonry structure with one inch raked joints (Technical Information Center, LAVO 3055, 1935). The northwest entrance was originally constructed in a "Y" configuration with State Route 44, and entrance pylons were erected at each arm of the "Y." Following the realignment of the northwest entrance from a "Y" configuration to a "T" intersection, only one pylon was retained. Sited on the western park boundary and visible to motorists on Route 44, the Northwest Entrance Pylon currently features a painted wooden sign hanging from a projecting peeled post. This sign and post are from a recent rehabilitation in 2000.

Northwest Entrance Checking Station and Ranger Residence
The northwest entrance checking station, completed in 1931, is located near the western shore of Manzanita Lake. It is positioned in the center of the road, opposite the ranger residence, and serves entering and exiting traffic. The checking station features a rough-cut lava rock foundation and walls and is surmounted by a steeply gabled, wood shake roof. Exposed rafter tails, and vertical, split, unpeeled logs on the gable ends contribute to the building's rustic character. Details include mullioned windows and copper lanterns. A non-historic, narrow turf island edged with barrier rocks frames the checking station and accommodates a seasoned, peeled wood flagpole. Although a flagpole appears in the same location in historic photographs, and the age of the current example cannot be determined, it should be considered significant until determined otherwise (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #3).

The northwest entrance ranger station, also completed in 1931, is located opposite the checking station, on the south side of the road. It is a gabled frame structure, also clad in a combination of rough cut lava rock masonry and wood siding painted dark brown within the gable ends. Deeply recessed casement windows feature heavy wooden lintels, also stained dark brown. A garage was added to the west end of the building in 1936. The original entrance, which featured a flagstone porch with an opening that offered an eastern view of Lassen Peak and Manzanita Lake, was partially filled with masonry and the opening glazed. Wood shake roof shingles, replaced in the summer of 2000, are painted a dark shade of green (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #4).

The landscape immediately around the checking station and ranger residence has been significantly altered following the periods of significance. Trees have been removed, and rock lined pathways have been added in addition to a stone barbecue, propane tank, fire hydrant, and trash receptacle (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #5).

Despite these modifications, this assemblage of buildings represents one of the best-preserved examples in the park of rustic-style architecture.

The historic Summit Lake Ranger station, built in 1926, is one of the original structures built by the NPS in Lassen Volcanic National Park. Although the Summit Lake Ranger station was built contemporaneously with the park road, the Summit Lake area is a separate landscape and will be documented at a later date.

Retaining Walls and Riprap

According to original construction reports, retaining walls and riprap were constructed on steeply sloped and heavily filled areas along the road. Construction photos reveal a retaining wall below Diamond Point (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #6), and a stone guard wall above (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #7, the only evidence of any guard wall along the road). The guard wall no longer exists and further research is needed to determine the existence of the Diamond Point retaining wall. Until the other retaining walls and riprap on the road have been assessed, all should be considered as contributing features.

NON-CONTRIBUTING BUILDINGS AND STRUCTURES

Southwest Entrance Station

The southwest entrance station, which was added during a major reconstruction of the road in 1965 to accommodate a winter use area, replaced the original entrance buildings dating from the early 1930s. In 1931, a checking station, located in the center of the road to serve two-way traffic, was built and paired with a wood-frame ranger residence located to the east in the approximate location of the Brokeoff Mountain parking area. These buildings were replaced in 1965 with two wood sided checking stations at their current location one mile north of the southern park boundary. These stations are stained dark brown and feature aluminum frame windows, traffic islands planted with grass, a flagpole, and signs. A parking area is provided on the east side of the checking stations, adjacent to the parking lot for the southwest walk-in campground and Chalet.

Winter Use Area

Since the mid-1930s the area near the southwest entrance had offered winter sports enthusiasts downhill and cross-country skiing opportunities. Originally, the only structure accommodating skiers was a simple wood frame warming hut with a wood burning stove. A rope-tow lift carried skiers up the slopes and in later years a t-bar and poma lift were added.

Winter sports at Lassen Volcanic National Park had a strong tradition, and the Chalet was constructed in the mid-1960s as an element in the Winter Use Area to meet the demands of northern California skiers. Designed as an expanded A-frame building, the Chalet features a corrugated metal roof and large windows on three elevations. Visitor services include a lunch counter and grill, gift shop, and restrooms downstairs. A wood frame deck on the rear of the Chalet provides panoramic views of the Mill Creek Valley and Lassen Peak. A ranger kiosk, located near the entrance to the Chalet, distributes park maps, brochures and booklets. Outlying service buildings immediately adjacent to the Chalet and at the south end of the parking lot are all contemporary structures.

Supan’s Sulphur Works
For nearly one hundred years, the Supan family maintained property adjacent to the road in the vicinity of Sulphur Creek. Over the years, numerous buildings were erected, originally designed to support Mathias Supan’s mid-nineteenth century sulphur mining operations. By the late 1940s, Mathias’ heirs had erected a number of buildings to support their tourist-related enterprises, including a bathhouse, guest cabins, curio shop and gas station (see photos, History #11 and #12). These buildings were removed in 1952 when the Supans lost title to their property in a court decision.

Sulphur Works Bridge
The Sulphur Works bridge replaced a large fill and culvert drainage system along the west fork of Sulphur Creek. Construction on the bridge began in 1964, and it was opened to traffic in the spring of 1966. The continuous deck steel stringer bridge spans 214 feet, 3 inches abutment-to-abutment. The design was based on the prevailing (1961) AASHO (American Association of State Highway Officials) standards for highway bridges. The concrete used for the footings and pier was classed as Type V Portland cement, a sulphate-resistant cementing material appropriate for the location (see Buildings and Structures map, Supplemental Information #3 and photo, Buildings and Structures #8).

Sulphur Works Boardwalk
From the period of Supan development, the Sulphur Works area adjacent to the road has been made accessible to park visitors. Over the years a variety of sidewalks, handrails, and interpretive signs have guided visitors along the active geothermal landscape. In 1984, the current boardwalk, observation deck, and on-grade overlook were constructed. A series of interpretive signs along the route describe the geological activity of the mud pots, steam vents and fumeroles. The boardwalk, which rises and falls in elevation as it traverses the geothermal features adjacent to Sulphur Creek, terminates at an asphalt observation deck. Handrails provide a measure of safety and discourage visitors from stepping off the boardwalk into the volatile geothermal area.

Lassen Crossroads Information Facility
Constructed in 1999, the facility is immediately inside park boundaries at the northwest entrance. It contains a parking lot, restrooms, and an interpretive pavilion which serve as a regional interpretation and tourism center in partnership with the Lassen National Forest.

Restrooms
Contemporary restroom structures are located at the southwest walk-in campground, the Bumpass Hell parking lot, the Lassen Peak parking lot, and the Devastated Area parking lot; none of which are contributing.

Gabions
Gabions are contemporary stabilization devices installed along the road to prevent slumping. Three locations have been identified, one at the first “S” curve, and two above the second “S” curve immediately south of the Diamond Sidehill. Many more have likely been installed but have been obscured by overpaving and shoulder sediments.

Crib Wall
A 180-foot long concrete crib wall, which was installed under the road north of the Diamond Peak curve in 1984, is visible to southbound motorists.

Although the addition of a number of buildings and structures along the road has negatively impacted the original road design, the remaining historic buildings and structures retain integrity as contributing landscape features of the Lassen Volcanic National Park Highway Historic District.

Buildings and Structures #1: Raker Memorial Gateway, the park's southern entrance, looking north. (PGSO, CLI, LAVO-P-0023-24, n.d.)

Buildings and Structures #2: Reconfigured Raker Gateway (1996), looking north. (PGSO, LCS, 56777, 1996)

Buildings and Structures #3: Northwest Entrance Checking Station, looking east. (PGSO, CLI, LAVO-S-0021-09, 2000)

Buildings and Structures #4: Northwest Entrance Ranger Station, north elevation. (PGSO, LCS, 05464, 1996)

Buildings and Structures #5: Northwest Entrance Ranger Station, west elevation. (PGSO, CLI, LAVO-S-0021-08, 2000)

Buildings and Structures #6: Diamond Point retaining wall under construction, looking northeast. (PGSO, CLI, LAVO-N-0004-28, 1938)

Buildings and Structures #7: Historic guard wall, no longer extant, at Diamond Point, looking southwest. (PGSO, CLI, LAVO, N-0023-28, n.d.)

Buildings and Structures #8: Sulphur Works Bridge (built 1964-66) to span west fork of Sulphur Creek, looking east. (PGSO, CLI, LAVO-N-0019-03, 2000)

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
Diamond Point retaining wall	Contributing	National Park Service Route 1 Retaining Walls	056787	LF11
Northwest Entrance Checking Station	Contributing	Park Entrance Station	05465	B50
Northwest Entrance Pylon	Contributing	Northwest Entrance Pylon	56788	LF12
Northwest Entrance Ranger Station	Contributing	Ranger Residence	05464	R49
Raker Memorial Gateway	Contributing	Raker Memorial Gateway	56777	LF1
Lassen Chalet	Non-Contributing			
Southwest Entrance Checking Station	Non-Contributing			
Sulphur Works Boardwalk	Non-Contributing			

Sulphur Works Bridge	Non-Contributing
Winter Use Area maintenance buildings	Non-Contributing

Circulation

The Lassen Volcanic National Park Highway connects on each end with State Route 89, and serves as a connecting highway between State Route 44, which skirts the park's northwestern boundary and State Route 36, which travels along the park's southern border. State Route 89 extends in a northwest/southeast direction. Its northern terminus is in the town of Mount Shasta in Siskiyou County and extends in a southwesterly direction, extends along the western shore of Lake Tahoe and terminates at its junction with U.S. Route 395 in southeastern Plumas County, east of the Sierra Nevada mountain range. The park road and State Route 89 are part of a larger regional scenic automobile tour, the Lassen National Scenic Byway. Thus, the road often accommodates drivers who are only passing through the park as part of a larger scenic automobile tour of the northern Sierras and southern Cascades. As a component of the National Scenic Byway, the park road offers an unsurpassed scenic vantage point for the entire region.

Within the park, the park road provides the only automotive link between the southwestern and northwestern entrance stations. As the park's principal road, it defines the predominant pattern of visitor circulation. Its location and effect on patterns of visitor use and circulation have focused park development along the road corridor, diminishing development in other areas of the park while offering automobile tourists access to some of the park's most scenic views as well as its geothermal landscape features. As it has done since its completion in 1931, the road continues to dominate visitor circulation in Lassen.

Topographic conditions ultimately determined the road's location along the southern slope of Lassen Peak, but the existence of private property within the park prevented proposed development plans, including the construction of a number of additional major roads, from being implemented. Further, the road successfully met the goals articulated in the earliest days of NPS park road development, i.e., to limit the incursion of roads into wilderness areas while at the same time providing the public access to the park's most scenic landscape features. The circulation system along the park road contains a number of features, both contemporary and historic, which are designed to facilitate this access. These include parking lots, side roads, pullouts, fog lines, and speed limit signs (see Circulation map, Supplemental Information #2). Other road components such as curbs, drop inlets and drainage systems are discussed in the Constructed Water Features section.

Road Characteristics
The Lassen Volcanic National Park Highway is 29.86 miles long and runs between the southwest and northwest park entrances. It is a two-lane roadway, with a twenty-two foot wide asphalt surface. Its shoulders range in width from two to three inches and the slope of shoulders is variable, depending on soil characteristics and topographical conditions. The minimum curvature is two-hundred feet and grades do not exceed six percent.

NPS engineers originally designed the horizontal alignment, vertical alignment, and cross section in 1924-25. A section stretching for approximately two miles (from just outside the southwest boundary to near the Sulphur Works) was constructed in 1925 according to these plans. Following the 1926 inter-bureau agreement between the National Park Service and the Bureau of Public Roads, some adjustments were made to the original design, though the width of the road remained at sixteen feet plus shoulders of variable width, depending on topographic and soil conditions.

From the southwest entrance near the Winter Use Area, the road ascends toward Diamond Point, around the head of the Little Hot Springs Valley, and toward the summit of Lassen Peak, constantly gaining elevation and negotiating the mountainous, subalpine terrain on a series of radial curves and intermittent switchbacks. Upon reaching the summit, the road begins its descent toward Kings Creek Meadow in an alternating series of tangents, switchbacks and radial curves. From Kings Creek Meadows, longer tangent sections connected to radial curves carry the road through the more level elevation as it continues past Summit Lake, Hat Lake, and the Devastated Area toward its northwest terminus near Manzanita Lake.

Parking Lots

Parking lots adjacent to the park road are located at various developed areas and trailheads. However, only those at Bumpass Hell and the trailhead for Lassen Peak were called out as part of the original road design. Other parking lots at scenic or geothermal areas such as Kings Creek Meadow, Summit Lake and the Sulphur Works were added shortly after completion of the road and served as staging areas for park dedication ceremonies in July 1931. During the subsequent era of CCC construction in the park, these latter three areas were formally designated and developed as campground/picnic, trailhead, and geothermal area parking lots. Although these areas are still used for parking, later modifications and expansions have altered their original design (see photo, Circulation #1). The parking area for the Sulphur Works was redesigned and constructed in the early 1960s, while an expanded visitor service area (the Winter Use Area) was being developed near the park's southwestern entrance. Future documentation of the Sulphur Works and Winter Use Areas should focus on its development as an expression of Mission 66 ideals.

Side Roads

Access to a number of side roads leading to maintenance, campground, and picnic areas can be found along the length of the park road. Those found at the Sulphur Works, Kings Creek Meadows, Summit Lake, Old Boundary Springs, Lost Creek, and the Environmental Education Center date to within the first period of significance. These roads led to private property inholdings within the park, to campgrounds, or to CCC camps, and are contributing because of their historic relationship to the road's original design and circulation system as well as the access they have historically provided to these developed areas. (see photo, Circulation #2). The remaining intersections, which include utility roads and entrances to the Manzanita Lake developed area cannot be dated and require further research to determine their significance (see Circulation map, Supplemental Information #1).

Pullouts

In addition to service, campground, and picnic area side roads, parallel pullouts can be found along the entire length of the park road. These features are oriented as bump-out or parallel, rather than perpendicular extensions, and can generally be found where views to the eastern portion of the park can be seen. Approximately ninety exist of which half are paved (see Circulation map, Supplemental Information #2). Although no construction document was found that designated any of these pullouts as official or designed constructions, the 1939 "Lassen Volcanic National Park" guidebook lists "points of interest" along the road. The following locations are listed: Diamond Peak, Lake Emerald, Lake Helen, Highway Summit, Kings Creek Meadows, Summit Lake, Devastated Area, Hot Rock, and Chaos Crags. While campgrounds were eventually developed at Kings Creek, Summit Lake and Chaos Crags, only the pullout at Hot Rock appears to have been officially designed. Further research is needed to determine the intent of all other pullouts along the park road (see photos, Circulation #3 and #4).

Fog Lines

Fog lines and center lines, running the length of the highway on both edges of the road and down the center, were introduced in a 1971-1972 paving project and are not a contributing characteristic of the features of the historic road.

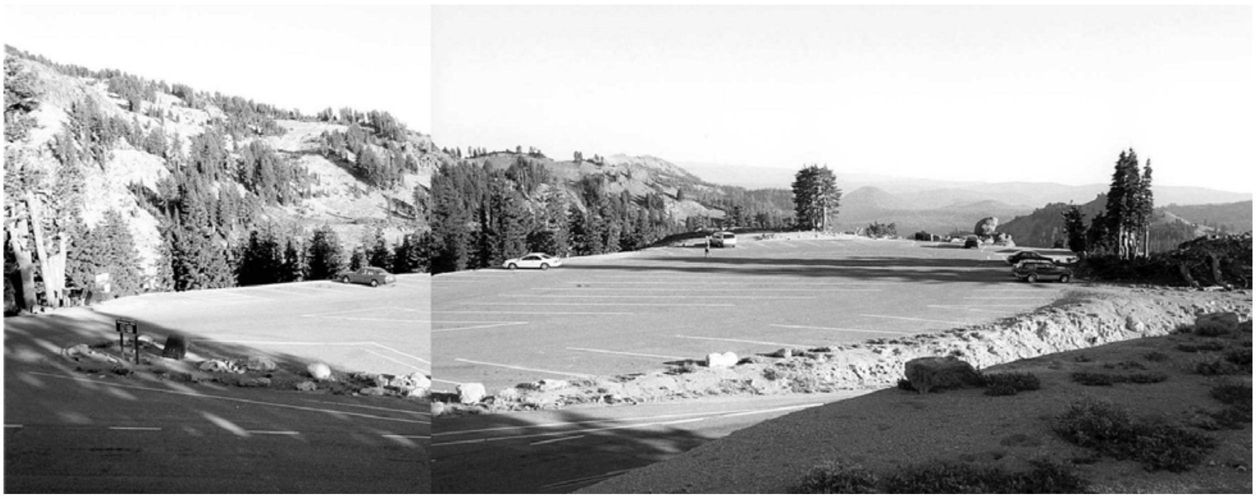
Speed Limits

When the road was first opened to the public no official speed limit was designated. Park bulletins issued to visitors stated "Automobiles and other vehicles shall be so operated as to be under the safe control of the driver at all times." While "no speed limitation of so many miles per hour [was]….proscribed" motorists were warned that "all driving which is considered faster than that which an ordinarily prudent man would drive will be actively enforced by park rangers." (Public Bulletin, LVNP, April 1931)

When speed limits were originally established, they were posted at 35 miles per hour with a 20-mile per hour zone at Manzanita Lake. The current park road speed limit is posted at 35 miles per hour for most of its length; however, on tangent sections between Upper Kings Creek Meadows and Manzanita Lake, the speed limit is set at 45 miles per hour. In the area of switchbacks between the southwest entrance and the summit, speed limits are reduced to 25 miles per hour. However, they are posted at 15 miles per hour at the tightest switchbacks (Diamond Point and Emerald Point) and at the bridge over the west fork of the Sulphur Creek, adjacent to the Sulphur Works boardwalk.

Non Contributing Road Segments
Four major alterations to the horizontal alignment, with a cumulative length of less than a mile, have occurred following the periods of significance. These alterations have caused the sections of road they effected to lose integrity. The following non-contributing portions have been delineated into ¼ mile segments (more research is needed to determine more precise road work positions). First, with the construction of the Southwest Developed Area in 1963, the portion of the road between the Southwest Entrance Station and the northern end of the Chalet was realigned to accommodate the parking area (mile 1.00 through 1.25). Second, the installation of the steel stringer bridge at the Sulphur Works between 1964-66 eliminated a circular curve around the West Fork of Sulphur Creek (mile 1.75 through 2.00) (see Buildings and Structures map, Supplemental Information #3). Third, in 1971-72 the road curve around the Lassen Peak trailhead parking lot was relocated to the east of the Lassen Peak trailhead parking area. This was done to create an enclosed parking lot where visitors did not have to cross the road to reach the trailhead (mile 7.75 through mile 8.00). Fourth, in 1978 the "Y" intersection that crossed the northwest boundary was realigned by CALTRANS into a "T" intersection immediately outside of the park (mile 29.86).

Although a number of the above features do not contribute to the significance of the park road, the essential circulation element, the road itself, continues to function as originally intended. As a result, circulation retains integrity as a contributing landscape characteristic of the Lassen Volcanic National Park Historic District.



Circulation #1: Parking lot at Bumpass Hell, looking east. (PGSO, CLI, LAVO-N-0018-36; N-0018-37, 2000)

Circulation #2: Summit Lake area service road, looking west (PGSO, CLI, LAVO-P-0011-30, 2000)

Circulation #3: Roadside pullout with rock barriers. (PGSO, CLI, LAVO-N-0011-32, 2000)

Circulation #4: Paved pull-out with asphalt curb, Hot Rock parking area, looking west. (PGSO, CLI, LAVO-P-0013-21, 2000)

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
Lassen Volcanic National Park Highway	Contributing	National Park Service Route 1 (State Route 89)	056785	LF9
Pullouts: (Diamond Peak, Lake Emerald, Lake Helen, Kings Creek Meadows, Summit Lake, Devastated Area, Hot Rock, Chaos Crags)	Contributing		332560	
Side Road Access: Sulphur Works, Lake Helen, Kings Creek, Summit Lake, Old Boundary Springs, Lost Creek, and the Naturalist's Residence	Contributing		332563	
Emerald Sidehill Road Section	Non-Contributing			
Lassen Peak Trailhead Road Section	Non-Contributing			
Lassen Volcanic National Park Highway Parking Lots	Non-Contributing			
Northwest Boundary Road Section	Non-Contributing			
Southwest Developed Area Road Section	Non-Contributing			
Sulphur Works Road Section	Non-Contributing			

Constructed Water Features

The Lassen Volcanic National Park Highway contains hundreds of drainage features both above and below grade. These include extruded asphalt curbing breaks, drop inlets, asphalt roadside ditches, corrugated metal drainage culverts with headwalls, and bridge culverts.

During the road's original construction, park crews built rock masonry water fountains, designed as low rising square wells with catch basins at the road's edge, to provide a source of water to motorists, to cool overheated radiators, or to fill canteens for drinking water. Shortly after their installation, however, these drinking fountains were removed. The fountains were discovered to be a source of damage to the road, as water impounded in the catch basins froze in cold weather and created frost heaves and surface and subgrade damage.

Asphalt curbing breaks, roadside asphalt drainage ditches, drop inlets, and surface drains were installed during road reconstruction and repaving projects between 1960 and 1990, and are not contributing (see photo, Constructed Water Features #1). In addition to these surface drainage features, final construction reports cite the installation of a number of perforated metal underdrains and vitrified clay tile underdrains to slow water seepage on steep slopes and to prevent road slumping. Although underdrains were included as part of the original construction process, they have been significantly altered or completely replaced (see photo, Constructed Water Features #2).

Headwalls and Drainage Culverts
Culvert headwalls and drainage culverts are the predominant National Park Service rustic design feature on the road. Headwalls were designed to serve a practical function as well as to produce an aesthetic effect; they provided passage for perennial and intermittent streams while masking the corrugated iron pipes within. The use of locally obtained lava rock was both an economic expedient and a design contrivance as it was readily available and served to blend the structures into the landscape. While headwall dimensions vary in relation to culvert diameter, the majority of headwalls are four feet by four feet by eighteen inches and feature flush pointing and squared edges. Masonry construction techniques range from ashlar (squared stone patterning) to rubble (see Contributing Constructed Water Features map, Supplemental Information #4 and photo, Constructed Water Features #3).

The headwalls and drainage culverts are documented in the Bureau of Public Roads Final Construction Reports from the 1920s and 1930s and were installed as part of early road grading and later road widening processes. Original corrugated iron pipes are either eighteen or twenty-four inches in diameter. Headwalls constructed between 1925 and 1951 appear to be distinguishable from later construction by masonry patterns, masonry materials, and culvert diameters. Unfortunately, a total count of original culverts and headwalls is impossible, as quantities indicated in the Final Construction Reports are given in linear feet--not units--of material. References such as "…corrugated metal pipe culverts with cement rubble masonry headwalls, were installed in the usual manner" are found throughout these documents and estimated quantities are recorded in the "Tabulation of Bids" section of the reports. In addition, road-widening projects between 1947 and 1951 would have necessitated the reconstruction of many of these headwalls.

Additional headwalls and drainage culverts were installed following the periods of significance. In 1983/84, two major culvert replacement projects were undertaken. Approximately eight corrugated culverts and their headwalls between the Chalet and the Bumpass Hell parking lot were replaced with twenty-four inch and forty-eight inch reinforced concrete pipe culverts. Cement mortared rubble headwalls were constructed with a less regular pattern, an uneven face, and used stone other than lava rock. The second major culvert replacement project, in 1993/94, replaced or installed twenty-four plastic pipe culverts. Each was built with new rubble or poured concrete headwalls in two general locations: between the Chalet and the Emerald Sidehill south of the summit, and between Lower Kings Creek Meadows and the east fork of Hat Creek, north of the summit.

Of the original culverts on the road, 117 appear to remain from the periods of significance. Of these, 104 retain the original corrugated iron culvert and a single headwall, ten retain the original corrugated iron culvert and two headwalls, two retain the original corrugated iron culvert with no headwalls, and three retain the original corrugated iron culvert with a rebuilt (see Contributing Constructed Water Features map, Supplemental Information #4 and and GIS data included with this document). All 117 of these, as mapped, should be considered as contributing until determined otherwise.

Bridge Culverts
Bridge culverts along the road are distinguished by substantial poured concrete and rubble masonry veneer construction with lava rock masonry wingwalls, and traverse perennial creeks. The culverts at Kings Creek, Hat Creek and Lost Creek function as bridges to carry the road over these perennial creeks, although each was independently designed (see Contributing Constructed Water Features map, Supplemental Information #4). The Kings Creek culvert is unique on the road in its masonry arch culvert construction, while the Lost Creek culvert is a dual-span box culvert and the Hat Creek culvert is a single box culvert.

Kings Creek culvert, constructed during the 1928 and 1929 construction seasons, was built to span Kings Creek on the southern side of Reading Peak. Built as a four by four masonry arch, stone for its headwalls was excavated onsite and from a nearby rockslide. Its masonry details include lintels and ringstones. The culvert appears to be in good condition (see photo, Constructed Water Features #4).

Hat Creek culvert was constructed at Hat Lake, northeast of Lassen Peak, in 1931. This structure was built to replace an earlier log stringer bridge that was washed out during the winter of 1929/30. A bridge was originally designed to span the creek, however the surrounding soils were found to consist of "mud flow of mixed volcanic cinders and broken lava of unknown depth" which necessitated the construction of a culvert. (BPR, Final Construction Report on Hat Creek Culvert, 1930) Day labor built the reinforced concrete structure with a fourteen-foot wide by six and one half foot tall box culvert. Two concrete slabs provided the floor and lintel. The exterior was veneered with local stone in three textures to a depth of twelve inches. The culvert is in good condition (see photo, Constructed Water Features #5).

Construction of Lost Creek culvert was completed in May of 1931. As at Hat Creek, the Lost Creek culvert was originally planned as a bridge, but foundation conditions proved inadequate. A double eight by eight-foot reinforced concrete box culvert with cement rubble masonry wingwalls was constructed instead. Rock for the wingwalls was obtained from a local quarry and rock slide. Based on design specifications prepared by National Park Service landscape architects working in the Branch of Plans and Design in San Francisco, the wingwall masonry rock was carefully selected for its weathered appearance. Lost Creek culvert exists today in fair condition due to the collapsing upstream north wingwall (see photo, Constructed Water Features #6).

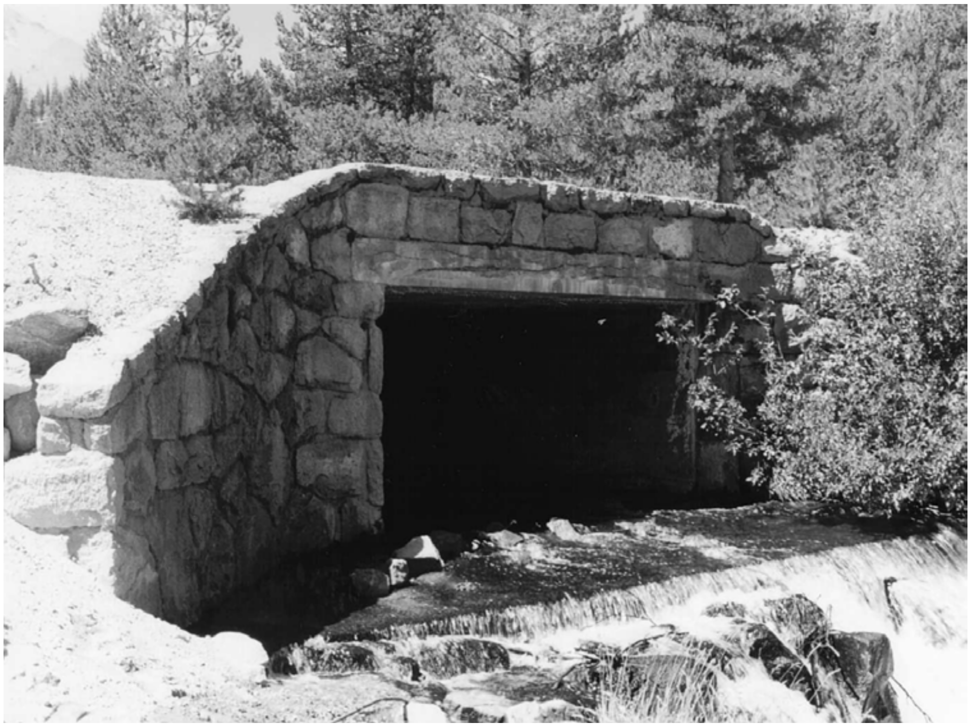
The 117 drainage culverts with headwalls and three bridge culverts which date from the periods of significance retain integrity as contributing landscape elements of the Lassen Volcanic National Park Highway Historic District.

Constructed Water Features #1: Asphalt curb drain. (PGSO, CLI, LAVO-P-0012-18, 2000)

Constructed Water Features #2: Additional drainage in wet areas along the road corridor was accomplished by six-inch vitrified clay tile underdrains. (PGSO, CLI, LAVO-N-0004-10, 1934)

Constructed Water Features #3: Historic lava rock masonry culvert headwall (left); Repointed headwall (right). (PGSO, CLI, LAVO-P-0013-12; LAVO-N-0017-03, 2000)

Constructed Water Features #4: Kings Creek culvert outlet, looking northwest. (PGSO, CLI, LAVO-N-0009-35, 2000)



Constructed Water Features #5: Hat Creek culvert outlet, looking southwest. (PGSO, CLI, LAVO-P-0012-31, 2000)

Constructed Water Features #6: Lost Creek culvert inlet, looking east. (PGSO, CLI, LAVO-P-0013-26)

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
117 Historic Masonry Headwalls and Pipe Culverts	Contributing	National Park Service Route 1 Culverts	56786	LF10
Hat Creek Culvert	Contributing	Hat Creek Culvert-Bridge	56783	LF7
Kings Creek Culvert	Contributing			
Lost Creek Culvert	Contributing	Lost Creek Culvert-Bridge	56784	LF8
24 Plastic Pipe Culverts	Non-Contributing			
Asphalt Curbs	Non-Contributing			
Metal Drop Inlets	Non-Contributing			
Poured Concrete Headwalls	Non-Contributing			

Land Use

Patterns of land use found in the vicinity of the Lassen Volcanic National Park Highway corridor fall into two categories: those that predated and influenced the location and construction of the road, and those that were contemporaneous with or post-date construction. This second category is further defined through land uses associated with park visitation and park maintenance and administration. Not all land uses associated with the road are found exclusively within the landscape boundaries, but are recorded as they relate to the development and use of the road.

Early Land Uses
Prior to the establishment of Lassen Volcanic National Park in 1916, a number of wagon and cattle trails dating from the mid-nineteenth century led into the park area from the north and the south. Local ranchers from Tehama and Lassen counties utilized these routes to drive livestock to summer grazing grounds at Badger Flat and along Hat Creek. The Hat Creek route cut a path from the north through the forest and meadows toward the base of Lassen Peak. In original location studies for the road, this cattle trail along Hat Creek served as the road's northern terminus. However, this was changed when a boundary expansion was approved by Congress in 1929 and extended the perimeter of the park to encompass Manzanita Lake, the current location of the road's northwest terminus.

Between Hat Creek and Manzanita Lake, remnant stretches of the Nobles Emigrant Trail crisscross the road. Established in 1852 as a westward emigration route, the Nobles Emigrant Trail reflects the period of European exploration and settlement. Visible sections of the trail are found about 26.5 miles from the southwest entrance and are interpreted with a bronze plaque. Where the road crosses the trail, vegetation is managed to preserve discrete vistas of the historic route (see photo, Views and Vistas #8).

In the mid-1860s, Austrian immigrant Mathias Supan staked a claim along Sulphur Creek, erected a cabin nearby, and mined the sulfur and salt deposits for sale in the markets of San Francisco. To gain easier access to his claim, Supan carved a wagon trail leading from the Tehama County Toll Road (now State Route 36) to the area of sulfur deposits at Sulphur Creek. This is generally the same route as the road follows from the southwest boundary to the Sulphur Works. In 1952, the Supan family relinquished their claim on the Sulphur Works property.

In the early 1920s, local resident Benjamin Loomis constructed a road connecting Manzanita Lake with the Devastated Area following the series of eruptions of Mount Lassen in 1914-17. These routes were incorporated into the original road location studies and surveys conducted by the NPS in 1923-24, and were adopted as component sections of the road.

During the period of construction, NPS landscape architects approved the location of quarries and borrow pits (excavations created by the surface mining of rock, unconsolidated geologic deposits or soil to provide material (borrow) for fill elsewhere). As construction operations were carried out within a narrow, forty-foot right-of-way, the location, extent, and use of borrow pits was carefully monitored to ensure that quarrying operations would not detract from the aesthetic qualities of the road's adjacent landscape. Although many references to borrow sites appear in BPR Final Construction Reports, only seven along the road have been tentatively identified by the park Natural Resources Division. Further research is required to determine all historic borrow pit areas within the district.

National Park Service Land Use
Land uses established after the construction of the road function to divide those activities associated with park visitation from activities associated with park maintenance and administration. This division of functions serves both practical and aesthetic needs by placing visitor-based amenities along the road

while effectively shielding maintenance and administration facilities from public view.

Visitor service land uses are found along the entire length of the road and include the southwest and Manzanita Lake developed areas, campgrounds, trailheads, parking lots, and comfort stations. However, both the southwest and Manzanita Lake termini of the road function as the main visitor service areas where automotive touring through the park begins and ends. The southwest developed area (Chalet, parking lot, maintenance area, walk-in campground, entrance stations) and the Manzanita Lake area are the most developed portions of the park, offering parking, retail, food, interpretive, camping, comfort, trailhead and picnic facilities. The southwest developed area originally began as a ski area in the 1930s and the Chalet was built in 1966. The ski area closed in 1993 and the Chalet currently serves as a food and retail service. A large parking lot and the Southwest Campground are also located adjacent to the Chalet. The Manzanita Lake developed area is significantly more complex with more visitor amenities and attractions including the Loomis Museum, camping/retail/laundry facilities, and Manzanita and Reflection Lakes. (see photos, Land Use #1)

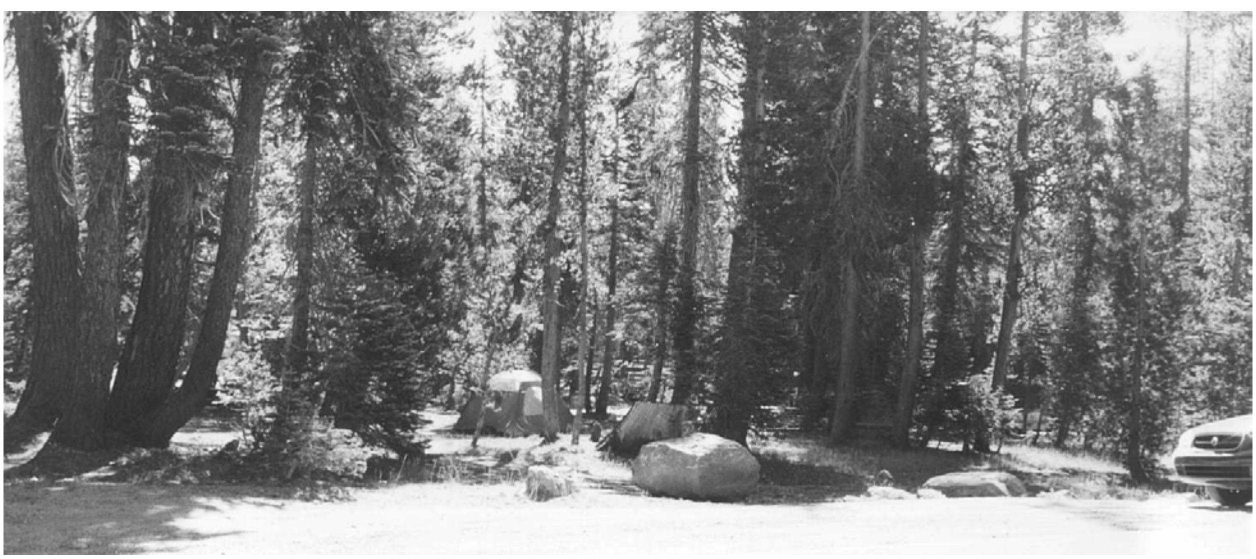
In addition to the southwest and Manzanita Lake developed areas, campgrounds are located at Summit Lake South, Summit Lake North, Lost Creek, and Chaos Crags. Lastly, major parking areas are found at the Sulphur Works, Bumpass Hell, Lassen Summit, Hat Creek, and the Devastated Area (see photos, Land Use #2 and #3, and Circulation #1).

Maintenance and administration facilities within the park are generally hidden from public view and are at times restricted from public entry by contemporary swinging gates, chain barriers, and “service area” signs. Those facilities located along the road include clusters of maintenance buildings and equipment on the southern end of the southwest developed area and the maintenance and seasonal housing to the northwest of Manzanita Lake. In addition, the Old Boundary Springs Helipad/boneyard is located at mile twenty-one, less than a quarter of a mile south of Hot Rock (see photo, Land Use #4).

Although land uses along the road have become more complex following the periods of significance, they remain focused on the same principles of automotive-based visitor amenities and park maintenance and administration. Further, no new activities in the park have been introduced following the periods of significance that have reorganized or re-shaped the landscape. Although physical elements of land use along the road have changed, general uses and locations have remained essentially the same.

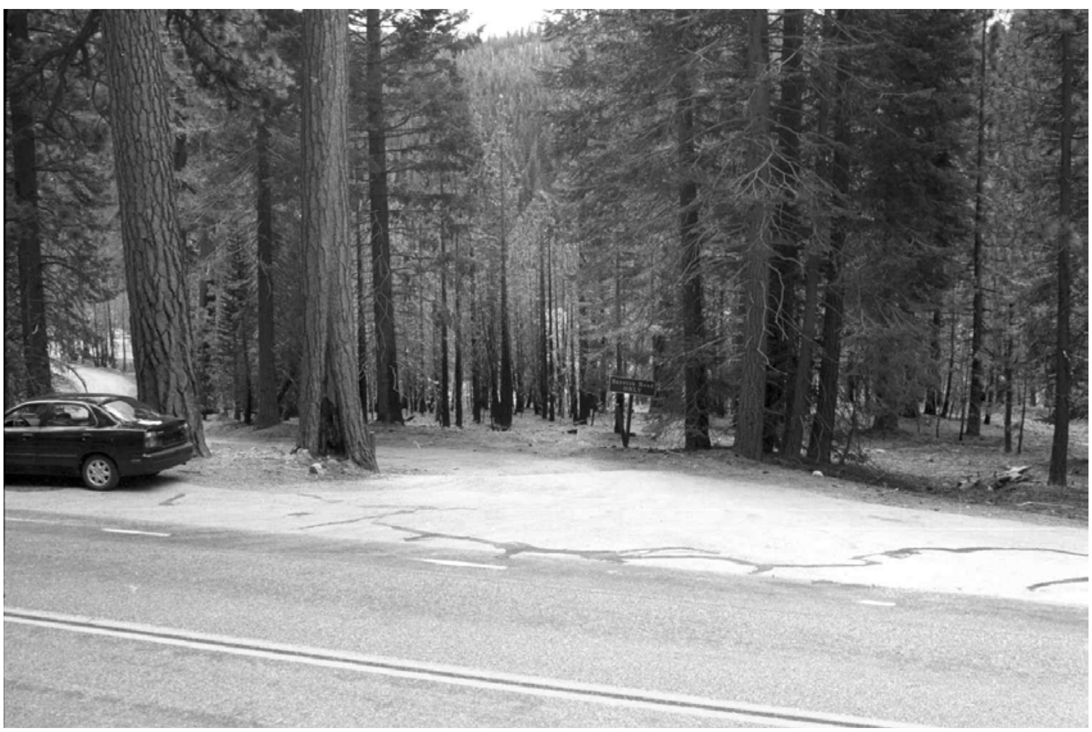
Land use retains integrity as a contributing landscape characteristic of the Lassen Volcanic National Park Highway Historic District.

Land Use #1: Intersection with Manzanita Lake Developed Area, looking west. (PGSO, CLI, LAVO-P-0015-16, 2000)



Land Use #2: Summit Lake Campground, adjacent to the road, looking east. (PGSO, CLI, LAVO-P-0011-32, 2000)

Land Use #3: Lassen Peak trailhead parking area, looking west. Note original road alignment in center right of photo. (PGSO, CLI, LAVO-P-0010-14, 2000)



Land Use #4: Entrance to Old Boundary Springs helipad/boneyard service road, looking west. (PGSO, CLI, LAVO-P-0013-19, 2000)

Natural Systems And Features

At a height of 10,475 feet, Lassen Peak dominates the western portion of Lassen Volcanic National Park. This active stratovolcano (a volcano composed of alternating layers of lava and ash) is the southernmost of the fifteen Cascade Volcanoes and is part of the volcanic system called the “Ring of Fire” that surrounds the Pacific Ocean. The geology of the region is dominated by Pliocene and Pleistocene basalt, andesite lava flows, and pyroclastic deposits. Multiple eruptions of Lassen Peak between 1915 and 1917 deposited a thick mantle of volcanic debris on its northeastern flank, while its southeastern flank displays characteristics of glacial activity unobscured by volcanism. This volcano, along with other, smaller mountains in the southwestern part of the park, created a rough landscape defined by lava pinnacles, craters, sulphur vents, boiling mud pots, and hot springs, the geologic environment of the Lassen Volcanic National Park Highway.

Hydrologic flow in the vicinity of the road south of Lassen Peak is mostly rapid in conjunction with the steep slopes that dominate the route, and slower around the more gently sloping road portions east and north of Lassen Peak. The area surrounding Lassen Peak is a hub of drainage divides, with streams flowing eastward to closed basins of the Modoc Plateau and the Great Basin, southward to the Feather River, westward to the Sacramento River, and northward to the Pit River. A number of lakes around Lassen Peak were created by landslides, and the area displays much hydrothermal activity. The hydrology along the road is of particular importance as many historic road features are associated with drainage. Further, perennial spring activity, particularly in the area of the first “S” curve before Emerald Lake, has caused significant road slumping.

“Approximately 800 species of plants are found in Lassen Park…comprising 83 families, 339 genera, 768 species, and 30 varieties.” (Showers, 1996:1) The road ranges in elevation from around 6,646 feet at the southwest entrance, to 8,511 feet near Lassen Peak, to 5,808 feet at Manzanita Lake. As a result, in the Sierran biotic province in which Lassen Volcanic National Park is located, three distinct plant communities are encountered: Montane Forest, Subalpine Forest, and Montane Meadow.

The mean annual precipitation is forty to sixty inches of which most is snow. The mean annual temperature is thirty to forty-five degrees. As a result, snow covers much of the park for much of the year, causing the road to be closed from late October through mid-June.

The natural systems and features retain integrity as a contributing landscape characteristic of the Lassen Volcanic National Park Highway Historic District.

Small Scale Features

Small scale features are those elements which provide detail and diversity for both functional needs and aesthetic concerns in the landscape and collectively add to the landscape's setting. The park road has retained three types of historic small scale features: signs, plowing markers, and a single cadastral marker. However, following the periods of significance, many small scale features have been added to the landscape that do not contribute to the significance of the park road. They include contemporary signs, service gates, snow poles, and asphalt curbing.). Other road components such as curbs and drop inlets are discussed in the Constructed Water Features section.

Roadside water fountains were an original small scale feature that have been totally lost. They were installed along the road in 1931 to provide water for overheating automobiles, but were found almost immediately to be impractical due to damage done by winter freeze/thaw cycles and snow plows. By 1941, the fountains were removed, although one example appears to exist in altered form at the Mineral Headquarters Area.

CONTRIBUTING SMALL SCALE FEATURES
Signs
Only five signs that date to the periods of significance remain along the road. The Brokeoff Mountain, Diamond Peak, Hat Lake, Raker Peak, and Manzanita Lake signs are all wooden, exhibit rustic design principles of log construction, and date from the CCC era. All have a consistent appearance of dark brown stain as a background for raised Art Deco styled lettering, painted white. According to Good's "Park and Recreation Structures" (1938), the Brokeoff, Diamond, and Raker Peak signs are categorized as Low Horizontal Signs, while Hat Lake is a Post Sign, and Manzanita Lake a Single Post Suspended Sign. These five features contribute to the integrity of the road (see photos, Small Scale Features #1, #2, #3, #4, and Small Scale Features map, Supplemental Information #5).

Plowing Markers
A number of small, numbered plowing markers are attached to trees along the road approximately thirty feet above ground. More research is necessary to determine their location, age, and significance. However, they should be considered contributing unless determined otherwise (see photo, Small Scale Features #5).

Cadastral
A single brass cadastral in a trapezoidal concrete base is located directly across the road from Hot Rock. This feature is dated 1926 and was the origin point for road construction surveys by the Bureau of Public Roads. Survey numbers began at this "zero" point and increased in both directions until reaching park boundaries (see photo, Small Scale Features #6, and Small Scale Features map, Supplemental Information #5).

NON-CONTRIBUTING SMALL SCALE FEATURES
Signs
Aside from the five historic signs along the road, there are dozens of contemporary signs, both wooden and metal, which post-date the periods of significance and are not contributing. They function as cautionary, regulatory, speed limit, trailhead, and interpretive markers.

Boulder Barriers
Along the entire length of the park road, boulder barriers have been placed to prevent vehicles from travelling on shoulders, across "S" curves, into meadows, and down steep slopes, in addition to

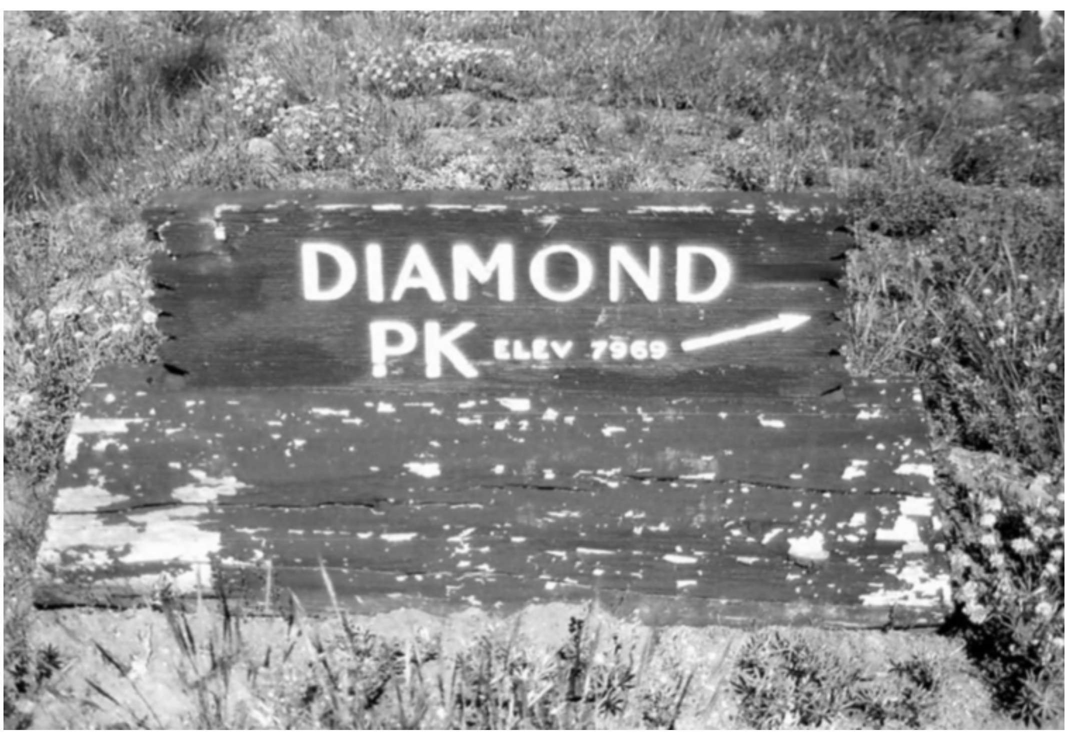
protecting the surrounding vegetation. Construction photos show horizontal log barriers placed along the road in a similar function. Log barriers appear to have been removed by the early 1950s when the first evidence of boulder barriers appears (see Small Scale Features map, Supplemental Information #5). Boulder barriers were installed in the early 1950s along the Lake Almanor lookout in order to protect the adjacent landscape from vehicles pulling over to enjoy the panoramic roadside views. This group of boulder barriers at the Lake Almanor lookout appear in landscape construction plans dating from the early 1950s and contribute to the integrity of the historic district. Boulder barriers in other locations appear to be more recent installations. More research is necessary to determine whether they are contributing small scale features.

Service Gates
A number of service roads that lead from the road have post and chain barriers to prevent public access. Further, six metal tube swing gates exist, three on side service roads, and three across the road (Sulphur Works, Hat Creek, and Manzanita Lake) (see Small Scale Features map, Supplemental Information #5).

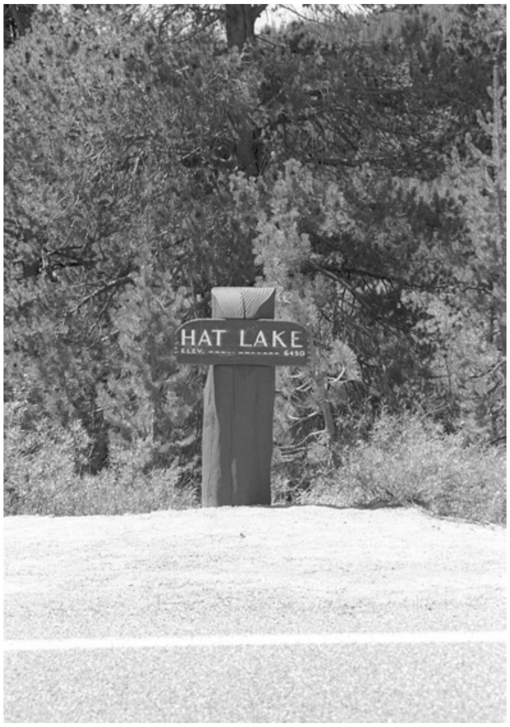
Snow-poles
Two metal “snow-poles” approximately forty feet high and painted yellow are found at the Lassen Peak parking lot and at Lake Helen (see Small Scale Features map, Supplemental Information #5).

USGS Survey Marker
A USGS brass survey marker, dating from 1928, is embedded in a large boulder adjacent to Hot Rock. This marker does not appear to be associated with the road construction.

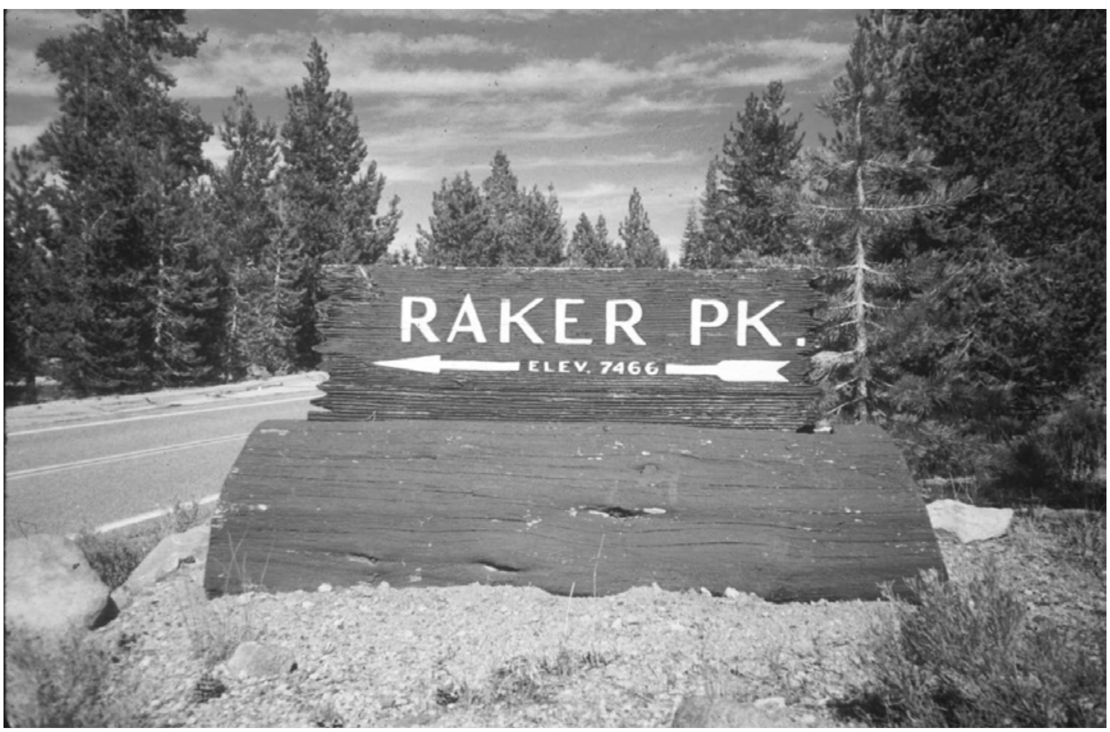
Small scale features along the park road have been almost totally removed or were installed after the periods of significance. With the exception of the five original signs, small scale features do not retain integrity as contributing landscape elements of the historic district.



Small Scale Features #1: Diamond Peak low horizontal sign, looking east. (PGSO, CLI, LAVO-N-0018-11, 2000)

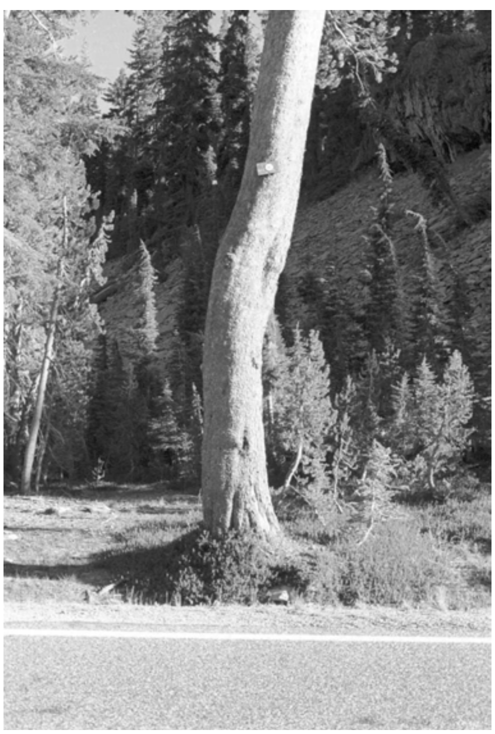


Small Scale Features #2: Hat Lake post sign, looking south. (PGSO, CLI, LAVO-P-0012-30, 2000)



Small Scale Features #3: Raker Peak low horizontal sign, looking east. (PGSO, CLI, LAVO-S-0020-10, 2000)

Small Scale Features #4: Manzanita Lake post sign, strung with sugar pine cones, looking east. (PGSO, CLI, LAVO-S-0021-11, 2000)



Small Scale Features #5: Historic snow plowing marker once served as sole means of locating the road under deep snowpack. (PGSO, CLI, LAVO-P-0010-14, 2000)

Small Scale Features #6: Bureau of Public Roads cadastral survey marker located directly across the road (to the east) from Hot Rock parking area. (PGSO, CLI, LAVO-P-0024-03, 2000)

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
Almanor Overlook Boulder Barriers	Contributing			
Cadastral survey marker	Contributing			
Diamond Peak sign	Contributing	Diamond Peak Sign	56779	LF3
Hat Lake sign	Contributing	Hat Lake Sign	56781	LF5
Manzanita Lake sign	Contributing	Manzanita Lake Hanging Sign	56782	LF6
Plowing marker	Contributing			
Raker Peak sign	Contributing	Raker Peak Sign	56778	LF2
Boulder barriers	Non-Contributing			

Contemporary wood and metal signs	Non-Contributing
Service gates	Non-Contributing

Spatial Organization

The spatial organization of the road is best understood as the way in which the road interacts with its immediate environment: where the road is located, how it lays upon landforms along its route, and in what manner has construction altered its immediate surroundings. These aspects are best analyzed by three components: horizontal alignment, vertical alignment, and cross section.

Current Road Characteristics
The current configuration of the Lassen Volcanic National Park Highway is as follows: the road is 29.86 miles long and runs between the southwest and northwest entries to the park. It is a two-lane roadway, with a twenty-two foot wide asphalt surface, variably sloped shoulders and a twenty-six foot, shoulder-to-shoulder width. The minimum curvature is two-hundred feet and grades do not exceed six percent. These configurations are basic elements of the spatial organization of the road.

Park service engineers originally designed the horizontal alignment, vertical alignment, and cross section in 1924-25. A section stretching for approximately two miles (from just outside the southwest boundary to near the Sulphur Works) was constructed in 1925 according to these plans. Following the inter-bureau agreement between the National Park Service and the Bureau of Public Roads in 1926, some adjustments were made to the original design, though the width of the road remained at sixteen feet plus shoulders of variable width, depending on topographic and soil conditions.

From the southwest entrance near the Winter Use Area, the road ascends toward Diamond Point, around the head of the Little Hot Springs Valley, and toward the summit of Lassen Peak, constantly gaining elevation and negotiating the mountainous, subalpine terrain on a series of radial curves and intermittent hairpin turns. Upon reaching the summit, the road begins its descent toward Kings Meadow in an alternating series of tangents, switchbacks and radial curves. From Kings Meadows, longer tangent sections connected to radial curves carry the road through the more level elevation as it continues past Summit Lake, Hat Lake, and the Devastated Area toward its northwest terminus near Manzanita Lake (see photos, Spatial Organization #1, #2, #3).

Horizontal Alignment (plan)
The horizontal alignment or “plan” of the road is organized to display the scenic qualities of the park while visually blending the road with the surrounding environment. It was engineered to provide a comfortable and safe driving experience and was located to showcase the park’s scenic and geological attractions in a planned sequence of views. The route follows the natural contours of the land, utilizing a series of radial curves connected to tangent sections. Early road construction projects (between 1926-1928) were built in accordance with 1926 Forest Highway standards. These standards dictated radial curves of no less than one hundred feet on open curves and no less than two hundred feet on blind curves. Exceptions to this standard were made at Diamond Peak, where two blind curves of one hundred and one hundred and thirty feet were constructed. Revised Forest Highway design standards were issued in 1929. The BPR followed these updated standards for the design of the sections between the summit and Upper Meadow and between Hat Creek and Manzanita Lake.

In addition to widening some of the tightest curves, BPR engineers introduced superelevation, or “banking,” to the road. Designed to counteract the effect of centrifugal force on vehicles moving around curves, superelevation was calculated at a maximum rate of 0.08 per foot width of the roadbed (see photo, Spatial Organization #4).

Vertical Alignment (profile)
Vertical alignment is made up of two geometric components, the inclined straight line, which is called

the grade, and the vertical curve, which are typically a crest curve (on a hill) or a sag curve (in a valley). From an aesthetic point of view, changes in grade provide motorists with a variety of perspectives on the surrounding landscape. On upgrades, the road ahead foreshortens the driver's field of vision. Downgrades offer a wider perspective, as sight lines expand to take in the surrounding countryside. In combination with the horizontal alignment, changes in grade provide a constantly changing outlook on the adjacent landscape.

Despite an overall altitude change of more than 2000 feet, the road maintains a grade of six percent or less throughout its length.

Cross Section

The cross-section, or "road prism" is the form derived by slicing the road on a perpendicular axis across its width. Elements of the cross section can include the materials and dimensions of the uphill slope, drainage ditches and culverts, shoulders, road crown, superelevation, surface and subgrade. Banks were rounded off, both to improve the naturalistic appearance of the road in the landscape, and to stabilize slopes (see photo, Spatial Organization #5).

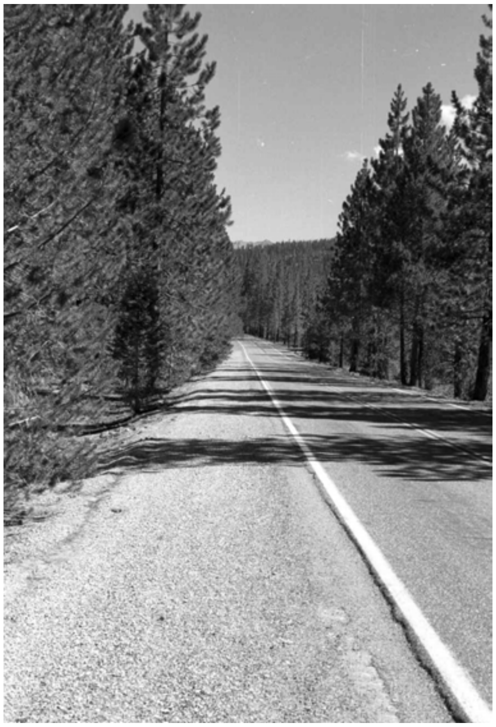
These characteristics were described in "typical cross sections" included in construction documents. Included in this report are two "typical cross sections" from Section B of the southwest approach road. Although they describe slightly different dimensions than those used on the road within park boundaries, the data elements are the same (see drawing, Spatial Organization #6).

Between 1948 and 1953 a road widening project brought the width of the road to twenty feet, plus shoulders (see History section). Typical sections were constructed to a width of twenty-six feet, shoulder-to-shoulder. The pavement contract called for scarifying the existing oiled rock surface, then blading and rolling the full twenty-six-foot width. Trench shoulders were excavated to an average depth of six inches below the top of the existing surface. The outside shoulders were constructed to a two and a half-foot width, while the width of the inside shoulder was variable, constructed between two and three feet wide. A base course of crushed gravel or stone was built up to a depth of three feet five inches, and to a width of twenty-one feet, which was then spread with a prime coat of bitumen. The surface course of Class C-1 dense graded road-mix was spread in two layers, to a depth of three inches over the improved and primed base course before a seal coat was spread.

Although some alterations to the spatial organization of the Lassen Volcanic National Park Highway have occurred following the periods of significance, the spatial organization of the road retains integrity as a contributing landscape characteristic of the historic district.

Spatial Organization #1: View of road along ridge above Little Hot Springs Valley, looking south. (PGSO, CLI, LAVO-P-0024-01, 2000)

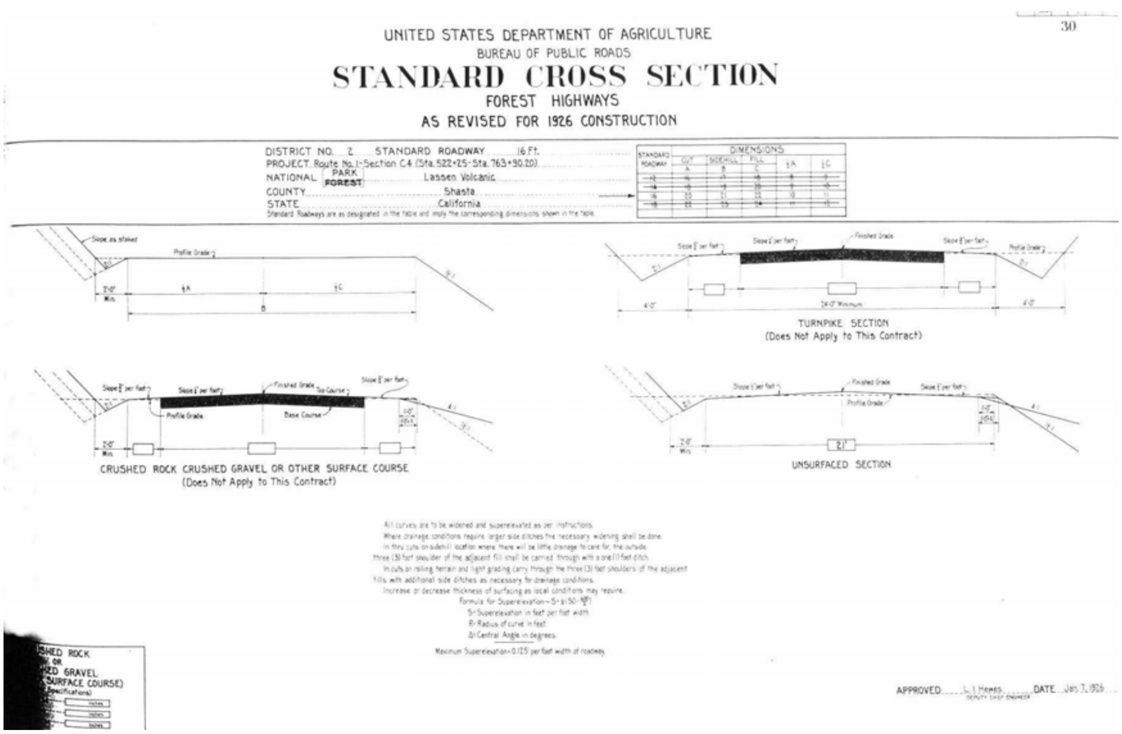
Spatial Organization #2: View of road as it descends toward Kings Meadow, showing tangent and radial curve alignment, looking south. (PGSO, CLI, LAVO-P-0024-02, 2000)



Spatial Organization #3: View of road tangent between Summit Lake and Manzanita Lake. (PGSO, CLI, LAVO-P-0013-23, 2000)

Spatial Organization #4: Superelevation, or "banking" was designed to allow safe and comfortable transitions between curves. (PGSO, CLI, LAVO-N-0004-22, 1928)

Spatial Organization #5: Finished slope at curve, looking northeast. (PGSO, CLI, LAVO-N-0005-02, 1933)



Spatial Organization #6: Bureau of Public Roads cross section drawing, showing typical road sections reflecting 1926 BRP Forest Highway Standards. (PGSO, CLI, LAVO drawings, 1932)

Topography

The topography of the Lassen Volcanic National Park Highway is composed of two elements: the natural contours of the landscape over which the road passes, and the manipulation of that landscape to accommodate the road. Over the course of its route, the road traverses a variety of terrain forms and a range of landscape types, from open, subalpine meadows and steep slopes in its southern portion, to more level and heavily forested areas in the northwest section (see Supplemental Information #6). Strict principles of naturalistic design ensured a minimum of disturbance to the existing topography and landscape features during construction projects, however, cuts and fills were required to maintain design standards such as the limits of vertical grades and transverse slopes.

Cuts and Fills
Cuts and fills are a road building necessity and are found along the entire length of the Lassen Volcanic National Park Highway (see photo, Topography #1). Although kept to a minimum in order to comply with NPS naturalistic design principles, these alterations are essential in understanding the road. Construction operations were carefully monitored by NPS landscape architects to ensure "especial care was taken in the clean up of slopes, toes of fills, scarred trees, etc." (BPR Final Construction Report, Project 6, Grading, 1931). Shoulders were rounded to minimize erosion and to blend the road more naturally into the landscape (see photo, Topography #2). At the end of cut sections, slopes were flared and rounded to further blend the road into the landscape. In areas of steep grades along the road corridor, cut and fill slopes were scaled 1:1; in more gentle terrain, slopes were staked at 1:4. Although major cuts and fills are identified below, further research is required of all those associated with road construction.

Section 1 - Southwest Entrance to Bumpass Hell
From the southwest entrance to Bumpass Hell, the road climbs gradually at first, gaining only 383 feet between the entrance station and the Sulphur Works. It climbs at a steeper rate along the remaining four miles to Bumpass Hell, gaining 1,020 feet to reach an elevation of 8,049 feet at the end of six miles. A maximum grade of 6% is maintained (see Topography Road Sections graphic in Supplemental Information and photo, Topography #3). A substantial fill was required near the Raker Gateway to maintain an easy grade, and as the road ascended toward Diamond Point, it was benched into the hillside (see photo, History #1). A major cut carried the road around the face of Diamond Point.

Section 2 - Bumpass Hell to Reading Peak
The second section of the road carries it over its steepest portions as it traverses the eastern slopes of Lassen Peak. Beginning at an elevation of 8,049 feet at Bumpass Hell, Section 2 gains 515 feet and reaches the road's highest point, 8,563 feet, at mile eight, just east of the Lassen Peak parking lot. The remaining portion of Section 2 loses 730 feet in elevation over three miles, ending at 7,834 feet at the hairpin turn above Upper Meadow (see Topography Road Sections graphic in Supplemental Information and photo, Topography #4). A large cut and fill, known as the Emerald Sidehill, was constructed on this section. Several retaining walls have been installed over the years, beginning with the original hand-placed rock retaining wall. A concrete crib wall system is currently in place to support this large fill section.

Section 3 – Upper Meadow to Old Boundary Springs
The third section of road runs from mile eleven at the hairpin turn to mile twenty-one between the Devastated Area parking lot and the Old Boundary Springs service road. This gently sloped section loses 1,554 feet over ten miles ending at 6,280 feet (see Topography Road Sections graphic in Supplemental Information and photo, Topography #6).

Section 4 – Old Boundary Springs to the Northwest Entrance

The final section of road follows the eastern and northern slopes of Chaos Crags, passes between Manzanita and Reflection Lakes before reaching the northwest entrance. Here, the relatively level road grade loses only 472 feet over 8.75 miles (see Topography Road Sections graphic in Supplemental Information and photo, Topography #6). Through Chaos Jumbles, an area of massive boulders that slid from the Chaos Crags, substantial fill was required to maintain a level grade.

Although grading, surfacing, widening, and filling projects throughout the entire length of the road have resulted in slight changes in grade, these do not collectively result in a change in topography. More research is required to indicate the precise location and dates of construction of each cut and fill section. Until such research is accomplished, cuts and fills should be considered to contribute to the integrity of the historic district.

The topography of the road retains integrity as a contributing landscape characteristic of the Lassen Volcanic National Park Highway Historic District.

Topography #1: Engineers used cut and fill construction techniques while preserving natural topographic contours. Near Lake Helen, looking southeast. (PGSO, CLI, LAVO-N-0008-30, 2000)

Topography #2: Rounded road shoulders and slopes. (PGSO, CLI, LAVO-N-0007-01, 1934)

Topography #3: View showing topography of road Section 1, between Southwest Entrance and Bumpass Hell, looking east. (PGSO, LAVO-N-0002-10, 1999)

Topography #4: Sub-alpine topography characteristic of road Section 2, between Bumpass Hell and Reading Peak. View toward Caribou Wilderness, looking east. Lake Almanor is visible in distance.(PGSO, CLI, DSC-09; DSC-10, 2000)

Topography #5: View showing topography typical to Section 3, between Upper Meadow and Old Boundary Springs, looking southwest. (PGSO, CLI, LAVO-P-0012-36, 2000)

Topography #6: View of tangent through level topography in Section 4, between Old Boundary Springs and northwest entrance, looking east. (PGSO, CLI, LAVO, P-0013-13, 2000)

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
Historic Cuts and Fills	Contributing			

Vegetation

PLANT COMMUNITIES
The Lassen Volcanic National Park Highway winds through three distinct plant communities. As a result, vegetation along the road is diverse and primarily native. Although the road begins and ends in the montane forest community, it climbs into the subalpine forest in the vicinity of Lassen Peak and passes through a number of montane meadow communities throughout its length (see Plant Communities graphic, Supplemental Information #6).

Montane Forest
Montane forest is found between 2,000 feet and 8,000 feet, and is characterized by coniferous trees. Prominent tree species include western white pine (Pinus monticola), ponderosa pine (Pinus ponderosa), incense cedar (Calocedrus decurrens), white fir (Abies concolor), quaking aspen (Populus tremuloides) and, Jeffrey pine (Pinus jeffreyi). Shrubs and flowers included within this community include arrowleaf balsamroot (Balamorhiza sagittata), mule's ear (Wyethia mollis), and greenleaf manzanita (Arctostaphylos patula) (see photo, Vegetation #1).

Subalpine Forest
Above the montane forest is the subalpine forest, whose elevation varies between 5,000 feet and 11,000 feet. Subalpine forest trees include lodgepole pine (Pinus murrayana), mountain hemlock (Tsuga mertensiana), red fir (Abies magnifica) and whitebark pine (Pinus albicaulis). Shrubs and flowers include currants (Ribes sp.), willows (Salix sp.), lupine (Lupinus sp.), senecio (Senecio sp.), pearly everlasting (Anaphalis margaritacea), rubber rabbitbrush (Chrysothamnus nauseosus), and pinemat manzanita (Arctostaphylos nevadensis) (see photo, Vegetation #2). The sections of road in this community are covered with snow from October through June.

Montane Meadow
Montane meadow communities are interspersed within the above communities in areas with shallow or moist soil. Montane meadows are characterized by perennial grasses, sedges, and broad-leafed herbs. Examples of flora found along the road include monkeyflower (Mimulus sp.), bog laurel (Kalmia sp.) and California corn lily (Veratrum californicum), alpine shooting star (Dodecatheon alpinum), and lupine (Lupinus sp.) (see photo, Vegetation #3).

CONSTRUCTION
During the period of original construction, methods of clearing, excavation, and slope finishing were carefully calculated to ensure protection of existing vegetation. Confining construction operations to within a forty-foot right-of-way promised a minimum of disturbance to landscape features, including native vegetation. However, when trees were cleared to make way for the roadbed, those less than six inches in diameter were normally burned, while larger trees were stockpiled to be recycled as building materials. Further loss of vegetation can be assumed at the numerous borrow pit locations along the road. (NPS, Final Construction Reports, 1928-32)

Protecting vegetation during construction, an express goal of the Landscape Engineering Division of the National Park Service, was codified in a system-wide plan to preserve landscape features (including vegetation) during National Park Service road construction carried out by the Bureau of Public Roads. Approved by Director Albright in 1928, NPS Chief Landscape Architect Thomas Vint's specifications for appropriate methods of excavation, known as "Type B Excavation," established contractor guidelines to guarantee a minimum of disturbance to landscape features during construction operations. Relatively low-impact techniques for cutting through sound rock, "plastering" and mudcapping," was allowed, while the use more destructive blasting methods, using "gopher" and "coyote" holes was prohibited. These guidelines were instituted service-wide in 1929, and were applied to construction operations on the stretch of road between the summit and Kings Meadows, as well as the section between Hat Creek and Manzanita Lake. These sections traverse a variety of landscapes, including mountain hemlock and pine forests, meadows and seasonal wetlands, as well as lava fields and rock avalanches associated with earlier eruptions of Lassen Peak. Landscape characteristics and existing vegetation was especially protected on these sections following Vint's newly established road construction standards and excavation practices.

With the exception of landscape architect Merel Sager's suggestion to plant willow and alder trees to soften the profile between the pylons and the cut banks at the Raker Memorial Gateway, no documentation exists to reflect planting, pruning or revegetation practices by the NPS, Bureau of Public Roads, or the CCC. It is also not known if the willows and alders were ever planted. However, roadside cleanup, in which park day labor and CCC enrollees removed dead and down timber, constituted vegetation management. Roadside cleanup had both practical and aesthetic value. Removing dead timber minimized the supply of potential incendiaries and improved the appearance of the landscape adjacent to the road.

In the area south of the summit, where the road crosses sidehills composed of loose talus and unstable volcanic soils and ash, resident landscape architect Theodore G. Meier realized that "the loose rocky nature of the banks" were resistant to stabilization. (Report, Meier to Vint, LVNP, July 1936) He anticipated that "repeated sewing of the banks with seed of the plants forming the ground cover in the area should be undertaken to help hold them from constant sloughing off" (see photo, History #8).

CHANGES IN VEGETATION

Due to the lack of documentation regarding planting, limbing, and other revegetation practices, traceable changes in the roadside vegetation are primarily the result of the natural reestablishment of vegetation on cuts and fills, the landscape's recovery from the Lassen Peak eruptions of 1915-17, and fire suppression practices. Viewsheds and overlooks, particularly on the southern portion of the road, were located in areas with no obstructing trees or shrubs and consequently have not required pruning and cutting maintenance.

At the southwest entrance, Final Construction Report photographs from 1928 and 1930 show cut and fill slopes immediately inside the park completely stripped of vegetation. Current conditions show second growth western white pine and red fir trees established on these slopes. (see photo, Vegetation #4) Along the entire length of the road, uphill surfaces were banked according to BPR standards. As a result, most if not all right-of-way vegetation on these slopes was lost during rough grading, but was allowed to reestablish naturally (see photo, Vegetation #5).

Within the Devastated Area, northeast of Lassen Peak, nearly all vegetation was destroyed by the eruptions of 1915-17, which sent massive amounts of melted snow, steam, hot gasses, mud and volcanic ash down Hat and Lost Creeks. By 1956, conifers (primarily western white pine, lodgepole pine, Jeffrey pine, white fir, and red fir) were established (see photos in Decker, 1997:40/41). Current conditions in the Devastated Area are of a firmly established forest with similar conditions found today at Hat and Lost Creek culverts (see photo, Vegetation #6).

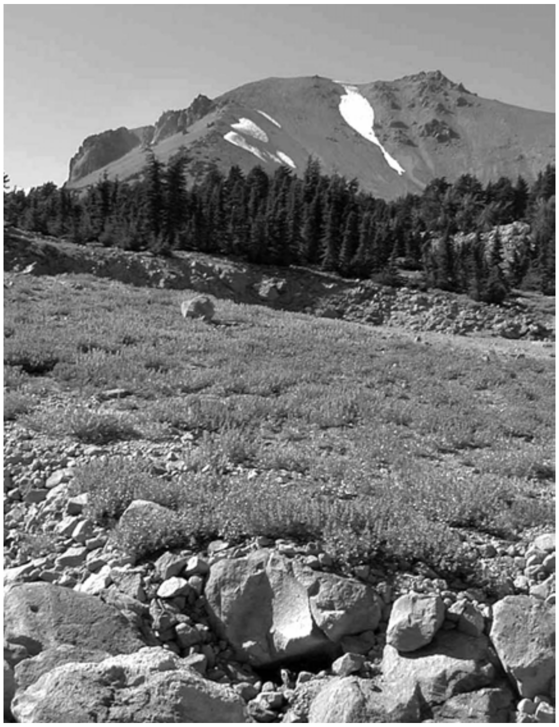
A 1931 Final Construction Report describes the landscape at the northwest entrance to the park as follows:

"The topography consists of fairly flat country covered with a heavy growth of manzanita brush with a few scattering large pine trees. This particular section has been burned over by forest fires many times. Consequently there is no second growth and the standing trees have all the branches within fifty feet of the ground burned off. This gives a characteristic gaunt appearance to the trees…" (FCR, Project 6, Grading, 1931:7)

Current conditions in this area (immediately off of Highway 44 adjacent to the Lassen Crossroads Information) are partially a result of fire suppression practices, displaying continued manzanita growth in open spaces, but with conifer branches sprouting at ground level.

Although planting, pruning, and revegetation practices associated with road construction and maintenance during the periods of significance were not documented, the overall character of the vegetation, specifically, plant communities, along the road remains the same. Vegetation retains integrity as a contributing landscape characteristic of the Lassen Volcanic National Park Highway Historic District.

Vegetation #1: Typical montane forest vegetation adjacent to road. (PGSO, CLI, LAVO-N-0016-12, 2000)

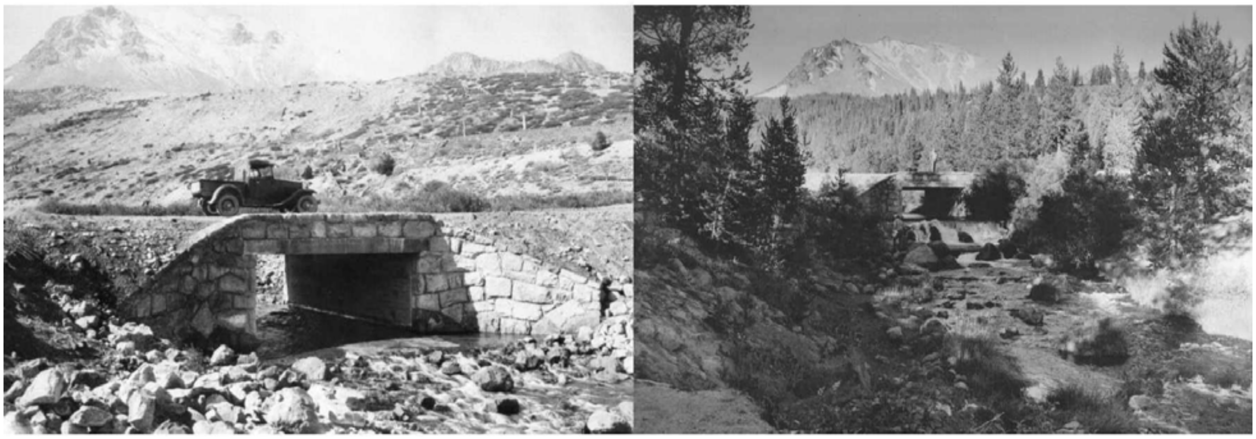


Vegetation #2: View showing Lassen Peak and subalpine forest vegetation, looking northwest. (PGSO, CLI-D-0022-12, 2000)

Vegetation #3: Montane Meadow vegetation, with view toward Kings Meadow, looking southeast. (PGSO, CLI, LAVO-P-0010-07, 2000)

Vegetation #4: Comparative view showing regeneration of native trees and plants on road banks following construction, looking north (PGSO, CLI, LAVO-N-0004-21 (1928); LAVO-S-0001-09 (1999)

Vegetation #5: View showing Lupines returning on finished slopes. (PGSO, CLI, LAVO-N-0005-01, 1934)



Vegetation #6: Two views of Hat Creek culvert bridge, showing forest regeneration, looking northwest. (PGSO, CLI, LAVO-N-0004-35 (1931); LAVO-P-12-34, 2000)

Views And Vistas

The park road was carefully planned, located and engineered to maximize scenic opportunities for recreational motorists. It was designed to fit naturally into topographic contours, to avoid steep grades, and to present a sequence of intimate and distant roadside views showcasing the park's diverse topography and landscape. Scenic opportunities focus on mountain meadows, alpine lakes, seasonal creeks, subalpine forests, as well as active geothermal areas.

While the natural processes of forest succession have altered the character of the historic views in some locations, principally through the Devastated Area, maturing trees in the pine forests between the summit and Kings Meadow threaten the panoramic views to Lake Almanor and the eastern horizon. In the future, these views may need to be managed in order to preserve access to this historic scenic viewshed.

As the road traverses the variety of landscape types, views expand or are foreshortened by the surrounding terrain. Between the southwest entrance and the area around the Chalet, views are restricted by the surrounding montane forest. As the road gains elevation in the sub-alpine terrain near the base of Lassen Peak, views expand beyond park boundaries to capture vistas of the Sierra Nevada range on the eastern horizon. As the road descends through the montane meadows and forests of the northwestern portion of the park, the surrounding forest foreshortens views, though occasional glimpses of Lassen Peak are available beyond the trees. Throughout its nearly thirty mile course, the park road presents a variety of perspectives on Lassen Peak, the park's dominant landscape feature. Intermittent vistas of the mountain serve to unify the variety of roadside views, however, as the road changes direction the perspectives on Lassen Peak change. From the first glimpse of the peak at the southwest entrance, to the road's summit where the mountain looms ahead, the park road provides a constantly changing perspective of Lassen Peak (see photo, Views and Vistas #1). The following are the primary designed viewing areas for motorists.

Diamond Point (past Windy Point)
Elevation: 7,372 feet
This pullout is located at a sharp turn on the southeast flank of Diamond Peak. It was built in the early 1930s as part of the road post-construction work when the road cut through Diamond Point was flattened (daylighted) to remove the protruding landform and open up the view. Diamond Point faces the southeast and offers excellent views of Brokeoff Mountain, Mount Conard, and Lassen Peak.

Little Hot Springs Valley
Elevation: 7,448 feet
A small parallel pullout provides motorists an opportunity to enjoy scenic views of the Little Hot Springs Valley. The valley exhibits geologic evidence of past lava flows, and deposits of iron, manganese, and sulfur tint the steep valley walls which rise up sharply from the banks of Mill Creek. The view into the Little Hot Springs Valley is more immediate than most along the road. The pullout offers a clear line of sight to the opposite side of the valley and a nearly complete viewshed of the valley below. A wayside interpretive panel explains the source of the unusual coloration of the hillsides.

Lake Helen and Emerald Lake
Elevation: 8,141 feet
As the road approaches its summit near Lassen Peak, it winds around the shore of two alpine lakes, Emerald Lake and Lake Helen. Relatively short views of these two glacial depressions are offset by prominent views of Lassen Peak and Brokeoff Mountain. This viewshed has remained relatively unchanged since the road was constructed (see Views and Vistas #2).

Bumpass Hell Parking Lot
Elevation: 8,227 feet
The Bumpass Hell parking lot offers a panoramic view to the southeast, down Little Hot Springs Valley, and extending beyond the park's boundary into the Lassen National Forest on the horizon. The park road is prominent on the western (right) side as it winds around Diamond Peak and up through the valley (see Bumpass Hell Visibility graphic, Supplemental Information #8, and photo, Views and Vistas #3).

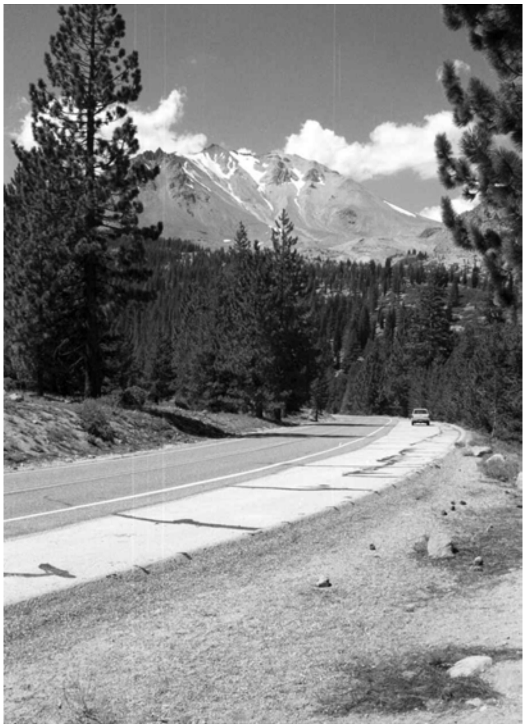
Panorama Pullout
Elevation: 8,408 feet
This expansive view is located at a parallel pullout one mile east of the Lassen Peak trailhead and parking lot. Facing southeast, the view overlooks a switchback in the road immediately below the pullout. The eastern plateau section of the park is in the middle ground, and forest lands beyond the boundary can be seen in the background. The blue waters of Lake Almanor, which feature prominently in this viewshed, stand in vivid contrast to the surrounding evergreen forest and are interpreted in a wayside panel. This panoramic overlook also offers views of Mount Harkness, a major prospect in the far southeastern section of the park, and captures views toward Reading Peak to the east (see Panorama Pullout Visibility graphic, Supplemental Information #7, and photo, Views and Vistas #4).

Meadow Views
Elevation: various, approximately 6,600 feet
As the road turns southward around Reading Peak, a number of views of Montane meadows are visible. Pullouts, both formal and informal, line the road between Kings Creek Meadow, Dersch Meadow, and Hat Lake. Located at a significantly lower elevation than the Lassen Peak trailhead parking area, these pullouts offer the driver a chance to view the profusion of meadow wildflowers on the eastern flanks of Reading Peak and Lassen Peak. Upper Kings Creek Meadow frames exceptional roadside views to Lassen Peak. Meadows fringing Hat Lake are also visible from the road. (see photo, Views and Vistas #5)

Devastated Area
Elevation: 6,491 feet
The parking lot at the Devastated Area offers a view through a screen of trees to the northeast flank of Lassen Peak. A number of interpretive panels describe the 1915-1917 eruptions. Although the road through this area was originally located to display the damage produced by the catastrophic eruptions of Lassen Peak, forest regeneration in the intervening eighty years has obscured much of the evidence of volcanic destruction.

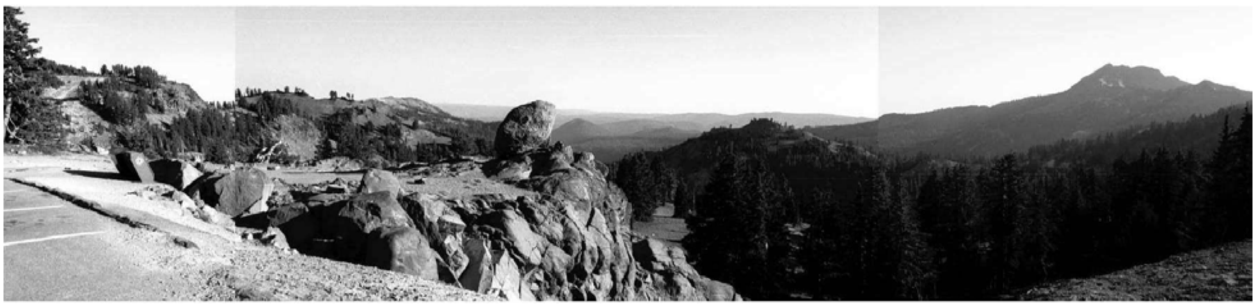
Nobles Emigrant Trail
Elevation: various, approximately 2,713 feet
Roadside vegetation has been officially managed for the deliberate construction of vistas in only two locations on the park road. Both of these are associated with the Nobles Emigrant Trail as it crosses the road in the northern portion of the park. The first location is the pullout and wayside interpretive panel located immediately northwest of Sunflower Flat. The vegetation here has been cut back in order to preserve the discrete roadside vista of the trail. Approximately half a mile further, the Nobles Emigrant Trail again creates a discrete vista as it climbs gently uphill to the west. At this location, vegetation is also managed to preserve vistas of the historic immigrant trail (see photo, Views and Vistas #6).

The views and vistas associated with the park road continue to offer motorists outstanding views both within the park and of distant panoramas. Accordingly, they retain integrity as contributing landscape features of the Lassen Volcanic National Park Historic District.



Views and Vistas #1: View of Lassen Peak, from near Hat Creek, looking northwest. (PGSO, CLI, LAVO-P-0012-26, 2000)

Views and Vistas #2: Historic view of Lake Helen (left, 1929) compared to contemporary view from same location (right, 2000), looking southeast. (PGSO, CLI, LAVO-N-0004-14; LAVO-N-0009-03)



Views and Vistas #3: Panoramic view to the east, from Bumpass Hell Parking Lot. Brokeoff Mountain can be seen to the right (south). (PGSO, CLI, LAVO-N-18-27; LAVO-N-18-28; LAVO-N-18-29, 2000)

Views and Vistas #4: Panorama view to the east. Mount Harkness in middleground, Lake Almanor visible in distance. (PGSO, CLI, LAVO N-0009-06; LAVO-N-0009-07, 2000)

Views and Vistas #5: View from road toward Hat Lake, showing meadows, looking southwest. (PGSO, CLI LAVO-P-0012-34, 2000)

Views and Vistas #6: Managed view of Nobles Emigrant Trail, looking southeast. (PGSO, CLI, LAVO-P-0015-09, 2000)

Management Information

Descriptive And Geographic Information

Historic Name(s): Lassen Loop Highway
Lassen Peak Highway
NPS Route 1

Current Name(s): Lassen Park Road
Lassen Volcanic National Park Highway

Management Unit:

Tract Numbers:

State and County: Tehama County, CA
State and County: Shasta County, CA

Size (acres): 290.00

Boundary UTM

Boundary UTM(s):	Source	Type	Datum	Zone	Easting	Northing
				10	620552	4488959
				10	624439	4475632

GIS File Name:

GIS File Description:

National Register Information

National Register Documentation: Entered -- Undocumented

Explanatory Narrative:

No current National Register documentation exists for the Lassen Volcanic National Park Highway. A consensus determination of eligibility on February 15, 1995 for the road and contributing features was received as part of a Section 106 compliance action. The following documentation exists for properties associated with the road: Park Entrance Station and Residence (DOE, 1975), Nobles Emigrant Trail (listed, 1975), Park Headquarters, Lassen Volcanic National Park (listed, 1978), Lassen Volcanic National Park Headquarters Historic District (DOE, 1994), Loomis Visitor Center, Building 43 (listed, 1975), Park Naturalists Residence (DOE, 1976), Loomis Visitors Center (listed, 1975), and the Comfort Station, Building 44 (DOE, 1975).

National Register Eligibility: Eligible -- SHPO Consensus Determination

Explanatory Narrative:

Date of Eligibility Determination: 8/18/2004

National Register Classification: District

Significance Level: National

Contributing/Individual: Individual

Significance Criteria: A -- Inventory Unit is associated with events that have made a significant contribution to the broad patterns of our history

C -- Inventory Unit embodies distinctive characteristics of type/period/method of construction; or represents work of master; or possesses high artistic values; or represents significant/distinguishable entity whose components lack individual distinction

Period Of Significance

Time Period: 1925 - 1941 AD

Historic Context Theme: Creating Social Institutions and Movements
Historic Context Subtheme: Social and Humanitarian Movements
Historic Context Facet: Poverty Relief And Urban Social Reform

Historic Context Theme: Expressing Cultural Values
Historic Context Subtheme: Landscape Architecture
Historic Context Facet: Protection Of Natural And Cultural Resources

Historic Context Theme: Transforming the Environment
Historic Context Subtheme: Conservation of Natural Resources
Historic Context Facet: Scenic Preservation

Historic Context Theme: Expressing Cultural Values
Historic Context Subtheme: Landscape Architecture
Historic Context Facet: The 1930's: Era Of Public Works

Time Period: 1948 - 1951 AD

Historic Context Theme: Expressing Cultural Values
Historic Context Subtheme: Landscape Architecture
Historic Context Facet: Protection Of Natural And Cultural Resources

Historic Context Theme: Transforming the Environment
Historic Context Subtheme: Conservation of Natural Resources
Historic Context Facet: Scenic Preservation

Area Of Significance:

Category: Landscape Architecture
Priority: 1

Category: Engineering
Priority: 2

Category: Entertainment/Recreation

Priority: 3

National Historic Landmark Information

National Historic Landmark Status: No

World Heritage Site Information

World Heritage Site Status: No

Cultural Landscape Type and Use

Cultural Landscape Type: Historic Designed Landscape

Current and Historic Use/Function:

Use/Function Category:	Recreation/Culture
Use/Function:	Recreation/Culture-Other
Detailed Use/Function:	Recreation/Culture-Other
Type Of Use/Function:	Both Current And Historic

Ethnographic Information

Ethnographic Survey Conducted: No Survey Conducted

Adjacent Lands Information

Do Adjacent Lands Contribute? Yes

Adjacent Lands Description:

Construction of the Lassen Volcanic National Park Highway was planned and executed, in part, as a loop tour road in and around the vicinity of Lassen Volcanic National Park. The portions of Routes 36 and 89 between Mineral Headquarters and the Raker Memorial at the park's southern boundary are included in the original construction reports and planning documents, are integral to the road, and should be considered as contributing to its significance. Further, the northwest approach road (originally, Forest Highway 77, now, State Route 44) was also envisioned as part of the loop touring route. Although it's original "Y" intersection on the park's northwest boundary was realigned by CALTRANS in 1978 to its current "T" configuration, this general entry into the park at this location is integral to early road planning efforts and is contributing to the significance of the road.

Adjacent Lands: Comparison image showing original and relocated junctions with the road (State Route 89) with State Route 44 outside northwest entrance, looking east. (PGSO, CLI, LAVO-P-23-04, n.d.; LAVO N-19-35, 2000)

General Management Information

Management Category: Must Be Preserved And Maintained

Management Category Date: 4/30/2001

Explanatory Narrative:

The Lassen Volcanic National Park Highway is compatible with the park's legislated significance which established a mandate for "…the freest use of the said park for recreation purposes by the public," and "The regulations governing the park shall include provisions for the use of automobiles therein…" (An Act to Establish the Lassen Volcanic National Park, 39 Stat. 442, 1916) The landscape retains its traditional use and function as a designed road landscape.

Maintenance Location Code: none

Condition Assessment And Impacts

The criteria for determining the condition of landscapes is consistent with the Resource Management Plan Guideline definitions (1994) and is decided with the concurrence of park management. Cultural landscape conditions are defined as follows:

Good: indicates the landscape shows no clear evidence of major negative disturbance and deterioration by natural and/or human forces. The landscape's cultural and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

Fair: indicates the landscape shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within 3-5 years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the character-defining elements will cause the landscape to degrade to a poor condition.

Poor: indicates the landscape shows clear evidence of major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural values.

Undetermined: Not enough information available to make an evaluation.

Condition Assessment: Fair

Assessment Date: 09/30/1998

Date Recorded: 09/30/1998

Park Management Concurrence: Yes **Concurrence Date:** 4/30/2001

Level Of Impact Severity: Moderate

Stabilization Measures:

Impact:

Type of Impact: Deferred Maintenance

Internal/External: Internal

Description:

A number of historic culvert headwalls along the entire length of the road are in need of repointing and, in some cases, rebuilding. Condition assessments of headwalls should be performed with subsequent preservation/stabilization actions performed.

Type of Impact: Improper Drainage

Internal/External: Internal

Description:

Significant spring and groundwater activity is found along the road with the most damaged area being the second switchback. The currently planned paving project, Package #117, calls for restructuring the road base and improving drainage.

Type of Impact: Inappropriate Maintenance

Internal/External: Internal

Description:

Buildings and structures that contribute to the integrity of the road are few in number. In the past, projects such as the installation of a heating duct on the exterior of the northwest checking station have both altered the structure and jeopardized its integrity. Future projects on those remaining structures should follow the Secretary of the Interior's Standards for the Treatment of Historic Properties and go through the process of Section 106 compliance.

Type of Impact: Removal/Replacement

Internal/External: Internal

Description:

Major culvert replacement projects in 1971, 1984, and 1995 have removed historic fabric at the expense of historic integrity. Further, a number of headwalls have been inappropriately built or rebuilt with unsympathetic stones and patterning. Future drainage projects should strongly consider retaining historic culverts, headwalls, and original materials.

Agreements, Legal Interest, and Access

Management Agreement: None

Explanatory Narrative:

NPS Legal Interest: Fee Simple

Explanatory Narrative:

Public Access: Unrestricted

Treatment

Approved Treatment: Preservation

Approved Treatment Document: Other Document

Document Date: October 30, 1990

Explanatory Narrative:

The current approved treatment of "preservation" was determined in the October, 1990 "Statemen for Management" in which management objective #5-C is "Preserve and maintain the historic structures." However, the August, 2000 draft General Management Plan identifies approved treatments of "stabilization" and "rehabilitation" in Alternative C-Preferred Alternative. This alternative states "This plan also includes…funds for rehabilitation of historic culverts on the scenic drive…" and "Ongoing loss of historic fabric will be halted and resources stabilized." (draf GMP, 2000: 81)

Approved Treatment Completed: No

Approved Treatment Cost

LCS Structure Approved Treatment Cost: $0

Landscape Approved Treatment Cost: $0

Cost Date:

Level of Estimate:

Cost Estimator:

Explanatory Description: The LCS has not identified ultimate approved treatment costs for the buildings and structures and no landscape treatment costs have been identified in a park document.

Stabilization Costs

LCS Structure Stabilization Cost: $8,300

Landscape Stabilization Costs: $6,000

Cost Date: January 30, 1996

Level Of Estimate: C - Similar Facilities

Cost Estimator: Support Office

Explanatory Description: The above figure was determined from the total

"Interim Treatment Costs" associated with road structures. Not all structures have an associated cost.

The PWR-Oakland maintenance division has devised a general repair cost of $1000 per headwall along the highway. Current Denver Service Center survey has identified six headwalls that need repair, amounting to the $6000 total cost.

Documentation Assessment and Checklist

Documentation Assessment: Fair

Documentation:

Document: Other
Year Of Document: 2000
Amplifying Details: Draft General Management Plan
Adequate Documentation: Yes
Explanatory Narrative:

The purpose of a GMP is to provide broad-based management strategies for a National Park Service Unit. Within the draft GMP, the road and other cultural landscapes are identified as cultural resources and are therefore adequately documented in the GMP.

Document: Statement for Management
Year Of Document: 1990
Adequate Documentation: No
Explanatory Narrative:

The Statement for Management does not mention cultural landscapes or the Lassen Volcanic National Park Highway specifically, although it does have general preservation objectives that may encompass the road.

Appendix

Bibliography

Citations:

Citation Author:	Lassen Volcanic National Park Association
Citation Title:	Lassen Volcanic National Park Association, Articles of Incorporation
Year of Publication:	1922
Source Name:	AAA
Citation Type:	Narrative
Citation Location:	Northern California Automobile Association Archives, Van Ness Avenue, San Francisco, California

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Citation Author:	Various
Citation Title:	Correspondence
Source Name:	Lassen Volcanic National Park
Citation Type:	Both Graphic And Narrative
Citation Location:	Lassen Volcanic National Park Central Administrative Files

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Citation Author:	Bureau of Public Roads
Citation Title:	Final Construction Reports
Source Name:	Lassen Volcanic National Park
Citation Type:	Both Graphic And Narrative
Citation Location:	Lassen Volcanic National Park Central Administrative Files

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Citation Title:	Report of the Director of the National Park Service to the Secretary of the Interior, 1920
Year of Publication:	1921
Source Name:	NPS, Annual Report
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Douglas Strong
Citation Title:	A History of Lassen Volcanic National Park
Year of Publication:	1998
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

Citation Author:	Ronald A. Foresta
Citation Title:	America's National Parks and Their Keepers
Year of Publication:	1984
Source Name:	PGSO
Citation Type:	Narrative
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Citation Author:	Warren Belasco
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Year of Publication:	1979
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

Citation Author:	Bruce Seely
Citation Title:	Building the American Highway System: Engineers as Policy Makers
Year of Publication:	1987
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Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Samuel P. Hayes
Citation Title:	Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920
Year of Publication:	1959
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Paul E. Shultz
Citation Title:	Guide to Lassen Peak Highway
Year of Publication:	1950
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	Lassen Volcanic National Park Central Administrative Files

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Citation Title:	Illustrated History of Plumas, Lassen and Sierra Counties
Year of Publication:	1882
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

Citation Author:	Ruby Johnson Swartzlow
Citation Title:	Lassen: His Life & Legacy
Year of Publication:	1964
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

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Citation Title:	National Parks: The American Experience, Second Edition
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Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	John Ise
Citation Title:	Our National Park Policy: A Critical History
Year of Publication:	1961
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Albert H. Good
Citation Title:	Parks and Recreation Structures, Parts I-II
Year of Publication:	1938
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

Citation Author:	Conrad Wirth
Citation Title:	Parks, Politics and People
Year of Publication:	1980
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	George E. Goodwin
Citation Title:	Report and Recommendations Regarding Lassen Volcanic National Park
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	Lassen Volcanic National Park Central Administrative Files

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Citation Author:	Robert Siskind
Citation Title:	Steve Mather of the National Parks
Year of Publication:	1970
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Horace Albright
Citation Title:	The Birth of the National Park Service: The Founding Years
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Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	William Everhart
Citation Title:	The National Park Service
Year of Publication:	1972
Source Name:	PGSO
Citation Type:	Narrative
Citation Location:	PGSO

Citation Author:	Ethan Carr
Citation Title:	Wilderness By Design: Landscape Architecture in the National Parks
Year of Publication:	1998
Source Name:	PGSO
Citation Type:	Both Graphic And Narrative
Citation Location:	PGSO

Supplemental Information