

CHARACTERISTICS OF THE DEVELOPED AREAS

INTRODUCTION

Within the CLR project boundary, the developed areas include two portions of the park dedicated to administration, operational infrastructure, and visitor services. The larger of these two areas is the Headquarters Area, which includes the cave opening/entrance, Administration Building, (Visitor Center), Historic and Post-WWII Housing areas, Maintenance Area, Mixing Circle, and wastewater lagoons. The second developed area is the Elk Mountain Campground, located northwest of the Headquarters Area. Both areas are described by feature type within this section. While some feature type descriptions, such as Natural Systems, cover overall features shared by both of the developed areas, most of the descriptions by feature type are broken down into two subsections, one addressing features found in the Headquarters Area, and one for those located at the Elk Mountain Campground.

NATURAL SYSTEMS

The developed areas are situated on a karst upland underlain by the Englewood, the Pahasapa, and the Minnelusa Formations (see Geomorphic Zone Two in the Environmental Context section). Elevations are generally between 4,000 to 4,300 feet above MSL, with the highest elevations occurring to the west, near Elk Mountain, and the lowest point to the east, on the floor of Wind Cave Canyon.

The developed areas are drained by a number of small, ephemeral tributaries of Cottonwood Creek that empty through Wind Cave Canyon. Surface drainage is flashy, and considerable surface water is lost underground. The Headquarters Area is located within a steep ravine (a collapse feature) directly over the cave, a part of Wind Cave Canyon (*Figures 3-93 /H-01 and 3-94 /H-02*). The cave opening, or blowhole, found by the Bingham in 1881 is located north of the Administration Building (*Figure 3-95 /H-13*). The Elk Mountain Campground is located upstream from the Headquarters Area, in a low area along an ephemeral waterway that is a tributary to Cottonwood Creek. This ravine edges the north side of Elk Mountain, from which the campground takes its name.

The developed areas have representative populations of most of the plant communities found in the rest of the park. Refer to the greater park natural systems section for plant community descriptions.

LAND USE

HEADQUARTERS AREA

Within the Headquarters Area there are a variety of land uses:

- **Visitor services:** Visitor services are available in the Headquarters Area and include restrooms, a souvenir/bookstore, and snack machines in the Administration Building (Visitor Center) and a comfort station at the picnic area.
- **Interpretation:** Interpretive displays on the cave ecology, cave history, and prairie and Black Hills ecology are located in the Administration Building.
- **Recreation:** Recreation activities include camping, hiking, wildlife viewing, and picnicking.
- **Administration:** Wind Cave administrative offices are located in the Administration Building and fire prevention and management offices for the Northern Great Plains Fire Management staff are located in Building HS-4, the Superintendent's Cottage.
- **Residential:** Housing is available for required occupants and seasonal staff park employees.
- **Maintenance:** The park's maintenance and storage facilities, including the park's wildland fire fighting equipment, are located in the Maintenance Area and at the Mixing Circle.
- **Utility:** Utility land uses are associated with water supply systems, electric and telephone services, HVAC systems, and wastewater treatment facilities.

ELK MOUNTAIN CAMPGROUND

At the Elk Mountain Campground, land uses relate to the function of the area as a short-term visitor camping facility:

- **Visitor services:** Visitor services at the campground include comfort stations and an amphitheater for evening ranger campfire programs.
- **Recreation:** Recreation activities include camping, hiking, and wildlife viewing.
- **Utility:** Utility land uses are associated with water supply systems, electric and telephone services, HVAC systems, and wastewater treatment facilities.

SPATIAL ORGANIZATION

The developed areas consist of two separate concentrations of features, the Headquarters Area and the Elk Mountain Campground. Each area is comprised of a set of clusters set within, and adjacent to, a ravine area. Each area is enclosed, its edge defined by a bison fence.

HEADQUARTERS AREA

The Headquarters Area is comprised of several developed clusters or nodes along Wind Cave Canyon. These clusters are connected by a system of roads and trails, with the hub of the area concentrated along the Headquarters Road that crosses the canyon. Clusters that form well-defined spaces within this area include the Administration Building Area, Historic Housing Area, cave entrance area, Maintenance Area, and Post-WWII Housing Area.

The Headquarters Road corridor enters the Headquarters Area, passing through its center. The pavement widens to form a 153-vehicle parking lot in front of the Administration Building. The road corridor in this area marks the division between two distinct use areas: the Administration Building (Visitor Center) and cave entrance area to the east of the road, and the Historic Housing Area to the west. The 11-space parking lot and walk along the west façade of the Administration Building are open to the larger area, with views down into the canyon and up into the historic residential area.

On the east side of the road, the landform slopes down into Wind Cave Canyon. The split-level Administration Building faces the parking area on its top level, and connects on its lower level to the bottom of the canyon. Sidewalks on the east (lower) and west (upper) sides of the building are connected by exterior stairs on the building's north and south sides. The walk on the lower side leads to the cave entrance area to the north, and the Elevator Building to the south. This walk is enclosed by the canyon walls on each side and light tree canopy above (*Figures 3-96 /B-05, 3-97 /B-22, 3-98 /C-03, 3-99 /B-07, 3-100 /E-02, and 3-101 /E-19*).

The cave entrance sits within a sheltered space formed by the road embankment and the wall of Wind Cave Canyon. Lacking trees, the character of this area is relatively open.

The Historic Housing Area is a cluster of residential buildings that sits immediately west of the Headquarters Road across from the Administration Building. Three of the houses are close to the road and on the same level as the Administration Building. The remaining houses are set back from the road and further up the slope. Light tree cover provides some enclosure and privacy for these residences. A short drive links the Historic Housing Area to the main road (*Figures 3-102 /G-08 and 3-103 /H-04*). A narrow road runs to the west of this cluster and climbs a grassy, open hillside to the east. The road ends at a small pump house building set against a forested hill and associated with underground water storage tanks (*Figure 3-108 /2X-07*).

The picnic area is located just to the north along the Headquarters Road corridor. This consists of a level, semicircular trailer parking area along the road, and a picnic loop with parking spaces around an open center, surrounded by forest.

To the south of the Administration Building, a secondary road departs the Headquarters Road to the east, gently descending into Wind Cave Canyon. This road passes between the rear of the Elevator Building on the north, and the VIP Center on the south. A short access drive behind the VIP Center climbs the hill to a Seasonal Residence (CCC Bunkhouse) (*Figures 3-104 /2W-09 and 3-105 /F-03*).

Further along the south edge of the canyon to the east lies the Post-WWII Housing Area. A loop road leads south from the maintenance road to this cluster along an open slope. Two apartment buildings and two houses frame a parking lot on the south side of the loop. Across the loop road stand a third apartment building and a parking area. The character of the space is relatively open, surrounded on all sides by grassland with a few plantings of trees among the buildings (*Figure 3-106 /G-11*).

The maintenance road continues east to the Maintenance Area, which hugs the edge of the hillside along the brow of an open ridge formed where a side canyon joins the main canyon. The

Maintenance Area is composed of two levels—the upper framed by one-story buildings on both sides and the lower level set behind an eastern row of buildings. There are few trees in this area. The bison fence that surrounds the Headquarters Area runs just east of the Maintenance Area. The maintenance road intersects just past the Maintenance Area with the U.S. 385 bypass corridor. On the opposite side of the highway is a fenced enclosure containing three wastewater lagoons set in the bottom of the canyon. Due to its adjacency, the low topography, and a lack of tree cover, the road corridor is open to the wastewater lagoons (*Figure 3-107 /2S-24*).

ELK MOUNTAIN CAMPGROUND

To the north of the Headquarters Area along the Headquarters Road corridor, a spur road leads to Elk Mountain Campground. It departs the main road to the west along the bottom of a canyon along the northern foot of Elk Mountain, running largely through open grassland at the edge of a wooded area that shelters the adjoining campsites (*Figure 3-109 /2U-07*). The campground is organized around a series of four loop roads that meander through the open understory of the ponderosa pine woods. These loops access a hundred campsites, a camp tender's residence, five comfort stations, an amphitheater, and a nature trail (*Figure 3-110 /2V-20*). The amphitheater is set on a slope in a pocket of forest within the campground (*Figure 3-111 /2V-09*). Each camp site consists of a level spot under the canopy of pine trees, with a parking area and site furnishings.

CIRCULATION

The Headquarters Road is the primary circulation corridor for the developed areas. U.S. 385 passes to the east of the developed areas, which are both sited along Headquarters Road. The Headquarters Road, formerly a segment of U.S. 385, was bypassed by the current U.S. 385 alignment in the 1960s. The U.S. 385 bypass was discussed previously in the greater park section. The north-south Headquarters Road has two twelve-foot wide lanes, and spans a length of approximately two miles, joining with U.S. 385 at either end. There are no interpretive pull-offs along this road.

HEADQUARTERS AREA

Midway along its length, the pavement of the Headquarters Road widens to form a parking area; along the parking area, the northbound and southbound lanes are divided by a narrow island with a concrete curb. A break in the island allows park personnel to enter the Historic Housing Area access road to the west. Concrete curbing edges the southbound lane of traffic. The 153-space parking lot is edged with stone on the east side along the building. The Headquarters Road crosses through a large parking lot supported by stone retaining walls on the east side of the parking lot (*Figures 3-96, 3-97, and 3-98*).

A narrow, chip-and-seal surfaced drive runs west from the Headquarters Road across from the Administration Building, accessing the Historic Housing Area. This access road curves to the south and splits into two parallel segments. The eastern, 450-foot-long segment accesses three residences and ends in front of a two-story garage (*Figure 3-115 /L-04*). The western segment, 675 feet long, accesses a storage building, a second garage, and the upper level of the first garage, then ends at a residence (*Figure 3-116 /J-23*). Portions of both drives have stone curbing.

A crushed stone and hard packed earth road originates along this drive at the curve, continuing west. This road curves, first north, then back to the west, and continues uphill for another quarter mile, ending at a pump house and underground water tanks on the flank of Elk Mountain (*Figure 3-117 /I-17*).

Just south of the Administration Building parking lot, the maintenance road intersects the Headquarters Road on its east side. This unstriped two-lane asphalt road accesses the rear of the Elevator Building, the VIP Center, the Seasonal Residence (CCC Bunkhouse), the Post-WWII Housing Area, and the Maintenance Area. Behind the Elevator Building is a paved five- to six-vehicle parking lot. Across the road, a short crushed-stone surfaced drive leads uphill to the Seasonal Residence (*Figure 3-105 /F-03*). Three hundred feet down the maintenance road from this intersection, a paved, unstriped access drive intersects the maintenance road from the south. This drive loops through the Post-WWII Housing Area, providing access to two parking lots, with concrete curbs, serving apartment buildings; and two driveways serving single-family houses. The access drive rejoins the maintenance road 900 feet to the east (*Figures 3-106 /G-11 and 3-113 /2S-20*). Five hundred feet further to the east, the road accesses the Maintenance Area. The Maintenance Area is comprised of two levels, each with a concrete-surfaced yard area, both connecting directly to the maintenance road but not to each other. A gravel parking lot is located at the entrance to the upper level (*Figure 3-107 /2S-24*). The maintenance road passes out of the fenced area and crosses U.S. 385 to access the wastewater lagoons.

An oval parking area with a planted island lies on the east side of the Headquarters Road north of the main parking lot. Just to the north of this parking area, a short paved drive allows access to a picnic loop with crushed stone spaces for parking (*see Figure 3-104 /2W-09*).

A system of walks traverses the Administration Building and residence areas. The principal concrete walks lead along the parking lot in front of the Administration Building, and along the rear façade of the Administration Building. The sidewalk along the parking lot is paved in asphalt and edged by a stone wall. The sidewalk behind the Administration Building crosses a sinkhole via a stone and timber pedestrian bridge (*Figures 3-99/B-07, 3-100/E-02, 3-101/E-19*). The concrete walk behind the building leads north to the cave entrance, and south to the Elevator Building.

Due to the slope of the terrain, there are numerous steps and ramps in the Headquarters Area. Concrete steps connect the parking lot sidewalk to the sidewalk behind the Administration Building (*Figure 3-119 /D-17*). A ramp (photographed while under construction) provides wheelchair access to the sidewalk behind the Administration Building (*Figure 3-120 /E-16*). Circulation-related small-scale features associated with the Headquarters Area include handrails on steps and lighting (*see Small-scale Features section below*).

In addition, there are some earthen paths, including the Prairie Vista Trail with timber steps leading up from the cave entrance (*Figure 3-121 /H-15*). Leading from the picnic area up to the parking lot is a crushed stone path that crosses over a stone bridge and ascends timber stairs. Another gravel path leads from the picnic area to the upper-level vehicle turnaround (*Figure 3-122 /2W-14*).

ELK MOUNTAIN CAMPGROUND

The access road to Elk Mountain Campground originates along the Headquarters Road approximately one-half mile north of the Headquarters Area. This unstriped, two-lane paved road connects to four paved loop roads accessing campsites and a parking lot at the amphitheater (*Figures 3-109 /2U-07 and 3-110 /2V-20*).

The campground is laid out in four loop roads that connect to the main road. A system of crushed stone paths cross the area; concrete and asphalt walks access the five comfort stations and the Amphitheater. The Elk Mountain Trail is approximately a mile long, and loops around the Elk Mountain Campground through nearby prairie, forest, and riparian areas, with nine interpretive stops emphasizing ecosystem diversity.

TOPOGRAPHIC MODIFICATIONS

HEADQUARTERS AREA

The Headquarters Area is situated in a ravine directly over the cave. As a result, there has been considerable topographic modification involved in situating the buildings, roads, parking lots, sidewalks, and trails on the ravine slopes. Some buildings, such as the old fire cache and the two-story garage, are built into the slope. In order to avoid extensive cut-and-fill engineering, the roads have been laid out to conform to topography. Both U.S. 385 and the Headquarters Road are built to conform to natural grades with minimal cut and fill. Topographic features can be seen in the images from Spatial Organization and Circulation sections.

Three underground water storage tanks are buried on the western flank of Elk Mountain (*Figure 3-123 /2X-03*). Three wastewater lagoons are located across U.S. 385 from the Maintenance Area (*Figure 3-124 /2M-19*).

ELK MOUNTAIN CAMPGROUND

The Campground is constructed along the slope at the foot of Elk Mountain along Wind Cave Canyon. The land on which the campground sits is relatively level; there is little topographic modification besides minor grading associated with the road and buildings.

VEGETATION

(Vegetation can be seen in the images within the Spatial Organization and Circulation sections).

Plants found within the developed areas are typical of the larger park's plant communities described earlier in this chapter. Both planted and naturally occurring vegetation within the developed areas is generally comprised of native species found in these plant communities.

The coniferous forest and woodland vegetation community type, made up of ponderosa pine forests and woodlands, forms scattered groves within the developed areas. Deciduous vegetation, as in the larger park, is generally concentrated in floodplains, drainage bottoms and the lower

portions of slopes within the developed areas. Deciduous trees include the green ash, box elder, bur oak, American elm, and paper birch. Shrubs typically found in these riparian areas include golden currant, Rocky Mountain sumac, Western snowberry, common chokecherry, and American plum. Boxelder/chokecherry vegetation occurs most commonly in drainages, as does the plains cottonwood and Western snowberry. There are also upland shrub communities of mountain mahogany and side-oats grama.

Upland grassland areas around the developed areas include such graminoid and herbaceous species as big bluestem, little bluestem, western wheatgrass (of the green needlegrass and Kentucky bluegrass types), and introduced weedy graminoid species (see Invasive Non-Native Plants section below).

INVASIVE NON-NATIVE PLANTS⁵²

Many of the same invasive plants discussed previously in the greater park landscape are found within the developed areas, as these plants thrive on sites disturbed by human activity. Common invasive plants include goat's beard or Western salsify (*Tragopogon dubius*), common mullein (*Verbascum thapsis*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), dandelion (*Taraxacum officinale*), smooth brome (*Bromus inermis*), Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), Kentucky bluegrass (*Poa pratensis*), Russian thistle (*Salsola pestife*), crested wheatgrass (*Agropyron desertorum*), yellow sweet clover (*Melilotus officinalis*), and white clover (*Melilotus alba*).

HEADQUARTERS AREA

The Headquarters Area is characterized by plantings such as groves of native trees and thickets of native ornamental shrubs, some of which were originally introduced there during the CCC period. Ponderosa pines, many naturally occurring, are the predominant trees found in the upland areas while boxelder and cottonwood dominate the tree cover in riparian areas along the lower elevations.

In the riparian areas along the bottom of Wind Cave Canyon, vegetation is relatively dense. While it is comprised mostly of native species, the historically typical composition has likely been affected by hydrologic change associated with the introduction of culverts such as that beneath the Headquarters Road. Some native plantings have over time taken on invasive characteristics. For example, shrubs identified as possibly originating from plantings in the CCC period have colonized extensive slope areas and areas along draws.

Native trees and shrubs are planted around and near buildings. There appear to be remnant foundation plantings around some of the buildings, such as along the front of the Administration Building and around some of the residences in the Historic Housing Area. Some species correspond to those planted in the CCC and Mission 66 periods, although their locations may have shifted as the original plants died or were removed and new ones sprang up from re-seeding or suckering. Tree species evident today that have been planted in this area in the past include

⁵² NPS, GMP/EIS, 47.

dwarf juniper (*Juniperus communis*), Rocky Mountain juniper (*J. scopularum*), boxelder, cottonwood, quaking aspen (*Populus tremuloides*), and American elm. Shrubs include American plum, chokecherry, evergreen shrub oak (*Quercus undulata*), sumac, squaw currant or wax currant (*Ribes cereum*), gooseberry (*Ribes sp.*), wild rose (*Rosa sp.*), and snowberry.

Prairie grasses and shrublands occur on slopes and at the edges of the mown grass areas that are maintained around building clusters. The Historic Housing Area, for example, is maintained in turf grasses with scattered groups of trees, mostly Ponderosa pine, and some shrubs around the buildings, possibly remnant foundation plantings as described above. Native prairie grasses are mown around the Maintenance Area, Mixing Circle, and at the underground water tanks.

Some additional introduced vegetation is found in the Headquarters Area—for example, lilacs surround the memorial at the Alvin McDonald gravesite.

ELK MOUNTAIN CAMPGROUND

Natively occurring Ponderosa pine forest, augmented with other tree plantings, comprises the vegetation within the Elk Mountain Campground. A ground cover of mown prairie grasses is maintained in the campsite areas beneath the shade of trees, which are mostly Ponderosa pines. The understory is open and grassy.

BUILDINGS AND STRUCTURES

HEADQUARTERS AREA

H-B-01 ADMINISTRATION BUILDING (VISITOR CENTER) (HS-1)

The Administration Building (Visitor Center) is located roughly three miles from the south entrance of the park on U.S. 385 (*Figures 3-125 /BVH-01, 3-126 /BVH-02*). The architecture of this structure employs traditional simple heavy beam building forms in materials and colors that harmoniously blend with the landscape. The CCC constructed two buildings connected by a loggia in 1936. The NPS completed a large three-story addition in 1980. The addition filled in the loggia and enclosed the space between the two CCC buildings. At the main entry façade, the Administration Building is one story. Because it sits on a slope, it has two lower level walkouts at the rear. The main and basement levels are finished in painted stucco. The sub-basement level is finished in random ashlar coursing (*Figures 3-127 /BVH-03, 3-128 /BVH-04*).

The steeply-sloped and multiple gable roof is sheathed in asphalt shingles installed in 1997; the shingles are in good condition. The gutters and downspouts consist of pre-finished aluminum K-style gutters with rectangular downspouts in dark bronze finish. The gutters, downspouts, and valley and chimney flashings were installed in 1997 and are in good condition. The stucco of the exterior walls has a smooth finish and is in good condition. There is some minor cracking at the southern exterior staircase. The stone face of building is also in good condition. The mortar is sound and functioning well. The building features dark-stained wood trim at the roof edges, wood gable vents, and wood window trim surrounds and door surrounds. The wood appears to be in good to fair condition. Wood at some valleys at roof junction points has minor

deterioration. The painted surfaces and stained surfaces are all in good condition. The windows consist of divided-light sashes. The sashes are either of casement or double hung configurations. The wood storm window sashes appear to be in good condition, and the paint finish of the sashes is in good to fair condition. There are some areas at the western, southern, and eastern exposures of the building where paint has faded, is chipped and is flaking. Some of the stucco is cracking at the northwest corner of the building. In 2003, a new wheelchair ramp was installed at the northeast corner of the Administration Building.

H-B-02 ELEVATOR BUILDING (HS-2)

The CCC built the Elevator Building in 1938 (*Figures 3-129 /BVH-05, 3-130 /BVH-06, 3-131 /BVH-07*). The building has three segments, with a middle segment of three stories and two flanking sections of a single story. The roofs of the tower and of the west end are hipped, while that of the east end is gabled. This building is built over the elevator shaft that descends 212 feet below the ground into the cave. The east end roof shelters a loggia, with a concrete deck and stone wall against the upper slope. The walls of the main and second levels are mainly finished in rock-faced limestone, and the highest level is finished in painted, lightly-textured stucco, which appears to be in good condition. The cut stone walls at the elevator tower and base of the building are in good condition. Some lower areas of the wall contain organic growth, but the majority of the wall surfaces are clean and the mortar joints are in good condition. The roof consists of asphalt shingles with sheet metal gutters and sheet metal rectangular downspouts. The gutters appear to be in fair condition. The downspouts are in fair to poor condition. Several of the downspouts have been crushed or dented from pedestrian traffic. The paint is peeling, revealing the galvanized sheet metal surface below. The gutters and downspouts appear to be a later addition and not original to the construction of the building, but still of older construction. The building also contains wood trim at the gable end and wood eaves at the upper tower area. Porches at the north and west are of timber construction with lath wood siding, and tongue-in-groove wood ceilings. All wood surfaces are stained a dark color. Wood trim, columns, porch roofs, and soffits appear to be in good condition. The finish is quite new and is performing well. Windows of the elevator building consist of double-hung wood sash with divided lights. Some windows also contain fixed divided light transoms. Window frames and sills are of wood construction and are painted. Wood storm windows are also used on all window openings. Window assemblies are in good condition. Paint at the sashes, frames, and storm windows are in good condition and well maintained. Doors at the Elevator Building consist of wood with multi-light glass inset panels and wood exterior storm doors. The north doors contain divided wood side lights and transoms. All doors are in fair condition. Some of the side lights and door assemblies have paint, which is worn, and glazing putty, which is deteriorated.

H-B-03 SUPERINTENDENT'S RESIDENCE (HS-3)

This one and a half story residence was constructed in 1934 by the CCC (*Figures 3-132 /BVH-08, 3-133 /BVH-09, 3-134 /BVH-10*). A sunroom was added to the southwest corner in 1940. The house is predominantly finished in stucco, with a massive fireplace chimney on the south side and a large limestone front terrace. The basement is exposed on the north side, with access to a single vehicle garage, original to the house. The foundation is concrete, with ashlar limestone veneer. The stucco is of a very heavy trowel finish and appears to be in good condition. Few

cracks were observed. The paint finish on the stucco is in very good condition. The limestone base and limestone terrace construction is also in good to fair condition. The mortar joints appear to be in good to fair condition and are weathering well. There is some algal growth, and discoloration was noted on the limestone around the base of the building at the ground line. The roof consists of asphalt shingles that appear to have been recently installed and are in good condition. At the roof edges there is a K-style gutter and rectangular downspouts, all formed from pre-finished aluminum. They also appear to be in good condition and recently installed. At the roof edge and in the gables are wood trim and lap siding at the roof gable ends. These wood elements are all stained with a dark seed-oil stain mixture. The trim and gable ends are in good to fair condition. Some members have splits and checks. The western façade contains a gable end which has some deteriorated clapboard siding. There are a variety of window styles on the residence. The northern section of the house contains wood double hung windows and wood sash frames. Aluminum window sashes in the southern portion of the building were retrofitted into the original wood frames. Some windows contain aluminum storms. New aluminum storms are mainly located at the replaced aluminum windows. The north side of the residence does not contain storm windows. The wood double hung windows are in fair to poor condition. The western windows lack paint finish, and the sills are in a deteriorated condition.

There are a variety of exterior doors, both new and original. These are typically wood with glass vision panels and a variety of raised panels. The porch entrance door is of natural finish oak, while the remainder of the doors is of painted wood. All door openings contain storm doors. The wood painted storm doors are in fair condition. Paint is peeling, with many areas of exposed wood. The aluminum combination storm doors, which are non-original, are in fair condition.

H-B-04 SUPERINTENDENT'S COTTAGE (HS-4)

The Superintendent's Cottage was constructed in 1905 (*Figures 3-135 /BVH-11, 3-136 /BVH-12, 3-137 /BVH-13*). The configuration of the Cottage is a "U" shape due to numerous additions over time. The front faces east, directly toward the opening of the cave. The body of the house is of stone construction, finished in painted, rough, textured stucco, with a limestone foundation and front terrace. The stucco is in good condition with very few cracks. There are several stones at the eastern end of the terrace that are deteriorated. The roof consists of asphalt shingles that appear to be recently installed and are in good condition, with new K-style aluminum gutters and rectangular downspouts, all in pre-finished brown metal. The gutters and downspouts are in good condition. At the roof edge and in the gables are wood trim and lap siding at the roof gable ends. These wood elements are all stained with a dark seed-oil stain mixture. The trim and gable ends are in good to fair condition. Some members have splits and checks. The wood is either painted or stained with a dark linseed oil stain mixture. Deterioration appears to be related to moisture penetration from the porch area and from freeze-thaw cycles. The windows consist of divided light sashes of a double hung configuration. Some of the windows have had sash replacements of a double hung aluminum construction that were set into the original wood frames and sills. The windows contain painted-wood storm sashes. The windows appear to be in good to fair condition. There are a few storm sashes where wood is cracked and checked. The doors are of a variety of configurations. The main door is composed of a stained wood slab construction with a wood storm door containing vision panels. The patio doors are constructed of multi-lighted wood

with multi-lighted storm doors matching the light configuration. The exterior doors appear to be in good condition and have recently been painted.

H-B-05 EMPLOYEE RESIDENCE (RANGER CABIN) (HS-5)

The one-story Ranger Cabin was constructed in 1924 (*Figures 3-138 /BVH-14, 3-139 /BVH-15, 3-140 /BVH-16*). The roof configuration is mainly hipped, with a gable end over the open front porch. The roof consists of asphalt shingles that appear to be recently installed and are in good condition, with new K-style aluminum gutters and rectangular downspouts, all in pre-finished brown metal. The gutters and downspouts are in good condition. At the roof edges and in the gable of the front porch is wood trim and lap siding at the roof gable ends. These wood elements are all stained with a dark seed-oil stain mixture. The trim and gable end are in good to fair condition. The wood is either painted or stained with a dark linseed oil stain mixture. The wall surfaces are comprised of painted stucco at the main body of the building, with the lower portion of the building being constructed of random-course cut limestone. The rails of the front porch are solid, with stucco finish matching that of the cabin. The stucco has been applied with a very heavy textured finish, is painted and in good condition with very few cracks. There is slight deterioration in the stone which appears to be related to moisture penetration from the porch area and from freeze-thaw cycles. The windows consist of divided light sashes of a double-hung configuration. Some of the windows have had sash replacements of a double-hung aluminum construction that were set into the original wood frames and sills. The windows contain painted-wood storm sashes. The windows appear to be in good to fair condition. There are a few storm sashes where the wood is cracked and checked. The doors are of a variety of configurations. The main door is composed of a stained-wood slab construction with a wood storm door containing vision panels. The patio doors are constructed of multi-lighted wood with multi-lighted storm doors matching the light configuration. The exterior doors appear to be in good condition and have recently been painted. Windows consist of the original and replacement windows. They are typically either single one-pane sashes or of double-hung configuration. It appears that the majority of the larger, double-hung windows have been replaced with aluminum hung sashes, retro-fitted into the original wood frames. These windows also contain aluminum storm units. The aluminum storms appear to be in good condition, and the aluminum replacement windows are also in good condition. There are also a couple of horizontal slider windows. They are also aluminum replacement windows with aluminum storm windows. The wood window frames are in good condition, and well painted as are the sills. Paint is in good condition and performing well. The wood of the door, on the front porch, and around the sides of the house is in good condition. The stone is in good condition, and the mortar joints are sound and in good condition.

The stone chimney of the house appears to be in fair condition. Stones appear to be somewhat discolored from moisture, and the mortar joints appear to be somewhat deteriorated, perhaps from exposure and moisture penetration.

H-B-06 EMPLOYEE RESIDENCE (HS-6)

This residence was constructed in 1934 (*Figures 3-141 /BVH-17, 3-142 /BVH-18*). The hipped gable roof consists of asphalt shingles that appear to be recently installed and are in good condition, with new K-style aluminum gutters and rectangular downspouts, all in pre-finished

brown metal. The gutters and downspouts are in good condition. At the roof edges and in the gables is wood trim and lap siding at the roof gable ends. These wood elements are all stained with a dark seed-oil stain mixture. The trim and gable ends are in good to fair condition. The wood is either painted or stained with a dark linseed oil stain mixture. The wall surfaces are comprised of painted stucco at the main body of the building, with the lower portion of the building being constructed of random course cut limestone. Walls consist of textured stucco with paint finish and a random course stone base. The exterior stucco walls are heavily textured. The paint finish is in good condition with very minor cracking of the plaster. The stone base of the Residence is in good to fair condition. There are a couple of sizable cracks in the stone foundation at the southeast corner. The remainder of the stone base appears to be in good condition with the mortar joints in good, solid condition.

The windows consist of divided light sashes of a double-hung configuration. Some of the windows have had sash replacements of a double-hung aluminum construction that were set into the original wood frames and sills. The windows contain painted-wood storm sashes. The windows appear to be in good to fair condition. There are a few storm sashes where the wood is cracked and checked. The limestone base construction is in good to fair condition. The mortar joints appear to be in good to fair condition and are weathering well. There is some algal growth, and discoloration was noted on the limestone around the base of the building at the ground line.

There are a series of patio doors off the main living room area. The patio doors are of divided light wood configuration with divided light sidelights. The wood is painted and the doors and sidelights appear to be in good to fair condition. Storm doors have been removed, leaving hinges exposed and weather stripping at the exterior doorframe.

The front porch is constructed of random course limestone with a lath stone porch floor surface. The stone porch appears to be in good condition. Some minor cracking was noted at the mortar joints, and a few stones are suffering from freeze/thaw deterioration.

H-B-07 EMPLOYEE RESIDENCE (HS-7)

This residence was constructed in 1932 (*Figures 3-143 /BVH-19, 3-144 /BVH-20*). The hipped roof consists of asphalt shingles that appear to be recently installed and are in good condition, with new K-style aluminum gutters and rectangular downspouts, all in pre-finished brown metal. The gutters and downspouts are in good condition. At the roof edges and in the gable of the front porch is wood trim and lap siding at the roof gable ends. The trim and gable end are in good to fair condition. The wood is either painted or stained with a dark seed-oil stain mixture. Walls of the residence consist of heavily textured plaster stucco with a limestone rubble base. The plaster is painted and is in good condition with very few cracks. The limestone base is also in good condition. Mortar joints are solid, and the stone is in good condition. There are a couple of minor cracks which occur at the porch area where some settlement may have occurred. The stone wing walls at the porch entrance stair are also heavily covered with algal growth, but appear to be in fair condition.

The front porch consists of wood pillars with a stucco lower wall railing. The pillars are in good condition, painted, with the paint film in excellent condition. The stucco is also in good

condition. The porch floor consists of tongue and groove wood boards covered by a layer of plywood. The plywood is painted and is in fair to poor condition. Much of the plywood is buckling, worn, and delaminating.

The original window frames and sills are of wood construction. The sashes have been removed and replaced with aluminum double-hung sashes with aluminum storm windows. The storm windows and replacement sashes are in good condition. The front door is composed of a stained wood slab construction with a wood storm door containing vision panels. The rear door is of solid slab wood construction with an aluminum storm door. The storm door is in fair condition, and the rear door is in good condition.

The stone chimney is in fair to poor condition. Iron angle brackets surrounding the chimney are rusted and deteriorated. Several of the stones within the chimney have cracked, are dislocated, and are in poor condition. There are several open mortar joints as well within the chimney configuration. Flashing at the chimney roof juncture appears to be in good condition.

H-B-8 EMPLOYEE RESIDENCE (RANGER'S DORMITORY & MESS HOUSE) (HS-8)

The one and a half story Ranger's Dormitory and Mess House was constructed in 1931 (*Figures 3-145 /BVH-21, 3-146 /BVH-22*). The house sits on a slope that falls away from back to front, and the foundation is not visible at the back. The building's hipped roof consists of asphalt shingles with K-style aluminum gutters and rectangular downspouts all constructed of pre-finished aluminum. The asphalt roof is in good condition and appears to be recently installed. The gutters and downspouts are also in good condition and appear to have been recently installed. The building's wall surfaces consist of heavily textured stucco with a random limestone finish below the main floor level. The stucco wall surfaces are in fair condition. There were several cracks noted around the perimeter of the building, particularly under windows that span from the windowsill to the stone base. The paint finish on the stucco is in good condition. The stone base appears to be in good condition. The sill areas have been recently tuck-pointed with a contrasting mortar material that does not match the original mortar. The stones themselves appear to be in good condition.

The east and south sides of the building are edged by a non-original wood porch with vertical wood porch railing systems stained a dark color. The porch appears to be in good to fair condition.

The roof edges and gables contain wood trim with lath wood siding gable in-fill. The wood at these areas is either painted or stained. The wood appears to be in good to fair condition with few areas of deteriorated material.

The windows of the dormitory consist of original wood frames and sills into which aluminum, double hung replacement sashes have been fitted. The windows also contain aluminum storm windows. The replacement windows appear to be in good condition. The original wood frames are also in good to fair condition. The original wood frames are painted and the paint finish is in excellent condition. The front door is composed of a stained wood slab construction with a wood

storm door containing vision panels. The rear door is of a solid slab wood construction with an aluminum storm door. The storm door is in fair condition, and the rear door is in good condition.

H-B-9 GARAGE (MACHINE SHOP SHED) (HS-11)

The Machine Shop Shed was constructed in 1934 (*Figures 3-147 /BVH-23, 3-148 /BVH-24*). The roof of the building consists of asphalt shingles with pre-finished aluminum K-style gutters and rectangular downspouts. The asphalt roof is in fair to poor condition. Several areas at the interior of the roof contain deteriorated shingles. Shingles have cupped and warped and there are several areas of uplifted tabs. The downspouts and gutters are in good condition and appear to have been recently installed. The garage's wall surfaces consist of heavily textured stucco plaster on the upper level with a limestone base. The stucco is in good condition. The painted surface is sound, and the stucco walls contain few areas of cracks. The limestone base of the building is in good to fair condition. There are several stones at the base of the building, mostly located at the lower garage door areas, which are deteriorated. Deterioration could be linked to vehicle abuse and also freeze/thaw intervals at the lower areas of the garage doors. The building's windows are of steel sash construction. The windows are in good to fair condition. The upper sashes tilt, allowing ventilation. The paint finish of the windows is in fair condition. The lower level garage doors consist of five pairs of wood doors, which contain upper divided light vision panels with lower inset diagonal wood panels. The doors are painted and are in fair condition. The doors exhibit some signs of sagging and misalignment. Door hardware, consisting of strap hinges and simple latches, are in fair condition. Some lower door panels exhibit signs of deteriorated or rotted wood.

H-B-10 GARAGE (FIRE CACHE) (HS-12)

Constructed in 1937, the Fire Cache Building is partially underground with an eastern exposure of three main doors (*Figures 3-149 /BVH-25, 3-150 /BVH-26*). The roof of the building is covered with sod. The roof condition is unknown. The stone parapets at the roof are in fair condition. There are a few open joints at the copings allowing moisture penetration, and there is some vegetation growth occurring at the open joints. Also on the sod roof there are some instrumentation pieces for moisture and meteorological measurements.

The building walls that emerge from the hillside are faced with random cut ashlar limestone. Walls are in good to fair condition. The stone contains some areas of deterioration from vehicle abuse and freeze/thaw cycles. Some limestone also contains a small amount of organic growth. The mortar joints appear to be mostly sound and are performing well.

The three pairs of garage doors are of built-up wood rail and style with upper divided light vision panels, in fair condition.

H-B-11 STORAGE BUILDING (POWER HOUSE) (HS-13)

The Power House was constructed in 1931 (*Figures 3-151 /BVH-27, 3-152 /BVH-28*). The equipment was removed between 1939 and 1942, and the building has been used as a storage shed since. The roof consists of asphalt shingles that are in good condition and appear to be

recently installed. The building contains no downspouts or gutters. Rainwater drips directly off the roof edge. The roof edge contains new galvanized flashings. The gable ends of the building contain wood trim with lath wood siding in-fill and appear to be in good to fair condition. The wood is stained in a dark color.

The walls of the storage building consist of stucco plaster surfaces with lower limestone battered base walls. The rough textured stucco is in good condition. Very few cracks were observed. The lower stone base wall is also in good condition. Some minor vertical cracking was observed at the stone walls, which may be due to thermal or foundation movements. Mortar joints within the wall are sound and functioning well. The storage building windows consist of steel sash, single-glazed windows with lower hopper operating section. Steel sashes appear to be in good condition. The paint finish is in fair condition. Some areas of caulking and touch up are needed.

The building contains two large wood entrance doors at the west façade that are original and of heavy wood panel construction with bead board wood inset diagonal panels. The wood doors are in fair condition. The paint finish is worn and deteriorated at the lower door areas. Several areas have been painted with aluminum panels.

H-B-12 VIP CENTER (POWER HOUSE) (HS-15)

This building, originally constructed in 1935, is now used as a VIP Center (*Figures 3-15 3/BVH-29, 3-154 /BVH-30, 3-155 /BVH-31*). The roof is of a simple hip form with a shed addition at the east and a shed overhang at the door entrance consisting of asphalt shingles. There are no downspouts or gutters installed on the building. The asphalt shingles are in good condition and appear to have been recently installed.

The building contains simple boxed-out wood eaves and soffits. The entrance canopy consists of exposed rafter and bracket construction. Wood eaves, soffits and brackets are all painted and appear to be in good condition. The paint surface in several locations shows some signs of cracking and de-lamination.

The building walls consist of a lightly textured stucco plaster surface applied over concrete. The eastern addition to the building consists of pressboard siding, which contains an imitation stucco finish. The painted stucco surfaces are in good condition. At some areas at the window sills the paint has eroded away, exposing the original concrete sill. The imitation stucco wood panels at the addition are in fair condition. Some joints are open and some of the stucco wood is warped.

The windows of the VIP Center consist of steel sash window units. The window frames contain a tilting vent sash, typically in the middle of the window. The paint finish on the steel windows is in fair condition. Some areas are exposed, allowing the window frame to rust.

H-B-13 GAS STATION/OIL HOUSE (HS-16)

This building, constructed in 1940, is a simple rectangular building with a gable roof (*Figures 3-156 /BVH-32, 3-157 /BVH-33*). The roof contains asphalt shingles with gable ends in-filled with lath wood siding. Gable ends also contain dimension-wood fascias. The asphalt roof appears to

be in fair to poor condition. Several areas of the roof have uplifted or lack mineral aggregate. The roof contains a polyvinyl chloride (PVC) downspout and gutter systems. Several areas of the downspout have lost their brown coloration. The roof of the building contains a small wood cupola vent that appears to be in fair condition. Some wood has been patched. The sides of the cupola need repair to some damaged or rotted wood members.

The gable ends containing wood fascias and lath siding are in fair condition. The paint is in good condition. Very few areas of wood deterioration were noted. The wall surfaces are of lightly textured stucco, in good condition, with the paint surface also in good condition. The building contains, steel sash windows with limestone sills. The steel windows appear to be in fair condition with the paint surface also in fair condition. The stone sills are in good condition. The base of the building contains a concrete curb that is in fair condition. The main door is a wood panel door with non-original metal vents cut into the bottom of the door assembly. The door is in fair condition, with panels exhibiting some wood de-lamination. The paint surface of the door and frame is in fair condition.

H-B-14 GARAGE A/CARPENTER SHOP (HS-17)

This garage, built in 1939, is a two-story structure built into a hillside with garage service bays at both levels (*Figures 3-158 /BVH-34, 3-159 /BVH-35*). The upper level is accessed from the northwest and the lower garage bays are entered from the southeast. Both the upper and lower levels of the garage contain five-garage bays. The simple gabled roof of the garage consists of asphalt shingles with K-style pre-finished aluminum downspouts and gutters. The asphalt roof appears to be in good condition, as do the gutters and downspouts, both recently installed.

The gable roof ends contain wood fascias and wood lath siding in-fill at the gable ends. The wood in these areas is stained a dark color. The wood and the stain appear to be in good condition. The wall surfaces at the upper level of the garage consist of lightly textured stucco which is painted. The lower level of the garage at the exposed areas consists of random ashlar limestone surfaces. The stucco upper surfaces are in good condition with few cracks. The paint finish is also in good condition. The limestone walls at the lower level of the garage are in good condition. The mortar appears to be sound and in good condition. The windows of the garage consist of steel industrial sashes. These windows contain upper pivot sashes to allow for ventilation. They are in fair condition. The paint is worn in many locations, allowing the steel sash to rust. The windows contain limestone sills that appear to be in good condition. The lower level garage doors consist of overhead wood-panel lift-type doors. Four doors appear to be original and contain eight vision panels with clear glass. These doors are in fair to poor condition. Lower rails are deteriorated from moisture penetration and rot. Many areas of the doors have been patched or repaired. The southernmost bay of the lower garage area has been extended with a wood lean-to addition. This addition allows a large fire truck to be housed in the garage stall. The lean-to addition utilizes textured Masonite wallboard with asphalt shingle shed roof surfaces. The addition appears to be in good condition.

The upper level garage doors are of design and configuration to the lower four original garage doors. The garage doors are also in fair to poor condition, containing areas of deterioration at the lower rails, and have been modified and reinforced many times.

The upper level garage area contains a small office with an entrance door. The entrance door is of wood construction with divided lights at an upper vision panel and a single wood inset panel at the lower area of the door. The door is in fair condition. The lower rail of the door has deteriorated from moisture penetration. The paint surfaces are deteriorated and peeling, leaving exposed wood surfaces.

H-B-15 GARAGE C/MAINTENANCE SHOP (HS-18)

The original six-bay section of Garage C was constructed in 1939 (*Figures 3-160 /BVH-36, 3-161 /BVH-37*). The two-bay addition at the northeast end was added in 1974. The Maintenance Shop has a simple gable roof form with asphalt shingles and K-style pre-finished aluminum downspouts and gutters. The asphalt shingles appear to be in fair condition. There are some asphalt shingles that have uplifted at the roof edges. The edge of the roof contains wood fascias with wood lath siding gable in-fills. The wood is either painted at the eaves, or stained at the gable in-fill areas. It appears to be in fair condition.

The walls of the garage and maintenance shop are composed of a smooth, stucco finish that is painted. The wall surfaces are in fair condition. There are several areas of cracked stucco at heads of overhead doors or from vehicle damage. At the larger garage component, several cracks have appeared in the stucco surface that are telescoping from the construction below. The paint surface of the walls is in good to fair condition.

The larger northern garage section contains steel sash windows, which are in fair condition. The larger northern garage section also contains wood overhead doors with an inset panel design. The central portion of the doors contains glass vision panels. The doors are in fair to poor condition. The rails of the garage doors show signs of rot from moisture. Many panels of the doors have been reinforced with steel straps to maintain integrity. The finish at the doors is in fair to poor condition. The garage doors at the southern narrow garage section consist of wood overhead doors. The doors appear to be of original construction with wood style and rail and wood panel insets. The garage doors also contain eight vision panels at the central portion of the door. One garage door has been modified with a band door of steel construction. The garage doors at the southern garage area are in fair to poor condition. The rails of the doors are rotted and in poor condition. The surface is failing and peeling, exposing the wood members.

H-B-16 STORAGE SHED (HS-25)

This is a small, rectangular building with a gable roof (*Figures 3-182 /BVH-58, 3-183 /BVH-59*). The wall surfaces are composed of lightly textured stucco plaster. The roof covering is asphalt shingles. The building has exposed rafter tails and wood fascias at the gable ends. The asphalt shingles are in good condition, and it appears that they have been recently installed.

The wood rafter tails and wood fascias are painted. These elements are in fair to poor condition. Paint is peeling and failing, leaving wood surfaces exposed to the elements. Wood fascias are split and warped. Rafter ends are deteriorating from exposure. The stucco plaster walls are painted a light buff color and appear to be in fair condition. There are some areas of the stucco walls that are exhibiting minor cracking.

The windows are composed of wood frames and sills, but are fitted with steel windows. The windows operate in a casement fashion. The wood frames and sills are in fair to poor condition. Paint coverings at the wood elements have failed, leaving wood elements exposed to the elements. Much of the wood is warped, checked, or split. The steel sash windows are in fair to poor condition. Several areas of the steel sash are no longer covered by paint, and the glazing putty is failing.

The main entrance door to the shed is composed of a wood panel door with large vision panels. Door is set in a wood frame. The wood door and frame are in fair to poor condition. The painted surface has completely failed, leaving much of the wood door elements exposed. Glazing putty at the door has failed. Bottom rails of the door are also deteriorated due to excessive moisture and rot.

H-B-17 SEASONAL RESIDENCE (CCC BUNKHOUSE) (HS-27)

The Seasonal Residence (CCC Bunkhouse) was constructed in 1934 (*Figures 3-162 /BVH-38, 3-163 /BVH-39, 3-164 /BVH-40*). It contains an asphalt shingle roof with K-style aluminum gutters and downspouts. Several of the downspouts are missing. The roof appears to be in good condition and recently installed. The edges of the roof have painted galvanized drip flashings. Much of the paint from the flashings has eroded away, exposing the galvanized flashings below. The roof contains painted exposed rafter tails and exposed roof sheathing at the roof eaves. Wood at several locations shows signs of rot or deterioration. Much of the wood fascias have peeling paint and cracked and checked wood surfaces. The building has been clad with textured plywood siding with a vertical wood impression that has been painted and is in fair condition. Many of the nails fixing the siding to the wall surface are loose and have popped from sliding movement. The building contains windows that are constructed of wood divided light sashes set in wood frames and sills with dimensioned wood trim. The windows are in poor condition. The frames, sashes, sills and trim contain paint that is severely deteriorated, exposing the wood components to weathering and rot. Several areas of deterioration have been observed. Putty at the window sashes has also deteriorated and is loose.

The front porch of the residence has shown signs of severe settlement which makes it virtually impossible to approach the building from this direction. Temporary shoring has been placed to support the porch roof structure that is constructed of wood railings, plank flooring, and columns. These elements are in poor condition. The railings and lower areas of the porch columns are deteriorated and show signs of rot. The underside of the porch has been clad in plywood.

H-B-18 PAINT LOCKER (COAL SHED) (HS-30)

The Coal Shed is a partially earth-sheltered structure (*Figures 3-165 /BVH-41, 3-166 /BVH-42*). Exposed walls on the east side are of limestone construction in a random ashlar pattern. A recent addition has been placed to the north of the coal shed. The addition incorporates steel framing with a shed roof construction that spans the gap between the Coal Shed and Garage A. The addition has a shed roof that spans the gap between the Garage and the Coal Shed and continues over the Coal Shed itself. The shed roof uses asphalt shingles and also contains a PVC downspout and gutter system. The roof appears to be in fair condition as are the downspout and gutter system.

There are dimension wood fascias and exposed rafter tails at the upper and lower edges of the shed roof. These surfaces are painted. The fascias and rafter tails are in good condition.

The wall surfaces of the new addition utilize vertical plywood siding that is painted. The siding is in good to fair condition.

H-B-19 RESIDENCE (QUARTERS B-40)

This single-family housing unit is located at the eastern edge of the Post-WWII Housing Area (*Figures 3-167 /BVH-43, 3-168 /BVH-44*). The roof is of asphalt shingle construction with PVC gutters and downspouts. The roof appears to be in fair condition as are the gutters and downspouts. The composition board lath siding is painted and appears to be in good condition. Windows are of aluminum double-hung construction with wood trim. They appear to be in good condition and the trim is in fair condition. The paint surface is faded and worn at some locations.

The house has a front patio of dimensioned timber, painted with a vertical board railing configuration. There is a small porch at the side of the residence at the back door, of similar construction. Both are in fair condition. Entrance doors consist of insulated steel door construction with aluminum storm doors. The doors appear to be in good condition. This house has a double-car garage which is a single rectangular shape with a single double-wide garage door. The garage contains the same roof, side, and trim and is in similar condition to the residence. The garage door is of a steel insulated type and appears to be in good condition.

H-B-20 RESIDENCE (QUARTERS B-41)

This single-family housing unit is located at the eastern edge of the Post WWII Housing Area (*Figures 3-169 /BVH-45, 3-170 /BVH-46*). The roof is of asphalt shingle construction with PVC gutters and downspouts. The roof appears to be in fair condition, and the gutters and downspouts are also in fair condition. The siding is of composition board lath siding material, which is painted. The siding appears to be in good condition. Windows are of aluminum, double-hung construction with wood trim. They appear to be in good condition, and the trim is in fair condition. The paint surface is faded and worn at some locations.

The house has a front patio of dimensioned timber, painted with a vertical board railing configuration. There is a small porch at the side of the residence at the back door, of similar construction. Both are in fair condition. Entrance doors consist of insulated steel door construction with aluminum storm doors. The doors appear to be in good condition. This house has a double-car garage that is a single rectangular shape with a single double-wide garage door. The garage has the same roof, side, and trim and is in similar condition to the residence. The garage door is of a steel insulated type and appears to be in good condition.

H-B-21 APARTMENT BUILDING (QUARTERS B-42)

This apartment building contains eight housing units, designated A through H (*Figure 3-171 /BVH-47*). The building is situated at the eastern side of the Post-WWII Housing Area and is of contemporary construction. The roof of the multi-unit residence is of asphalt. There are no downspouts or gutters. The eaves are clad in pre-finished aluminum fascias and soffits of a dark brown color. The roof and fascias are in good condition. The housing units are sided with aluminum siding of a buff, light yellow color. The aluminum siding is in good condition. The windows of the housing units are of aluminum slider configuration and appear to be in fair condition. The entrance doors to the housing units are of wood slab construction with aluminum storm doors. Front entry steps are concrete construction with painted steel handrails. Entrance doors appear to be in good to fair condition. Entrance steps and landings are in good condition. Painted steel railings are in fair condition.

H-B-22 APARTMENT BUILDING (QUARTERS B-43)

This apartment building contains four housing units, designated A through D (*Figures 3-172 BVH-48, 3-173 /BVH-49*). The building is situated at the eastern side of the Post-WWII Housing Area and is of contemporary construction. The roof of the multi-unit residence is of asphalt. There are no downspouts or gutters. The eaves are clad in pre-finished aluminum fascias and soffits of a dark brown color. The roof and fascias are in good condition. The housing units are sided with aluminum siding of a buff, light yellow color. The aluminum siding is in good condition. The windows of the housing units are of aluminum slider configuration and appear to be in fair condition. The entrance doors to the housing units are of wood slab construction with aluminum storm doors. Front entry steps are of concrete construction with painted steel handrails. Entrance doors appear to be in good to fair condition. Entrance steps and landings are in good condition. Painted steel railings are in fair condition.

H-B-23 APARTMENT BUILDING (QUARTERS B-44)

This apartment building contains four housing units of contemporary construction, designated A through D, and located at the Post-WWII Housing Area (*Figures 3-174 BVH-50, 3-175 /BVH-51*). The roof contains asphalt shingles. The gutters and downspouts at the roof edges are of PVC construction. The roof appears to be in good condition and the PVC downspouts and gutters are in fair condition. Some lower areas of the downspouts have been broken. Wood fascias and soffits are at the roof eaves. The wood trim is in fair condition. The paint surface has deteriorated on some of the elements, and the fascia boards are warped. The housing units have Masonite

wood lath siding, surface nailed. The siding is in fair condition. The windows consist of double-hung aluminum units with wood trim. The window units appear to be in good to fair condition and the window trim is in fair condition. The paint surface has faded and worn, allowing the wood to warp and check in many locations. The housing units have wood decking entrance porches with 2 x 2 vertical porch railing systems. The porches appear to be in good to fair condition. Some boards have warped or split. All wood porches are stained with a dark color to match other stained surfaces of the Headquarters Area. The entrance doors to the units are of a steel, panelized, insulated door construction. The doors are in fair condition and the paint surface has faded and is in need of repainting.

H-B-24 PICNIC AREA COMFORT STATION

This small building is contemporary in style, with a breezeway and a single unisex restroom. The building is constructed of split-block faced concrete masonry in a buff-gray color. It is covered by a corrugated-metal sheathed simple gable roof, with one eave supported by a freestanding concrete masonry wall; the other half of the building is comprised of the enclosed restroom. A metal door is located in the central wall, providing access from the covered section to the restroom. The original hinges have been modified with the addition of mortise-style hinges. The hinges are bent and the door no longer closes. The concrete masonry on the exterior gable end wall rises to a height of about five feet, above which is a triangular screened vent opening for ventilation. There is a vent on the lower part of one exterior wall, and a tall metal vent stack on the rear of the building. The building, which is of relatively recent construction, is surrounded by concrete sidewalk and appears to be in good condition.

H-S-01 WALK-IN CAVE ENTRANCE (CCC CAVE ENTRANCE & REVOLVING DOOR) (HS-90)

CCC Cave Entrance

The CCC cave entrance consists of an arched stone passageway designed in a naturalistic style. The passageway leads to a low wooden door set flush with a metal frame that is in turn set into the rustic rock tunnel. The door and frame are painted brown. The door has three oversized, highly decorative, rustic, black-painted iron strap hinges, with matching door handle, bolt, and other hardware. There is a porthole-type round window in the upper center of the door, also edged in iron. The door appears to be in fair to poor condition, with water damage along the bottom causing paint loss and some rot in the wood; much worn and chipped paint; and rust evident on and around the hinges and hardware where paint has also failed on the metal. The window glass is missing and the porthole is blocked instead with some kind of lath. A contemporary warning sign has been affixed to the door. Inside the door is a metal security gate, also showing evidence of rust (*Figures 3-184 /BVH-60 and 3-185 /BVH-61*).

Revolving Door

This is a relatively new entrance to the cave, added to the exterior of the original stone arched entrance that still exists (*Figures 3-186 /BVH-62 and 3-187 /BVH-63*). It is an extruded metal revolving passage with glass panels and a flat extruded metal roof, attached to a concrete wall

that connects to the original opening. The metal is corroding, and gaps at the bottom allow wind and weather to enter the cave.

H-B-31 PUMP HOUSE

The pump house is a rectangular building clad in vertical wood board-and-batten siding with a gable roof covered in standing-seam metal. The eaves overhang the building edges about one foot on all sides. The pump house has no windows and a single brown-painted metal door in the center of one long side. The pump house appears to be in good condition.

H-S-06 ABOVEGROUND WATER TANK

This large cylindrical silver-painted metal water tank is situated on a hill and surrounded by pine woodland.

H-S-07 UNDERGROUND WATER TANKS

The underground water tanks adjacent to the pump house described above are set below grade; their extent indicated by the level ground and sloped edges of the fill section that covers them. They are visible above ground only as flat rectangular metal access panels painted light gray, set on concrete bases parallel to the ground. They are roughly four feet square and project about six inches above grade. Curved light gray painted metal vent pipes also appear on the ground surface above the tanks. These aboveground features are in fair to good condition, with some rusting dents apparent on the metal panels.

H-S-08 WASTEWATER LAGOONS

The park's wastewater lagoons are located along U.S. 385 where it bypasses the Headquarters Area (*Figure 3-124 /2M-19*). The sewage treatment system consists of three one-acre sewer treatment lagoons that recently have been relined, but according to the GMP/EIS, "There is still concern that the sewage lagoon may not have adequate capacity during peak times for additional use."⁵³ Plans are being considered to relocate the lagoons out of Wind Cave canyon and constructing new lagoons to the north.

H-S-09 CAVE TOUR ASSEMBLY SHELTER

The Cave Tour Assembly Shelter is located between the Administration Building and the Walk-in Cave Entrance (*Figure 3-192 /BVH-68*). Its purpose is protection of tourists from the elements when waiting for a tour of the cave. It was constructed in 1974. The simple low-slope gable roof is of asphalt shingles, and in good condition. The fascias and gables are of wood and there are no gutters or downspouts. The structure is of heavy timber with open walls, supported on a low stone wall in an ashlar pattern. All wood elements are stained with a dark seed-oil stain mixture.

⁵³ NPS, GMP/EIS, 5.

The trim, gable ends, and structure are in good condition. The floor is a concrete slab at grade, with little cracking, in good condition.

H-S-10 ADMINISTRATION BUILDING (VISITOR CENTER) PEDESTRIAN BRIDGE

This footbridge connects the lower level of the Administration Building with the walkway to the cave entrance (*Figure 3-101 /E-19*). The footbridge was probably built by the CCC. It crosses the usually dry Wind Cave Canyon Creek. It is approximately seven feet wide and forty feet long. The bridge abutments are of ashlar-patterned rustic cut and mortared masonry, with the top blocks stepping down slightly on the outward ends. They project out as end walls roughly three feet high and six feet long on either end of the bridge. The bridge structure is of wood, with brown-painted wooden plank railings on the sides and wood plank treads. It appears to be in good condition.

H-S-11 PICNIC AREA STONE FOOTBRIDGE

This stone-edged footbridge crosses a small draw along the trail connecting the Picnic Area to the trailer parking lot. Low and unobtrusive, the bridge is roughly six feet wide and twelve feet long. The surface of the bridge is edged by long rectangular blocks of rustic-faced masonry, and the substructure is of ashlar-patterned rustic masonry. The tread is surfaced in crushed stone like the surrounding trail. There are no railings or guardrails. The bridge appears to be in fair condition, with lichens and some signs of age such as unevenness and chipping in the surface of the stone bridge sides.

H-S-12 STONE BARRIER WALLS (HS-94)

There is a large stone retaining wall supporting the parking lot (*Figures 3-118 /D-07, 3-193 /A-20*). Other stone walls occur in front of ponderosa pine plantings, along the parking lot, and around the Elevator Building courtyard (*Figures 3-194 /B-23 and 3-195 /F-19*).

H-S-13 STONE-FACED CULVERTS (HS-95)

Stone-faced culverts appear beneath the Headquarters Road grade where it crosses the streams that flow through Wind Cave Canyon. There are two of these large culverts, each with a stone headwall. One culvert is located just north of the Cave Walk-in Entrance, while the second is found just west of the Elevator Building. The latter is composed of dry-laid rough-hewn masonry blocks of varying sizes set as tapered flanking walls on either side of a corrugated metal pipe with a larger keystone block above the pipe. This culvert appears to be in good condition, with some vegetative overgrowth. A smaller stone-faced culvert of similar construction is found at the Maintenance Area, below the lower level maintenance yard, in a mown grass area. It appears to be in good condition. Another small stone-faced culvert is found south of the Administration Building (Visitor Center) (*Figure 3-200 /E-08*).

ELK MOUNTAIN CAMPGROUND

H-B-25 CAMPGROUND TENDER'S RESIDENCE

This building is a simple rectangular private residence located at the entrance to the Elk Mountain Camp Site (*Figures 3-176 /BVH-52 and 3-177 /BVH-53*). It contains a simple gable roof covered with asphalt shingles and lath wood siding walls. A small notch at the southwest corner forms the main entrance to the residence. Exposed rafter tails and light sheathing are expressed at deep gable end and eave overhangs. All eave fascias, rafters, and wood trim are painted. The lath wood siding is also painted. All wood surfaces, including trim, fascias, siding, and wood window trim, appear to be in good to fair condition. Only small portions of the corner appear to have poor paint coverage. New windows are of simple double-hung sash configuration. An architectural window is placed in the living room area. All windows have aluminum storm windows of a standard finish color. Windows appear to be in good to fair condition. The main entrance doors are of simple slab construction with vision panels. The doors have a clear finish that is worn and faded. These doors are in fair condition. The entrance doors also contain aluminum storm doors that are in fair condition.

H-B-26 CAMPGROUND COMFORT STATION

This simple rectangular building contains men's and women's restrooms, a small utility room, and an accessible restroom. It has a shallow, simple gable roof covered with light-colored rolled asphalt roofing material. The exterior walls are of yellow-painted stack bond masonry up to approximately five feet, above which are plywood panels interspersed with operable vent windows. The stack bond masonry and its paint are in good condition, with only very minor flaking visible at the base of the building. The plywood top wall areas are painted a dark brown color and appear to be in good condition. The windows located within the plywood wall area are aluminum hopper units with single-pane glass and exterior screens. Doors leading to men's and women's restrooms and the utility room are flush steel doors set in hollow metal frames, which are painted. The roof structure is composed of a central laminated beam with smaller beams twelve pitch. Roof decking is composed of by six dimension lumber with 2 x 6 fascias and edges. There are no gutters or downspouts at the roof edges. This building contains ADA accessible restrooms. The comfort station appears to be in good condition overall.

H-B-27 CAMPGROUND COMFORT STATION

Like the other comfort stations, this building is a simple rectangular building containing men's and women's restrooms, a small utility room, and an accessible restroom (*Figure 3-178 /BVH-54*). It has the same roof, windows, walls, doors, and paint colors as the campground comfort station described above. The masonry and paint appear to be in good condition. The plywood top wall areas are painted a dark brown color and appear to be in good to fair condition. The windows, doors, and hardware appear to be in working order and are in fair condition. Roofs appear to be in fair condition.

H-B-28 CAMPGROUND COMFORT STATION

This simple rectangular building, much like the two previous comfort stations, contains men's and women's restrooms, a small utility room, and an accessible portable toilet (*Figure 3-179 /BVH-55*). It has the same roof, walls, windows, doors, and paint colors. The stack bond masonry is in good condition. The paint is also in good condition. The plywood top wall areas appear to be in good to fair condition. Windows, doors and hardware appear to be in functioning or working order and are in fair condition. The roof structure is composed of a central laminated beam with smaller beams twelve pitch. Roof decking is composed of by six dimension lumber with 2 x 6 fascias and edges. There are no gutters or downspouts at the roof edges. Roofs appear to be in fair condition. This building does not contain ADA accessible restrooms.

H-B-29 CAMPGROUND COMFORT STATION

This simple rectangular building contains men's and women's restrooms, a small utility room, and a handicap accessible restroom (*Figure 3-180 /BVH-56*). It has the same roof, walls, windows, doors, and paint colors. The stack bond masonry is in good condition. The paint is also in good condition. The plywood top wall areas appear to be in good to fair condition. The windows appear to be in functioning or working order and are in fair condition. Doors and hardware all appear to be in fair condition. The roof structure is composed of a central laminated beam with smaller beams twelve pitch. Roof decking is composed of by six dimension lumber with 2 x 6 fascias and edges. There are no gutters or downspouts at the roof edges. Roofs appear to be in fair condition. This building does not contain ADA accessible restrooms.

H-B-30 CAMPGROUND COMFORT STATION

This simple rectangular building contains men's and women's restrooms, a small utility room, and a handicap accessible restroom (*Figure 3-181 /BVH-57*). It has a very shallow sloping, simple gable roof covered with rolled asphalt roofing material. The exterior walls are composed of stack bond masonry up to approximately five feet. Above that are plywood panels interspersed with operable vent windows. The stack bond masonry is painted and in good condition. The paint is also in good condition. The plywood top wall areas are painted a dark brown color and appear to be in good to fair condition. The windows located within the plywood wall area are aluminum hopper units with single-pane glass and exterior screens. These units appear to be in functioning or working order and are in fair condition. Doors leading to men's and women's restrooms and the utility room are flush steel doors set in hollow metal frames. The doors are painted, and the doors and hardware all appear to be in fair condition. The roof structure is composed of a central laminated beam with smaller beams twelve pitch. Roof decking is composed of by six dimension lumber with 2 x 6 fascias and edges. There are no gutters or downspouts at the roof edges. Roofs appear to be in fair condition. This building contains ADA accessible restrooms.

H-S-02 AMPHITHEATER STAGE

The Amphitheater consists of a small stage platform constructed of concrete with a wood-framed stage cover (*Figure 3-188 /BVH-62*). The amphitheater also contains a series of wood benches

arranged on a sloping hill at regular spacing. The stage cover contains a simple shed roof that is constructed of 4 x 6 wood beams with plywood sheathing. Asphalt shingle covers the roof structure. The wall surfaces are clad in wood board-and-batten siding in a vertical arrangement stained a light gray color. The wood siding, eaves, and soffits are all in good condition. The roof is in good to fair condition.

H-S-03 AMPHITHEATER PROJECTION BOOTH

At the rear of the seating area of the Amphitheater is a small projection booth (*Figure 3-189 /NPS-2*). The projection booth is under construction. It is constructed of wood framing with plywood siding and an asphalt shingle roof. It contains a simple shed roof that is constructed of 4x6 wood beams with plywood sheathing. An asphalt shingle roof covers the structure.

H-S-04 CAMPGROUND WOODSHED

This small rectangular gable roofed shelter is located near the entrance to the Campground and the Campground Residence/Office Building (*Figure 3-190 /BVH-66*). The roof is of cedar shingles in good condition. There are no fascias, gutters, or downspouts. The gables are of vertical tongue-and-groove board, stained a dark brown, in good condition. The roof is supported by six large hewn logs founded in the ground, stained a dark brown color, and in good condition. Three sides of the shelter are enclosed to a height of approximately four feet with horizontal boards, also stained a dark brown, in good condition. There is no floor construction.

H-S-05 CAMPGROUND HOST SHED

This is a rectangular building with a simple low slope gable roof (*Figure 3-191 /BVH-67*). The building walls consist of vertical-groove plywood siding and an asphalt shingle roof. A pair of double doors is located on the east side of the building. The plywood siding is painted yellow with brown trim and asphalt shingles appear to be in good condition. The plywood siding also appears to be in good condition.

VIEWS AND VISTAS

Views and vistas in the developed area are constrained by the location of many features in this area along the bottoms of relatively narrow, steep-sided drainages: the Headquarters Area, the housing areas, the Maintenance Area, and the wastewater lagoons are in the gorge formed by Wind Cave Canyon Creek, the campground is situated where Wind Cave Canyon Creek exits Elk Mountain, and the Mixing Circle lies along the bottom of Cottonwood Creek.

The Headquarters Area lies within a wooded swale and the only open views are across the parking lot. The Post-WWII Housing Area and the Maintenance Area have less tree cover and are considerably more open, but their position at the base of the drainage limits the range of view, while the wastewater lagoons are at the entrance to Wind Cave Canyon and are partially enclosed by canyon walls. The Mixing Circle is also situated down in drainage and is surrounded by low, pine-covered ridges. The campground sits within wooded parkland between two ridges

extending from Elk Mountain, and views are filtered. Within the developed area, there are no deliberately contrived vistas, no screen plantings, no framed views or focal points.

SMALL-SCALE FEATURES

There are various small-scale features located within the developed area; most are of twentieth century origin and associated with CCC or Mission 66 development. They include signs, site furnishings, fencing, gates, footbridges, bollards, wheelstops, lighting, and utility features.

HEADQUARTERS AREA

The Headquarters Area is fenced with 4.5 miles of seven-foot-tall metal post and wire fence and the campground is fenced with 2.5 miles of four-foot metal post and wire fence. Cattle guards are located where roads pass through the fencing. Chain link fence surrounds the wastewater lagoons and the utilities located adjacent to the pump house.

Small-scale features in the Headquarters Area include picnic tables, clotheslines, a propane tank, and a basketball hoop. There is terracing and a stone grill at the Superintendent's Residence and a fire ring with picnic tables in the Historic Housing Area. Signage includes painted wood and metal regulatory, directional, interpretation, and informational signage. There are also standard metal traffic signs. The park headquarters sign is timber with a stone base. Small-scale utility features include lampposts, utility poles, fire hydrants, pole-mounted overhead lighting that illuminates the parking area and sidewalk leading to the Administration Building (*Figures 3-196 /I-24, 3-197 /D-05, 3-95, 3-96, and 3-98*).

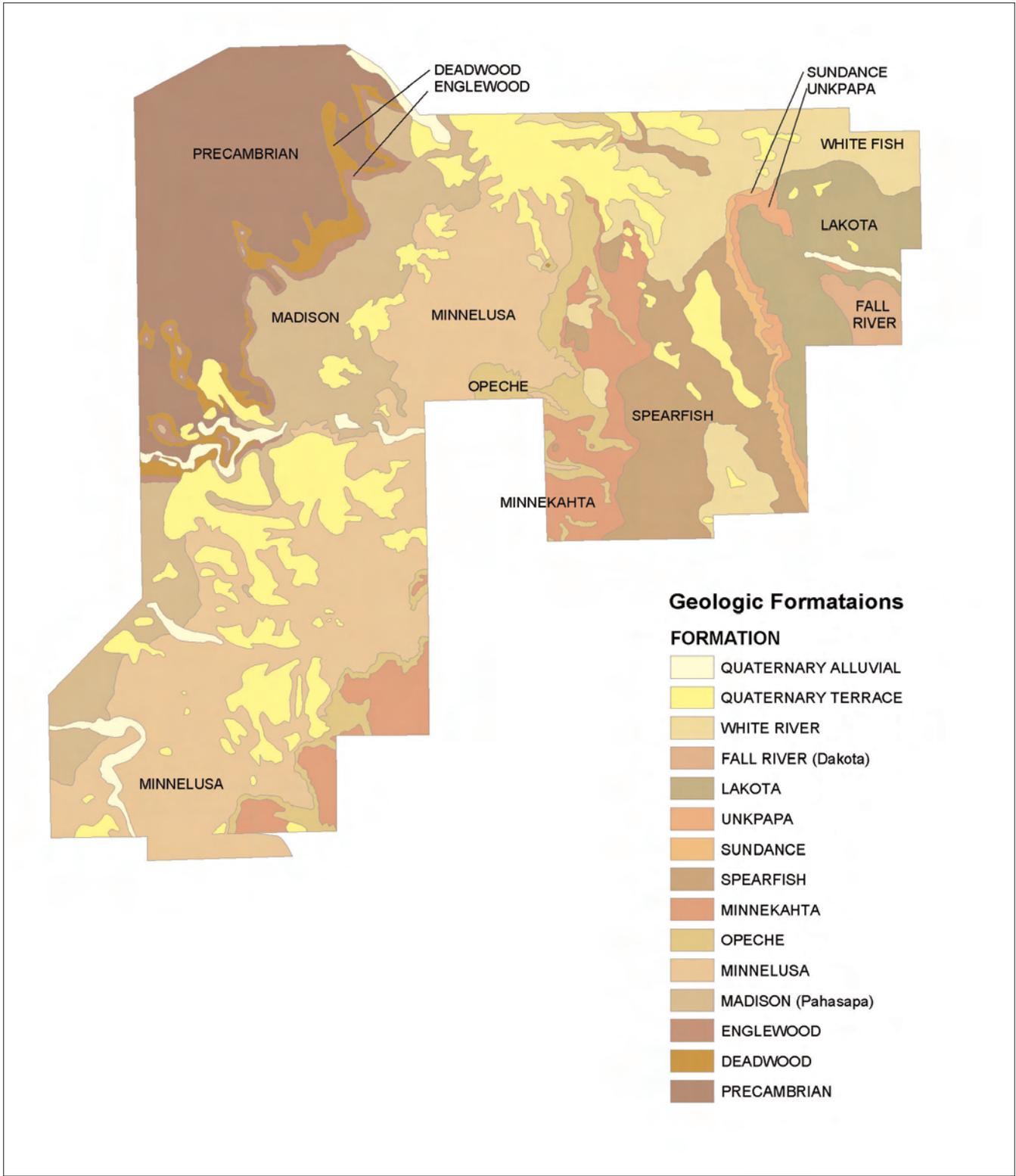
Site furnishings include two types of wood and metal frame benches—one with a back and one backless—set on concrete or flagstone paving near the building entrance; metal frame trash/recycling receptacles located at various points around the Administration Building; and a metal flagpole (*Figures 3-198 /M-13, 3-199 /M-10*). A post-and-rail fence and wooden railings edge the sidewalks beside the Administration Building (*Figure 3-98 /C-03*). There are handrails associated with steps.

There are numerous culverts located throughout the Headquarters Area. Some examples are a stone culvert beneath the sidewalk near the Administration Building, a stone and metal culvert beneath the sidewalk near the elevator building, a metal culvert under the service road to the Historic Housing Area, and a stone culvert in the Maintenance Area (*Figure 3-200 /E-08*). Other small-scale features in this area include a weather station, the Alvin McDonald Memorial, and a survey marker (*Figures 3-201 /K-06 and 3-202 /I-06*). The Alvin McDonald Memorial is a marker composed of a plaque attached to a large boulder, signage, and small boulders edging the trail (*Figure 3-203 /H-12*).

The Maintenance Area small-scale features include gas pumps, a propane tank, a large water pump, trashcans, and a dumpster (*Figure 3-107*). There are several miscellaneous storage bins and a metal retaining wall at the Mixing Circle, along with a portable toilet and various debris piles.

ELK MOUNTAIN CAMPGROUND

The Elk Mountain Campground furnishings include picnic tables, signs, trash and recycling receptacles, grills, and water spigots. Parking areas are edged with timber, bollards, and wheel stops (*Figures 3-204 /2V-06, 3-110, and 3-111*). The amphitheater has an overhead light, benches, two concrete fire rings, bollard lights, and trash receptacles. There is a pamphlet box at the head of the Elk Mountain Nature Trail.



Source: Wind Cave National Park, GIS Data.

Figure 3-1
Wind Cave National Park Geology.



Source: John Milner Associates, Inc., 2003.

Figure 3-2
(2Y-15) View of Beaver Creek.



Source: John Milner Associates, Inc., 2003.

Figure 3-3
(2A-16) View of Dry Creek channel.



Source: John Milner Associates, Inc., 2003.

Figure 3-4
(2C-22) Excessive gullying seen from NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-5
(2D-08) View of Red Valley looking at Boland Ridge.



Source: John Milner Associates, Inc., 2003.

Figure 3-6
(2M-05) Grassland in a gently sloping area.



Source: John Milner Associates, Inc., 2003.

Figure 3-7
(2J-03) Coniferous forest and woodland vegetation type at higher elevation.



Source: John Milner Associates, Inc., 2003.

Figure 3-8
(2W-22) Hardwood forest and woodlands in floodplains and drainage bottoms.



Source: John Milner Associates, Inc., 2003.

Figure 3-9
(2D-24) Evidence of fire management near NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-10
(2O-04) View south from U.S. 385.



Source: John Milner Associates, Inc., 2003.

Figure 3-11
(2M-14) View north from U.S. 385.



Source: John Milner Associates, Inc., 2003.

Figure 3-12
(2P-03) U.S. 385 at West Entrance to park.



Source: John Milner Associates, Inc., 2003.

Figure 3-13
(2Y-01) Pine-grass savannah and trail marker along Centennial Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-14
(2Q-16) View from SD 87.



Source: John Milner Associates, Inc., 2003.

Figure 3-15
(2Q-05) View from SD 87.



Source: John Milner Associates, Inc., 2003.

Figure 3-16
(2P-20) View approaching Beaver Creek Bridge.



Source: John Milner Associates, Inc., 2003.

Figure 3-17
(2K-14) Pull-off along U.S. 385.



Source: John Milner Associates, Inc., 2003.

Figure 3-18
(2Q-06) Pull-off along SD 87.



Source: John Milner Associates, Inc., 2003.

Figure 3-19
(2I-04) Pull-off along SD 87.



Source: John Milner Associates, Inc., 2003.

Figure 3-20
(2K-02) A county road off U.S. 385 near the South Entrance.



Source: John Milner Associates, Inc., 2003.

Figure 3-21
(2Q-22) View west along County Route 391 at park gate.



Source: John Milner Associates, Inc., 2003.

Figure 3-22
(2E-13) View north along NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-23
(2J-14) View from Rankin Ridge Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-24
(2I-10) View from Rankin Ridge Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-25
(2Y-07) View from Centennial Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-26
(2N-05) View east along Wind Cave Canyon Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-27
(2N-10) View east along Wind Cave Canyon Trail to Pump House.



Source: John Milner Associates, Inc., 2003.

Figure 3-28
(2I-13) View along Rankin Ridge Trail adjacent to a rocky face.



Source: John Milner Associates, Inc., 2003.

Figure 3-29
(2J-02) Rankin Ridge Fire Tower view.



Source: John Milner Associates, Inc., 2003.

Figure 3-30
(2F-23) A small hill screens the Wildlife Handling Facility from NPS Route 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-31
(2G-04) Corrals and chutes at Wildlife Handling Facility.



Source: John Milner Associates, Inc., 2003.

Figure 3-34
(2H-01) SD 87 at North Entrance.



Source: John Milner Associates, Inc., 2003.

Figure 3-35
(2E-14) Gravel pull-off along NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-36
(2A-02) South Entrance to park along NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-37
(2E-01) NPS 5 approaching the highland area of the park.



Source: John Milner Associates, Inc., 2003.

Figure 3-38
(2A-19) Intersection of NPS 5 and 6.



Source: John Milner Associates, Inc., 2003.

Figure 3-39
(2B-15) View north along NPS 6.



Source: John Milner Associates, Inc., 2003.

Figure 3-40
(2C-07) View north along NPS 6 near park entrance.



Source: John Milner Associates, Inc., 2003.

Figure 3-41
(2C-12) View of trailhead off NPS 6.



Source: John Milner Associates, Inc., 2003.

Figure 3-42
(2F-22) View along access road to Wildlife Handling Facility.



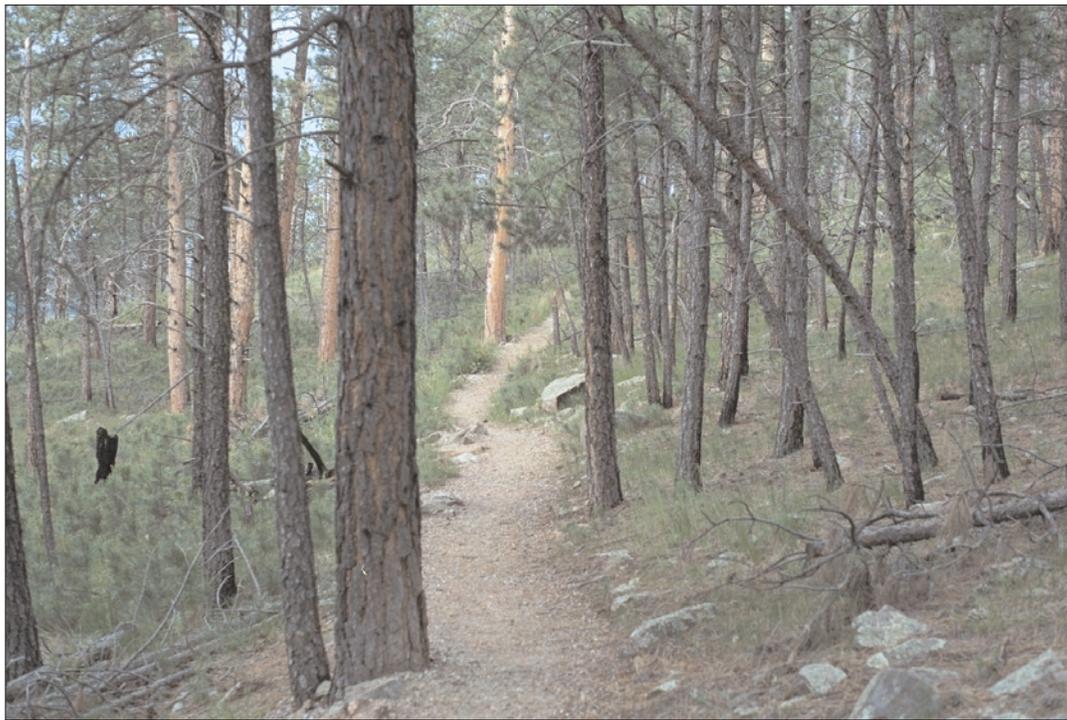
Source: John Milner Associates, Inc., 2003.

Figure 3-43
(2I-06) View along road to Rankin Ridge Trailhead.



Source: John Milner Associates, Inc., 2003.

Figure 3-44
(2F-03) Trailhead off NPS 5, trail beyond is barely discernable.



Source: John Milner Associates, Inc., 2003.

Figure 3-45
(2I-09) Rankin Ridge Trail passes through ponderosa pine forest.



Source: John Milner Associates, Inc., 2003.

Figure 3-46
(2X-19) Remnant planted vegetation at former game preserve headquarters.



Source: John Milner Associates, Inc., 2003.

Figure 3-47
(2F-25) Cabin at Wildlife Handling Facility.



Source: John Milner Associates, Inc., 2003.

Figure 3-48
(2I-20) Building at base of fire tower.



Source: John Milner Associates, Inc., 2003.

Figure 3-49
(2J-01) Rankin Ridge Fire Tower.



Source: John Milner Associates, Inc., 2003.

Figure 3-50
(2P-21) Beaver Creek Bridge along SD 87.



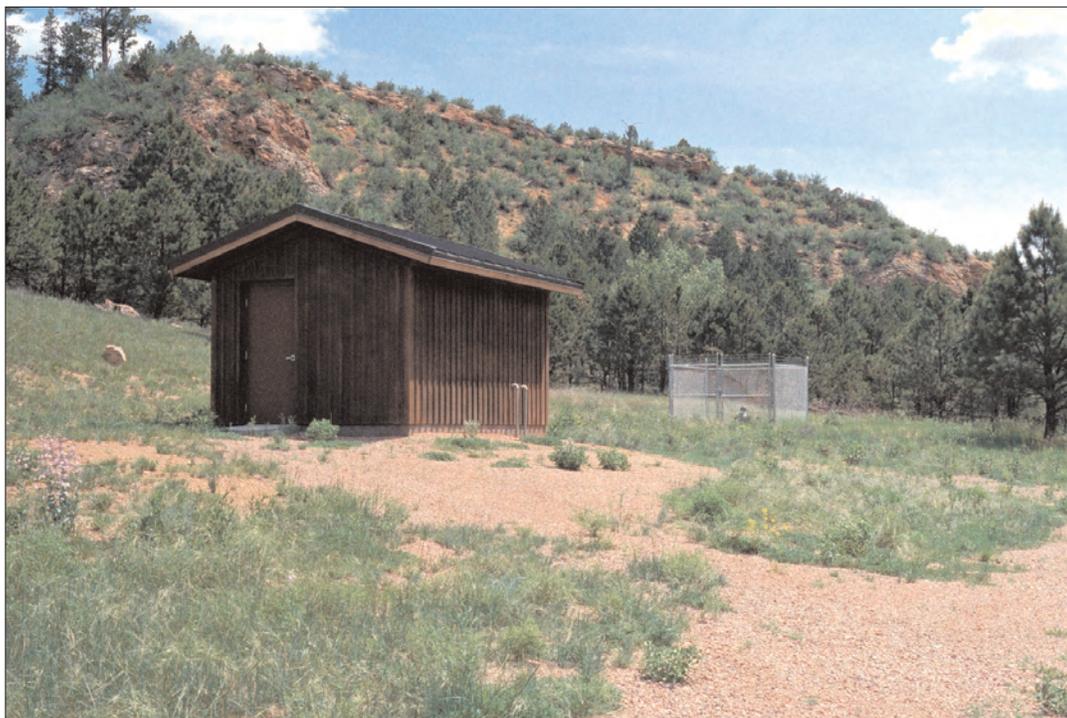
Source: John Milner Associates, Inc., 2003.

Figure 3-51
(2Q-13) Pig Tail Bridge along SD 87.



Source: John Milner Associates, Inc., 2003.

Figure 3-52
(2N-03) Shooting Range Booth, (former Ticket Booth used relocated from Visitor Center).



Source: John Milner Associates, Inc., 2003.

Figure 3-53
(2N-11) Pump House at end of Wind Cave Canyon Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-54
(2N-15) Stone and timber structure along Wind Cave Canyon Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-55
(2Y-17) USGS water gauging station near Beaver Creek.



Source: John Milner Associates, Inc., 2003.

Figure 3-56
(2J-24) View from Gobbler Pass.



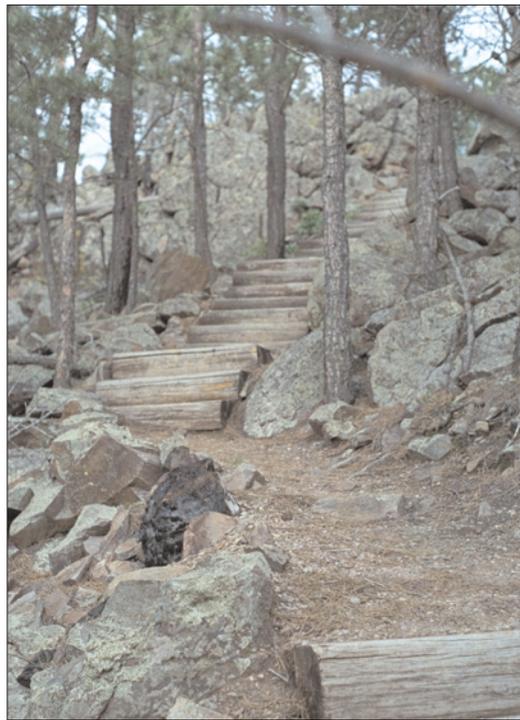
Source: John Milner Associates, Inc., 2003.

Figure 3-57
(2E-05) View across Red Valley from NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-58
(2I-15) Rankin Ridge Trail wood trail marker and rustic log bench.



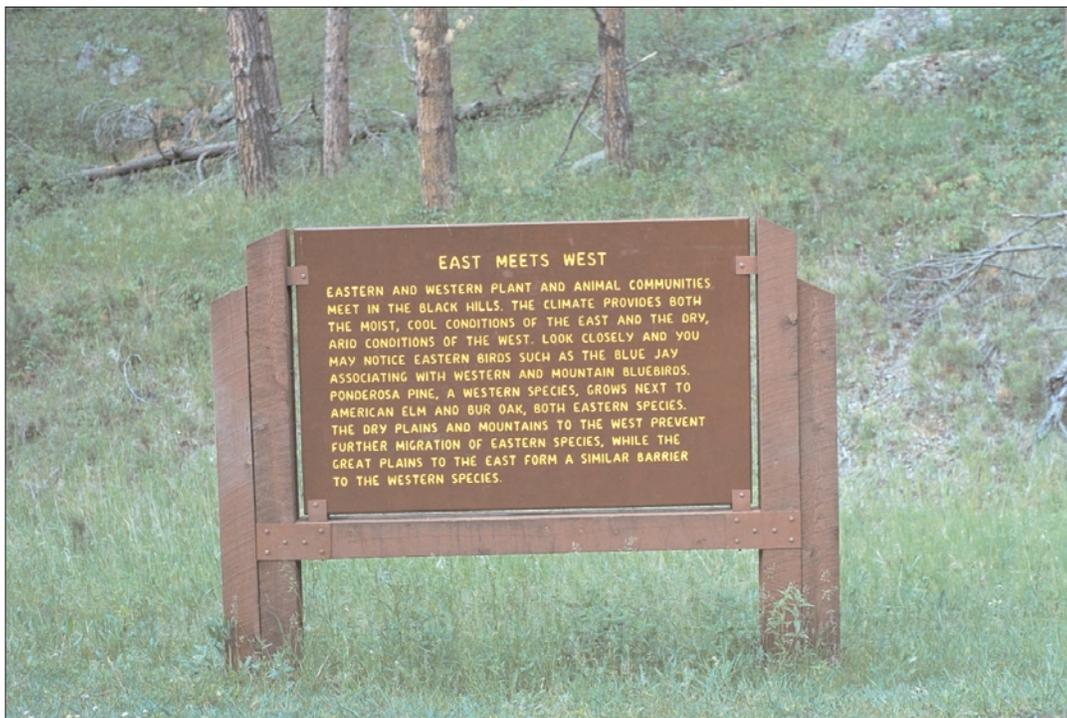
Source: John Milner Associates, Inc., 2003.

Figure 3-59
(2I-14) Timber steps along Rankin Ridge Trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-60
(2P-08) Timber and stone interpretive exhibit.



Source: John Milner Associates, Inc., 2003.

Figure 3-61
(2Q-17) Timber and routed-wood panel interpretive exhibit.



Source: John Milner Associates, Inc., 2003.

Figure 3-62
(2A-03) Woven-wire perimeter fencing and cattle guard at park's boundary at NPS 5.



Source: John Milner Associates, Inc., 2003.

Figure 3-63
(2K-06) Fence along southern perimeter of park.



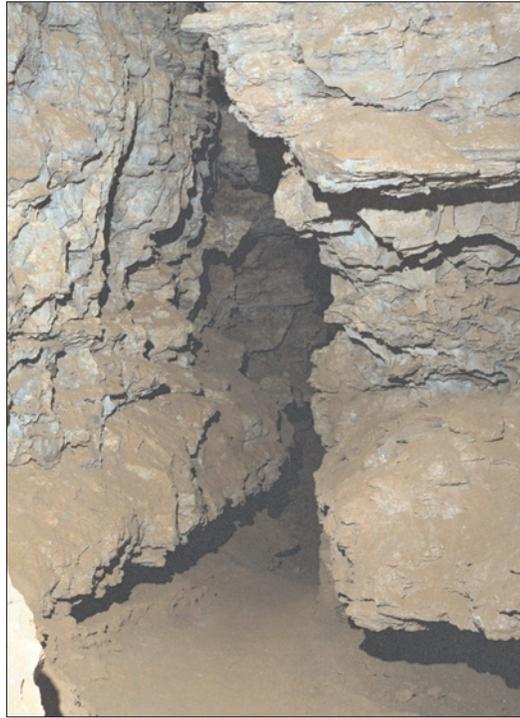
Source: John Milner Associates, Inc., 2003.

Figure 3-64
(2F-19) Cattle guard in Highland Creek streambed.



Source: John Milner Associates, Inc., 2003.

Figure 3-65
(2X-18) Abandoned hydrant at former Game Preserve headquarters.



Source: John Milner Associates, Inc., 2003.

Figure 3-66
(CC-21) Cave excavation for trail.



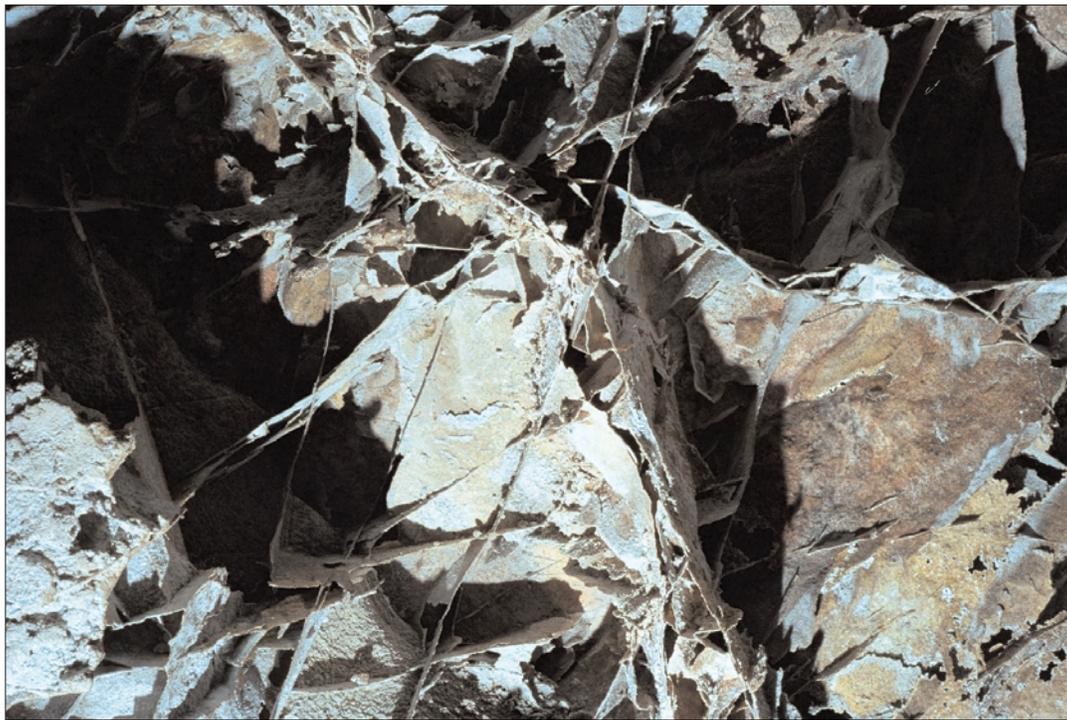
Source: John Milner Associates, Inc., 2003.

Figure 3-67
(2R-18) Blowhole near Mixing Circle.



Source: John Milner Associates, Inc., 2003.

Figure 3-68
(CB-03) Popcorn or globulites seen throughout the cave.



Source: John Milner Associates, Inc., 2003.

Figure 3-69
(CC-17) Example of boxwork formation.



Source: John Milner Associates, Inc., 2003.

Figure 3-70
(CA-03) Stairs leading into cave.



Source: John Milner Associates, Inc., 2003.

Figure 3-71
(CA-07) Spiral staircase near Walk-in Entrance.



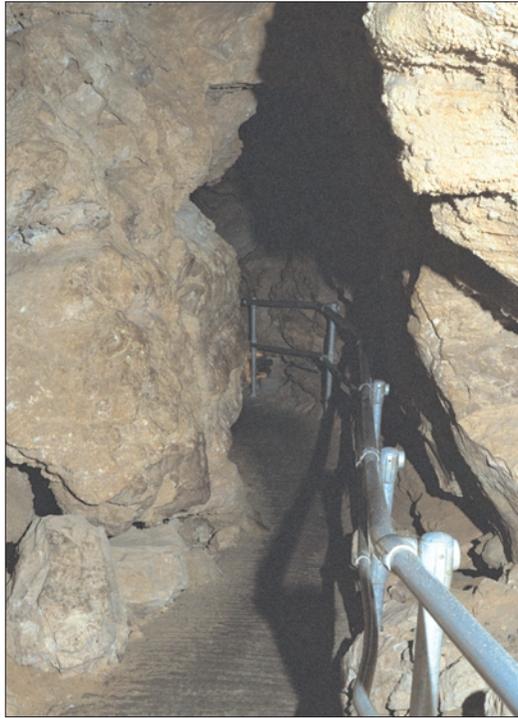
Source: John Milner Associates, Inc., 2003.

Figure 3-72
(CB-21) Path approaching Garden of Eden.



Source: John Milner Associates, Inc., 2003.

Figure 3-73
(CC-13) Trail in Fairgrounds.



Source: John Milner Associates, Inc., 2003.

Figure 3-74
(CA-15) View of trail along Natural Entrance
Tour Route.



Source: John Milner Associates, Inc., 2003.

Figure 3-75
(CB-19) Stone-lined trail.



Source: John Milner Associates, Inc., 2003.

Figure 3-76
(CB-13) Aluminum Escape Stairs in cave.



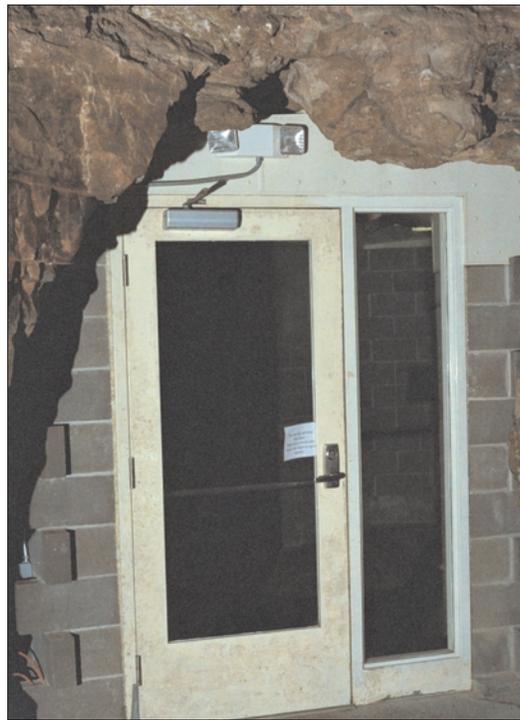
Source: John Milner Associates, Inc., 2003.

Figure 3-77
(CC-23) Wood board ladder along Candlelight Tour.



Source: John Milner Associates, Inc., 2003.

Figure 3-78
(CC-24) Walkway of fitted stone.



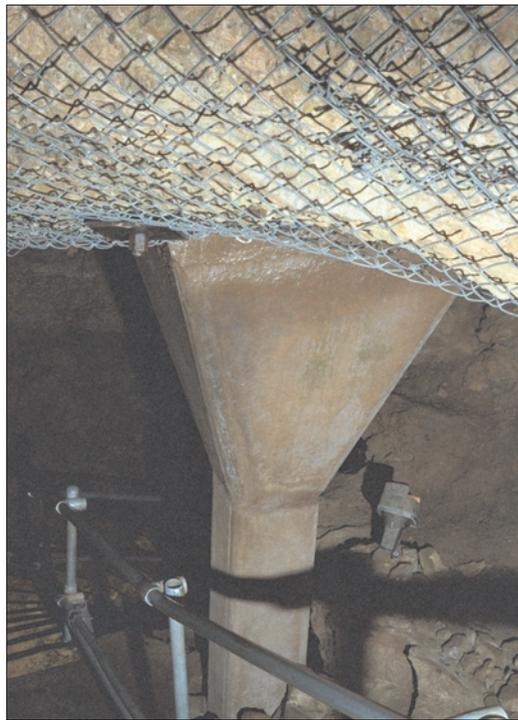
Source: John Milner Associates, Inc., 2003.

Figure 3-79
(CB-16) Cave antechamber housing elevator.



Source: John Milner Associates, Inc., 2003.

Figure 3-80
(CB-17) Cave elevator.



Source: John Milner Associates, Inc., 2003.

Figure 3-81
(CA-05) Concrete pillars and chain link fence
for stabilization with handrail and light fixture.



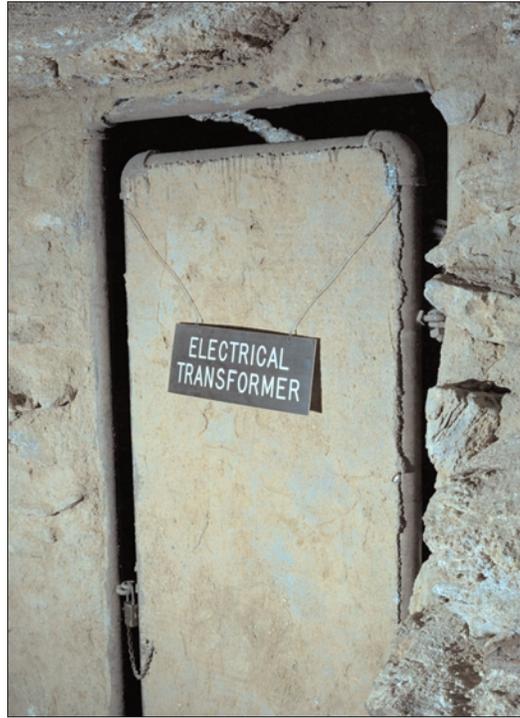
Source: John Milner Associates, Inc., 2003.

Figure 3-82
(CB-01) Painted concrete reinforcement pillars.



Source: John Milner Associates, Inc., 2003.

Figure 3-83
(CC-08) Lighting fixture.



Source: John Milner Associates, Inc., 2003.

Figure 3-84
(CA-16) Transformer box.



Source: John Milner Associates, Inc., 2003.

Figure 3-85
(CB-06) Piles of stone to conceal wiring.



Source: John Milner Associates, Inc., 2003.

Figure 3-86
(CC-04) Cave telephone.



Source: John Milner Associates, Inc., 2003.

Figure 3-87
(CB-12) Painted survey station from 1902.



Source: John Milner Associates, Inc., 2003.

Figure 3-88
(CC-02) Historic graffiti.



Source: John Milner Associates, Inc., 2003.

Figure 3-89
(CC-03) USGS survey marker.



Source: John Milner Associates, Inc., 2003.

Figure 3-90
(CB-04) Pile of rubble.



Source: John Milner Associates, Inc., 2003.

Figure 3-91
(CB-07) Contrast of dust-covered and cleaned cave surface.



Source: John Milner Associates, Inc., 2003.

Figure 3-92
(CC-14) Wood benches on concrete steps in front of the Frostwork Ledge in the Fairgrounds.



Source: John Milner Associates, Inc., 2003.

Figure 3-93
(H-01) View of Headquarters Area looking southwest.



Source: John Milner Associates, Inc., 2003.

Figure 3-94
(H-02) View of Headquarters Area looking west.



Source: John Milner Associates, Inc., 2003.

Figure 3-95
(H-13) Natural Entrance north of Headquarters Area Walk-in Entrance.



Source: John Milner Associates, Inc., 2003.

Figure 3-96
(B-05) View of north end of Visitor Center parking.



Source: John Milner Associates, Inc., 2003.

Figure 3-97
(B-22) View south in front of the Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-98
(C-03) Visitor Center (HS-1).



Source: John Milner Associates, Inc., 2003.

Figure 3-99
(B-07) View south of Walk-in Cave Entrance and walk leading to Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-100
(E-02) View of walk leading to the south end of the Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-101
(E-19) View north of stone and timber bridge and trail to Walk-in Entrance and Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-102
(G-08) View looking west of Visitor Center and Historic Housing Area.



Source: John Milner Associates, Inc., 2003.

Figure 3-103
(H-04) View looking west of Historic Housing Area and access road.



Source: John Milner Associates, Inc., 2003.

Figure 3-104
(2W-09) Picnic area access road.



Source: John Milner Associates, Inc., 2003.

Figure 3-105
(F-03) View east of Elevator Building parking and road leading to Post WWII Housing Area and Maintenance Area.



Source: John Milner Associates, Inc., 2003.

Figure 3-106
(G-11) View looking southeast of Post WWII Housing Area.



Source: John Milner Associates, Inc., 2003.

Figure 3-107
(2S-24) View of Maintenance Area from the west.



Source: John Milner Associates, Inc., 2003.

Figure 3-108
(2X-07) View looking east along road to underground water tanks.



Source: John Milner Associates, Inc., 2003.

Figure 3-109
(2U-07) Entrance to campground looking west.



Source: John Milner Associates, Inc., 2003.

Figure 3-110
(2V-20) View of campground loop looking west.



Source: NPS, 2005.

Figure 3-111
(NPS-1) View of amphitheater looking west.



Source: John Milner Associates, Inc., 2003.

Figure 3-112
(2R-12) View along road at Mixing Circle.



Source: John Milner Associates, Inc., 2003.

Figure 3-113
(2S-20) Parking lot at Apartment Building in Post WWII Housing Area (Quarters B-42).



Source: John Milner Associates, Inc., 2003.

Figure 3-114
(2T-11) Lower level parking area at Maintenance Area.



Source: John Milner Associates, Inc., 2003.

Figure 3-115
(L-04) Road through Historic Housing Area looking southeast.



Source: John Milner Associates, Inc., 2003.

Figure 3-116
(J-23) Upper-level road through Historic Housing Area looking northwest.



Source: John Milner Associates, Inc., 2003.

Figure 3-117
(I-17) Service road to underground tanks looking northwest.



Source: John Milner Associates, Inc., 2003.

Figure 3-118
(D-07) Visitor Center sidewalk and Stone Barrier Walls (HS-94) along east edge of parking lot south of Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-119
(D-17) Concrete steps connect lower-level sidewalk and south end of Visitor Center parking lot.



Source: John Milner Associates, Inc., 2003.

Figure 3-120
(E-16) Wheel chair accessible ramp at north end of Visitor Center during construction.



Source: John Milner Associates, Inc., 2003.

Figure 3-121
(H-15) Prairie Vista Trail path with log steps and gravel surface.



Source: John Milner Associates, Inc., 2003.

Figure 3-122
(2W-14) Path at picnic area. Note stone bridge.



Source: John Milner Associates, Inc., 2003.

Figure 3-123
(2X-03) Underground water tanks.



Source: John Milner Associates, Inc., 2003.

Figure 3-124
(2M-19) Wastewater lagoons near Maintenance Area.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-125
(BVH-01) Visitor Center front lawn area looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-126
(BVH-02) Visitor Center front lawn area looking north east.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-127
(BVH-03) South side of Visitor Center.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-128
(BVH-04) View looking northwest of Visitor Center.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-129
(BVH-05) Elevator Building (HS-2) looking from walk connecting to Visitor Center.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-130
(BVH-06) Elevator Building looking from northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-131
(BVH-07) View of Elevator Building from southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-132
(BVH-08) Superintendent's Residence (HS-3) looking west.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-133
(BVH-09) Superintendent's Residence looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-134
(BVH-10) Superintendent's Residence looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-135
(BVH-11) Superintendent's Cottage (HS-4) looking west.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-136
(BVH-12) Superintendent's Cottage looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-137
(BVH-13) Superintendent's Cottage looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-138
(BVH-14) Residence (Ranger Cabin HS-5) looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-139
(BVH-15) Residence (Ranger Cabin HS-5) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-140
(BVH-16) Residence (Ranger Cabin HS-5) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-141
(BVH-17) Residence (HS-6) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-142
(BVH-18) Residence (HS-6) looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-143
(BVH-19) Residence (HS-7) looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-144
(BVH-20) Residence (HS-7) looking east.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-145
(BVH-21) Residence (HS-8) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-146
(BVH-22) Residence (HS-8) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-147
(BVH-23) Garage (HS-11) looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-148
(BVH-24) Garage (HS-11) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-149
(BVH-25) Top of garage (HS-12) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-150
(BVH-26) Garage looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-151
(BVH-27) Storage Building (HS-13) looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-152
(BVH-28) Storage Building looking west.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-153
(BVH-29) VIP Center (HS-15) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-154
(BVH-30) VIP Center (HS-15) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-155
(BVH-31) VIP Center (HS-15) looking north.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-156
(BVH-32) Gas Station (HS-16) looking north.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-157
(BVH-33) Gas Station (HS-16) looking south.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-158
(BVH-34) Garage A (HS-17) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-159
(BVH-35) Garage A looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-160
(BVH-36) Garage C (HS-18) looking north.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-161
(BVH-37) Garage C looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-162
(BVH-38) Seasonal Residence (CCC Bunkhouse) (HS-27) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-163
(BVH-39) Seasonal Residence (CCC Bunkhouse) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-164
(BVH-40) Seasonal Residence (CCC Bunkhouse) looking south.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-165
(BVH-41) Paint Locker/Coal Shed (HS-30) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-166
(BVH-42) Garage A and Paint Locker/Coal Shed looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-167
(BVH-43) Residence (Quarters B-40) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-168
(BVH-44) Residence (Quarters B-40) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-169
(BVH-45) Residence (Quarters B-41) looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-170
(BVH-46) Residence (Quarters B-41) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-171
(BVH-47) Apartments (Quarters B-42) looking east.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-172
(BVH-48) Apartments (Quarters B-43) looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-173
(BVH-49) Apartments (Quarters B-43) looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-174
(BVH-50) Apartments (Quarters B-44) looking north.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-175
(BVH-51) Apartments (Quarters B-44) looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-176
(BVH-52) Campground Tender's Residence looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-177
(BVH-53) Campground Tender's Residence looking south.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-178
(BVH-54) Campground Comfort Station looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-179
(BVH-55) Campground Comfort Station looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-180
(BVH-56) Campground Comfort Station looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-181
(BVH-57) Campground Comfort Station looking northeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-182
(BVH-58) Carpenter Shop looking northwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-183
(BVH-59) Carpenter Shop looking southeast.



Source: John Milner Associates, 2003.

Figure 3-184
(BVH-60) Cave CCC-era Walk-in Entrance gate.



Source: John Milner Associates, 2003.

Figure 3-185
(BVH-61) Cave CCC-era Walk-in Entrance door.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-186
(BVH-62) Cave Walk-in Entrance revolving door.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-187
(BVH-63) Cave Walk-in Entrance revolving door roof looking southeast.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-188
(BVH-62) Amphitheater stage and campfire pit.



Source: NPS, 2005.

Figure 3-189
(NPS-2) Amphitheater projection booth.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-190
(BVH-66) Woodshed near Campground Tender's Residence looking north.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-191
(BVH-67) Campground Host Shed looking southwest.



Source: Bahr Vermeer Haecker, 2003.

Figure 3-192
(BVH-68) Cave Tour Assembly Shelter looking north.



Source: John Milner Associates, 2003.

Figure 3-193
(A-20) Barrier Wall (HS-94) at Visitor Center parking lot looking northwest.



Source: John Milner Associates, Inc., 2003.

Figure 3-194
(B-23) Retaining wall in front of ponderosa pines.



Source: John Milner Associates, Inc., 2003.

Figure 3-195
(F-19) Retaining wall at Elevator Building courtyard.



Source: John Milner Associates, Inc., 2003.

Figure 3-196
(I-24) Furnishings at Superintendent's Residence.



Source: John Milner Associates, Inc., 2003.

Figure 3-197
(D-05) Stone wall, handrail, signage, and wall lights near Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-198
(M-13) Bench at Elevator Building.



Source: John Milner Associates, Inc., 2003.

Figure 3-199
(M-10) Small-scale features at Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-200
(E-08) Stone culvert beneath sidewalk at Visitor Center.



Source: John Milner Associates, Inc., 2003.

Figure 3-201
(K-06) Weather station in historical residence area.



Source: John Milner Associates, Inc., 2003.

Figure 3-202
(I-06) Survey marker.



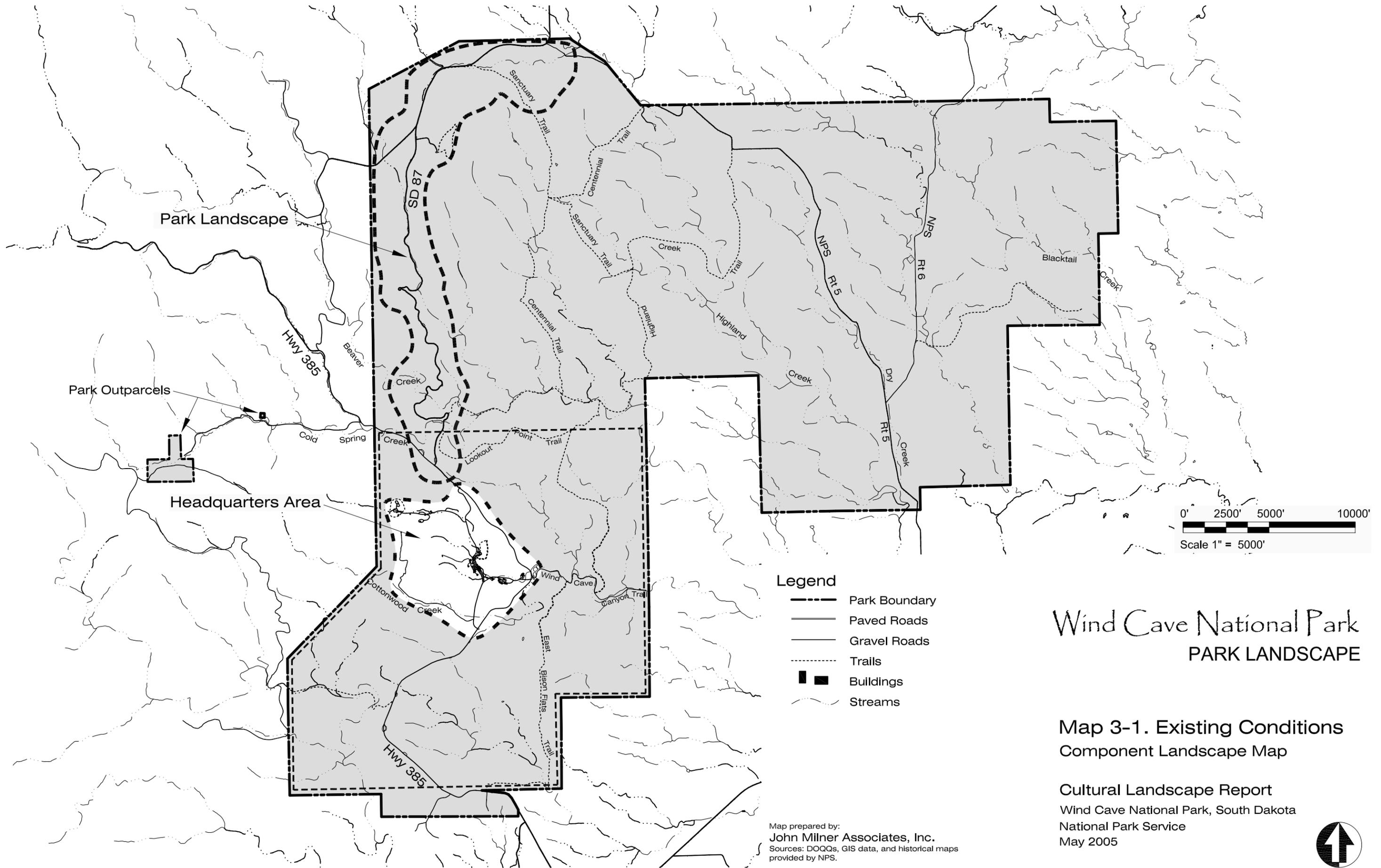
Source: John Milner Associates, Inc., 2003.

Figure 3-203
(H-12) Alvin McDonald's grave site.



Source: John Milner Associates, Inc., 2003.

Figure 3-204
(2V-06) Campground furnishings.



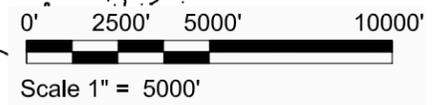
Park Landscape

Park Outparcels

Headquarters Area

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- Streams



Wind Cave National Park

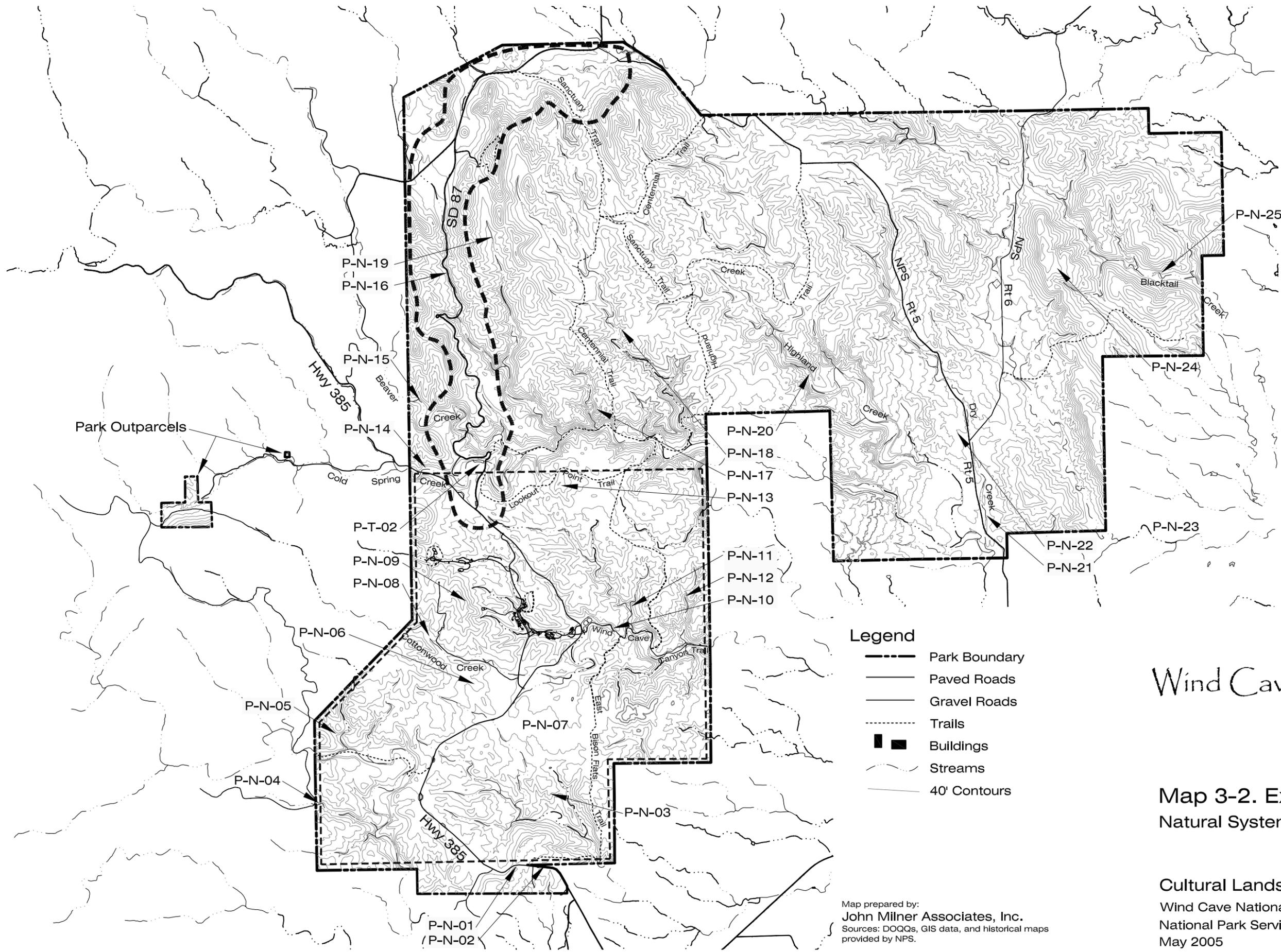
PARK LANDSCAPE

Map 3-1. Existing Conditions
Component Landscape Map

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005

Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps
provided by NPS.





- LEGEND**
- NATURAL SYSTEMS**
- P-N-01 Gobbler Pass
 - P-N-02 Gobbler Ridge
 - P-N-03 Gobbler Canyon
 - P-N-04 Limestone Spring
 - P-N-05 Fossil Ridge
 - P-N-06 Windy Point
 - P-N-07 Bison Flats
 - P-N-08 Cottonwood Creek
 - P-N-09 Elk Mountain
 - P-N-10 Wind Cave Canyon
 - P-N-11 Prairie Dog Canyon
 - P-N-12 Negro Canyon
 - P-N-13 Lookout Point
 - P-N-14 Cold Spring Creek
 - P-N-15 Beaver Creek
 - P-N-16 Reaves Gulch
 - P-N-17 Curley Canyon
 - P-N-18 Limestone Canyon
 - P-N-19 Rankin Ridge
 - P-N-20 Highland Creek
 - P-N-21 Dry Creek
 - P-N-22 Red Valley
 - P-N-23 Fuson Canyon
 - P-N-24 Boland Ridge
 - P-N-25 Blacktail Creek
- TOPOGRAPHY**
- P-T-02 Old Norbeck Dam



- Legend**
- Park Boundary
 - Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Streams
 - 40' Contours

Wind Cave National Park

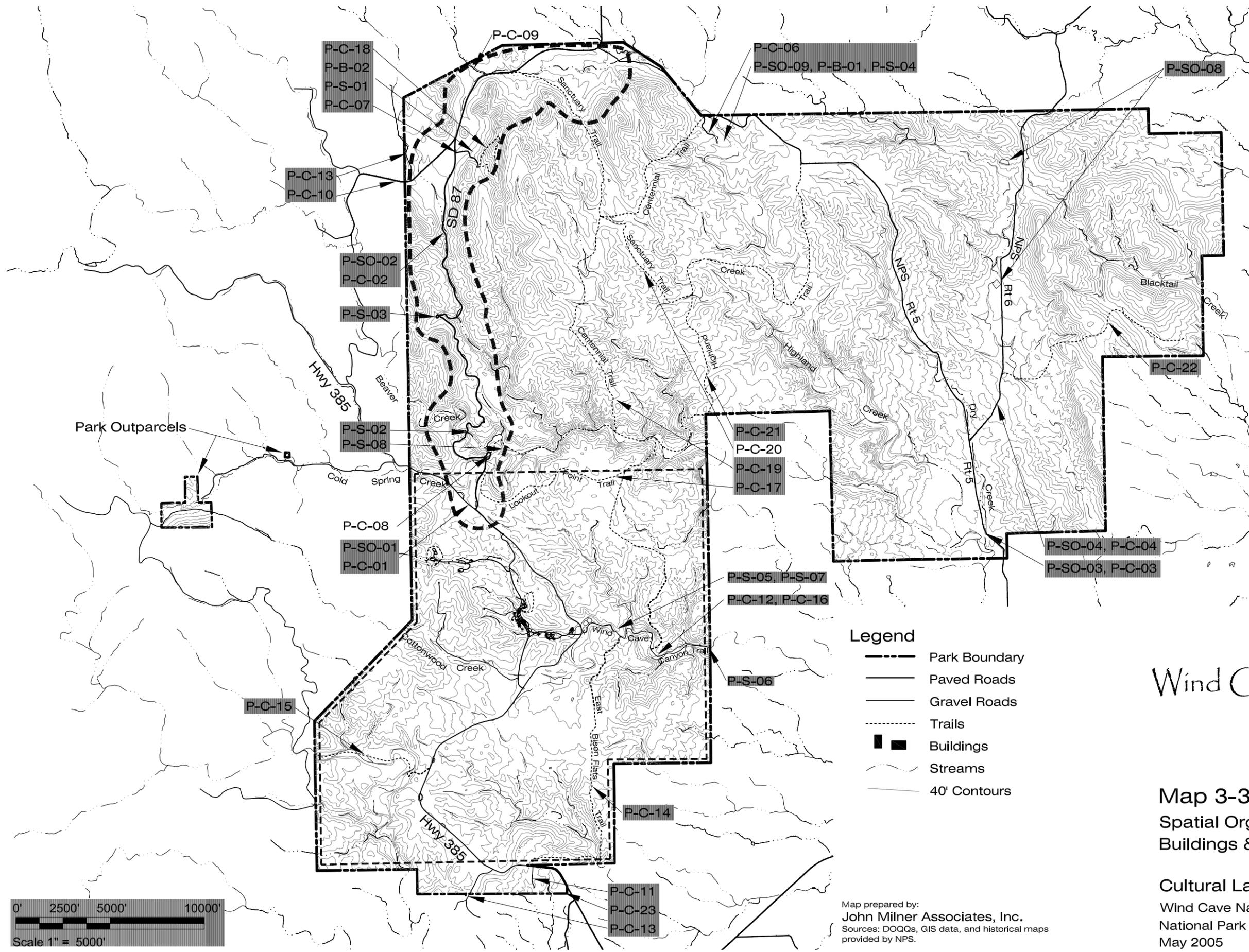
PARK LANDSCAPE

Map 3-2. Existing Conditions
Natural Systems and Topography

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005



Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.



- LEGEND**
- SPATIAL ORGANIZATION**
- P-SO-01 U.S. 385
 - P-SO-02 SD 87
 - P-SO-03 NPS 5
 - P-SO-04 NPS 6
 - P-SO-08 Fenced Research Areas
 - P-SO-09 Corral Area
- CIRCULATION**
- P-C-06 Wildlife Handling Facility Access Road
 - P-C-07 Rankin Ridge Access Road & Parking
 - P-C-08 Centennial Trailhead Access Road & Parking
 - P-C-09 Wildlife Preserve Access Road
 - P-C-10 County Route 391
 - P-C-11 Residential Driveway
 - P-C-12 Water Utilities Access Road
 - P-C-13 Minor County Road
 - P-C-14 East Bison Flats Road
 - P-C-15 Cold Brook Canyon Road
 - P-C-16 Wind Cave Canyon Trail
 - P-C-17 Lookout Point Trail
 - P-C-18 Rankin Ridge Trail
 - P-C-19 Centennial Trail
 - P-C-20 Sanctuary Trail
 - P-C-21 Highland Creek Trail
 - P-C-22 Boland Ridge Trail
- BUILDINGS & STRUCTURES**
- P-B-01 Cabin at Wildlife Handling Facility
 - P-B-02 Storage Building at Fire Tower
 - P-S-01 Rankin Ridge Fire Tower
 - P-S-02 Beaver Creek Bridge (HS 99)
 - P-S-03 Pig Tail Bridge (HS 98)
 - P-S-04 Stock Pens, Cattle Chutes, etc.
 - P-S-05 Booth at Shooting Range
 - P-S-06 Pump House
 - P-S-07 Stone/Timber Shelter
 - P-S-08 USGS Gauging Station

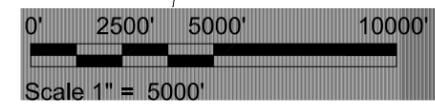
- Legend**
- Park Boundary
 - Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Streams
 - 40' Contours

Wind Cave National Park

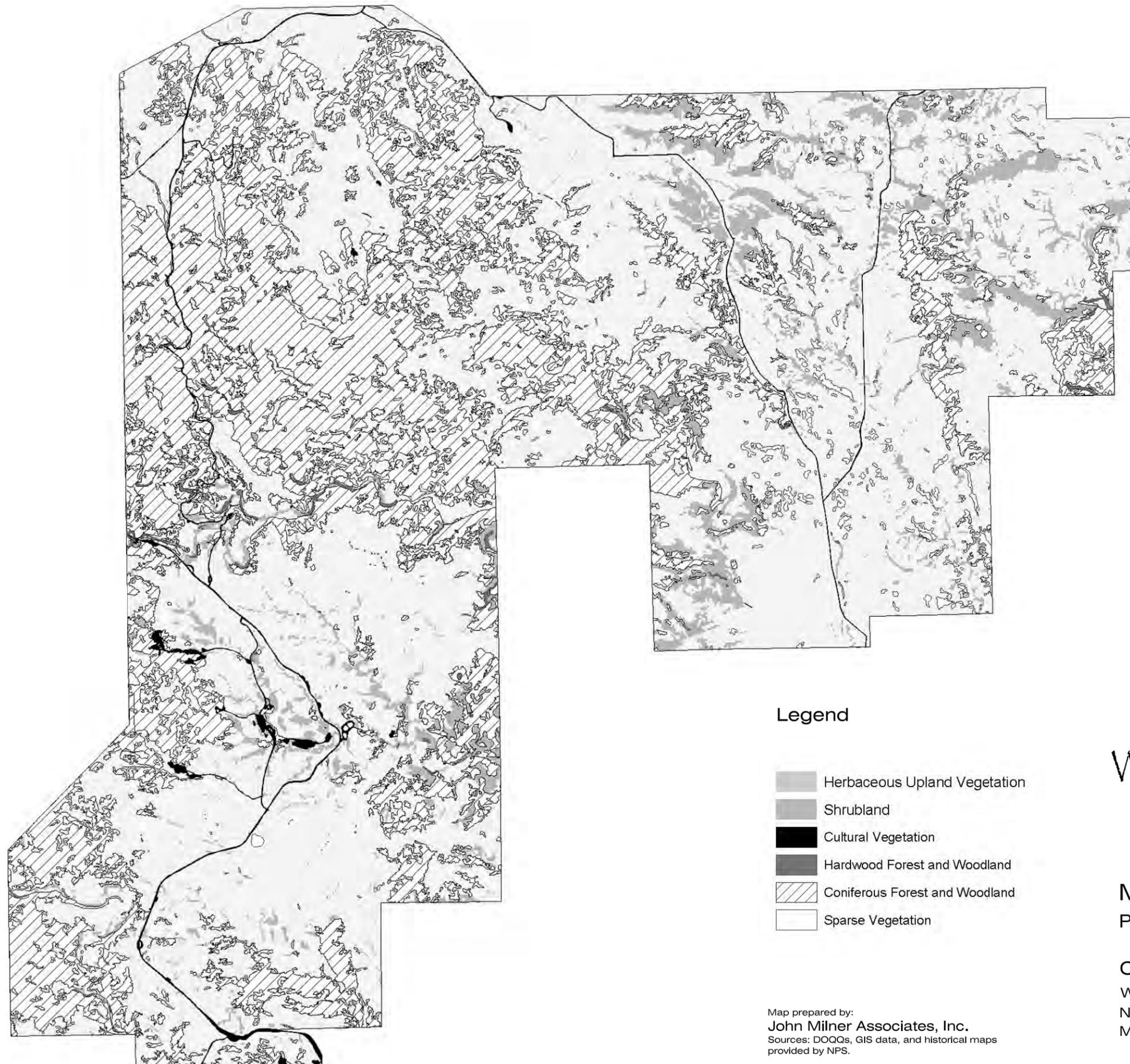
PARK LANDSCAPE

Map 3-3. Existing Conditions
 Spatial Organization, Circulation, and Buildings & Structures

Cultural Landscape Report
 Wind Cave National Park, South Dakota
 National Park Service
 May 2005



Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.



Legend

-  Herbaceous Upland Vegetation
-  Shrubland
-  Cultural Vegetation
-  Hardwood Forest and Woodland
-  Coniferous Forest and Woodland
-  Sparse Vegetation

Wind Cave National Park
PARK LANDSCAPE

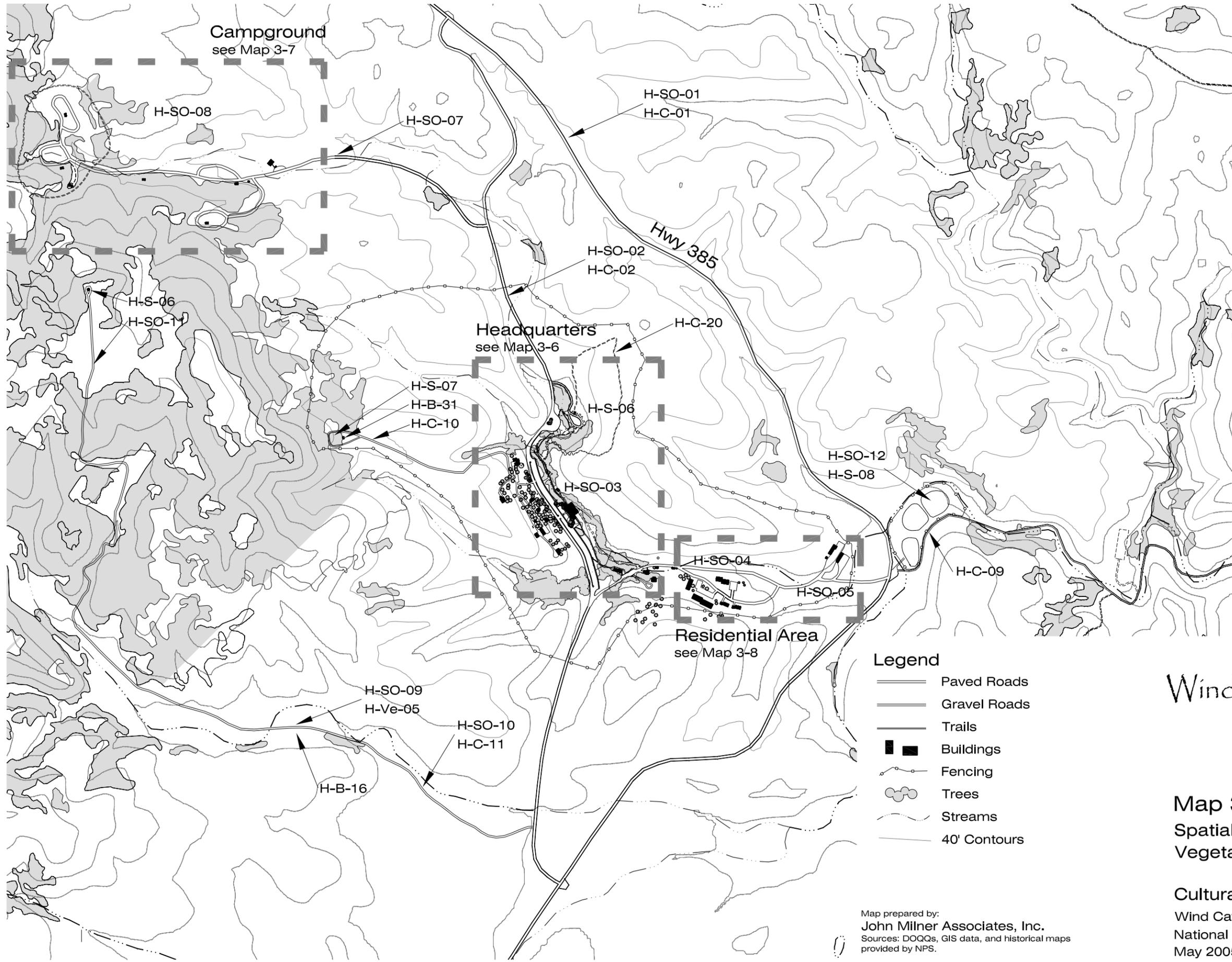
Map 3-4. Existing Conditions
Plant Communities

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005

Map prepared by:
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Sources: DOQQs, GIS data, and historical maps
provided by NPS.

Not to scale





LEGEND

SPATIAL ORGANIZATION

- H-SO-01 U.S. 385 Corridor
- H-SO-02 Headquarters Road Corridor
- H-SO-03 Headquarters Surrounds
- H-SO-04 Residence Area Surrounds
- H-SO-05 Maintenance Area Surrounds
- H-SO-06 Picnic Area Surrounds
- H-SO-07 Campground Road Corridor
- H-SO-08 Campground Surrounds
- H-SO-09 Mixing Circle Surrounds
- H-SO-10 Mixing Circle Service Road Corridor
- H-SO-11 Road Corridor to Water Storage
- H-SO-12 Wastewater Lagoons Surrounds

CIRCULATION

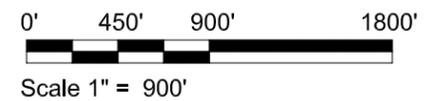
- H-C-01 U.S. 385
- H-C-02 Headquarters Road (HS-93)
- H-C-08 Residential Parking Lots
- H-C-09 Wastewater Lagoons Access Road
- H-C-10 Underground Water Tanks Service Road
- H-C-11 Mixing Circle Service Road
- H-C-20 Prairie Vista Trail

VEGETATION

- H-Ve-05 Mixing Circle Landscape

BUILDINGS & STRUCTURES

- H-B-16 Storage Shed
- H-B-31 Pump House
- H-S-06 Aboveground Water Tank
- H-S-07 Underground Storage Tanks



Legend

- Paved Roads
- Gravel Roads
- Trails
- Buildings
- Fencing
- Trees
- Streams
- 40' Contours

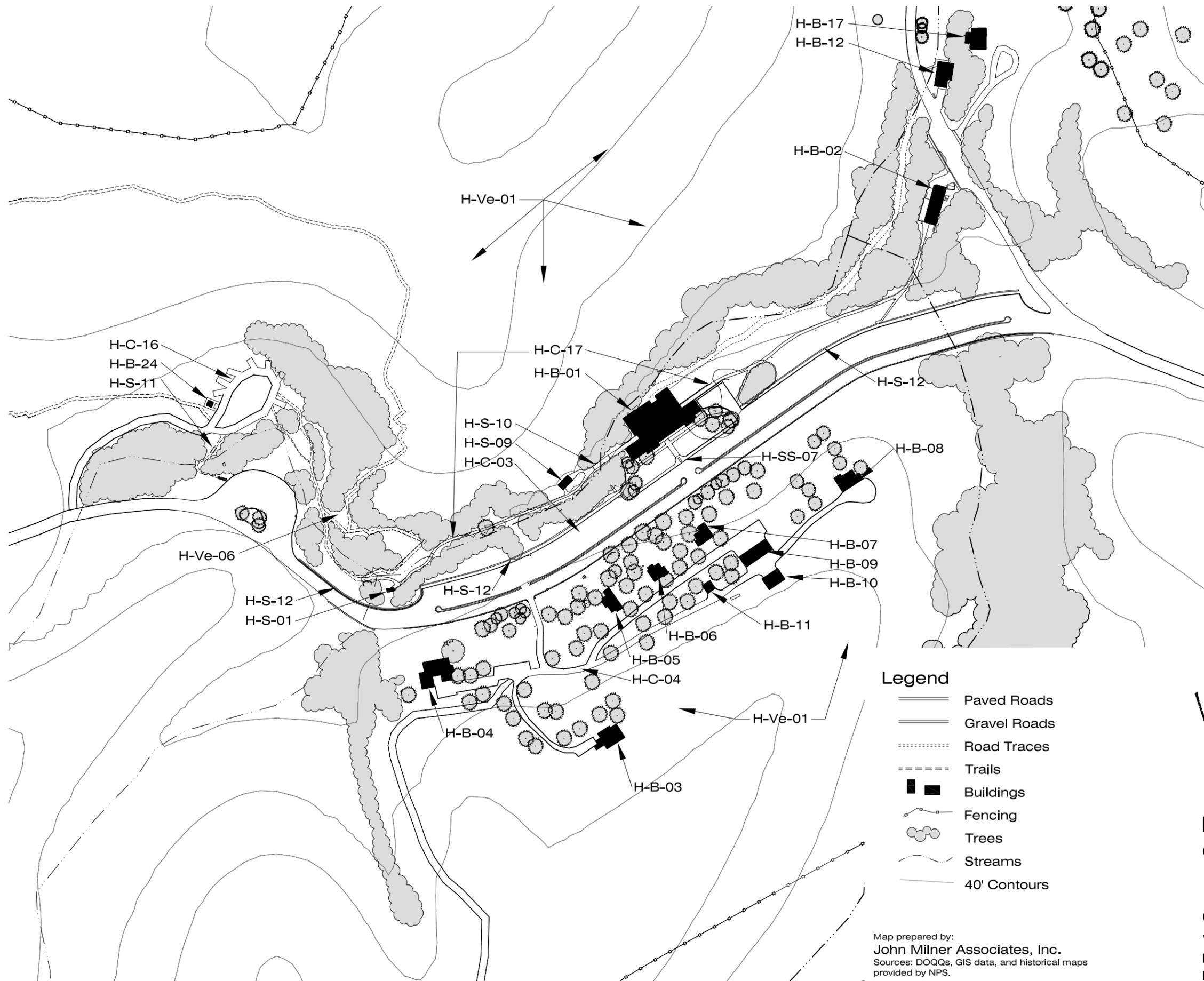
Wind Cave National Park HEADQUARTERS AREA

Map 3-5. Existing Conditions
Spatial Organization, Circulation,
Vegetation, and Buildings

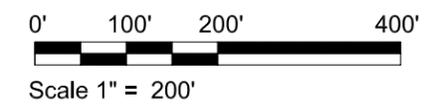
Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005

Map prepared by:
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Sources: DOQQs, GIS data, and historical maps
provided by NPS.





- LEGEND**
- CIRCULATION**
- H-C-03 Headquarters Parking Lot
 - H-C-04 Historic Housing Area Access Road
 - H-C-16 Picnic Area Drive
 - H-C-17 Headquarters Walks
- VEGETATION**
- H-Ve-01 CCC Plantings at Headquarters Area
 - H-Ve-06 McDonald Gravesite Lilacs
- BUILDINGS & STRUCTURES**
- H-B-01 Administration Building (Visitor Center) (HS-1)
 - H-B-02 Elevator Building (HS-2)
 - H-B-03 Superintendent's Residence (HS-3)
 - H-B-04 Superintendent's Cottage (HS-4)
 - H-B-05 Employee's Residence (Ranger Cabin) (HS-5)
 - H-B-06 Employee's Residence (HS-6)
 - H-B-07 Employee's Residence (HS-7)
 - H-B-08 Employee's Residence (Dormitory/Mess) (HS-8)
 - H-B-09 Garage (Machine Shop) (HS-11)
 - H-B-10 Garage (Fire Cache) (HS-12)
 - H-B-11 Storage Building (Power House) (HS-13)
 - H-B-12 VIP Center (Power House) (HS-15)
 - H-B-17 Seasonal Residence (CCC Bunkhouse) (HS-27)
 - H-B-24 Picnic Area Comfort Station
 - H-S-01 Walk-in Cave Entrance (HS-90)
 - H-S-09 Cave Tour Assembly Shelter
 - H-S-10 Administrative Building/Visitor Center
 - Pedestrian Bridge
 - H-S-11 Picnic Area Stone Footbridge
 - H-S-12 Stone Barrier Walls (HS-94)



- Legend**
- Paved Roads
 - Gravel Roads
 - ⋯ Road Traces
 - - - Trails
 - Buildings
 - Fencing
 - Trees
 - ~ Streams
 - 40' Contours

Wind Cave National Park

HEADQUARTERS AREA

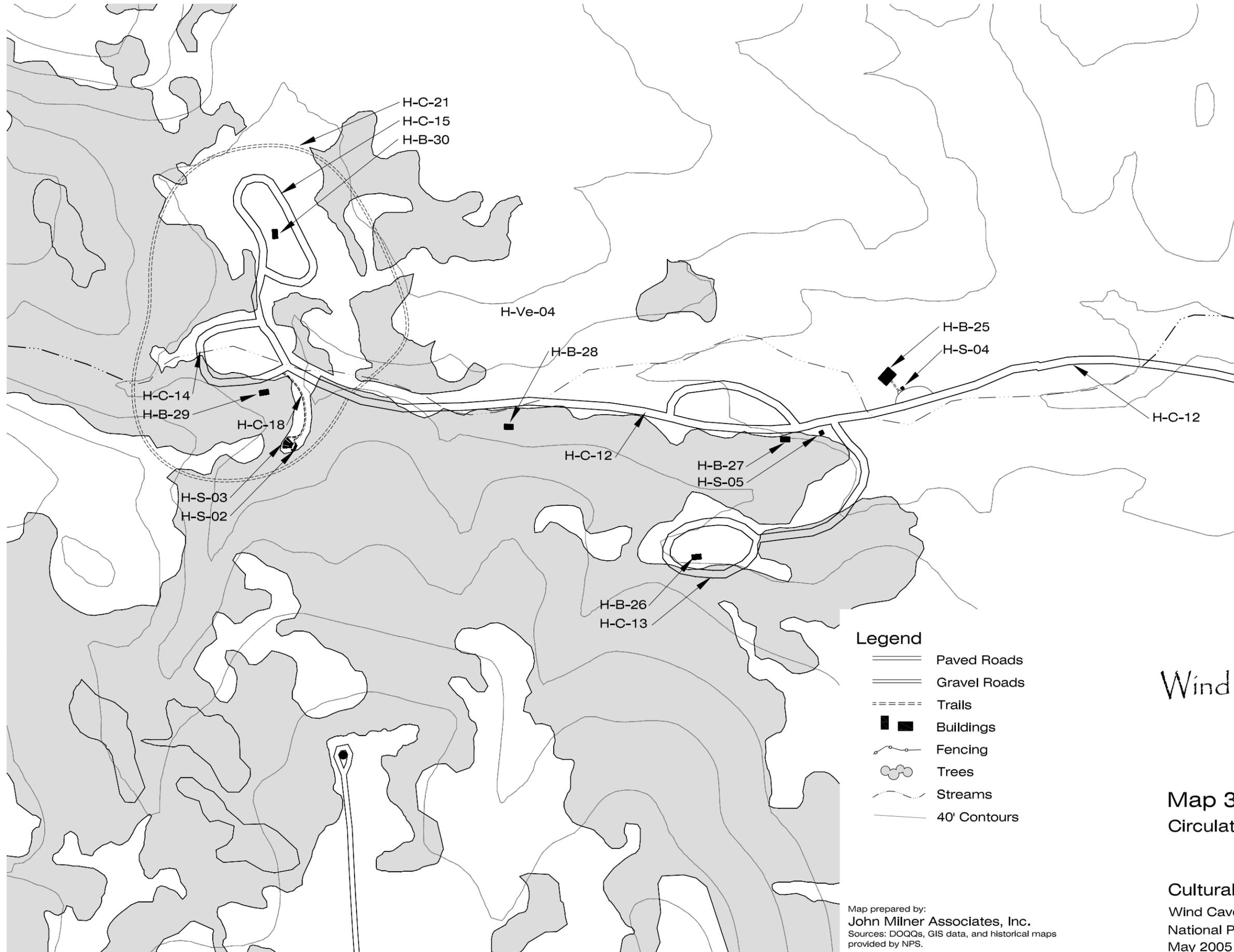
HEADQUARTERS

Map 3-6. Existing Conditions
Circulation, Vegetation, and Buildings

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005

Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps
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- LEGEND**
- CIRCULATION**
- H-C-12 Campground Road
 - H-C-13 Campground Loop A
 - H-C-14 Campground Loop B
 - H-C-15 Campground Loop C
 - H-C-18 Campground Walks
 - H-C-21 Elk Mountain Trail
- VEGETATION**
- H-Ve-04 Campground Landscape
- BUILDINGS & STRUCTURES**
- H-B-25 Campground Tender's Residence
 - H-B-26 Campground Comfort Station
 - H-B-27 Campground Comfort Station
 - H-B-28 Campground Comfort Station
 - H-B-29 Campground Comfort Station
 - H-B-30 Campground Comfort Station
 - H-S-02 Amphitheater Stage
 - H-S-03 Amphitheater Projection Booth
 - H-S-04 Campground Woodshed
 - H-S-05 Campground Host Shed



- Legend**
- Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours

Wind Cave National Park

HEADQUARTERS AREA

CAMPGROUND

Map 3-7. Existing Conditions
Circulation, Vegetation, and Buildings

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005

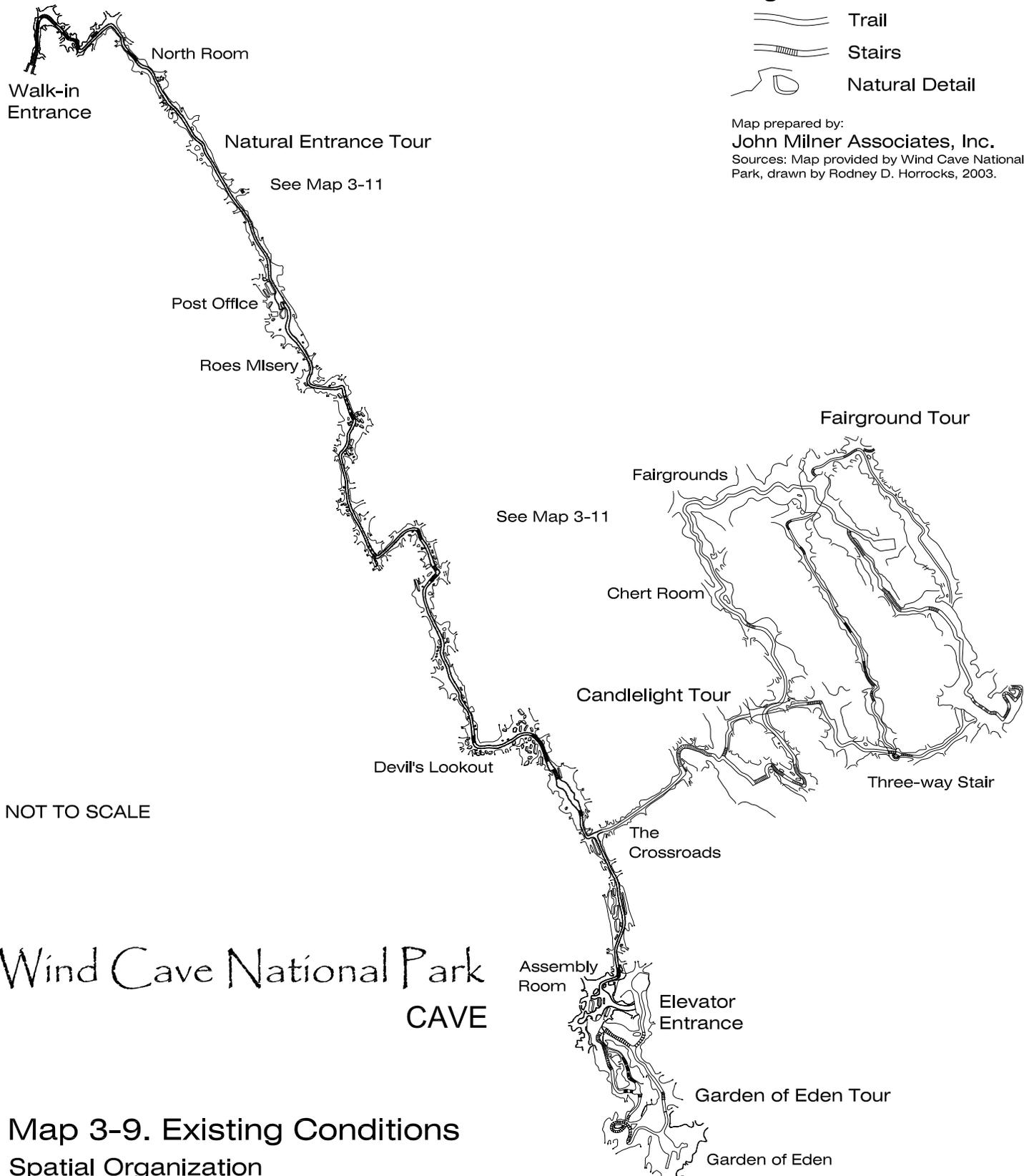


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Sources: DOQQs, GIS data, and historical maps
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Legend

-  Trail
-  Stairs
-  Natural Detail

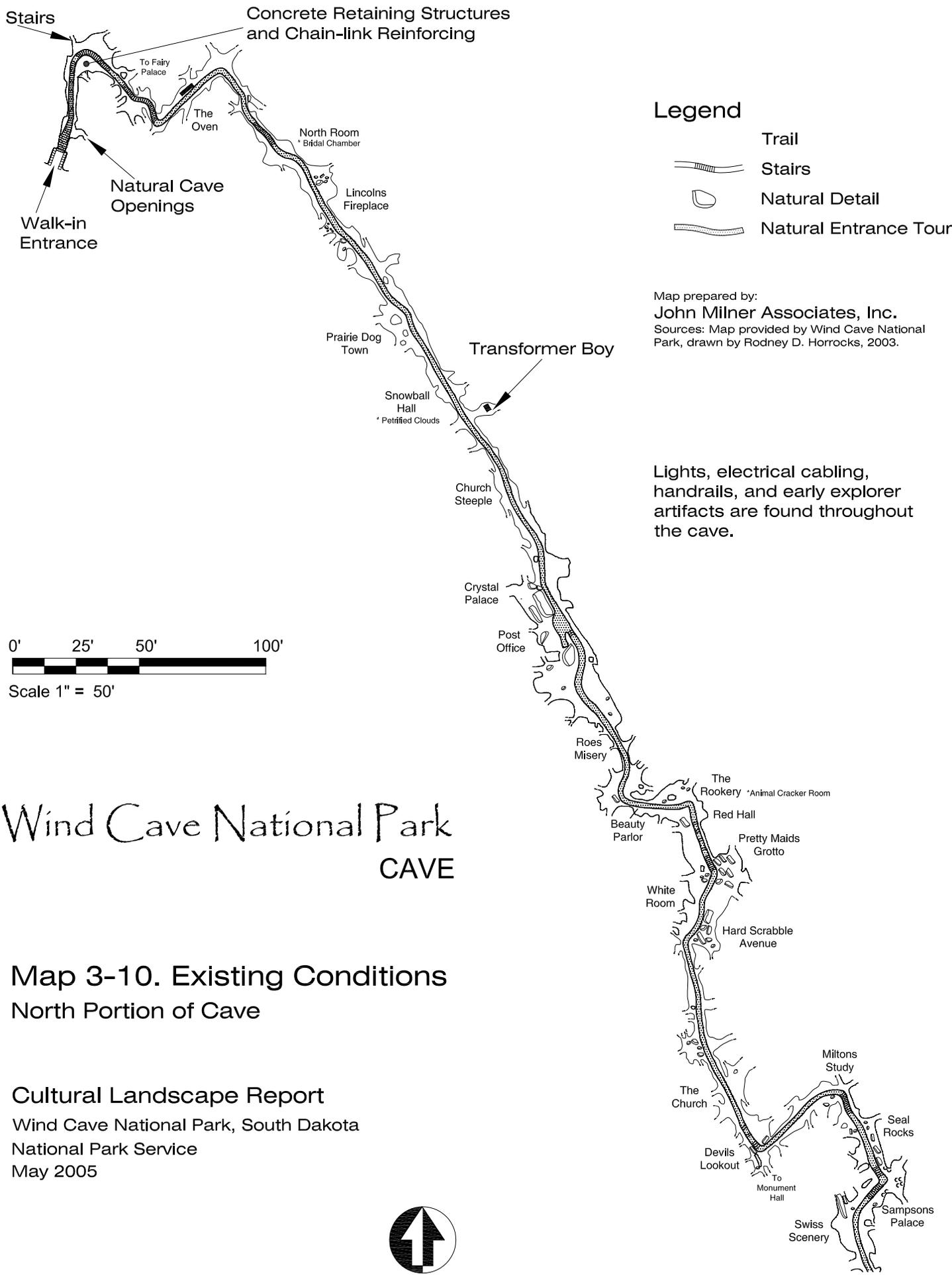
Map prepared by:
John Milner Associates, Inc.
Sources: Map provided by Wind Cave National
Park, drawn by Rodney D. Horrocks, 2003.

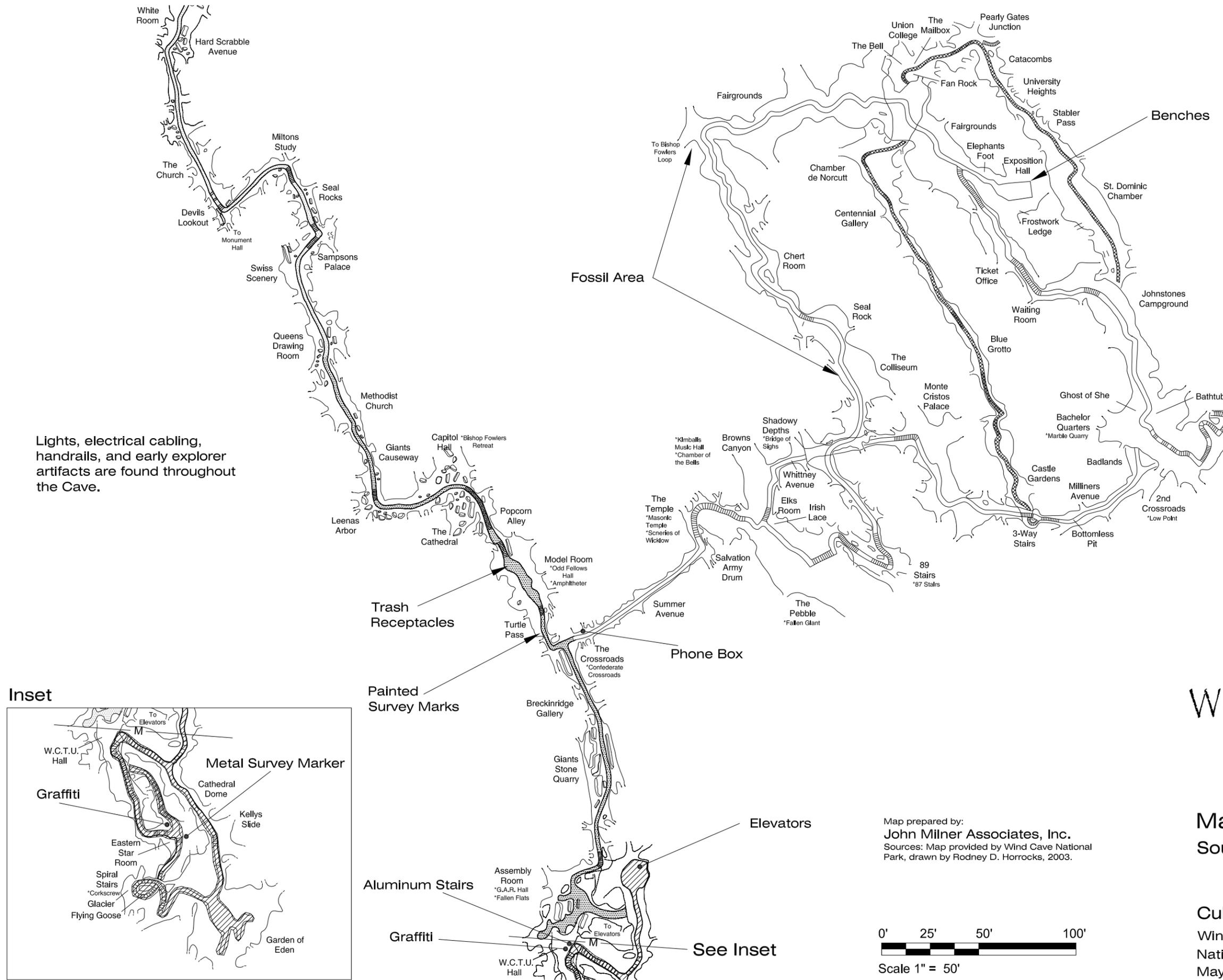


Cultural Landscape Report

Wind Cave National Park, South Dakota
National Park Service
May 2005

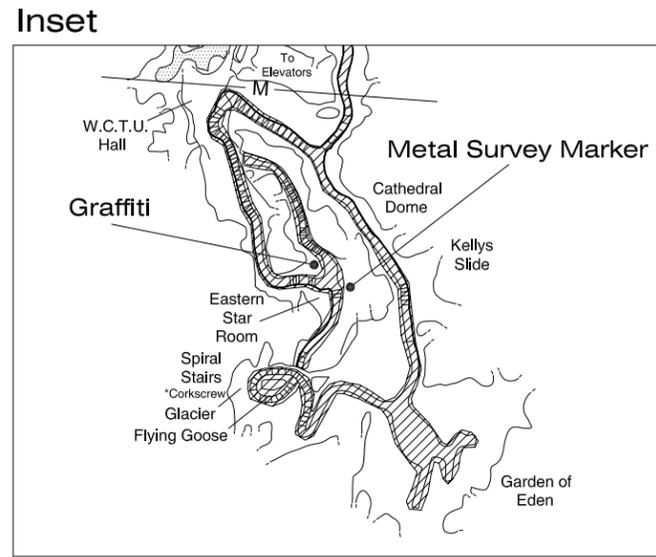






- Legend**
- Trail
 - Stairs
 - Natural Detail
 - Natural Entrance Tour
 - Garden of Eden Tour
 - Fairgrounds Tour
 - Candlelight Tour

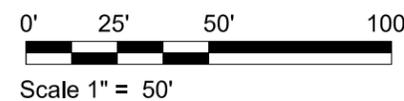
Lights, electrical cabling, handrails, and early explorer artifacts are found throughout the Cave.



Wind Cave National Park CAVE

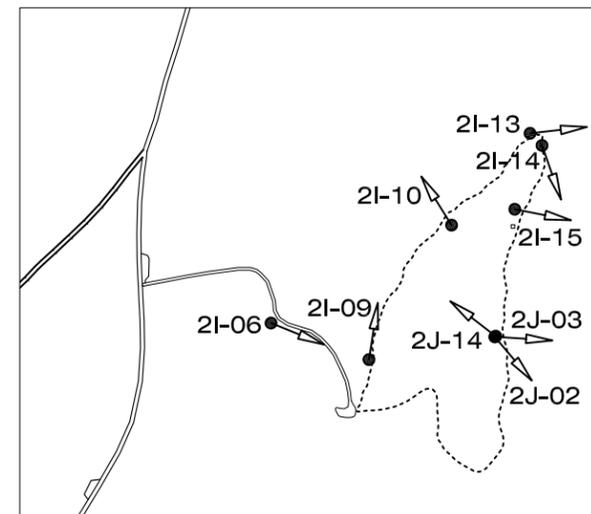
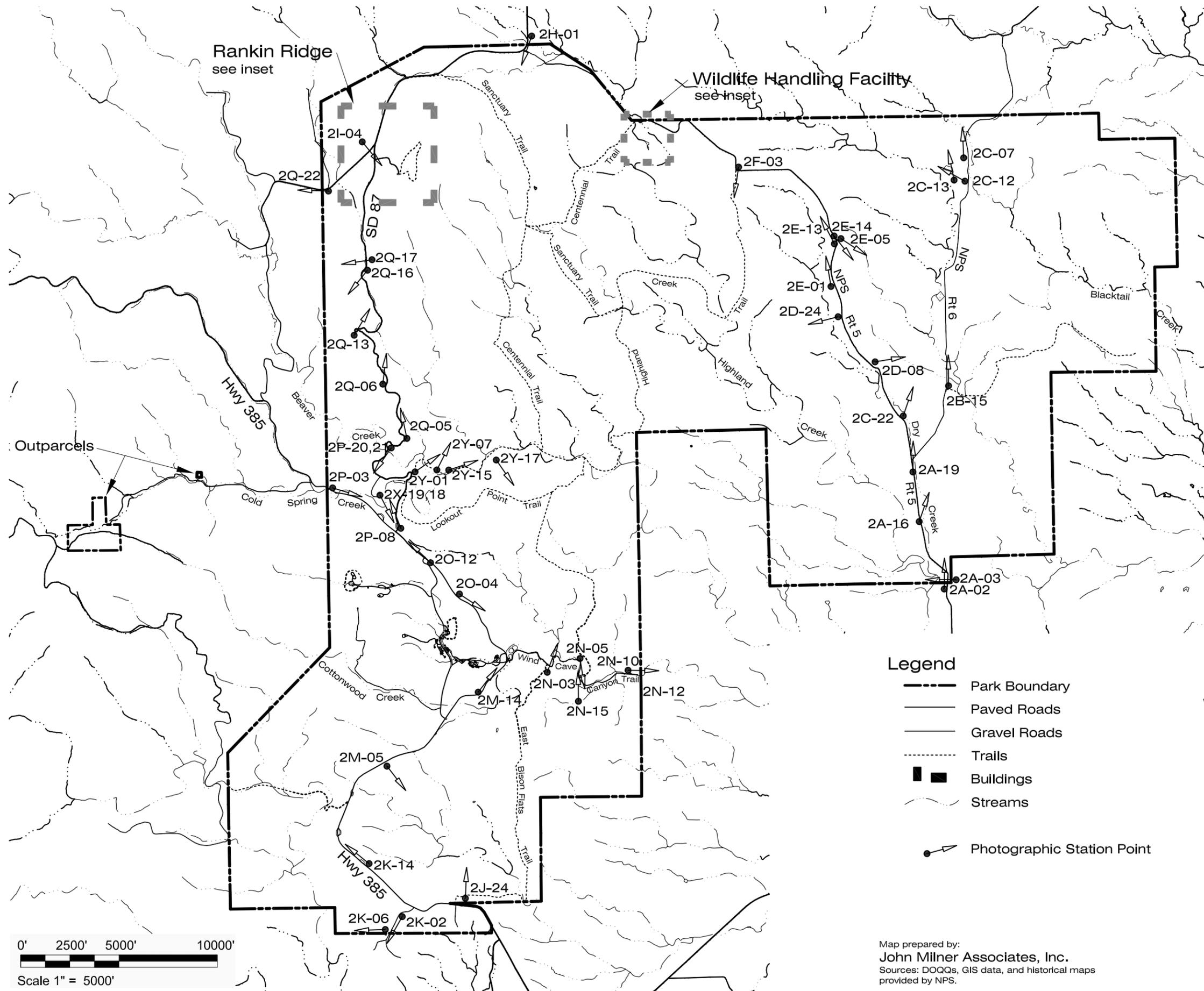
**Map 3-11. Existing Conditions
Southern Portion of Cave**

Map prepared by:
John Milner Associates, Inc.
Sources: Map provided by Wind Cave National Park, drawn by Rodney D. Horrocks, 2003.

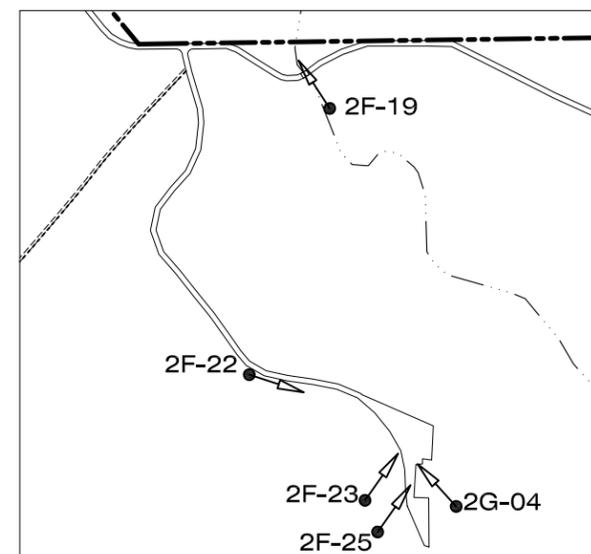


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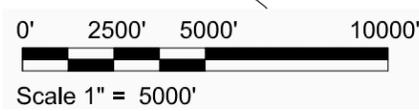


Rankin Ridge



Wildlife Handling Facility

- Legend**
- Park Boundary
 - Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Streams
 - Photographic Station Point



Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.

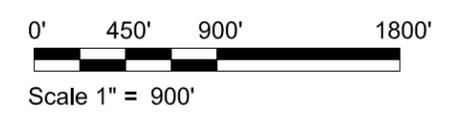
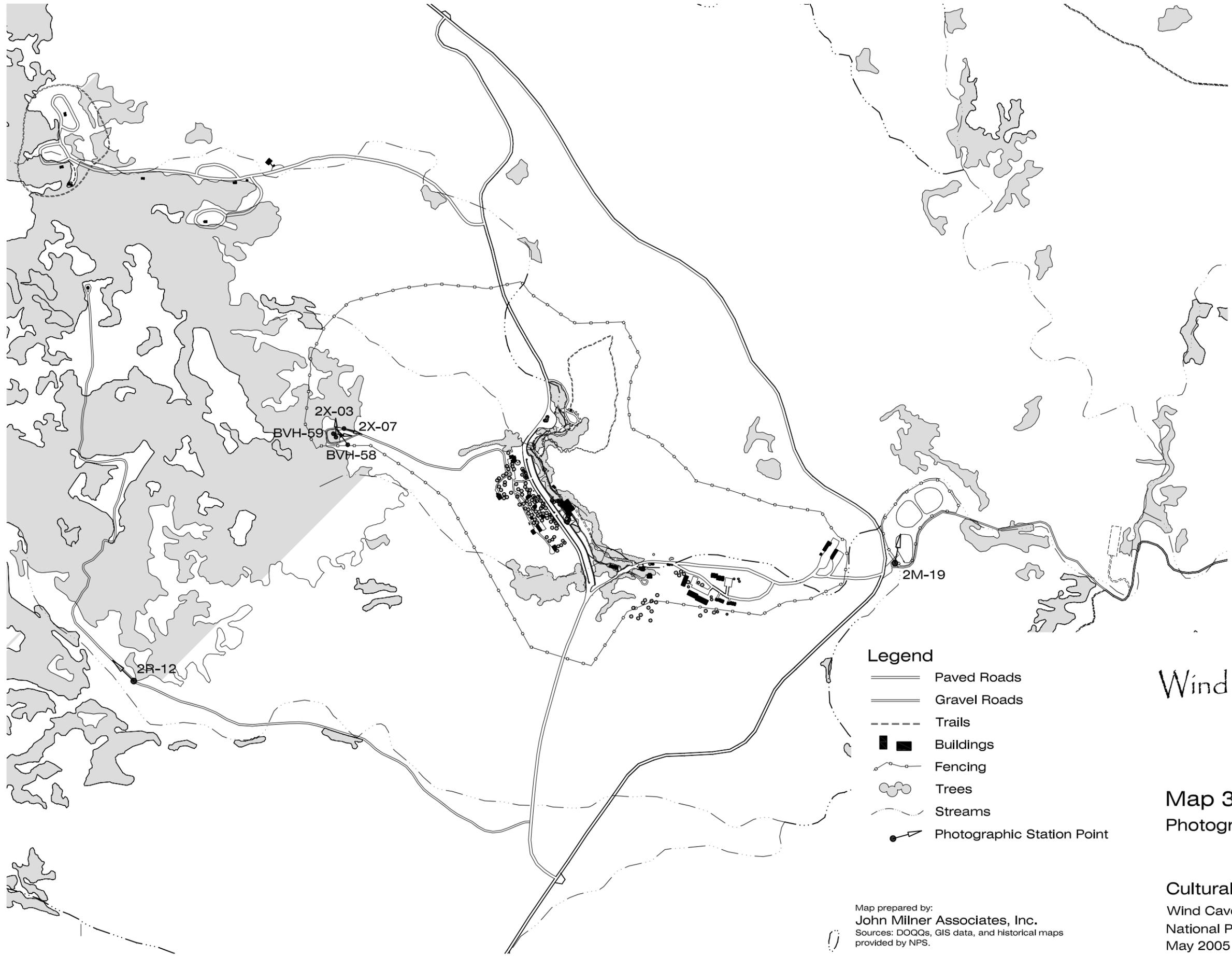
Wind Cave National Park

PARK LANDSCAPE

Map 3-12. Existing Conditions
Photographic Station Points

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- Legend**
- Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - Photographic Station Point

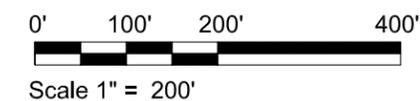
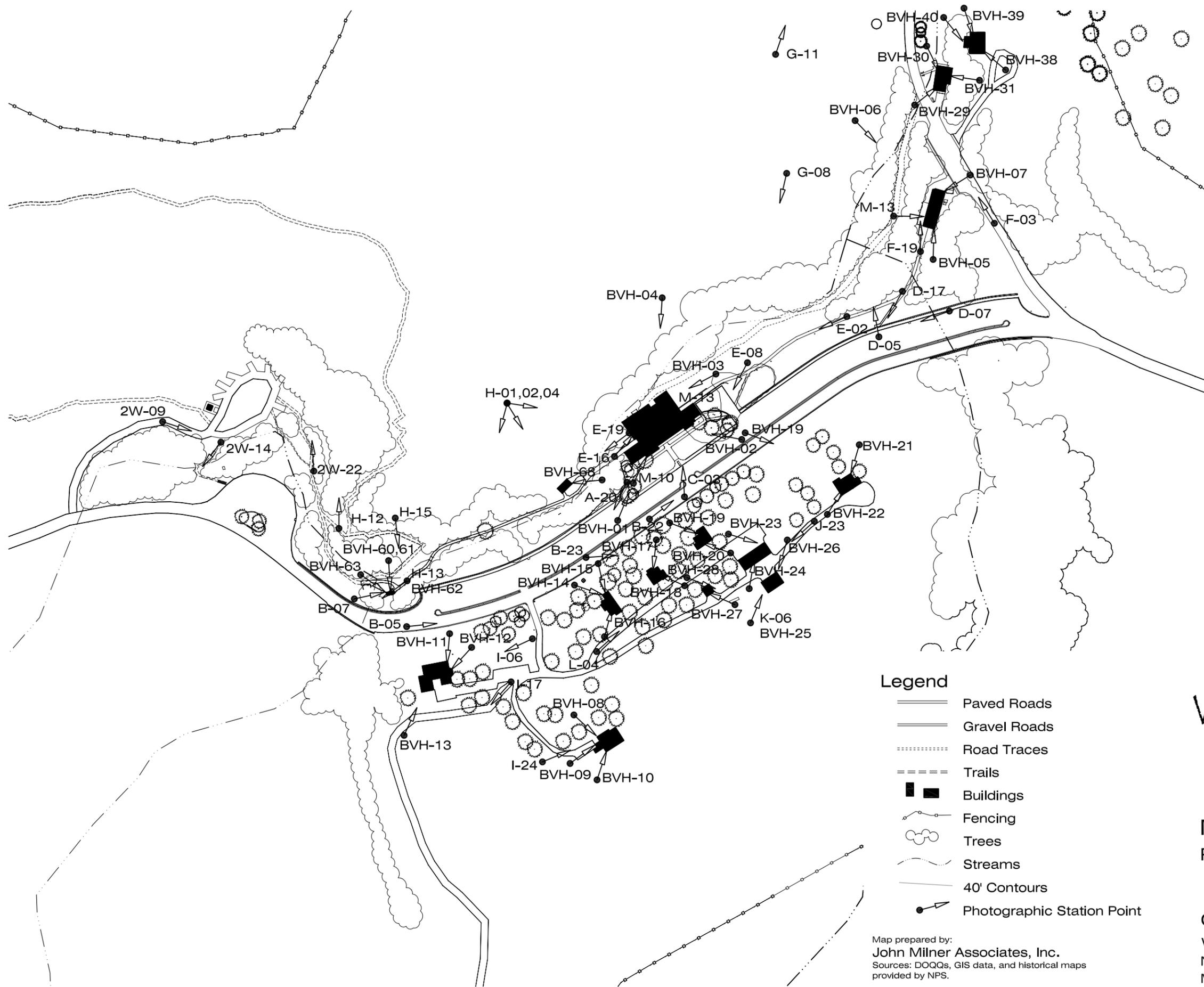
Wind Cave National Park HEADQUARTERS AREA

**Map 3-13. Existing Conditions
Photographic Station Points**

Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps
 provided by NPS.

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- Legend**
- Paved Roads
 - Gravel Roads
 - Road Traces
 - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours
 - Photographic Station Point

Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps
 provided by NPS.

Wind Cave National Park

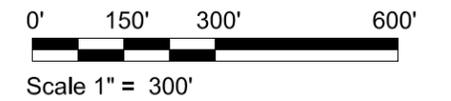
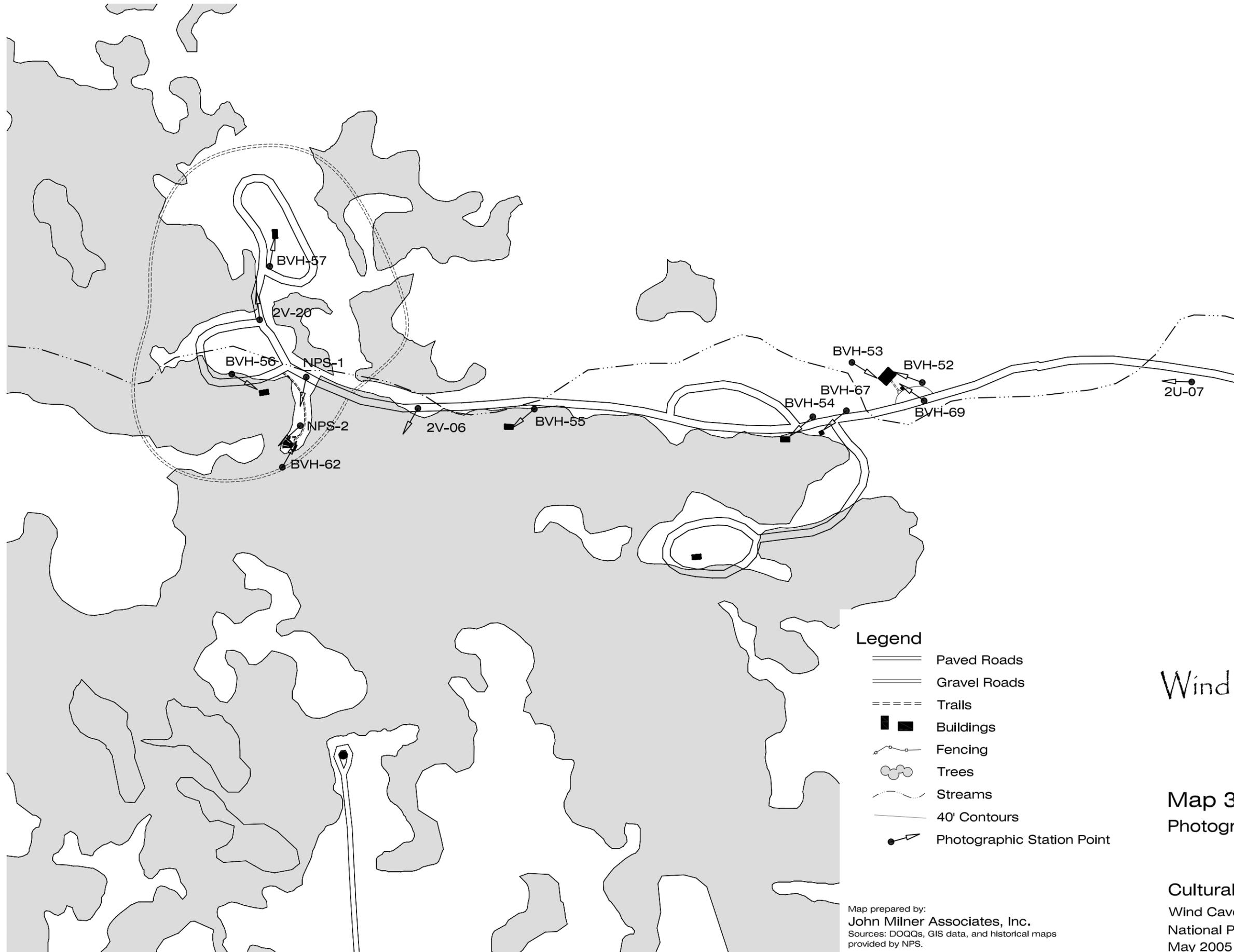
HEADQUARTERS AREA

HEADQUARTERS

Map 3-14. Existing Conditions
 Photographic Station Points

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- Legend**
- Paved Roads
 - Gravel Roads
 - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours
 - Photographic Station Point

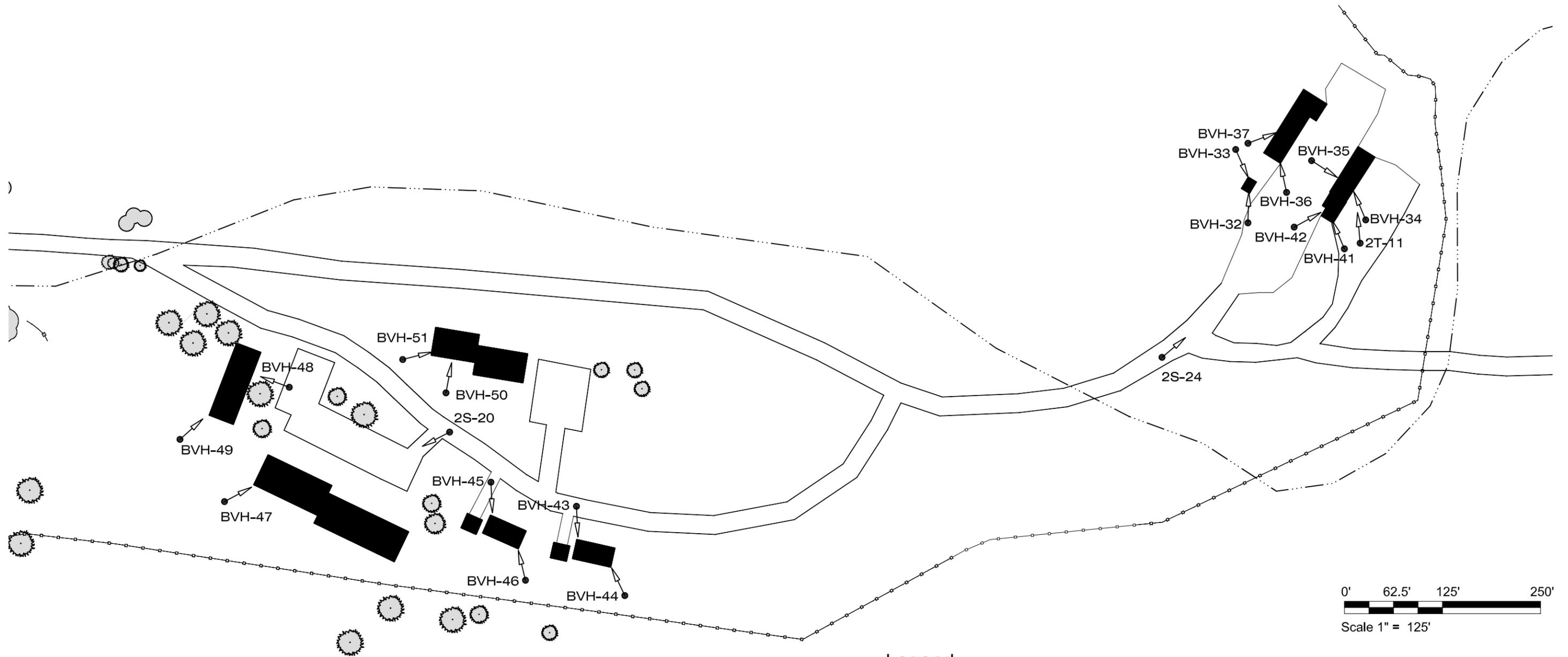
Wind Cave National Park
 HEADQUARTERS AREA
 CAMPGROUND

Map 3-15. Existing Conditions
 Photographic Station Points

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Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps
 provided by NPS.





Legend

- Paved Roads
- Gravel Roads
- Buildings
- Fencing
- Trees
- Streams
- 40' Contours
- Photographic Station Point

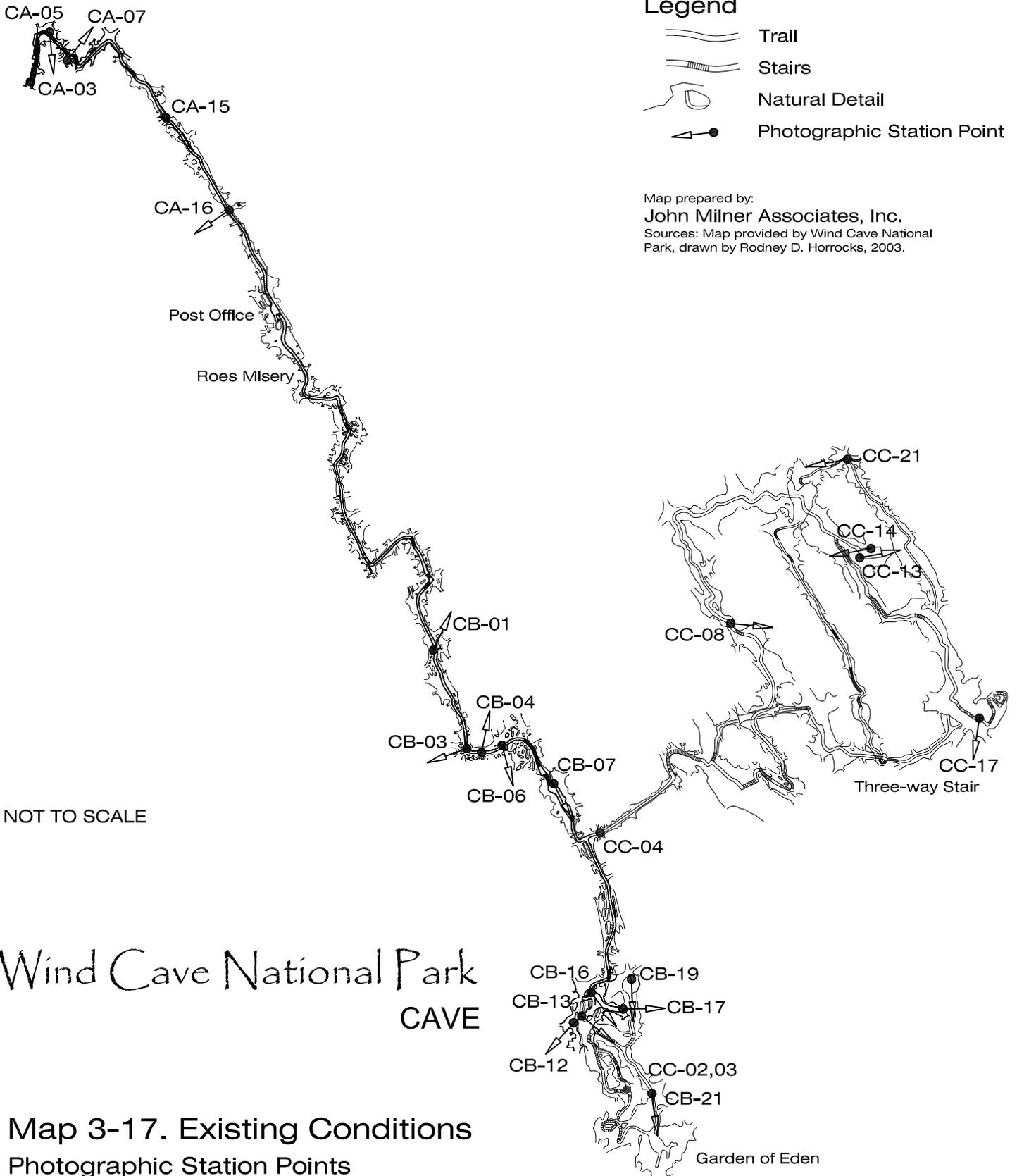
Wind Cave National Park
HEADQUARTERS AREA
RESIDENTIAL

Map 3-16. Existing Conditions
Photographic Station Points

Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps
provided by NPS.

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Cultural Landscape Report

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CHAPTER FOUR

ANALYSIS AND EVALUATION

CHAPTER FOUR

ANALYSIS AND EVALUATION

SIGNIFICANCE EVALUATION

INTRODUCTION

This section of Chapter 4 includes a summary of previous evaluations of significance; a significance assessment for the project area of this cultural landscape report—Wind Cave National Park (NP); an evaluation of the Cultural Landscape Report (CLR) project area using the National Register criteria; and a period of significance for Wind Cave National Park as a whole. In addition, at the end of Chapter 4 and following the comparative analysis of the historic landscape and integrity assessment of the CLR project area is a section on recommendations concerning existing and future nominations to the National Register of Historic Places (NRHP) has been developed.

Summary of Previous Evaluations of Significance

In 1982 the Administrative and Utility Area in Wind Cave NP was nominated to the National Register of Historic Places. By 1988, the district was formally listed on the National Register. In 1995, an Additional Documentation form for the administrative and utility area was submitted, providing important additional park context for the listing. In addition to the Administrative and Utility Area Historic District National Register of Historic Places Nomination Form (1982), the following National Register Nominations and Historic American Engineering Record documentation provide information on significance for the project area.

- Beaver Creek Bridge (HS-99) National Register Registration Form (1984);
- Beaver Creek Rock Shelter National Register Registration Form (1993);
- Pig Tail Bridge (HS-98) National Register Registration Form (1995); and
- Historic American Engineering Record documentation of Wind Cave National Park Roads and Bridges, HAER No. SD-53, and HAER No. SD-54.

The relevant information contained in these documents is summarized below.

National Register of Historic Places Nomination Form—Administrative and Utility Area Historic District, Wind Cave National Park (1982)

The Wind Cave National Park Administrative and Utility Area Historic District was nominated to the National Register of Historic Places in 1982. A total of fifteen historic structures within

the district were nominated as a unique assemblage of Mission/Spanish Revival style buildings. In addition, the ‘old’ or natural blowhole entrance to Wind Cave was nominated as a contributing landscape feature.

The areas of significance were designated as architecture and conservation. The period of significance for the National Register District was identified as 1903 and 1930–1941. The National Register Nomination indicates that 1903 was the year that President Theodore Roosevelt signed the act establishing Wind Cave as a park. The nomination indicates that the period of 1930-1941 is associated with the CCC and the preparation of a “uniform plan for buildings and landscaping.”

National Register of Historic Places Registration Form, Wind Cave National Park Administrative and Utility Area Historic District, Additional Documentation (1995)

The following data was listed in the South Dakota state listing section of the NRHP website:

Wind Cave National Park Administrative and Utility Area Historic District (added to the National Register 1984 - District - #84003259)

Also known as Wind Cave National Park Historic District

Historic Significance: Architecture/Engineering, Event

Architect, builder, or engineer: Baker, Howard, Multiple

Architectural Style: Bungalow/Craftsman, Other

Area of Significance: Politics/Government, Landscape Architecture, Conservation, Architecture, Entertainment/Recreation

Period of Significance: 1900-1924, 1925-1949

Owner: Federal

Historic Function: Domestic, Government, Landscape, Recreation and Culture, Transportation

Historic Sub-function: Government Office, Institutional Housing, Outdoor Recreation, Park, Secondary Structure

Current Function: Domestic, Government, Landscape, Recreation and Culture

Current Sub-function: Government Office, Institutional Housing, Museum, Outdoor Recreation, Park, Secondary Structure

The Administrative and Utility Area Historic District was nominated to the National Register of Historic Places through an Additional Documentation submission in 1995 under Criterion A for its association with events that have made a significant contribution to the broad patterns of our history, and under Criterion C for its distinctive characteristics of a type, period, or method of construction. The areas of significance were designated as architecture, conservation, politics/government, and landscape architecture. The period of significance for the Administrative and Utility Area Historic District was identified as 1905–1945, the end of the fifty-year historic period as defined by the National Register.

As part of the 1995 documentation, two additional buildings were added to the historic district, a coal shed (HS-30) and an officer’s quarters (HS-27). Several additional landscape features within the project area were also identified as contributing to the historic district including the

Historic Cave Entrance and Stairs (HS-96); the remnant of a historic road through the Headquarters Area; the Rustic Style low ashlar stone walls in the Headquarters parking lot; rock-faced culverts in the administrative area; the pedestrian stone bridge just east of the Visitor Center; the pedestrian trail from the Walk-in Entrance to the Elevator Building; a stone retaining wall along the trail to the Elevator Building; and a rock-faced concrete box culvert adjacent to the Elevator Building. The 1995 additional documentation form did not list the natural entrance to Wind Cave as the 1982 nomination had done.

The Historic District was nominated under National Register Criterion A for its national-level associations with the Civilian Conservation Corps (CCC) and Work Projects Administration (WPA), and for its local significance under Criterion C as an exemplary representation of National Park Service (NPS) Rustic Architecture.

The Historic District was also found to be associated with the historic contexts “Recreation and Tourism in the Black Hills and at Wind Cave, 1890–1945,” “Development and Administration of Wind Cave National Park, 1903–1945,” and “National Park Service Rustic Architecture and Public Works Construction, 1931–1942.”

Beaver Creek Bridge

HAER No. SD-53 (2003)

The following data was listed in the South Dakota state listing section of the NRHP website:

Beaver Creek Bridge (added 1984 - Structure - #84003254)
Wind Cave National Park, SD 87, .5 mi N of 385, Hot Springs
Historic Significance: Architecture/Engineering, Event
Architect, builder, or engineer: Linder, J.A., Adelstein, Morris E., et al.
Architectural Style: Other
Area of Significance: Engineering, Transportation, Politics/Government
Period of Significance: 1925-1949
Owner: Federal
Historic Function: Transportation
Historic Sub-function: Road-Related
Current Function: Transportation
Current Sub-function: Road-Related

Beaver Creek Bridge was an important link in a scenic road system developed by the South Dakota State Highway Commission to facilitate Black Hills motor tourism. Although typical of concrete bridge construction during the 1920s, Beaver Creek Bridge represented a significant engineering achievement for this remote location. When built, it was the longest, most complex example of its type in the state. The bridge and its approach roads were carefully coordinated to present motorists with striking views of the impressive structure spanning a rugged gorge.

Pig Tail Bridge

HAER No. SD-54 (2003)

The following data was listed in the South Dakota state listing section of the NRHP website:

Pig Tail Bridge (added 1995 - Structure - #95000344)

Also known as HS-98

SD 87 loop over SD 87, N of Norbeck Lake, Wind Cave NP, Hot Springs

Historic Significance: Architecture/Engineering, Event

Architect, builder, or engineer: South Dakota Highway Dept.

Architectural Style: Other

Area of Significance: Transportation, Engineering, Politics/Government

Period of Significance: 1900-1924

Owner: Federal

Historic Function: Transportation

Historic Sub-function: Road-Related

Current Function: Transportation

Current Sub-function: Road-Related

The Pig Tail Bridge is one of a series of bridges constructed by the South Dakota State Highway Commission during the development of Custer State Park. The bridge helped facilitate motor tourism in the Black Hills by establishing a link between the newly developed Custer State Park and Wind Cave National Park. In keeping with the contemporary park manager's preferences for naturalistic design, the bridge was carefully integrated into its surroundings and was originally constructed from local pine. The unusual "pig tail" configuration consists of a relatively short, straight span that forms part of a spiral ramp, allowing the roadway to gain elevation quickly in constricted terrain by looping back over itself in a tight 270-degree curve. The South Dakota State Highway Commission employed this configuration in several locations in the Black Hills, but this is the only 'Pig Tail Bridge' in Wind Cave National Park.

Beaver Creek Rock Shelter (39CU779), 6,700 – 3,800 BP

The following data was listed in the South Dakota state listing section of the NRHP website.

Beaver Creek Rockshelter (added 1993 - Site - #93001130)

Also known as 39CU779

Address Restricted, Pringle

Historic Significance: Information Potential

Area of Significance: Prehistoric

Cultural Affiliation: Late Archaic, Middle Archaic, McKean Culture, Early Archaic

Period of Significance: 5000-6999 BC, 3000-4999 BC, 1000-2999 BC, 500-999 BC, 499-0 BC, 499-0 AD

Owner: Federal

Historic Function: Domestic

Historic Sub-function: Camp

Current Function: Recreation and Culture
Current Sub-function: Outdoor Recreation

The Beaver Creek Rock Shelter was excavated as a paleontological site by the South Dakota School of Mines and Technology during the early 1980s. As cultural deposits were encountered, South Dakota state archeologist Robert Alex conducted investigations between 1985 and 1987. A total of 22 stratified horizons were identified dating between 1,750 to 9,380 years BP. Based on radiocarbon dating, material culture and features recovered in horizons 11 through 17 were assigned to the Early and Middle Archaic cultural periods, with human occupations dating to between 6,700 to 3,800 years BP. Chipped stone debitage, diagnostic points, animal bone, and several features including cooking hearths and roasting pits were recovered.

Given the early human occupation of the site, the integrity of the deposits, and the relative lack of stratified cultural occupation sites spanning the Archaic period within the larger northwestern Plains, the Beaver Creek Rock Shelter must be considered a significant archeological site to South Dakota and the larger Plains region.

EVALUATION OF SIGNIFICANCE BY CRITERIA

The *Guide to Cultural Landscape Reports: Contents, Process, and Techniques* (1998) states that determining the significance of a property “involves relating findings from the site history and existing conditions to the historic context associated with the landscape.” This statement of significance recognizes the cultural landscape as a whole and its ability to physically convey its historical association as set forth by National Register of Historic Places criteria for evaluating significance.

SIGNIFICANCE OF WIND CAVE NATIONAL PARK BY NATIONAL REGISTER CRITERIA

The National Register of Historic Places states that to be eligible for listing, a property must meet one or more of the following criteria or considerations:

- A. Be associated with events that have made a significant contribution to the broad patterns of our history; or
- B. Be associated with the lives of persons significant in our past; or
- C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. Have yielded or be likely to yield information important in prehistory or history.

Evaluation of Significance of Wind Cave National Park Using National Register Criteria

Based on previous documentation and evaluation and current analysis and research undertaken by John Milner Associates, Inc., (JMA), two areas of the Wind Cave National Park CLR project study area appear to be historically significant: a large cultural landscape with multiple associations including early cave exploration and tourism, national park establishment, and park development during the New Deal era; and a landscape corridor associated with the historic designed road SD 87.

The areas of significance associated with the two historic landscapes include social history, recreation (tourism), government, conservation, community planning and development (park), landscape architecture, architecture, and engineering.

The historical contexts that are addressed within the criteria discussions include:

- early commercial development and tourism in the Black Hills of South Dakota associated with natural, scenic, and cultural resources;
- the establishment and development of the nation's national parks and monuments beginning in the mid-nineteenth century up until the creation of the National Park Service and its system of parks;
- private and government efforts to conserve our nation's natural heritage and resources;
- the twentieth-century movement to develop national parks for public enjoyment, to conserve natural features and scenic areas as public parks, and to develop natural areas, including submarginal lands, for public recreational use; and
- park landscape architectural, architectural, and engineering design developed and used by the National Park Service in national parks from 1916 to 1942 and in state and national parks through Emergency Conservation Work (ECW), CCC, Public Works Administration (PWA), or WPA projects from 1933 to 1942.

Research for and development of this CLR indicates that the land falling within the original 1903 boundary of Wind Cave National Park is

- locally significant under Criterion A for its association with late nineteenth/early twentieth century tourism and recreational development within the Black Hills;
- nationally significant under Criterion A as the first National Park established to protect a subterranean resource and acknowledge early federal cave conservation efforts and as one of the earliest national parks pre-dating the creation of the National Park system;
- significant at the state level under Criterion A for the establishment and development of the Wind Cave National Game Preserve, administered by the U.S. Biological Survey, which protected bison and other endangered large mammals;

- significant at the state level under Criterion A for its association with the Civilian Conservation Corps and Works Projects Administration; and
- significant at the state level under Criterion C as an exemplary representation of New Deal-era park master planning, resource conservation planning, facility and road design, and construction; National Park Service Rustic Style of landscape architecture, architecture, and engineering; design and construction of visitor and operational access improvements within a cave; and of a unique collection of Mission/Spanish Colonial Revival park buildings.

Research for and development of this CLR indicates that the section of SD 87 falling within the current boundary of Wind Cave National Park is

- locally significant under Criterion A for its association with late nineteenth/early twentieth century tourism and recreational development within the Black Hills;
- significant at the state level under Criterion A for its association with the CCC and WPA; and
- significant at the state level under Criterion C as an exemplary representation of New Deal-era park master planning, resource conservation planning, facility and road design, and construction; and, National Park Service Rustic Style of landscape architecture and engineering.

Owing to the lack of a national or regional context for evaluating post-World War II planning and design as well as Mission 66-era development, further research is required to determine whether evidence of Mission 66-era development meets National Register significance criteria.

The evaluation of prehistoric and historic archeological resources associated with the park landscape was not included within the scope of this CLR.

CRITERION A: ASSOCIATION WITH EVENTS, ACTIVITIES OR TRENDS THAT HAVE MADE A SIGNIFICANT CONTRIBUTION TO THE BROAD PATTERNS OF OUR HISTORY.

Private development of Wind Cave as a tourist destination, 1890–1901

The South Dakota Mining Company of New York City acquired the land upon which Wind Cave was located in 1890. The mining company hired J.D. McDonald to manage and operate its Wind Cave claims. The McDonalds, J.D. and his two sons Elmer and Alvin, arrived at Wind Cave in April of 1890. During the McDonald's tenure between 1890 and 1900, they systematically carried out formal development of the cave trail system.

Private development of Wind Cave took place during a period of expanded tourist development in the southern Black Hills. By the late 1880s, the nearby resort town of Hot Springs, South Dakota had a small but growing population. The warm springs were originally marketed as a

hospital setting catering to the ill and infirm, but soon began to appeal to resort tourists as well. The railroad arrived at nearby Buffalo Gap in 1886 and in Hot Springs in 1891. The “plunge,” a large enclosed bath house that combined the healthful and recreational aspects of the warm springs, was constructed in 1891.

Recognizing the benefit that positive publicity could bring to his cave operations, J.D. McDonald established an early and mutually-beneficial relationship with the *Hot Springs Star*. As early as June 1890, McDonald made regular trips to Hot Springs to report on the work being done at Wind Cave and to promote his interests, and he frequently left interesting and unusual geological specimens collected from the cave. These specimens were later sold in Hot Springs and at Wind Cave.

In 1891, John Stabler moved to Hot Springs. It was shortly thereafter that he visited Wind Cave and was impressed with its potential. McDonald and Stabler formed the Wonderful Wind Cave Improvement Company in early 1892. The company offered a free hack ride between Hot Springs and Wind Cave. By the spring of the same year, John Stabler constructed a two-story 22x32 foot frame hotel at Wind Cave “for the accommodation of those visiting that justly noted natural attraction.”

The first improvements made to Wind Cave included blasting a larger entrance and constructing the basic facilities that would allow access to the cave interior, including stairs, ladders and ropes. The earliest descriptions of trips inside the cave record that visitors had to climb ladders and ropes, slide down precipices, crawl on their bellies, and squeeze through narrow openings and crevices just to reach “rooms” worth viewing. Tours were led primarily by Alvin and Elmer McDonald and the Stabler children, and passages and rooms were lit by candlelight.

Recognizing that more visitors would enter Wind Cave if the undeveloped and sometimes hazardous paths were made more comfortable and less strenuous, the McDonalds initiated formal development of the cave interior in 1890. Alvin McDonald and his father, brother and other colleagues made seasonal improvements to Wind Cave between January 1891 and July 1892. These improvements included drilling, chiseling, hammering, blasting, and subsequent clearing of debris in cave passages to make them wider or taller, and generally more accommodating to visitors. Cave exploration was a continual process that resulted in the identification of improved tour routes, and ultimately the opening up of new passages and routes. By 1893, three developed visitor tour routes—the Garden of Eden, the Fair Grounds, and the Pearly Gates—were established. Like later NPS improvements to the cave trail system, the extensive alterations accomplished under the McDonald and Stabler tenure came at the expense of the natural resource itself.

In addition to their cave improvements, McDonald and Stabler also allowed visitors to participate in the exploration and discovery of new routes and rooms, thereby increasing the positive attention given to and excitement about the cave. The network of passages and rooms in Wind Cave, like many other caves of the period, was a reflection of late nineteenth century social history. Guides and tourists alike named new rooms or routes after religious or popular places and persons. Likewise, the McDonalds and Stablers led visitors to specimen collection grounds where various types of geological wonders could be harvested.

The federal government's early cave conservation efforts, resulting in Wind Cave National Park being the first unit established to protect a subterranean resource, 1903 to 1945.

Wind Cave is unusual in that it represents perhaps the most extensive known example of a type of cave genesis that researchers are just beginning to understand. Most caves are created by water percolating downward from the surface, forming carbonic acid that dissolves away limestone, dolomite, and other carbonate rocks. However, several lines of evidence, including the abundant “boxwork” and the lack of large openings to the surface, indicate that Wind Cave was largely formed by either 1) rising water that was released from mineral bonds (juvenile water); or 2) heated groundwater rising under artesian conditions (hydrothermal water). This water dissolved the gypsum within the Pahasapa Formation, releasing sulfur and forming sulfuric acid, a much more powerful reactant than the carbonic acid usually associated with cave formation. Jewel Cave, about nineteen miles northwest of Wind Cave and also formed in the Black Hills Pahasapa Limestone, is believed to have originated through similar processes.

Boxwork is formed by a complex process in which gypsum invades fractures in surrounding rock, then is later hydrated into anhydrite, and subsequently replaced by calcite, a substance that remains behind as projecting fins when the surrounding rock is later dissolved by sulfuric acid. Wind Cave has the finest known examples of boxwork in the world.

South of Lowell, Wyoming, the University of Texas is conducting research at Lower Kane Cave, one of only about a dozen active sulfide caves worldwide.¹ Although Wind Cave is no longer active, it could aid greatly in investigations into this unusual type of cave genesis. In addition, the varieties of bacteria known as “dark life” that are associated with these types of caves may shed new light on the origins of life on our planet.

With the 1903 establishment of the 16.5-square-mile Wind Cave NP, the Department of the Interior committed to protecting its first cave resource. The federal government became aware of Wind Cave through the Government Land Office (GLO) and late 1890s ownership rulings. Between 1898 and 1901, several surveys and reports on the cave itself and the surrounding lands provided the Department of the Interior with a rationale for federal acquisition. These reports described the cave as “of unusual and wonderful beauty,” “of sufficient extent and importance to be reserved as a national park,” and “possessing wonders of such surpassing interest as that it should be set apart as a park or pleasuring ground for the people.” The primary reasons for the park’s creation was the exemplary resources of the cave; the extensive system of explored trails and rooms, the potential that the cave was in fact much larger than the known area, and the presence of unique boxwork and other cave formations. Just as important, however, was the poor quality of the land above the cave, the importance of encouraging tourism in the Black Hills, and the need to protect the cave from “spoliation and defacement.”

The first three decades of cave conservation within Wind Cave NP consisted of maintaining and in some cases enhancing the facilities that the NPS inherited. Stairs and ladders were replaced as necessary and passageways and rooms were “opened up” for visitors. Passageways were improved by leveling the floor surface and widening the sides to generally make cave travel less onerous. In 1929, the park began experimenting with concrete and stone as permanent

¹ Evan Hadingham, “Subterranean Surprises,” *Smithsonian*, October 2002, 70.

replacements for the rotting wood bridges and stairways. The results were deemed “very satisfactory.”

Beginning at the time of its initial development in 1890, the Wind Cave trail system was lit by explorers and/or visitors carrying candles and lanterns. By the late 1920s, an inspection report recommended that the cave be lit by electricity to better display cave formations. In 1931, the cave was lit with indirect lighting and all of the wiring was hidden from sight.

During the New Deal era of the early 1930s, park officials began to stress the need for improving the existing system of trails and stairways to make Wind Cave more comfortable and convenient for its visitors. As a result, a multi-year “cave betterment and improvement program” was initiated in 1933. Trails were widened, floors lowered and ceilings raised by drilling and blasting where necessary, low areas were filled where bridges once stood, additional concrete stairs with handrails were constructed, and a fine screened gravel was placed on the trail surface to make walking safer.

The cave betterment and improvement program was essentially completed by the early 1940s. It was not without its critics. In the mid-1930s, Park Service geologists objected to what they described as the haphazard development of trails at the expense of the naturally narrow fissures of the cave. They argued that the extensive drilling and blasting had created an artificially “trimmed up appearance,” and that “the natural state of the cave has been altered to give it more the aspect of a tunnel.” The result of the controversial cave development program was an agreement to reduce the scale of all future trail development in Wind Cave. “Since the primary purpose of the NPS is to preserve the natural features of an area and yet present them to the public in such a way that the areas will not be duly disturbed, the trails and stairways should follow as nearly as possible the natural existing fault lines and openings.”

Establishment and development of the Wind Cave National Game Preserve, administered by the U.S. Biological Survey, Department of Agriculture, for the protection of bison and other endangered large mammals, 1912–1935.

By the late nineteenth century, the American bison (buffalo) had been hunted to near extinction. By 1900 it is estimated that within the entire United States, there were only two small herds in the wild totaling approximately 550 animals. In addition, other animals including elk and pronghorn antelope had been overhunted and driven from their natural habitat by successive waves of westward expansion. In recognition of the rapidly disappearing natural resources of the west, late nineteenth and early twentieth century private hunting and conservation organizations began to raise public awareness of the national emergency and raised funds for the immediate protection of endangered animals. It is during this period that organizations like the Boone and Crockett Club of New York (1887) and the American Bison Society (1905) were formed.

In 1905, William T. Hornaday, Martin S. Garretson and other individuals formed the American Bison Society. Hornaday, also the director of the Bronx Zoo, guided the organization’s conservation efforts and shipped the first fifteen-head herd of bison westward to Oklahoma’s Wichita Mountain Preserve in 1907. A year later, the National Bison Range was established on part of the Flathead Indian Reservation in Montana. By 1909, the first thirty-seven-head herd of bison, courtesy of the Boone and Crockett Club, arrived in Montana.

Seeking to establish another National Game Preserve, the American Bison Society sent its representative Alden Loring to visit three separate sites in South Dakota in 1911. Loring's report dated the same year strongly recommended the establishment of a Game Preserve on the lands of Wind Cave National Park. He concluded that Wind Cave National Park was "suited for buffalo, elk, deer, antelope and mountain sheep, all of which in bygone years lived here." The following year, Congress established the Wind Cave National Game Preserve "for a permanent national range for a herd of buffalo to be presented to the United States by the American Bison Society, and for such other native American game animals as may be placed therein." The Game Preserve was to be administered by the U.S. Biological Survey, Department of Agriculture. In 1913, the first herd of fourteen bison was shipped from the New York Zoological Society (Bronx Zoo) to a new 3,400 acre fenced pasture at Wind Cave National Park. The following year, the first herd of elk was shipped to the Game Preserve.

The establishment of the Wind Cave National Game Preserve was the most important event in the park's first quarter century of operation. As a result of the Game Preserve, the larger park received substantially more federal funds than it normally would have. In addition, the Game Preserve was established during a period when auto touring was beginning to become extremely popular with the American public. By 1914, the park superintendent noted that "traffic is mostly by automobile and is increasing yearly and rapidly." The presence of the Game Preserve within the larger park contributed to its popularity with both local and regional visitors, and like the cave itself, was a stimulant for regional tourism. In an acknowledgement of this popularity, the park superintendent recommended the construction of a smaller holding pen visible from the roadside. "Since it will be important for the general public to obtain a glimpse of either buffalo or elk after they have been liberated within the large pasture, it will be the policy of the department to retain within a smaller enclosure alongside the road, a few of the animals." Due to a lack of funds, however, the holding pen or exhibition pasture was not constructed until 1930.

The headquarters for the Game Preserve was a late nineteenth century homestead and the former residence of William Rankin, the first superintendent of Wind Cave NP. The U.S. Biological Survey repaired and improved the property during the first two decades of operation, but it was not until 1930 that the facilities received a complete rehabilitation. Like the park headquarters, the reorganization and renovation of the Game Preserve Headquarters reflected the new emphasis on architectural coherence and spatial relations based on function and visitor visibility, strongly suggesting the guiding hand of NPS landscape architects. The style of the newly renovated Warden's residence was described in 1931 as "Dutch Colonial which will not conflict with the English type as being used at Park Headquarters." Other significant developments within the Game Preserve included the creation of a new 3,600-acre pasture in 1928 adjacent to the original one, and the construction of Lake Ta-Tan-ka, or the Norbeck Dam, in 1929, a controversial impoundment.

By 1935, the NPS assumed administrative control of the Game Preserve. More than a decade later, in 1946, President Truman signed legislation that more than doubled the size of Wind Cave National Park, from 11,718.17 to 28,059 acres, substantially increasing the bison and other large mammal grazing range. The new acreage was added from a portion of the former Custer Recreational Development Area (RDA) lands to the east of the park. A boundary fence encompassing the new lands was constructed in 1951.

Although not the first national preserve to protect bison, the Wind Cave National Game Preserve was one of the earliest and was significant to the early conservation movement and important to the early development and growth of Wind Cave NP and regional tourism.

The Civilian Conservation Corps and Work Projects Administration develop Wind Cave NP's Administrative and Utility Areas, 1931–1941.

Federal funding to relieve the nationwide economic depression had already reached the Black Hills region by 1931. During this year, federal programs hired local labor to perform banksloping, cutting and rounding of road shoulders near Cold Spring Dam and Beaver Creek Bridge. The following year, log guardrail construction was completed near the Beaver Creek Bridge. Work was also begun on the construction of the Custer-Newcastle approach road to Wind Cave National Park.

Formal NPS development of the larger landscape within the Headquarters Area of Wind Cave National Park began in 1931. The fence surrounding the Headquarters Area was extended out to include the new and future proposed structures, and a new street lighting system was installed adjacent to the main road. The water and sewer system was also substantially improved with the construction of a three-mile pipeline trench from the newly acquired Beaver Creek springs to the Headquarters Area, and the laying of approximately 3,160 feet of six-inch vitrified clay pipe that emptied into the wastewater lagoons near the Maintenance Area.

In March 1933, President Roosevelt established his New Deal public work programs, generally called the CCC, but including the WPA, Civil Works Administration (CWA), and ECW. Wind Cave National Park received funding for a Civil Works labor force that started work at the park in December of 1933. Much of the work accomplished by this program consisted of cleaning up and sloping shoulders along roads, cleaning drainage ditches, repairing fire roads, and tree planting. Perhaps most significantly, the first tree planting program in Wind Cave National Park was initiated by the Civil Works program in 1933. A total of 143 western yellow pine trees, and many others including cedar, juniper, elm and wild cherry were planted in the Headquarters Area during this year, and numerous other planting campaigns were carried out in subsequent years. The Civil Works program was discontinued in April 1934.

Company 2754 Camp NP-1, an ECW (CCC) labor force, was organized at Wind Cave National Park on July 9, 1934. The ECW force lived in a temporary summer camp between July and October. Construction of a permanent campsite began in Wind Cave Canyon on August 2, 1934, and completed in October of that year. The camp contained a mess hall (kitchen and store room), bath house/laundry, eight barracks, supply/warehouse building, supervisor's/officer's quarters, recreational hall, hospital, garage, administrative office, two latrines, coal shed, garbage rack, incinerator, and a tennis court. Further east temporary utility facilities were also built including two separate garages A and C, an oil house, hose house, and gasoline pumps. Much of the work carried out by the new CCC labor force continued the work of the previous Civil Works program, including roadside cleanup and shoulder sloping, construction of truck trails and fire roads, general landscaping, enlargement of water storage facilities and excavation and installation of new waterlines, erecting new fence lines, moving old buildings, and planting a significant number of new shrubs and trees.

In addition to the major construction projects, other significant landscape features built by the CCC included log and later stone wall guardrails lining the road through the Headquarters Area, three “entrance pylons” made of native limestone and logs, camping spurs and fireplace and picnic bench combinations in the original campground/picnic area, the new walk-in tunnel entrance stairway descent to Wind Cave, the pedestrian bridge and trail connecting the Visitor Center to the cave entrance and elevator building, construction of a new bison grading corral and compound, and construction of the Elk Mountain Lookout Tower.

CRITERION C: EMBODIES THE DISTINCTIVE CHARACTERISTICS OF A TYPE, PERIOD, OR METHOD OF CONSTRUCTION, OR REPRESENTS THE WORK OF A MASTER.

The development of National Park Service Rustic landscape architecture, architecture, and engineering in Wind Cave NP, 1931–1941.

In 1903, Wind Cave NP inherited a rag-tag assortment of buildings and structures that had formerly served numerous domestic, agricultural, and recreational needs. Due to budget considerations, temporary repair and improvement of these facilities was the only option for the park superintendent during the early years of operation. The need for an overarching architectural and landscape design for the developing park was first expressed by park landscape architect Thomas Vint. In 1928, Thomas C. Vint, NPS landscape architect, first expressed a need for cohesive architectural and landscape architectural design esthetic at the developing park. With the assurance of a commitment in federal funding in 1930, and based on Vint’s initial recommendations and the input of the superintendent, NPS landscape architects began to redesign facilities at Wind Cave NP.

The design ultimately chosen by the landscape architects brought a uniform plan and coherency to the park buildings and landscape design. Howard Baker, a NPS landscape architect, appears to have supervised the ongoing development at Wind Cave. New development was initiated in 1931 with the construction of the Power House and a ranger’s dormitory. These new buildings, and all future ones, were built of frame or masonry tile and were covered in stucco. Most were trimmed with reddish brown sandstone. At the time of their construction, the new architectural style was described as Spanish or California. Years later, landscape architect Howard W. Baker explained the reasons for choosing this particular style for new development within Wind Cave National Park: “We chose to use the northern Spanish architecture, which harmonized with the landscape, having a not too rustic but pleasing character.”

The break from traditional NPS Rustic Architecture was significant. While native materials were utilized, the rustic-ness was subtly suppressed and placed in stark contrast with more modern architectural features. The new architecture, however, still reflected the Park Service philosophy of incorporating natural landscape elements in planning and design. “What is curious about the Wind Cave structures is that the rusticated materials—hewn timbers, masonry trim, and stucco—is used in English Vernacular style architecture. The precise, incised lines created by the steel, and the multi-light windows create a contrast to the less refined, more organic stucco and hewn timber. Again the ashlar coursing of the sandstone masonry contrasts with the more commonly employed rubble masonry in structure such as the Custer State Game Lodge.”

Beyond individual structures, the landscape architects also developed functional building clusters within Wind Cave NP. The residential cluster, already partly developed between 1905 and 1930, was enhanced and expanded with the addition of new structures in a ridge overlooking the main road and cave entrance. A new utility cluster was initially planned on the same ridge top above the residential cluster, but was later sited at the old CCC camp in the late 1930s. A new administrative and visitor service cluster was developed on the north side of the main road. This complex included a reconstructed natural cave entrance, a visitor center, an elevator building, and a pedestrian trail linking all three.

Thomas C. Vint, NPS landscape architect's role in the design and development of Wind Cave National Park, 1928–1941.

Thomas C. Vint joined the NPS landscape engineering department as a draftsman in late 1922. For the next five years he advanced through the department and in 1927 was appointed to head the new office of landscape architecture based in San Francisco.²

Under Vint's tenure, the landscape program developed a streamlined process of park master planning and development that was based on naturalistic principles of design and an ethic of landscape preservation. According to the NPS mission, his work made parks more accessible to the general public but also preserved their resources for future generations.³

Vint visited Wind Cave NP in 1928, only one year after his appointment as head of the Park Service's landscape division. His shocked reaction to the state of the park facilities during this period, what he subsequently described as the "most perfect haywire outfit we have in the park system," was to provide the conceptual impetus for future redesign efforts. By the late 1920s, Wind Cave NP consisted of an eclectic collection of new, old and deteriorating buildings and structures with no sense of coherence in design or spatial relations. The eclectic nature of the buildings and structures was at least in part a direct result of annual underfunding for maintenance and operations for several years. Many other features including pedestrian and vehicular circulation systems were in poor condition and in desperate need of repair. Vint's characterization that "they are in a class with the development on one of the many homestead failures typical of the western states" must be considered fairly accurate.

Correspondence between Vint and the park superintendent subsequent to his visit demonstrate that Vint already had very specific ideas as to what new facilities the park needed, and where new development would be centered. Most of these ideas were ultimately carried out in the CCC era of park development between 1931 and 1941. In particular, Vint called for new administration and concessionaire buildings to be connected by an open porch, a design element that was essentially carried out in the construction of the new Visitor Center in 1936. Vint chose a new location for the administrative/concessionaire structure that was further south of the cave entrance and existing registration building thereby relieving the vicinity of the cave entrance of unnecessary traffic. Vint also proposed a new pedestrian trail "of relatively low gradient" that would connect the new administrative/concessionaire facility with the cave entrance. Across the

² Charles A Birnbaum and Robin Karson, eds. *Pioneers of American Landscape Design* (New York: McGraw Hill, 2000), 414.

³ Birnbaum and Karson, *Pioneers*, 414.

main road, Vint recommended development of both a residential and utilitarian cluster, laid out in a front (lower) and rear (higher) row on a ridge overlooking the cave itself. In proposing that the most extensive development be removed west of the main road, Vint effectively limited the impact in the immediate vicinity of the cave: “On completion of the new layout all buildings except one will be on the west side of the roadway.” Lastly, anticipating the need for expanded vehicular parking, Vint also recommended that the road in front of the headquarters be graded to a 60-foot width for 800 feet to accommodate angled parking.

In addition to guiding new development at the park, Vint also cleaned up the appearance of the Headquarters Area, strongly recommended that numerous dilapidated and unused buildings and structures be torn down. Vint specifically recommended that the “Wind Cave” sign forming large letters made of whitewashed stones on the hillside above the cave be removed.

The extensive landscaping and road design that took place at Wind Cave National Park between 1931 and 1941 are due directly to Vint’s experience and influence as well. In the two years between his graduating with a B.S. in landscape architecture from Berkeley in 1920, and his employment by the NPS in 1922, Vint learned about and supervised the large-scale planting of trees and shrubs. During his Park Service tenure, Vint also became known for his design of park roads. It was Vint who ensured that the CCC era development of Wind Cave National Park, particularly in the Headquarters Area, included extensive planting of native trees and shrubs and that the park entrance roads were softened by shoulder sloping.⁴

While individual building design and general construction supervision was carried out by others, ultimately the cultural landscape of the Administrative and Utility Historic District within Wind Cave National Park today owes its appearance to Thomas Vint.

FURTHER CONSIDERATIONS

Significance of Mission 66-Era Development, 1954–1966.

An additional subject related to historical significance in Wind Cave NP will need to be explored further and discussed regarding new NRHP nominations—Mission 66-era Development, 1954-1966. The NPS is currently developing national context data on the Mission 66 program and planning and design resulting from and that characterizes this period of NPS growth, development, and management. Mission 66-era development at Wind Cave National Park should be evaluated in the future when this context is available.

Mission 66 represented the largest program for park improvements ever initiated by the NPS. This ten-year improvement program was a response to increasing pressures to modernize the national park system. Under the direction of Conrad Wirth, then Director of the NPS, the program was named Mission 66 to mark what would be the fiftieth anniversary of the NPS in 1966. In addition to modernizing and expanding park facilities, Mission 66 funded the re-

⁴ Birnbaum and Karson, *Pioneers*, 414.

initiation of the Historic American Buildings Survey (HABS) in 1957 and, in 1960, provided funding for the establishment of the National Historic Landmarks program.⁵

In text included at the front of every NPS unit submission for projected improvements entitled “What is Mission 66?” the NPS maintained:

MISSION 66 is a forward-looking program for the National Park System intended to so develop and staff these priceless possessions of the American people as to permit their wisest possible use; maximum enjoyment for those who use them; and maximum protection of the scenic, scientific, wilderness, and historic resources that give them distinction.

Construction is an important element of the program. Modern roads, well planned trails, utilities, camp and picnic grounds, and many kinds of structures needed for public use or administration, to the meet the requirements of an expected 80 million visitors in 1966, are necessary; but they are simply one means by which “enjoyment-without-impairment” is to be provided.

Under this program, outmoded and inadequate facilities will be replaced with physical improvements adequate for expected demands but so designed and located as to reduce the impact of public services of the quality and quantity that the public is entitled to expect in its National Park System. It is intended to assure the fullest possible degree of protection, both to visitors and resources.

Some of the design and planning philosophies that informed the Mission 66 program included the use of modern design principles and materials to create functional and economical buildings, the decentralization of services and destinations in order to diminish overcrowding, and the accommodation of large numbers of visitors.

The planning principles that formed the basis for Mission 66 design included the following:

- improving access by developing interpretive facilities as close to the resource as possible;
- expanding on interpretive opportunities by extending interpretation into the landscape through a range of experiential activities;
- establishing synergies between educational programs and signature park resources;
- using curvilinear forms to allow for multiple views and an unimpeded processional;

⁵ HABS was originally started in 1933 as a “make work” program for out of work architects and draftsmen. Part of the Mission 66 program was the initiation of the “National Survey of Historic Sites and Buildings,” that was the precursor to the current National Historic Landmarks program. Barry Mackintosh, *The National Park: Shaping the System* (Washington, DC: Government Printing Office, 1985, 2000 3rd edition) “Mission 66 and the Environmental Era, 1952-1972,” [n.p.]; United States, Department of the Interior, National Park Service, *Mission 66 In Action* [Report on the first year of Mission 66.] Washington, DC, fiscal year 1957; United States, Department of the Interior, National Park Service, *Mission 66 Progress Report* (Washington, DC: October 1963), 21.

- managing visitor movement;
- clustering relatively dense site planning of new facilities and complexes;
- utilizing a unifying design concept that made use of an armature or datum along which development occurred;
- employing zoning of like uses;
- practicing the visual and physical separation of different uses;
- avoiding fragile resources in site developments;
- incorporating existing features into new designs; and
- espousing the use of modern materials and construction methods and minimizing of detailing and ornamentation in order to avoid distraction from the surrounding natural or historic resource.

Since 1914, Wind Cave National Park catered to long distance drivers by providing them with a convenient pavilion and picnic area north of and adjacent to the cave entrance. During the CCC era, this picnic area was transformed into a formal combination campground and picnic location. This campground area served visitors to the park for nearly three decades. After many years of planning, in 1962 construction was begun on the Elk Mountain Campground. The selected area west of and adjacent to the Headquarters Area was cleared and grubbed, topsoil stripped, culverts installed, main road, loop roads, and parking areas constructed. A new camp tender's residence, five comfort stations, and a campfire circle (amphitheater building and paving) were constructed. In addition, cattle guards, water gates, timber curbing, sidewalks, and signage were erected. Four camp loops, labeled A through D, containing 100 campsites, were built. A 7,900-foot-long fence was subsequently erected completely surrounding the Elk Mountain Campground. The new campground was opened to the public in June 1963.

Throughout the 1950s, a greater emphasis was placed on interpretation in Wind Cave National Park. In 1952, the park received and installed "numerous signs" throughout the park. By 1954, a new interpretive sign was placed at the "original discovery opening" to Wind Cave. During the same year, a new roadside exhibit on prairie dogs was constructed at the Norbeck Prairie Dog Town. The exhibit consisted of an incised wood panel on a stone base. Positive public reaction to the roadside interpretive exhibit led to the construction of six additional interpretive signs in 1955. These were mostly located along the northern portion of SD 87 in Wind Cave National Park. They included "What You See," an explanation of park geology positioned over Beaver Creek; "Drama of the Land," a sign showing reversion of old sub-marginal farms to native cover; "East Meets West," an interpretation of the overlapping range of trees and shrubs; "The Buffalo Gap," an interpretation of a pegmatite dike overlooking the southern hills and the historically significant gap; "Rankin Ridge," an explanation of the nearby fire lookout; and the Northern Entrance exhibit "From the Mountain to the Prairies" that identified wildlife and interpreted natural history values. The "Norbeck Prairie Dog Town" roadside interpretive exhibit was expanded in 1955 to include a new pullout area, guardrail and curbing. Small signs

explaining prominent trees and shrubs were also placed on the pedestrian path leading from the Visitor Center to the cave entrance. By 1957, the new Master Plan proposed “well designed interpretive signs at appropriate spots on the park road system ... [to] greatly enrich visitor experience and serve to increase understanding of the park’s significance and possibly thereby to help discourage vandalism.” The signs proposed were for the southern end of the main highway through Wind Cave National Park.

Between 1966 and 1967, all of the existing roadside interpretive exhibits were renovated to include pullouts, walkways and curbs. In addition, several new exhibits were constructed. Each exhibit was slightly different however “while they differed slightly in scale and capacity, each of the new parking areas shared a similar plan and section, with a basically symmetrical parking area separated from the main roadway by a grassy safety island surrounded by a concrete curb.” The new wayside exhibits included a “Buffalo-Antelope” exhibit (south entrance), “Concretions” exhibit (Headquarters Area), “Prairie Dog” exhibit (north Prairie Dog Town), “What You See” sign (SD 87 above Norbeck dam), “Pegmatite” sign (SD 87 below Pig Tail Bridge), “Buffalo Gap” sign (SD 87 below Pig Tail Bridge), “East Meets West” sign (SD 87 in Reaves Gulch above Pig Tail Bridge), “Silent Invasion” sign (SD 87 south of Rankin Ridge), and the “From Mountains to Prairies” sign (SD 87 near the north entrance).

Significance of Ethnographic and Archeological Resources

The significance of archeological and ethnographic resources was not included in the scope of this CLR. However, review of available documentation indicates that the park as a whole should be evaluated for its significance as a Traditional Cultural Property. In addition, though archeological resources have been documented and evaluated, the NPS should continue their efforts to ensure that all archeological resources are documented and evaluated.

Significance of Buried Cultural Resources in Wind Cave

According to park staff, buried cultural items and materials have been found, documented and at times removed from the cave. The buried items were purposely deposited and then buried by loose rock material. Some items may have been discarded or lost by visitors, workers, and others. Construction materials in the form of fragments and debris have been uncovered including, but not limited to, wood (structures such as steps, stairs, and handrails); asphalt (trail surfacing); concrete (steps); metal (handrails); wire and cabling (electric supply lines for cave lighting); and rock (excavation and blast debris). The historical significance of buried items and materials was not undertaken as part of this CLR.

COMPARATIVE ANALYSIS OF HISTORIC AND EXISTING CONDITIONS

The analysis and evaluation section of a CLR is an essential tool for unraveling the complexities of cultural landscapes and their resources. The analysis process involves the review of collected information from a site's history and the placing of this information within the context of American history to determine its relevance, importance, and representation of a period and/or practice. The criteria for conducting the analysis are based upon NRHP guidance. From the analysis, the statement of significance—how a place's meaning relates to history and a period of significance—when place-shaping events occurred, are developed. This was presented in the previous section of this chapter. Further analysis comparing the physical conditions of a place during the determined period(s) of significance and current physical conditions, provides an evaluation of the degree to which they have changed, as well as determining which features are linked to the historic period(s) and therefore contribute to historic significance. Features that are not associated with the historic period(s) of significance are also identified. The analysis process thus examines the presence, or lack of, historic features and intrusive non-historic features. This information is also used to determine historic integrity. The significance and integrity information developed is critical to establishing the appropriate treatment recommendations in subsequent chapters of this CLR. A description of National Register criteria for evaluating integrity is included in the next section of this chapter.

With each change in occupation and associated land-use practices of the project area, from American Indian, to Euro-American settlers, explorers, ranchers, and early cave developers, to the NPS, the physical landscape has also changed. Today, the physical landscape reflects aspects of the land use practices associated with each period; however, the most recent occupation by the NPS is the best represented. The acquisition of the site for a national park was a landmark event for the Wind Cave landscape. Making the site accessible to visitors, while maintaining the integrity of the cave resource, as well as the 28,000-acre aboveground parkland resource, has been of primary concern to the NPS since the early twentieth century.

Today, after years of questions about the historic ecological impacts of cattle and bison grazing, and of the means used to render the cave accessible and visible to visitors, the NPS is working to protect and enhance the hydrology and ecology of the park. In addition, the NPS continues to undertake measures to further protect and enhance Wind Cave through mitigating surface impacts such as the use of asphalt construction materials. In addition, the NPS continues to undertake alterations within the cave to mitigate the damaging impacts associated with cave access including the removal of wood and asphalt construction materials from various past periods of development.

The two historically-significant landscapes within Wind Cave National Park include the landscape associated with the 1903 park boundary with a period of significance between 1890 and 1941, and the SD 87 corridor with a period of significance between ca.1910 and 1941. Following is a comparison by landscape characteristic of the physical conditions of the two

identified historic landscapes during their periods of significance and the physical conditions in 2003.

Extant features are linked to their period of construction or presence during the periods of significance. If the feature survives from the period of significance, then it is assessed as contributing to the historic landscape character of the landscape. Features not associated with a significant historic period are identified as noncontributing.

Appendix A: Landscape Features Inventory includes an inventory of existing features and systems by landscape characteristic with an evaluation of whether the inventoried feature contributes to the historic landscape or not, as well as listing its associated period of significance and condition.

THE HISTORIC LANDSCAPE ASSOCIATED WITH PARK DEVELOPMENT 1890-1941

NATURAL SYSTEMS AND FEATURES

The primary components of the natural systems associated with the historic landscapes remain principally unaltered since the end of the period of significance. The ridges, canyons, and gulches have eroded at a predictable and normal rate, and the underlying geological formations and the fossils they enclose have not changed. Stream flow has noticeably decreased, and the aquifer is currently being depleted by well withdrawal. The boundaries between the plant communities—ponderosa forest, mixed-grass prairie, and riparian—have shifted due in part to climatic changes, and human intervention. The construction of the U.S. 385 bypass around the Headquarters Area, the construction of Elk Mountain Campground, and construction of the addition to the Administration Building, and the extension of the Administration Building parking lot to the south all resulted in some loss of undeveloped areas. However, there is little change to the overall patterns and characteristics of the physiographic and natural systems that were present during the periods of significance.

Contributing natural systems and features:

Aboveground resources

- Gobbler Pass
- Gobbler Ridge
- Gobbler Canyon
- Limestone Spring
- Fossil Ridge
- Windy Point
- Bison Flats
- Cottonwood Creek
- Elk Mountain
- Wind Cave Canyon
- Prairie Dog Canyon

- Negro Canyon
- Lookout Point
- Cold Spring Creek
- Beaver Creek
- Reaves Gulch
- Wetlands
- Sinkholes
- Caves
- Bison Wallows
- Ponderosa Pine Forest
- Mixed-Grass Prairie
- Riparian Vegetation
- Other Springs

Wind Cave resources

- Pahasapa Formation
- Passages
- Rooms
- Natural Cave Openings/Blowholes
- Speleothems
- Weathering deposits
- Subterranean lakes
- Cave biota
- Fossils

Missing natural systems and features:

- Removed specimens

SPATIAL ORGANIZATION

Much of the spatial organization that characterized the landscape during the period of significance survives today. Changes to historic period spatial organization include encroachment of forest down slopes into formerly open areas, the addition of buildings and increased areas of trees and shrubs within formerly open areas in the developed area during the Mission 66 period, and the addition of a new campground in 1963 in a formerly forested and open area. Most of the road corridors established during earlier periods remain essentially the same, although several small road sections have been added. Spatial organization has also been affected by the loss of earlier features, including the developed area associated with the Game Preserve demolished in 1959. The spatial organization of the Game Preserve headquarters complex of buildings, fencing, and plantings has been lost. Early spaces associated with circulation routes within the cave were completely dominated by the configuration of negotiable natural passages and involved considerable crawling and squeezing, beginning with the small natural cave entrance.

Contributing spatial organization:

Aboveground resources

- Maintenance Area, central paved spaces defined by buildings
- Picnic area (former campground), the central space defined by the picnic pull-off and tree plantings
- Headquarters Road Corridor, defined by the canyon and hillside features
- Administration Building (Visitor Center), front yard defined by flanking pines and the front façade of the building
- U.S. 385 Corridor, north and south of the Headquarters Area excluding the bypass
- SD 87 Corridor, the short section of SD 87 at the northern edge of the landscape
- Historic Housing Area, the small lawn and open field spaces defined by buildings and road edges
- Wind Cave Canyon
- Cottonwood Creek drainage
- Unnamed drainages
- Mixed-grass prairie, Bison Flats
- Prairie Dog Canyon
- Gobbler Canyon
- Mixing Circle service road corridor
- Road corridor to water storage/pump house

Cave resources

- Passages
- Openings
- Bridal Chamber (North Room)
- Crystal Palace
- Post Office
- Roe's Misery
- Beauty Parlor
- Devil's Lookout
- Methodist Church
- Model Room (Oddfellows Hall)
- Crossroads
- The Temple
- Elks Room
- Chert Room
- Fairgrounds
- Bachelor's Quarters
- Garden of Eden

- Eastern Star Room
- Assembly Room
- Three Way Stairs
- Blue Grotto
- Chamber de Norcutt
- The Catacombs
- Pearly Gates
- Badlands
- The Tabernacle

Non-contributing spatial organization:

Aboveground resources

- Elk Mountain Campground, road corridor
- Elk Mountain Campground, the campsite areas
- Mixing Circle Service Road Corridor
- Road corridor to water storage/pump house
- Wastewater lagoons, and spaces defined by impoundment edges
- Post-WWII Housing Area, the spaces defined by buildings, plantings, and parking/roads
- U.S. 385, bypass around Headquarters Area

Not yet determined spatial organization:

- Mixing Circle Surrounds

LAND USE

Land uses that continue from those present during the period of significance include cave tourism, camping, recreation, wildlife viewing, wildlife management, motor touring, visitor services, residential, and maintenance. Uses that have been discontinued include the slaughter of livestock, mineral extraction, and food concessions.

Contributing land uses:

- Residential
- Science/exploration
- Interpretation/museum
- Recreation
- Burial sites
- Wildlife management
- Operations/maintenance

Missing land uses:

- Mineral extraction
- Agricultural
- Commercial
- Industrial

Non-contributing land uses:

None determined.

CIRCULATION

The horizontal alignment for the existing major road corridors—north and south segments of U.S. 385 and Headquarters Road (HS-93)—remain essentially unaltered since the period of significance. However, the material used to surface these roads has changed from stone to asphalt. Several components of the current circulation systems post-date the period of significance, including the Elk Mountain Campground access road and U.S. 385 bypass around the Headquarters Area.

Many existing minor roads and drives remain substantially unchanged from the period of significance. These include the drives within the historic housing area, the road heading west from the Historic Housing Area to the water supply facility, the road connecting with Headquarters Road to the Maintenance Area and serving the Elevator Building and the VIP Center building (former Power House).

The drive associated with the Picnic Area (former campground) remains substantially intact. The large visitor and staff parking lot at the Administration Building was expanded south in the 1960s. Other alterations after the period of significance include changes in 2003-2004 to concrete islands and widening of paved areas.

The earliest circulation routes within the cave began at the Natural Entrance, and radiated from there. Movement was by squeezing, sliding, and climbing through narrow crevasses and tunnels using ropes and candles. Routes were makeshift and dictated by natural corridors. Starting in 1890, the McDonald family initiated improvements to make the trails more comfortable and less strenuous, enlarging passages by drilling, chiseling, hammering, and blasting. As new sections were explored, new rooms were added to tour routes, and by 1893 three formal routes for visitors had been developed: the Garden of Eden, the Fairgrounds, and the Pearly Gates tours. A bypass was created in the 1910s or 1920s to allow groups entering the cave to avoid running into groups exiting of the cave. The bypass went through the Cathedral. During the CCC period wood steps and handrails were replaced with concrete steps and pavements and metal handrails. Many of these concrete circulation structures remain today. Recent changes such as the minor alternations of path edges including resetting of edging stones and the systematic removal of all iron and aluminum hand and guardrails and replacement with stainless steel handrails.

Contributing circulation systems and features that survive from the period of significance include:

Aboveground resources

- U.S. 385, segments north and south of the Headquarters Area
- SD 87, the segment at the north edge of the proposed historic district
- Headquarters Road (HS-93), the segments north and south of the Headquarters Area
- Administration Building parking lot, portions of the overall form remain
- Historic Housing Area access road
- Maintenance Area, paved yard areas
- Maintenance Road
- Underground Water Tanks service road
- Mixing Circle service road
- Picnic Area (former campground) Drive, the road and pull-offs remain
- Administration Building, the segments fronting the parking lot and connecting to the building entrance, a short segment extending straight out from the entrance to the parking lot
- Game Preserve access road, remnant road
- Road traces
- Cold Brook Canyon Trail
- Wind Cave Canyon Trail, segments
- Lookout Point Trail, segments

Cave resources

- Natural Entrance Tour Trail
- Fairgrounds Tour Trail
- Candlelight Tour Trail
- Wild Cave Tour Trail
- Elevator
- Steps, concrete

Not yet determined circulation features include:

Aboveground resources

- Wastewater Lagoons access road

Non-contributing circulation features that post-date the period of significance include:

Aboveground resources

- Post-WWII Housing Area Loop
- Post-WWII Housing Area parking lots

- Post-WWII Housing Area walks
- Headquarters Area Walks including concrete steps leading from south end of Administration Building parking lot to path connecting to the Elevator Building; and concrete path sections and surface in Wind Cave Canyon connecting the Natural Entrance and the Elevator Building
- Campground Road
- Campground Loop A
- Campground Loop B
- Campground Loop C
- Campground Walks
- Elk Mountain Trail
- wood handicap ramp at lower-level north entrance of Administration Building/Visitor Center

TOPOGRAPHY

For the most part, the landform and topography of Wind Cave NP and surrounding lands remains similar to that which existed prior to and during the period of significance. Over the years, topographic modification within the region has been associated with road corridor development, bridging of stream corridors and canyons, homestead development, and quarrying. Most of the topographic modifications effected during the period of significance are still evident in the landscape today.

Topographic modifications that post-date the period of significance include the excavation of wastewater lagoons in Wind Cave Canyon and the installation of underground water storage tanks on the side of Elk Mountain.

Within Wind Cave there are few topographic changes since the period of significance. However, cave-ins have occurred that have resulted in minor alterations since the period of significance. In addition, the removal of blast debris and rearranging of loose rock materials in the cave has altered the topographic conditions. However, since little is know about the precise conditions at the end of the period significance, it cannot be determined whether current loose rock removal and alterations has changed a historic period condition.

Contributing topography features that survive from the period of significance include:

Aboveground resources

- Building sites, some
- Grading for roads and parking, sections
- Old Norbeck Dam
- Quarries
- Road Corridors

Cave resources

- Passage enlargements

Non-contributing topography features that post-date the period of significance include:

Aboveground resources

- Wastewater lagoons
- Buried water tanks
- expansion of parking lot at Administration Building
- all road and building grading associated with the Elk Mountain Campground
- alteration of Wind Cave Canyon resulting from the addition to the Administration Building (Visitor Center)
- all road and building grading associated with the Post-WWII Housing Area
- the removal of blast debris from Wind Cave

VEGETATION

By the time the NPS established Wind Cave National Park, the region's vegetations was largely forest and grasslands used for cattle grazing.

During park development, agricultural practices such as livestock grazing continued with the creation of new pastures and planting of field crops. The land fenced for pasture was scattered throughout the park, crop fields were located in close proximity to residential areas. In addition, areas around early buildings were planted in lawn, transplanted native trees, and new trees and shrubs. Specific examples include native trees transplanted to the grounds of the Superintendent's Residence and a hedge of wild roses planted at the Warden's residence at the Game Preserve.

Similar activities continued as part of the CCC labor projects. Areas adjacent to residences and at the Superintendent's garage were seeded with grass lawn. New pastures were created, while some crop and orchard land was converted back to grassland through the planting of prairie grasses and forbs. Efforts to restore and maintain natural plant communities began in the 1950s with a reseeding program and furthered in the 1970s through prescribed burning and tree thinning in natural drainage areas. Prescribed burning continues throughout the park today.

Other planting projects conducted during this period included a large number of trees and shrubs planted in the Headquarters area. During this planting program, western yellow pine, cedar, juniper, elm, wild cherry, birch, aspen, cottonwood, wild plum, chokecherry, gooseberry, dogwood, and other shrub species were planted. To date, specific planting plans for the developed area during the period of significance have not been located. The park also attempted to revegetate degraded areas with native grasses.

Today, vegetation in the park includes the natural plant communities in undeveloped areas, composed of forest, woodlands, grasslands, and riparian communities, and planted areas

associated with developed areas. The natural plant communities, especially the grasslands and ponderosa pine forest, require fire for stand rejuvenation. Without fire, the distribution and composition of these plant communities evolves increasingly towards woody growth. Today the park actively uses fire as a management tool to maintain a healthy ecosystem and manage invasive plant species.

The Headquarters Area is characterized by plantings that survive from the CCC era. The residential area is maintained in turf grasses and a few trees and shrubs. The campground area consists of mostly turf with a few trees surrounded by pine/grass savannah. The Alvin McDonald gravesite has lilacs surrounding the memorial. Areas around the Maintenance Area, Mixing Circle, and at the underground water tanks are maintained in mown prairie grasses.

It is unknown whether the trees planted in the early 1900s still remain, although traces of hedges are found at the Game Preserve Headquarters and the former Superintendent's Residence. Much of the vegetation found today in the developed area survives from the CCC era. Lawn surrounds buildings and residences and several large massings of trees edge the developed area. Thus, the existing vegetation in the developed area possesses integrity to the CCC planting initiative and therefore the period of significance. However, the trees planted by the CCC in the Headquarters Area have increased in density over time, as has the shrub understory. This may be one factor contributing to the reduction in moisture in the cave.

The overall park vegetation has been managed since the 1950s to restore and rejuvenate natural plant communities. The pattern of scattered forest and grasslands interspersed with riparian vegetation has been historically maintained through fire. Use of prescribed fire by the park continues in order to manage forest and grassland composition and rejuvenation.

Contributing vegetation that survives from the period of significance include:

Aboveground resources

- tree plantings flanking the front of the Administration Building (Visitor Center)
- lawn fronting the Administration Building (Visitor Center)
- lawn throughout the Historic Housing Area
- tree plantings throughout the Historic Housing Area
- tree plantings augmenting native vegetation in Wind Cave Canyon
- tree plantings augmenting native vegetation in the picnic area (former campground)
- Alvin McDonald Memorial site Lilacs
- remnant plantings at the Game Preserve Headquarters site
- tree and shrub plantings at the Elevator Building

Not yet determined vegetation includes:

- shrub plantings within the Historic Housing Area
- shrub plantings within Wind Cave Canyon

Missing vegetation includes:

- tree plantings at the Maintenance Area

Non-contributing vegetation includes:

- Post-WWII Housing Area tree and lawn areas
- Elk Mountain Campground lawn areas and tree plantings augmenting native forest
- volunteer shrub and tree massings that have encroached into riparian areas upstream from the Administration Building

BUILDINGS AND STRUCTURES

The buildings and structures that survive from the period of significance are largely intact with relatively few major modifications since the period of significance. Exceptions include the Administration Building (Visitor Center) expansion into Wind Cave Canyon, and the CCC-era cave entrance that has been covered with a revolving door/airlock at the Walk-in Cave Entrance. The old CCC-era “washing and greasing rack” in the Maintenance Area has been converted to a storage area and an addition was built onto the fire cache. New buildings added since the period of significance include all of the structures associated with the Post-WWII Housing Area, all buildings and structures associated with the Elk Mountain Campground, the recent comfort station at the Picnic Area (former campground), and miscellaneous structures associated with park operations and maintenance.

Contributing buildings and structures that survive from the period of significance include:

Aboveground resources

- Administration Building (Visitor Center) (HS-1)
- Elevator Building (HS-2)
- Superintendent’s Residence (HS-3)
- Superintendent’s Cottage (HS-4)
- Employee Residence (Ranger Cabin) (HS-5)
- Employee Residence (HS-6)
- Employee Residence (HS-7)
- Ranger’s Dormitory and Mess Hall (HS-8)
- Garage (Machine Shop) (HS-11)
- Garage (Fire Cache) (HS-12)
- Storage Building (Power House) (HS-13)
- VIP Center (Power House) (HS-15)
- Gas Station (Oil House) (HS-16)
- Garage A (Carpenter Shop) (HS-17)
- Garage C (Maintenance Shop) (HS-18)

- Storage Shed (Carpenter Shop) (HS-25)
- Seasonal Residence (CCC Bunkhouse) (HS-27)
- Paint Locker (Coal Shed) (HS-30)
- Cave Walk-in Entrance (CCC portion) (HS 90)
- Visitor Center Pedestrian Bridge
- Stone Barrier Walls (HS-94)-6
- Rock Faced Culverts (HS-95)
- Beaver Creek Bridge (HS 99)

Cave resources

- Elevator shaft and airlocks

Not yet determined buildings and structures include:

Aboveground resources

- Picnic Area Stone Footbridge
- Timber bridge
- Stone/timber shelter

Cave resources

- Concrete retaining structures

Non-contributing buildings and structures that post-date the period of significance include:

Aboveground resources

- Cave Walk-in Entrance (revolving door)
- Wastewater Lagoons
- Cave Tour Assembly Shelter
- Residence (Quarters B-40)
- Residence (Quarters B-41)
- Apartment Building (Quarters B-42)
- Apartment Building (Quarters B-43)
- Apartment Building (Quarters B-44)
- Picnic Area Comfort Station
- Campground Tender's Residence
- Campground Comfort Stations (all)
- Campground Amphitheater Stage
- Campground Amphitheater Projection Booth
- Campground Wood Shed
- Campground Host Shed

- Aboveground Water Tank
- Underground Water Tanks
- Pump house
- Booth at shooting range
- USGS Gauging Station
- Buildings and towers (air quality monitoring and radio transmitter)

Cave resources

- Concrete Retaining Structures
- Chain-link reinforcing

VIEWS AND VISTAS

Today the views and vistas at the park appear much like they were during the period of significance and earlier. Views and vistas that were extant during the period of significance have been impacted by two major changes: the spread of native and planted vegetation and the construction of park facilities.

Contributing views that survive from the period of significance include:

Aboveground resources

- Views from U.S. 385 in the segments north and south of the Headquarters Area
- Views from Cold Brook Canyon Trail
- Views from Wind Cave Canyon Trail
- Views from Lookout Point Trail
- Views from the Historic Housing Area buildings and drives
- Views from Headquarters Road
- Views from the picnic area

Non-Contributing views include:

- Blocked views down and up Wind Cave Canyon owing to the Administration Building addition, and encroaching vegetation
- Views of the Elk Mountain Campground
- View of Post-WWII Housing Area from the Elevator Building and U.S. 385
- Views into Wind Cave Canyon from the edge of the Administration Building parking lot and road approaches
- Views of the Maintenance Area and lagoons from U.S. 385
- All views of the bypass section of U.S. 385
- View from wayside pull-offs that post-date the period of significance

SMALL-SCALE FEATURES

In 1931 the headquarters fence was extended to include new construction and a cattle guard was installed. A later fence, finished in 1936 and encompassing the entire park, was built after the NPS assumed control of the Game Preserve. Cattle guards were placed at the northern and southern entrances in 1935, and in late 1937 limestone and log entrance pylons with hanging signs were put up at the park's three main entrances. Garbage pits, stone fireplaces and rustic table and bench combinations were added to the picnic/campground area in 1937.

Various small-scale water features were built during the CCC period, including a concrete intake box with a slow sand filter at the McAdam Middle (Valentine) Spring, water pipelines to the Game Preserve and the park Headquarters Area, a 25,000 gallon reservoir in the Headquarters Area, 3,160 feet of six-inch vitrified clay sewer line from the headquarters to the wastewater lagoons in the Maintenance Area, and an auxiliary concrete 6,250-gallon septic tank and 1,400 feet of sewer line from the Headquarters Area. During this same period, nine streetlights were replaced, a 1,500 gallon concrete cooling tank was built adjacent to the Power House, and power lines ran to the new Maintenance Area from the Power House. It was not until 1947 that the Black Hills Power and Light Company hooked up the park headquarters. The overhead power lines to the various building clusters in the developed area were installed in 1957. The Maintenance Area was re-fenced that year.

Many small-scale features have been associated with wildlife management and the Game Preserve. In 1913 a temporary fence was erected around fifty-five acres in preparation for the arrival of bison, and the following year a fence was completed around the new 3,400-acre Game Preserve. In 1916, the game warden's residence was fenced, a cedar post and woven-wire fenced hay corral was constructed adjacent to the barn, and a pole pen made of six-inch poles twenty-two feet long and five high was added. In preparation for the sale of bison in 1924, catching pens, a slaughter house, and carcass scaffolding were built on the Game Preserve, and two long wings were later added. By 1928 a new 3,600-acre range was fenced, and shortly thereafter an "exhibition pasture" was fenced at the Game Preserve to give visitors a better view of the animals. In 1931 a small fountain and pool was built adjacent to the warden's residence. In 1941 the old bison corral and compound was razed and replaced with a new facility of six 30 x 40 pens surrounding a central hub. This was razed in 1959, and six years later a new bison complex with corrals, chutes, and holding pens was built. A lone water hydrant remains at the site of the game warden's residence.

Some unusual features that are no longer extant or are in a ruined state include the 1919 Wind Cave sign of large white painted rocks, reported to have been removed in 1928 at the request of NPS landscape architects, and the sandstone statue of cave explorer and guide Alvin McDonald, erected in the spring of 1894, which later disappeared. NPS staff members have indicated that the statue may have been buried in the Maintenance Area. Some of the painted sign stones that remain are visible on the hillside in early spring. A bronze plaque was installed at the gravesite on a boulder in 1959.

Most of the small-scale features described above are missing from the landscape. Some of the small-scale features that post-date the period of significance are a 5,000 gallon oil storage tank in the utility area, an interpretive sign at the Natural Entrance, the Prairie Dog interpretive sign near the intersection of U.S. 385 and SD 87 (installed in 1954), and six more roadside interpretive signs from the following year, and interpretive signs identifying native trees and shrubs near the Administration building. New entrance signs were built in 1958-1959. Bison watering tanks and salting stations were added in 1959. All of the small-scale features associated with the Elk Mountain Campground post-date the period of significance.

Most of the small-scale features within the cave are associated with lighting and circulation. Initially, lighting in the cave was provided by candles and lanterns. In 1931, some trails in the cave were illuminated with indirect electrical light, and the “long route,” most likely the Fairgrounds Tour Route, was lighted in 1937. The lighting system was completely rewired from 1955-1956, with 421 fixtures replaced, a black light installed in the Fairgrounds, and a flood light in the Temple to allow photography. A new indirect lighting system using fluorescent lights was installed in 1980, and these lights were then replaced with incandescent lights in 1988. In 1997, corroded light fixtures were replaced with plastic, and in 1998 portions of the old lighting system in the Blue Grotto and Pearly Gates were removed.

By the turn of the twentieth century, wooden ladders, handrails, and climbing ropes were used to facilitate movement along the tour routes. Between 1935 and 1937 many of the cave’s old wooden landings, stairs, and bridges were replaced with concrete structures. Some additional concrete stairs were added in 1948 to steep sections of the cave trails, and in other areas in the 1970s and 1980s. Most of the old handrails were replaced with stainless steel tubing from 1963-1964. Currently there is an ongoing project to replace all handrails with stainless steel tubing.

Early explorers left behind various artifacts such as matches, candles, and string. Some of this material, along with graffiti as well as painted and metal survey markers, is still extant, including writing by Alvin McDonald. In addition, early workers left behind piles of rubble and construction debris.

In 1903 a small stone ‘high water’ wall was constructed around the cave’s opening to prevent surface runoff from entering. In 1963, a drain was installed at the Garden of Eden level, and several sheets of corrugated fiberglass were suspended beneath wet sections of the ceiling to direct dripping water from the trail. Later, in 1967, a low rock wall was constructed around the base of the Natural Entrance and a plate was attached to the bottom of the existing iron gate.

The stone sign at the entrance of the Administration Building may be the one constructed during the CCC period. However, construction drawings prepared after WWII show new edge of pavement lines running through the historic period sign. It has not been determined whether the sign is the original sign in its original location, it was moved, or the sign was constructed after the period of significance. In addition, though the stone structure may be historic, the date of origin of the sign panel has not been determined.

Contributing small-scale features that survive from the period of significance include:

Aboveground resources

- stone curbing

Cave resources

- Painted survey marks
- Metal survey marks
- Wood board ladder
- Graffiti
- Early explorer artifacts
- iron handrails

Not yet determined small-scale features include:

Aboveground resources

- Headquarters Sign
- Hydrant at Game Preserve
- Entrance signs
- pipe handrails and tubular metal handrails at steps

Cave resources

- Construction debris

Missing small-scale features include:

- signs of all types
- site furnishings
- light posts
- fencing of all types
- cave lighting
- iron handrails
- overhead power and telephone lines and poles

Non-contributing small-scale features that post-date the period of significance include:

Aboveground resources

- Alvin McDonald Memorial
- Interpretive signs
- Metal Post and Wire Fencing around Headquarters Area
- Post and Rail Fencing

- Metal gates
- Metal culverts
- Informational signs
- Cattle gates
- Cattle guards
- Traffic signs
- Wheelstops
- Concrete curbing
- Telephone Pedestals
- Transformers
- Campground Site Furnishings
- Benches at Amphitheater
- Fire Rings at Amphitheater
- Materials at Mixing Circle
- Site Furnishings at Maintenance Area
- Concrete wildlife tanks
- Weather station
- Propane Tank

Cave resources

- Lights and lighting-related systems
- Electrical cabling
- Transformer boxes
- Emergency telephones
- Metal gates
- Aluminum and stainless steel handrails
- Aluminum steps
- Benches
- Trash receptacles
- Signs

HISTORIC SD 87 ROAD CORRIDOR

NATURAL SYSTEMS AND FEATURES

The primary components of the natural systems associated with the historic landscape remain principally unaltered since the period of significance. The ridges, canyons, and gulches have eroded at predictable and normal rates. The boundaries between the plant communities—ponderosa forest mixed-grass prairie, and riparian—have shifted to a degree due to climatic changes, and human intervention. In 2003, there was little change to the overall patterns and characteristics of natural systems that were present during the period of significance.

Contributing natural systems and features:

- Cold Spring Creek
- Beaver Creek
- Reaves Gulch
- Rankin Ridge
- Tributaries of Highland Creek
- Wetlands
- Sinkholes
- Caves
- Bison wallows
- Ponderosa Pine Forest
- Mixed-Grass Prairie
- Riparian Vegetation
- Other Springs

SPATIAL ORGANIZATION

Much of the spatial organization that characterized the landscape during the period of significance survives today. The major surviving spaces include the corridor bounded by the west-facing slopes of Rankin Ridge and the eastern slopes of the hills flanking the western edge of the roadway, open prairie spaces in the northern and southern ends of the corridor, Reaves Gulch, Beaver Creek Canyon, and the narrow space of the roadway flanked by forest within the middle section of the corridor.

Contributing spatial organization:

- Corridor bounded by the west-facing slopes of Rankin Ridge and the eastern slopes of the hills flanking the western edge of the roadway
- Open prairie spaces in the northern and southern ends of the corridor
- Reaves Gulch
- Beaver Creek Canyon
- Narrow space of the roadway flanked by forest within the middle section of the corridor

- Deck of the Pig Tail Bridge defined by the guardrails
- Deck of the Beaver Creek Bridge defined by the guardrails
- Pig Tail Bridge underpass

Non-contributing spatial organization:

- Mission 66 designed and constructed wayside parking lots defined by the edge of pavement and various barriers such as bollards and curbing

Missing spatial organization:

- Spatial patterns associated with the Game Preserve Headquarters development

LAND USE

Land uses that continue from those that occurred during the period of significance include recreation, wildlife viewing, wildlife management, and motor touring.

Contributing land uses:

- Interpretation
- Recreation
- Wildlife management

Missing land uses:

- Agriculture operations

Non-contributing land uses:

None determined.

CIRCULATION

The layout for roads in the SD 87 Corridor remains essentially unaltered since the period of significance. However, the material used to surface these roads has changed from crushed stone to asphalt.

Several components of the current circulation system post-date the period of significance, including the Rankin Ridge Road, parking lot, and Nature Trail, built in 1960; interpretive wayside pullouts were altered after 1941.

Contributing circulation systems and features that survive from the period of significance include:

- SD 87

Not yet determined circulation features include:

- Minor county roads

- Centennial Trail (may follow historic road)
- Lookout Point Trail (may follow historic road)

Missing circulation features include:

- Portions of SD 87 that were modified when U.S. 385 was realigned
- Game Preserve Headquarters drives and roads

Non-contributing circulation features that post-date the period of significance include:

- Centennial Trailhead access road and parking
- Rankin Ridge Trail
- Rankin Ridge access road and parking

TOPOGRAPHY

For the most part, the landform and topography associated with the park remains similar to that which existed prior to and during the period of significance. Over the years, topographic modification within the SD 87 corridor has been associated with road construction including cutting and filling, bridging of stream corridors and canyons, Game Preserve Headquarters development, and quarrying. Most of the topographic modifications effected during the period of significance are still evident in the landscape today. SD 87 follows Reaves Gulch through some rugged terrain and the roadway has been blasted out in places. A portion of this road crosses the top of the Old Norbeck Dam, which was built in 1928 and decommissioned in 1989.

Contributing topographic features that survive from the period of significance include:

- Cut and fill of SD 87
- Norbeck Dam landform
- Graded areas associated with the Game Preserve Headquarters development

Non-contributing topographic features:

None determined.

VEGETATION

Today the vegetation in the corridor includes the natural plant communities typical of the undeveloped areas of the park, composed of forest, grasslands, and riparian communities; and planted areas associated with the Game Preserve Headquarters site. The extent and location of plantings introduced during and after the period of significance along the roadway and waysides is not known. The natural plant communities, especially the grasslands and ponderosa pine forest, require fire for stand rejuvenation. Without fire the distribution and composition of these plant communities evolves increasingly towards woody growth. Today the park actively uses fire as a management tool to maintain a healthy ecosystem and manage invasive plant species.

Contributing vegetation that survives from the period of significance includes:

- Remnant plantings at Game Preserve Headquarters
- Ponderosa pine forests
- Riparian vegetation
- Prairie
- Wetlands

Not yet determined vegetation includes:

- Possible roadside plantings

Missing vegetation includes:

- Plantings at Game Preserve Headquarters

Non-contributing vegetation:

None determined.

BUILDINGS AND STRUCTURES

In general, few changes have occurred within the corridor regarding structures. Though altered through repairs and maintenance, the Beaver Creek and Pig Tail Bridges remain intact. The Rankin Ridge Fire Tower and associated building post-dates the 1941 end date of the period of significance.

Contributing buildings and structures that survive from the period of significance include:

- Beaver Creek Bridge (HS 99)
- Pig Tail Bridge (HS 98)

Non-contributing buildings and structures that post-date the period of significance include:

- Restroom at Rankin Ridge Fire Tower
- Rankin Ridge Fire Tower

VIEWS AND VISTAS

Today the views and vistas at the park appear much as they did during the period of significance with the exception of those in the areas developed as part of Mission 66.

Contributing views that survive from the period of significance include:

- Distant views from roadway of open prairie and forested ridges and hills
- Near views from roadway of forested flanks of ridges and hills
- Views from roadway into Reaves Gulch
- Views from roadway into Beaver Creek Canyon

- Approach views from roadway of Beaver Creek Bridge
- Approach views from roadway of the Pig Tail Bridge
- View of the Beaver Creek Bridge from roadway south of bridge
- Interpretive views from wayside pull-offs along the highway corridors

Non-Contributing views include:

- View from the SD 87 roadway of the Rankin Ridge Fire Tower

SMALL-SCALE FEATURES

Little information was available to verify the full extent of historic period small-scale features. However, review of historic period records and photographs and post-1941 records suggest that very few small-scale features survive. Many small-scale features extant are associated with post-WWII development, repairs, and alterations. Determining the date of construction of wire fencing was not conclusive. Many small-scale features, including wayside exhibits, stone curbing, bollards, and signs are associated with the Mission 66 improvements to wayside pull-offs.

Contributing small-scale features that survive from the period of significance include:

None determined.

Not yet determined small-scale features include:

- Hydrant at Game Preserve Headquarters
- Post and wire fencing and gates
- Entrance signs
- Wood post and rail fencing

Non-contributing small-scale features that post-date the period of significance include:

- informational signs
- interpretive signs and exhibits
- cattle gates
- cattle guards
- traffic signs
- wheel stops
- concrete curbing
- trash receptacles

INTEGRITY ASSESSMENT

Assessment of the integrity of the two historically-significant landscapes—the park landscape within the 1903 park boundary, and the SD 87 corridor—is based on an evaluation of the existence and condition of physical features dating from the period or periods of significance, taking into consideration the degree to which the individual qualities of integrity are present. The seven qualities of integrity assessed in accordance with National Register criteria are location, design, setting, materials, workmanship, feeling, and association. As defined in National Register Bulletin 15: *How to Apply the National Register Criteria for Evaluation*:

Location is the place where the historic property was constructed or the place where the historic event occurred; **design** is the combination of elements that create the form, plan, space, structure, and style of a property; **setting** is the physical environment of a historic property; **materials** are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property; **workmanship** is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory; **feeling** is a property's expression of the aesthetic or historic sense of a particular period of time; and **association** is the direct link between an important historic event or person and a historic property.

National Register Bulletin 15 also states that:

Integrity is the ability of a property to convey its significance...Historic properties either retain integrity (that is convey their significance) or they do not. Within the concept of integrity, the National Register Criteria recognize seven aspects or qualities that, in various combinations, define integrity. To retain historic integrity a property will always possess several, and usually most, of the aspects. The retention of specific aspects of integrity is paramount for a property to convey significance. Determining *which* of these aspects are most important to a particular property requires knowing why, where, and when the property is significant.

INTEGRITY ASSESSMENT OF THE TWO HISTORIC LANDSCAPES

The two historically-significant landscapes within Wind Cave National Park—the landscape associated with the 1903 park boundary and the SD 87 corridor—appear to possess a high degree of integrity for their periods of significance ending in 1941.

The **cultural landscape associated with the 1903 park boundary retains integrity to the 1941 end date of the period of significance**. Though the current NPS-administered lands do not include all of the original lands comprising the original bounded area of the National Park in 1903, the land area within the park today continues to convey the historic character extant in between 1903 and expansion in 1931 and 1946. The major landscape features that survive from the period are the vast natural features and systems including terrain, surface water, vegetation

communities and patterns, and the cave itself. From a district-wide perspective, many of the park development features such as roads, buildings, spatial organization, planted areas, and land management regimes remain substantially unchanged from the historic character established during 1931-1941. Many changes do not detract from the integrity of location, design, setting, materials, and feeling, including the addition of buildings and small-scale features. In particular, the loss of facilities associated with the Game Preserve are not substantial enough to be intrusive or to reduce integrity when viewing the district landscape as a whole including those natural features and systems that generated site development and resource management.

The cultural landscape associated with the SD 87 corridor retains integrity to the 1941 end date of the period of significance. The major landscape features that survive from the period are the vast natural features and systems including terrain, surface water, and vegetation communities and patterns. Many features such as roads, bridges, graded and planted landforms, patterns and organization, and land management regimes remain substantially unchanged from the historic character established between the early 1920s and 1941. Many changes that do not detract from the integrity of location, design, setting, materials, and feeling include pavement surface changes, minor road and parking alignment and configuration changes, the addition and loss of small-scale features, and spatial organization changes resulting from evolving vegetation patterns. In particular, changes associated with post-WWII and Mission 66 development are not substantial enough to be intrusive or to reduce integrity when viewing the district landscape as a whole including those natural features and systems that generated site development and resource management.

Assessment of the Two Historic Landscapes by Aspect of Integrity.

See Map 4-1 Zones of Integrity for the park landscapes beyond the developed area and Map 4-2 Zones of Integrity for the Headquarters Area at the end of this chapter.

The Headquarters Area continues to retain integrity owing to the survival of most of the historic-period buildings in their original form. Many of the plantings established by the CCC and the circulation patterns in the Headquarters Area also remain intact. In the cave, while the materials utilized to surface many of the circulation systems, as well as the lighting features, have been changed, visitors still follow the same routes and experience the same natural wonders as were available during the period of significance.

Some of the 1950s and 1960s development at Wind Cave National Park modified the character of the two historic landscapes. Two Mission 66 efforts diminished the integrity of early development: the Elk Mountain Campground and the Post-WWII Housing Area. The Elk Mountain Campground introduced new buildings, road, and related development in what was an undeveloped area of grasslands, forested areas, and an unimproved road. The Post-WWII Housing Area was constructed in an area once occupied by the CCC camp. The impacts of the Elk Mountain Campground were mitigated by sensitive siting of roads, campsites, and buildings, and the compatible character of materials and design. The impacts of the Post-WWII Housing Area were mitigated somewhat by siting: the new facilities were not easily viewed from locations within the areas that survived from the period of significance. The removal of the Game Preserve Headquarters buildings and structures, however, did result in a loss of integrity.

The two historic landscapes possess a high degree of integrity of **location** based on the fact that all of the identified constructed historic landscape features remain at the sites of original construction. Furthermore, the places where the historic events occurred—early cave tourism, Game Preserve ranching, and CCC activities—remain in their historic locations.

The two historic landscapes retain a high degree of integrity of **design** for the early park development period. The Headquarters Area retains the overall site layout and architectural style of the CCC design. The spatial arrangement of the road systems, broad patterns of open prairie and forest, and access to cave resources are consistent with developments during the period of significance. The SD 87 road corridor also retains the road alignment, bridges, and spatial patterns of open prairie and forest that are consistent with developments during the period of significance.

The integrity of design of the two historic landscapes has been impacted by minor changes since the end of the period of significance, including minor road alignment changes, increases in tree cover and shrub vegetation within the drainageways of the developed area, variations in forest patterns and edges, and the addition of various buildings and small-scale features. The integrity of design of the two historic landscapes has also been impacted by the loss of historic features, mainly the buildings and structures associated with the Game Preserve operations and small-scale features such as seating, signs, fencing, and bollards.

The features associated with Mission 66 development in the park do vary in style and form from those associated with the early park establishment period. The residences and campground comfort stations incorporate modern forms and materials, which are inconsistent with the design typology of the early park development period. However, the physical separation of these areas from the rest of the headquarters and developed area mitigates their impact on integrity to some extent.

The two historic landscapes retain a high degree of **integrity of setting** for the early park period. The park and surrounding landscape continue to be sparsely settled and relatively undeveloped. On a broad scale, the resource management practices that have been conducted by the park over the years have maintained much of the park in its natural state, with a strong attempt to maintain and enhance the viability, health, and diversity of the prairie community.

The two historic landscapes' features retain a high degree of **integrity of materials** for the 1903-1941 period. Historic materials of stone, wood, crushed stone, and native plants remain evident. The primary materials extant that contribute to the integrity of materials include ashlar blocks of stone integrated into buildings, bridge structures, terraces and steps, guardwalls, and curbing; native stone boulders integrated into the cave entrance and bridge abutments; roughly-stacked stone retaining walls and culvert endwalls; painted or stained rough timber elements of buildings and bridges; cast-in-place concrete used in walks and bridges; crushed stone and soil road surface; painted wood siding used in buildings; and native tree plantings augmenting native plants communities.

The two historic landscapes retain a high degree of **integrity of workmanship** for features constructed during the early park period and CCC era. The primary features that convey historic integrity of workmanship are the stone elements including ashlar patterns of the stone walls of

buildings, bridges, and guardwalls. Stone steps, terrace paving, and curbing also convey historic workmanship. The native stone boulders integrated into the cave entrance and bridge abutments, and the rough-hewn-stacked stone retaining walls and culvert headwalls also convey historic workmanship. The features associated with the Mission 66 development lack the same qualities of workmanship of the early development period and detract slightly from the early park period integrity of workmanship.

The two historic landscapes retain a high degree of **integrity of feeling** for the early park development period. The maintenance of open prairie, continued presence of landforms that characterize and structure the landscape, and natural wonders and facilities offered within the cave continue to contribute to historic feeling. Surviving aspects of the 1930s park design contribute to the early park development period's integrity of feeling, including the use of native construction materials; the continued range use of much of the site, and the ranching uses that still surround the park.

Generally, the two historic landscapes retain a high degree of **integrity of association** for the early park development period, 1903-1941. NPS and CCC developments survive in much the same configuration as when they were established, helping to convey associations with these groups and their efforts to create a natural resource park, and provide access to the wonders of the cave. The presence of Alvin McDonald's gravesite memorial, the interpretation of his and the cave's early history in the Visitor Center, and his and other early explorers' graffiti in the cave all convey to visitors a strong association with McDonald. His passion and that of others to explore the cave and to share this wonder with the world can still be appreciated by twenty-first century visitors.

SUMMARY OF THE IMPLICATIONS OF THE ANALYSIS ON FUTURE MANAGEMENT AND INTERPRETATION

The findings of the historical research, documentation, significance evaluation and integrity assessment indicate that:

- there are two significant historic landscapes that retain high integrity within the boundary of Wind Cave National Park;
- a large mostly undeveloped cultural landscape—including the relatively small developed area and the Wind Cave areas exploited for tourism—that is bounded by the current park boundary and the 1903 park boundary on the north and south with a period of significance between 1890 and 1941; and
- a large linear road corridor following SD 87 from the northern park boundary to U.S. 385 with a period of significance of ca. 1910 to 1941.
- the park landscape as a whole should continue to be viewed as a highly sensitive remnant of a larger ethnographic landscape until such time as a final determination can be made concerning its ethnographic significance;

- there are a large number of sensitive archeological sites within the park, including those listed and eligible for listing on the National Register of Historic Places, and those that have not been evaluated; and
- the park landscape as a whole, including Wind Cave and all other subsurface resources, should continue to be viewed as a highly sensitive remnant of what was once a large unspoiled Black Hills natural system.

Given the findings above, the single largest management consideration is how to approach balancing cultural and natural resource management values. The vast areas within the two identified historic landscapes—even the park as a whole when addressing ethnographic values—include the single most important cultural and natural landscape characteristic: the large natural systems and features including landforms, terrain, water streams, prairie and forest patterns, and caves. In terms of level of historical association, these natural features and systems dominate all other constructed cultural resources. As natural systems and features that form the location and setting significant events and uses including tribal use, early settlement, early cave tourism, wildlife management and conservation, New Deal programs, and natural area interpretation, consideration must be given to how to manage these resources in a healthy state to ensure the protection of the historically-significant places as well as the larger ethnographic landscape.

Ensuring the protection of large-scale natural systems and discrete constructed features, all of which are essential to conveying historic significance, will likely require an ecologically-focused approach to cultural resource management. Management of dynamic components of the cultural landscape, such as forests and prairie, will need to be flexible to allow for healthy ecosystems and the retention of landscape-scale pattern of historic character. Resource managers have been and will continue to be challenged by difficult decisions when faced with balancing natural and cultural resources. The health and protection of the natural systems may require extraordinary means and methods for minimizing and mitigating, to the greatest extent feasible, the loss of cultural features. The enhancement of park procedures for addressing the need to balance natural and cultural resource values should be continued including data collection, research and investigations, and identification to support maintenance, interpretation, planning and design.

RECOMMENDATIONS CONCERNING EXISTING AND FUTURE NOMINATIONS TO THE NATIONAL REGISTER OF HISTORIC PLACES

See Map 4-3 Key Map – Proposed Historic District at the end of this chapter.

The significance evaluation, comparative analysis of the historic and the existing landscape, and assessment of landscape integrity focused on the proposed SD 87 and proposed and revised Wind Cave historic districts, as indicated by the CLR scope of work prepared by the NPS. This approach resulted in addressing all potentially historic resources, which is logical in an instance when the evaluation involves one of the nation's earliest national parks. The process for evaluating national parks as a whole and the individual resources within parks has progressed substantially since the late 1980s and early 1990s. With the NPS's publication of Linda Flint McClelland's *Presenting Nature: The Historic Landscape Design of the National Park Service*,

1916 to 1942 in 1993, and the emergence of analysis methodologies stemming from guidance provided *National Register Bulletins 18* and *30*, a more holistic view of a national park's designed cultural landscape was possible.

The multiple property listing "Historic Park Landscapes in the National and State Parks" provides guidance on relevant property types and the potential boundary of a nominated district or site. According to this multiple property listing:

"Ideally, it is desirable to identify and register the largest unit having significance and integrity as a historic park landscape...The coordinated development for parks during the historic period through a comprehensive planning process and the development of master plans provides a strong argument for this approach.

With a broad understanding of the historical significance of the development of the park, a recommendation is offered below regarding a revised National Register historic district encompassing the lands surviving from the 1903 boundary.

In addition, this CLR also recommends that consideration be given regarding a second National Register historic district within the park that includes the SD 87 historic road corridor. This recommendation focuses on the need to address the SD 87 historic road corridor in the context of the larger system of surviving historic roads within Custer State Park and Wind Cave National Park.

The boundary and scope of the Administrative and Utility Area Historic District National Register Nomination focuses almost exclusively on the architectural resources and does not adequately address the significance and integrity of the cultural landscape. The 1995 nomination attempts to address cave development, but stops short with the documentation of the entrance.

It is unlikely that a historic district encompassing all of the NPS-administered lands established after 1946 would be considered eligible for listing on the National Register. Though the addition of substantial new land resulted in expanded opportunities for preservation of sensitive natural and scenic resources, continuing bison grazing and wildlife management, and interpretation and recreation for visitors, this continuation of historic land use and function is not significant within the identified historic contexts. It is important to note that the lands that were a part of Custer State Park do represent early efforts to establish state parks during the New Deal era, and federal efforts regarding the establishment of Recreational Demonstration Areas. This aspect of significance was considered as part of the CLR team's evaluation of this portion of Wind Cave National Park.

In addition, it is important to note that the CLR scope did not include identifying and evaluating archeological resources and ethnographic resources. Any potential district of archeological sites and/or listing of additional individual sites is not addressed in this CLR.

Mission 66 resources are addressed within the context of each potential historic district discussed below.

RECOMMENDED NATIONAL REGISTER DISTRICTS

Wind Cave National Park Historic District

See Map 4-3 Key Map – Proposed Historic Districts at the end of this chapter.

Boundary

The CLR team recommends that a revised/expanded historic district be considered for the current NPS-administered lands including cultural resources and natural features and systems that are contained within the original boundary for Wind Cave NP. This district should include the cave areas that are known to have been accessed and altered for the purposes of tourism between 1890 and 1941 including the Natural Entrance Tour Trail, Fairgrounds Tour Trail, Candlelight Tour Trail, and Caving Tour Trail. Those areas of the cave that are deemed to be pristine and not explored or altered during the historic period of significance (1890-1941) should not be included in the district.

The current Administrative and Utility Area Historic District could be revised to meet the recommendations of this proposed district including the boundary of the existing district. Alternatively, the district could be amended to focus on architecture only, with the proposed Wind Cave NP Historic District encompassing all landscape resources including those within the Administrative and Utility Area Historic District.

Consideration should be given to the possibility of cooperating with the National Forest Service to determine if lands formerly a part of Wind Cave NP that are now within their jurisdiction should be evaluated for inclusion in the historic district.

Justification

The park area falling within the original 1903 boundary is significant for its association with the following:

- late nineteenth/early twentieth century tourism and recreational development within the Black Hills including the exploitation of Wind Cave for tourism and specimen collection;
- the establishment of the first national park to protect a subterranean resource, early federal cave conservation efforts, and as one of the earliest national parks pre-dating the creation of the National Park system;
- the establishment and development of the Wind Cave National Game Preserve, administered by the U.S. Biological Survey, Department of Agriculture, which protected bison and other endangered large mammals;
- its association with the CCC and WPA; and
- as an exemplary representation of New Deal-era park master planning, resource conservation planning, facility and road design, and construction; NPS Rustic Style of

landscape architecture, architecture, and engineering; design and construction of visitor and operational access improvements within a cave; and of a unique collection of Mission/Spanish Colonial Revival park buildings.

In addition, the proposed historic district or resources within the district may be significant regarding association with the National Park Service's Mission 66 program. This aspect of significance should be addressed through assessment of the district using a national context for Mission 66 park planning and design.

Period of Significance

The period of significance begins in 1890 with McDonald's initial formal development of the cave interior to afford visitor access and ends in 1941 with the completion of CCC construction projects.

This period spans the early cave tourism efforts led by McDonald between 1890 and 1903 when the federal government regains control of the cave and surrounding lands; the establishment of Wind Cave NP and the period of park management and that precedes NPS administration between 1903 and 1916; the establishment of the Game Preserve within the national park that was administered by the U.S. Biological Survey, Department of Agriculture between 1912 and 1935; and the completion of the park development including architectural, landscape architectural, and engineering works and improvements between 1931 and 1941.

As more is learned about the context of Mission 66 as a program, and the architectural, landscape architectural, and engineering design stemming from this program, the recommended district's period of significance could be re-evaluated.

Integrity

The cultural landscape as a whole retains integrity to the 1941 end date of the period of significance. Though the current NPS-administered lands do not include all of the original lands comprising the original bounded area of the national park in 1903, the remaining portion of this land area within the present national park continues to convey the historic character extant in 1903 and expansion in 1931 and 1946. The major landscape features that survive from the period are the vast natural features and systems including terrain, surface water, vegetation communities and patterns, and the cave itself. From a district-wide perspective, many of the park development features such as roads, buildings, developed area patterns and organization, planted areas, and land management regimes remain substantially unchanged from the historic character established in the 1931-1941 period. Many changes that do not detract from the integrity of location, design, setting, materials, and feeling include the addition of buildings and small-scale features. In particular, the loss of facilities associated with the Game Preserve and Mission 66 development are not substantial enough to be intrusive or to reduce integrity when viewing the district landscape as a whole, including those natural features and systems that generated site development and resource management.

South Dakota 87 Historic District

See Map 4-3 Key Map – Proposed Historic Districts at the end of this chapter.

Boundary

The CLR team recommends that a historic district be considered running the length of SD 87 beginning from the current northern boundary of the park and extending to the intersection with U.S. 385. The boundary of the district should include the environs of the road. The terrain features and plant communities that define the spatial character of the road should define the edges of the district. The district should include important designed scenic views away from the roadway and views of the road features such as bridges.

Consideration should be given to incorporating the historic SD 87 corridor within a larger historic district including all historic scenic roads with the Black Hills that are related with and interconnected with Custer State Park, Mount Rushmore National Memorial, and Wind Cave NP. Placing the Wind Cave NP segment of SD 87 within such a historic district would allow for the evaluation of this corridor as part of a complete system versus an isolated district.

Justification

The linear road corridor—including road, structures, terrain, plant communities, and viewsheds—is significant for its association with the following:

- early twentieth century tourism and recreational development within the Black Hills;
- early twentieth century state and federal roads programs;
- the establishment of the first national park to protect a subterranean resource and early federal cave conservation efforts, and as one of the earliest national parks pre-dating the creation of the National Park system;
- its association with the CCC and WPA; and
- as an exemplary representation of New Deal-era park road design and construction; NPS Rustic Style of landscape architecture and engineering.

In addition, the proposed historic road corridor district or resources within it may be significant due to association with the National Park Service's Mission 66 program. This aspect of significance should be addressed through the assessment of the district using a national context for Mission 66 park planning and design.

Period of Significance

The period of significance for the historic road corridor within Wind Cave NP begins ca. 1910 with McDonald's initial formal development of the cave interior to afford visitor access and ends in 1941 with the completion of Civilian Conservation Corps construction projects.

This period spans the early cave tourism efforts led by McDonald between 1890 and 1903 when the federal government gained control of the cave and surrounding lands; the establishment of Wind Cave NP and the period of park management and that preceded NPS administration between 1903 and 1916; the establishment within the national park of the Game Preserve that was administered by the U.S. Biological Survey, Department of Agriculture between 1912 and 1935; and the completion of park development including architectural, landscape architectural, and engineering works and improvements between 1931 and 1941.

As more is learned about the context of Mission 66 as a program and the architectural, landscape architectural, and engineering design stemming from this program, the recommended district's period of significance could be re-evaluated.

Integrity

The cultural landscape as a whole retains integrity to the 1941 end date of the period of significance. The major landscape features that survive from the period are the vast natural features and systems including terrain, surface water, and vegetation communities and patterns. Many features such as roads, bridges, graded and planted landforms, patterns and organization, and land management regimes remain substantially unchanged from the historic character established between the early 1920s and 1941. Many changes that do not detract from the integrity of location, design, setting, materials, and feeling include pavement surface changes, minor road and parking alignment and configuration changes, the addition and loss of small-scale features, and spatial organization changes resulting from evolving vegetation patterns. In particular, changes associated with post-WWII and Mission 66 development are not substantial enough to be intrusive or to reduce integrity when viewing the district landscape as a whole, including those natural features and systems that generated site development and resource management.

RECOMMENDATIONS CONCERNING THE NATIONAL REGISTER OF HISTORIC PLACES-ELIGIBILITY OF ETHNOGRAPHIC AND ARCHEOLOGICAL RESOURCES

The results of research, documentation, and analysis undertaken as part of the CLR project include general recommendations concerning the National Register status of the multiple archeological resources and the ethnographic values of the larger landscape of the park.

Archeological Resources⁶

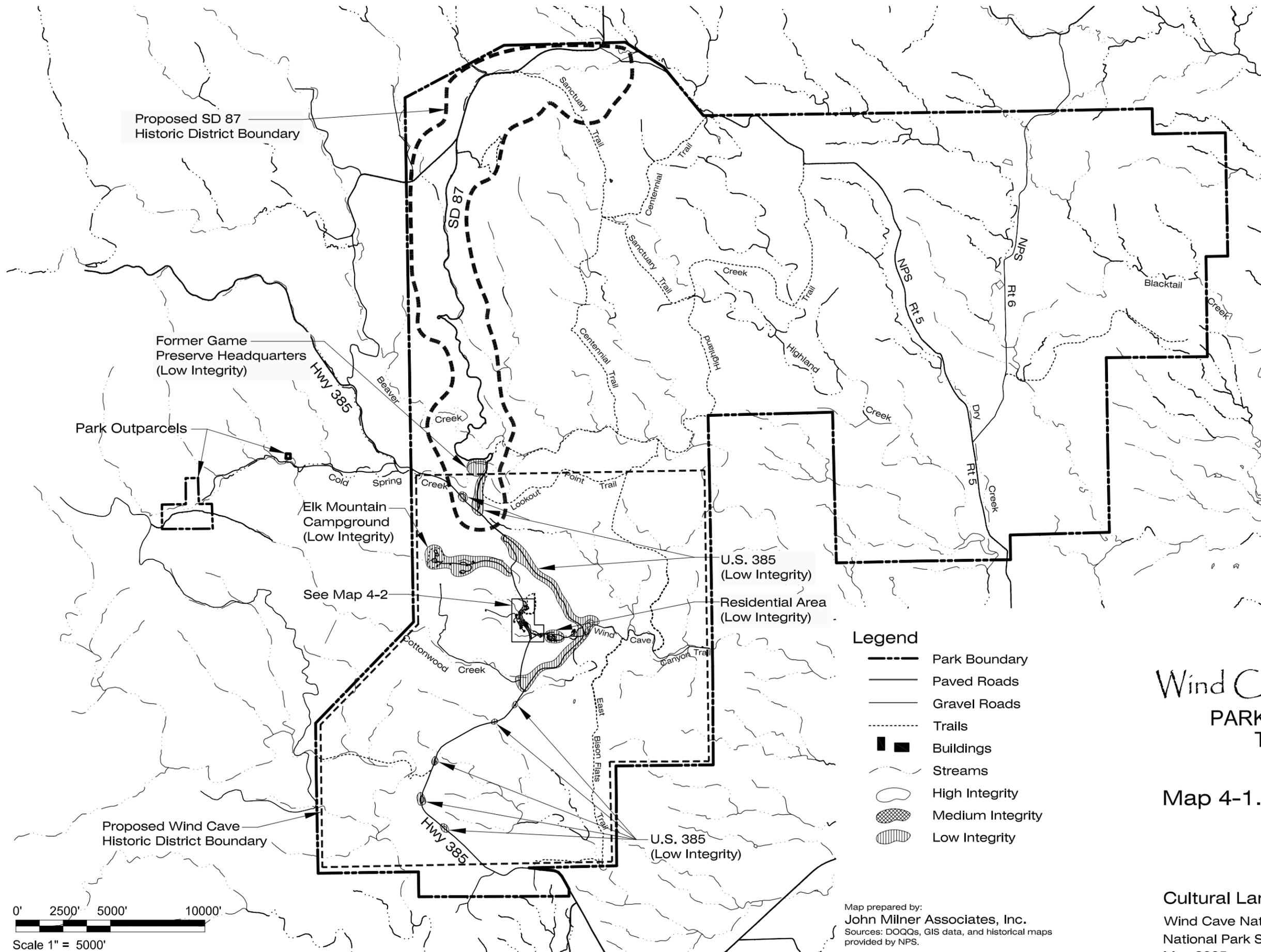
Though some individual park archeological resources are listed on the National Register of Historic Places, the park should continue to document and nominate individual sites and/or consider investigating a district of discontinuous sites. The various known and potential archeological resources that have and should continue to be addressed are discussed in Chapter 3.

Ethnographic Resources⁷

With the completion of the two-volume study *The Home of the Bison: An Ethnographic and Ethnohistorical Study of the Traditional Cultural Affiliations to Wind Cave National Park*, sufficient information appears to be available to explore the preparation of a Traditional Cultural Property National Register of Historic Places Nomination. According to this study, the lands forming Wind Cave NP represent a portion of the larger Black Hills, an entire area of ethnographic importance. As such, the whole landscape of the park should be viewed as important for its association with tribal peoples. In particular, the area between Elk Mountain and Buffalo Gap, including a section of the Race Track and Wind Cave, is considered sacred. Though Hot Springs and Buffalo Gap are outside the park, portions of the Race Track are within the park boundary. Other ethnographic resources of special importance within the park include springs, bluffs, rocky outcroppings, ridges, and burial sites. In addition, it is important to note that the locations of places of many religious observances within the park are unknown and may never be known to park managers.

⁶ The source for the information summarized in this section is based on the latest GMP/EIS; and also taken from the “Wind Cave Archeological Inventory Project: Final Report.” (U.S. Dept. of the Interior, National Park Service, Midwest Archeological Center, Lincoln, Nebraska, 2004).

⁷ The source for the summary of ethnographic resources is “The Home of the Bison: An Ethnographic and Ethnohistorical Study of the Traditional Cultural Affiliations to Wind Cave National Park,” Volume Two. (U.S. Dept. of the Interior, National Park Service & The Department of American Indian Studies, University of Minnesota, 2003).



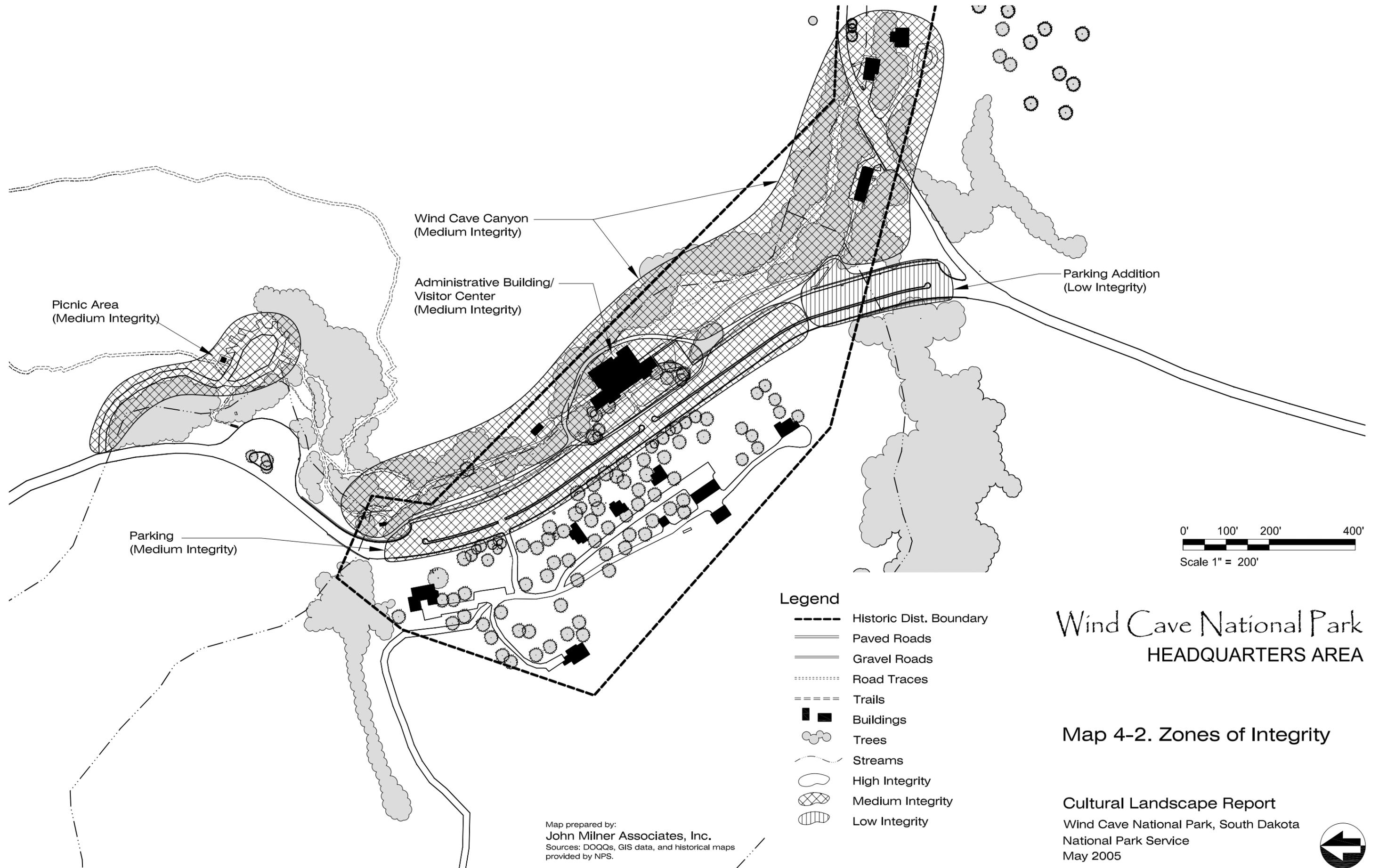
Wind Cave National Park

PARK LANDSCAPE BEYOND THE DEVELOPED AREA

Map 4-1. Zones of Integrity



Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.



Picnic Area
(Medium Integrity)

Wind Cave Canyon
(Medium Integrity)

Administrative Building/
Visitor Center
(Medium Integrity)

Parking Addition
(Low Integrity)

Parking
(Medium Integrity)

0' 100' 200' 400'
Scale 1" = 200'

Legend

- Historic Dist. Boundary
- Paved Roads
- Gravel Roads
- Road Traces
- Trails
- Buildings
- Trees
- ~ Streams
- High Integrity
- ⊗ Medium Integrity
- ▨ Low Integrity

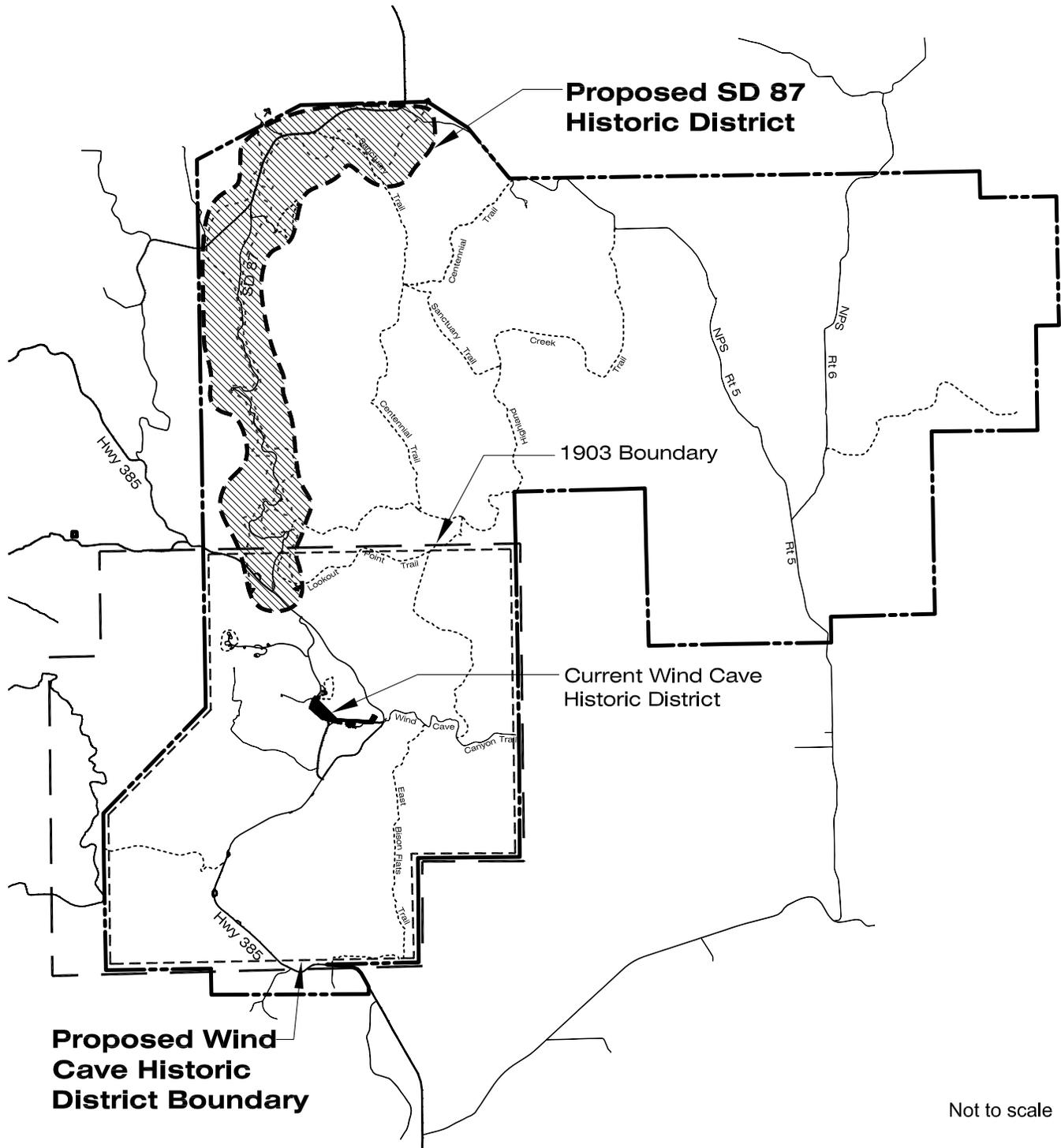
Wind Cave National Park
HEADQUARTERS AREA

Map 4-2. Zones of Integrity

Cultural Landscape Report
Wind Cave National Park, South Dakota
National Park Service
May 2005



Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps
provided by NPS.



Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- ■ Buildings
- Boundary

Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.

Wind Cave National Park

Map 4-3. Key Map
Proposed Historic Districts

Cultural Landscape Report
 Wind Cave National Park, South Dakota
 National Park Service
 May 2005





CHAPTER FIVE

LANDSCAPE TREATMENT

CHAPTER FIVE

LANDSCAPE TREATMENT

INTRODUCTION

The 1994 General Management Plan (GMP) for Wind Cave National Park (NP) identified the need for more information about both historic and ethnographic landscapes at Wind Cave. While the buildings and structures at Wind Cave were described as adequately documented, the GMP suggested that more documentation was needed for the associated landscape. With the addition of documentation comes the potential to address landscape treatment.

This chapter focuses on providing park managers with information and guidance protection and management of historic landscape resources, both aboveground and underground. One goal for the subsurface treatment is discussing how to protect historic resources while attempting to restore natural cave functions. This chapter is organized into a series of subsections. The first describes the treatment issues, goals, and objectives that have emerged over the course of this project through scope development, meetings, and preparation of Part 1 of the CLR. The second section presents the four treatment approaches recognized by the Secretary of the Interior for historic landscapes. The advantages and disadvantages of applying each alternative ‘considered but rejected’ to the treatment of Wind Cave NP are discussed within this section. The third section recommends a preferred treatment approach and provides a series of schematic treatment alternatives at Wind Cave NP. The last section is comprised of a series of treatment guidelines and recommendations supporting the preferred treatment approach. The treatment guidelines are general in nature and apply to the park as a whole, while specific treatment recommendations are organized by management zone. The five management zones identified for this project include the Undeveloped Area; the Headquarters Area; the Elk Mountain Campground; Wind Cave; and the SD 87 Corridor (*see Map 5-1 Key Map – Management Zones at the end of this chapter*).

TREATMENT ISSUES, GOALS, AND OBJECTIVES

This section provides a summary of the landscape treatment and management issues currently of concern to the park. These issues are based upon the Wind Cave GMP, review of existing park planning documents, and management issues identified in the kickoff meeting (November 18, 2002) and treatment work session meeting (March 8, 2004).¹ The discussion of management issues in this CLR is also informed by observations made by the project team during site investigations and also includes issues identified through the preparation of existing conditions documentation, and the comparative analysis of historic and existing conditions. These issues have served as a guide for the development of treatment recommendations and in selecting a preferred alternative. Issues are organized by topic, with some issues relating to more than one topic.

¹ Wind Cave National Park, General Management Plan/Environmental Impact Statement (National Park Service, June 1994).

VISITOR ISSUES

- As the area around the park becomes developed, viewshed intrusions increasingly impact the visitor experience. The park will need to address current viewshed intrusions and future viewshed protection.
- Accessibility issues are of concern in the Headquarters Area, the cave, and at pull-off interpretive exhibits. How to sensitively approach these issues while protecting historic character, specifically within the cave itself, needs to be addressed.

ADMINISTRATIVE AND INFRASTRUCTURE ISSUES

- As the construction of additional buildings and structures in the current historic district becomes necessary, the park needs to know how to meet these needs with the least amount of impact to the area's natural and historic resources. Specifically, the park will need to address this issue with the construction of a new maintenance building, cave entrance (airlock door), and wastewater pumping station.

RESOURCE ISSUES

- Balancing natural resource and cultural resource values is a challenge associated with cave management. Managing a healthy cave ecosystem raises the issue of impacts to surviving historic cave features. Historic period features and systems that impact the cave ecosystem include the manmade debris, construction materials such as asphalt, alterations to the cave resulting in changes in hydrology and air circulation, and introduced vegetation in the canyon from above the cave.
- As noted in the discussion of the cave resources, the density of vegetation within the canyon above the cave is of concern based on the water it absorbs from the surrounding soil. Cave moisture is lower today relative to past moisture levels. Naturally occurring vegetation in this area would have been less dense with the presence of fire and grazing by bison. However, some of the vegetation was part of the plan of the development for the area and was planted by the CCC. The park needs to develop a plan of action to address this issue.
- The routine maintenance of historic buildings and structures is also an issue that the park would like to address. Of immediate concern is the treatment of the Seasonal Residence (CCC Bunkhouse), the Beaver Creek and Pig Tail bridges, and the replacement of lighting and handrails in the cave.
- The management of the remnant exotic ornamental plants associated with the developed area is also of concern to the park.

GOALS AND OBJECTIVES

Treatment goals regarding the future condition of the cultural landscape of Wind Cave NP are based upon the historic significance and integrity of the landscape, the ongoing and planned cultural and natural resource management programs, and the planned and anticipated interpretive and visitor access improvements.

The major goals are as follows:

- Identify a treatment approach and supporting treatment recommendations for the park that adequately protects and manages cultural landscape resources, aboveground and underground. The treatment recommendations will incorporate resource management and visitor experience issues identified by the GMP as they relate to the desired future condition of the park cultural landscape.
- Identify a treatment approach and supporting treatment recommendations for the cave that balances historic landscape protection with the goal of restoring natural cave ecosystems. The objectives established by the GMP for cave resource management and research will be used to further develop this approach.²

NPS TREATMENT APPROACHES

The Department of the Interior currently recognizes four appropriate treatment alternatives for historic landscapes: preservation, rehabilitation, restoration, and reconstruction. These are defined and discussed in both The Secretary of the Interior's Standards for the Treatment of Historic Properties and NPS Director's Order #28 (DO-28): *Cultural Resources Management Guidelines*. DO-28 provides the following definitions of the four treatment approaches for cultural landscapes:

Preservation maintains the existing integrity and character of a cultural landscape by arresting or retarding deterioration caused by natural forces and normal use. It includes both maintenance and stabilization. Maintenance is a systematic activity mitigating wear and deterioration of a cultural landscape by protecting its conditions. In light of the dynamic qualities of a landscape, maintenance is essential for the long-term preservation of individual features and integrity of the entire landscape. Stabilization involves re-establishing the stability of an unsafe, damaged, or deteriorated cultural landscape, while maintaining its existing character.

Rehabilitation improves the utility or function of a cultural landscape, through repair or alteration, to make possible an efficient compatible use while preserving those portions or features that are important in defining its significance.

² General Management Plan, 14.

Restoration accurately depicts the form, features, and character of a cultural landscape as it appeared at a specific period or as intended by its original constructed design. It may involve the reconstruction of missing historic features, and selective removal of later features, some having cultural value in themselves.

Reconstruction entails depicting the form, features, and details of a non-surviving cultural landscape, or any part thereof, as it appeared at a specific period or as intended by its original constructed design. Reconstruction of an entire landscape is always a last-resort measure for addressing a management objective and will be undertaken only after policy review in the regional and Washington offices.³

APPROACHES CONSIDERED AND REJECTED

A **preservation** treatment approach to the natural and cultural resources of Wind Cave NP would include cessation of incremental loss of integrity to the cultural and natural resources through maintenance and stabilization. This would involve management of the natural forest and prairie ecosystems to perpetuate their current conditions, while allowing for routine clearing to maintain current ecological functions and spatial organization. It would also involve the preservation of current roads and trails, structures, interpretive features, and recreational facilities. Aboveground and underground resources would be maintained in their existing condition, with the exception of modifications required for safety and stabilization of deteriorating features. Disadvantages to this approach are many, as it would limit the park's ability to accommodate needed changes resulting from increased visitor use and expansion of the interpretive program. It would also prevent implementation of actions recommended in the GMP.

A **restoration** treatment approach to the natural and cultural resources of Wind Cave would seek to restore the landscape to conditions that existed during the 1903-1941 period of significance, with an emphasis on the National Park Service period of development dating from 1931-1941. This would involve removal of non-contributing features (such as the Post-WWII Housing Area and Elk Mountain Campground, Administration Building (Visitor Center) addition, cave Walk-in Entrance, wastewater lagoons, cave lighting, etc.) and restoration of the character of the landscape through planting and/or clearing of vegetation within the developed area to reflect the conditions of the 1939 master plan. Disadvantages to this approach are significant, as it would require removal of features that are essential to current park operation and management, and which may be significant to the Mission 66-era of development which has yet to be evaluated. It would also prevent implementation of actions recommended in the GMP.

A **reconstruction** treatment approach to the natural and cultural resources of Wind Cave would entail depiction of the form, features, and details of the period of significance, as intended by its original constructed design. This would include actions such as the reconstruction of missing features dating to the period of significance, such as those structures associated with the game preserve. Replacement of historic materials, such as the wooden stairs within the cave that have since been replaced with modern aluminum, would also be part of this approach. As the overall

³ U.S. Department of the Interior, National Park Service, *Director's Order #28: Cultural Resource Management Guidelines* (Washington, D.C.: Government Printing Office, 1997), 98-102.

integrity of the cultural landscape is considered high, and because reconstruction is always considered as a last-resort, this approach is not recommended.

RECOMMENDED TREATMENT APPROACH

In consideration of the need to protect the character-defining qualities of the Wind Cave landscape in order to provide a quality experience for visitors and protect the park's natural and cultural resources, and the need to address future park interpretive and administrative needs, the recommended treatment approach for Wind Cave NP is **rehabilitation**. This approach will allow the park to meet the goals outlined by its enabling legislation and reaffirmed in its GMP, and therefore protect park resources while improving visitor services.

Along with the four treatment alternatives, The Secretary of the Interior's Standards for the Treatment of Historic Properties offers ten basic principles for rehabilitation created to help preserve the distinctive character of a cultural landscape while allowing for reasonable change to meet new needs. The Secretary of the Interior's Standards for Rehabilitation are as follows:

- A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building, its site, and environment.
- The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
- Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
- Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
- Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
- Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities, and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
- Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
- Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

- New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
- New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment shall remain unimpaired.

Preservation is a critical component of rehabilitation requiring that existing contributing resources are protected and maintained. This ensures enhancements and repairs are undertaken in as non-intrusive a manner as possible and in such a way that allows little or no resource damage. Inherent in this approach is the protection of historic areas and features that are functional and retain integrity, including certain natural systems, the majority of the spatial organization and land-use patterns at Wind Cave, its circulation corridors, and views.

Under this alternative, historic resources contributing to the period of significance would be preserved, while resources that detract from the historic integrity of the park could be removed or mitigated. New development, necessary for park goals regarding visitor accommodation, accessibility, interpretation, and administration, would be permitted. New design would be differentiated from existing historic resources as a product of its time, but would be compatible with the historic resources in materials, size, scale and proportion, and massing. A clear differentiation between historic and contemporary features would be maintained. The following schematic alternatives consider different ways in which this rehabilitation treatment approach can be implemented.

SCHEMATIC REHABILITATION ALTERNATIVES

ALTERNATIVE A: REHABILITATION WITH EMPHASIS ON ECOLOGICAL DESIGN AESTHETIC

This alternative considers a rehabilitation approach with emphasis on ecological systems. Contributing features surviving from the period of significance would be protected and maintained, but the overall emphasis would be on natural resource protection and healthy ecosystem sustainability. A vocabulary for new interventions would be established based on principles of ecological design. Examples of this alternative would include:

- Preservation of contributing cultural and natural features.
- Vegetation management focused on a healthy ecosystem, with a secondary emphasis on historic preserving and restoring viewsheds.
- Removal of exotic plants and restoration of native species and plant communities.
- Rehabilitation of existing facilities to incorporate renewable energies and regenerative systems.

- Rehabilitation of facilities to reduce materials that impact sensitive ecosystems and improve stormwater management.
- Emphasis on the use of locally procured, sustainable, and recyclable materials.

ALTERNATIVE B: REHABILITATION WITH EMPHASIS ON PERIOD OF SIGNIFICANCE DESIGN AESTHETIC

This alternative considers a rehabilitation approach with emphasis on the period of significance design aesthetic. In this case, the National Park Service design concepts of Rustic Style architecture, defined by the use of natural materials within modern architectural forms (since defined as the English Vernacular Revival style in the National Register nomination), and the incorporation of native and natural landscape elements in the overall planning and design of the park's master plan, serves as inspiration for rehabilitation of historic resources and the design of new interventions. Examples of this alternative would include:

- Preservation of natural and cultural features contributing to the period of significance.
- Removal and/or mitigation of Mission 66 features, such as non-contributing trails, pull-offs, etc. and re-design of interpretive waysides to better reflect aesthetic principles of the period of significance.
- Reestablishment of vegetation patterns and species composition that existed during the period of significance.
- Replacement of existing maintenance facilities with new interventions that draws from the NPS design aesthetic of the 1930s.
- Design and installment of interpretive waysides to interpret features missing from the period of significance, such as those associated with the Game Preserve.
- Preservation and rehabilitation of the Picnic Area to reflect original character of NPS design.
- Removal of wastewater lagoons and regrading to historic topography.

ALTERNATIVE C: REHABILITATION WITH EMPHASIS ON MISSION 66 PERIOD DESIGN AESTHETIC

This alternative considers a rehabilitation approach with emphasis on the preservation of Mission 66 resources until a national context could be developed for treatment of Mission 66 landscapes. Contributing features surviving from the period of significance would be protected and maintained; while a design vocabulary for new interventions would draw from Mission 66 design principles. Examples of this alternative would include:

- Preservation of natural and cultural features contributing to the period of significance.

- Preservation of natural and cultural features associated with the Mission 66-era of development.
- Expansion of existing maintenance facilities with a new design that builds upon the Mission 66 design aesthetic.
- Design and development of new interpretive waysides that build upon the Mission 66 design aesthetic.
- Preservation and rehabilitation of the Picnic Area to reflect Mission 66-era character.

TREATMENT PLAN

INTRODUCTION

See Map 5-1 Management Zones.

This section of Chapter 5 includes the identification and description of the recommended treatment alternative by management zone for the proposed Wind Cave Historic District, including the Headquarters Area, the Elk Mountain Campground, Wind Cave, and undeveloped areas; and, the proposed SD 87 Historic District. Guidelines are described for undertaking treatment of the cultural landscape and precede detailed treatment recommendations for the two recommended historic districts.

RECOMMENDED TREATMENT ALTERNATIVE: ALTERNATIVE A- REHABILITATION WITH EMPHASIS ON ECOLOGICAL DESIGN AESTHETIC

As indicated in the section above, this alternative proposes a rehabilitation approach with an emphasis on maintaining and enhancing ecological systems. Contributing features surviving from the period of significance would be protected and maintained, but the overall emphasis would be on natural resource protection and healthy ecosystem sustainability. With an understanding that the larger undeveloped surface land areas and Wind Cave have both natural and cultural values, a treatment approach that ensures the protection of these ecosystems also ensures the protection of the historic integrity of the cultural landscapes. Historic resource planning and design for new interventions should be established based on principles of ecological design. Examples of this alternative approach include:

- Preservation of cultural features—including natural systems—contributing to the period of significance.
- Minimizing land disturbance and increases in structures and pavements associated with new development to protect the integrity of the historic landscapes and the health of sensitive ecosystems.

- Vegetation management focused enhancing ecosystem health, with secondary focus on preserving and restoring historic spatial organization and viewsheds associated with prairie and forest patterns.
- Continued control and removal of exotic plants and rehabilitation of plantings and planted areas to reduce impacts to aboveground and underground ecosystems while maintaining the essential historic planting design character.
- Emphasis on repair versus replacement of historic features and the use of locally procured, sustainable, and recyclable materials.

The treatment recommendations provided in this chapter are intended to assist Wind Cave NP managers in their efforts to identify, preserve, and protect existing natural and cultural resources, and to undertake appropriate management.

GENERAL TREATMENT GUIDELINES

The purpose of this section is to identify the appropriate approaches to undertaking the management of historic resources and new interventions within the proposed historic districts.

General

- Undertake all treatment projects under the direction of the appropriate specialists including historical landscape architects, historical architects, archeologists, natural resource management specialists, and qualified technicians and preservation tradepersons.
- Undertake all work in compliance with the Secretary of the Interior's *Standards for the Treatment of Historic Properties, Guidelines for the Treatment of Cultural Landscapes*, DO-28, and all applicable local, state, and federal codes, regulations, and policies.

New Construction within the Historic Districts

- To the greatest extent feasible and practicable, limit the construction of new facilities as in-fill development within the appropriate non-historic sites in the developed areas. Construct limited new additions to the landscape only as necessary to protect resources, ensure staff and visitor safety, improve operations, enhance the visitor experience, or achieve resource education goals.
- New features and systems should be added in such a way as to minimize adverse impacts on both the sensitive ecosystems and the contributing historic characteristics and features of these landscapes. Consider carefully, when adding new features, the potential impacts of development on Wind Cave, archeological resources, and the historic character of the proposed historic districts as a whole.
- Base the design of new interventions within the historic landscape on a thorough understanding of the ecosystem of the site to avoid impacts.

- Base the design of new interventions within the historic landscape on a thorough understanding of the history of the proposed historic districts to avoid diminishing historic integrity.
- Differentiate new work from existing historic resources. Design all new additions and alterations to be a product of their time, yet compatible with the historic resources in materials, size, scale, proportion, and massing. New landscape and building exhibits should be developed and constructed based on historical research.
- When designing and siting new additions or alterations to the landscape, protect historic materials, features, and spatial relationships that characterize and contribute to the cultural landscape.
- When designing alterations of existing facilities to meet accessibility and safety requirements, minimize visual intrusions and loss of historic elements.
- Design and site new additions and alterations to the landscape in such a way that, if removed in the future, the essential form and integrity of the cultural landscape would be unimpaired.
- Minimize disturbance associated with the installation of new facilities and systems that cross or abut sensitive ecosystems in order to preserve existing landforms and natural resources.
- Design new features, systems, and programs to be as accessible as possible while minimizing impacts to sensitive ecosystems and surviving historic features.
- Limit artificial lighting and lighting systems in such a way as to prevent light pollution.
- Develop park standards for site furnishings, including benches, trash receptacles, lighting fixtures, drinking fountains, signs, and other small-scale features, such as road edging materials to prevent visitors from pulling off to the side of the road in inappropriate locations.

Cultural and Natural Resource Management

- Encourage stewardship of park resources by developing resource education programs that address cultural resources, natural systems, and their interrelationships over time. Consider interpretive goals when implementing landscape changes—landscape changes should be compatible with and supportive of interpretive planning goals and objectives.
- Avoid the use of chemical or physical treatments that cause damage to cultural resources and natural features and systems.
- Control and monitor visitor access, use, and impacts to the park to prevent damage to cultural and natural resources, particularly, but not limited to, sensitive ecological areas such as riparian corridors as well as known and potential archeological resources.
- Retain and maintain historic buildings and structures and associated materials, features, finishes, construction techniques, spaces, and spatial relationships.

- Repair, rather than replace, deteriorated historic features. Repair of deteriorated features should be based on archeological, documentary, and/or physical evidence.
- Base replacement of historic features, if necessary, on archeological, documentary, and/or physical evidence; the new features should match the historic period characteristics in design, color, texture, and, where possible, materials.
- Document, through drawings, photographs, and notes, all landscape changes, treatments and removed features. Maintain records of treatments and preserve documentation according to professional archival standards.
- Undertake archeological clearing for all areas slated for construction/demolition, to protect archeological resources. Identify, document, and protect archeological resources. Protect and preserve archeological resources in place. If such resources must be disturbed, undertake mitigation measures such as recovery, curation, and documentation.
- Remove damaged, diseased, or dead trees that threaten people, property, and cultural or archeological resources. Use a method that minimizes the potential impacts on known and potential archeological resources.
- Avoid endangering known or potential archeological resources by limiting activities that may disturb the land until archeological and additional cultural landscape investigations have been completed. If it is not known whether archeological resources are located within an area planned for land disturbing activity, such activity should be preceded by archeological evaluations and investigations.
- Protect biodiversity by monitoring for and controlling invasive species.
- Incorporate, to the greatest extent possible, only native plants into new plantings. Specifically, consider installing native species of trees, shrubs, and grasses currently and historically found growing within the park. Caution should be used to prevent the introduction of any invasive plant species as part of new plantings.
- Undertake installation of new plants in areas of known or potential sensitive historic or archeological resources using acceptable and least-damaging planting techniques accompanied by archeological monitoring. Recommended techniques include the minimization of ground disturbance through the installation of small plants when possible; the installation of plants by hand; the selection of planting locations that are not in conflict with desirable plants to remain; and the protection of existing plants and resources to remain.
- Recognize the critical importance of natural resources to the cultural landscape and site history, and strive to maintain ecological health.
- Evaluate potential impacts to existing wildlife habitat and wildlife circulation networks that would result from changes to the landscape.

Accessibility

- Design and construct all new facilities to be barrier free to the greatest extent feasible without impacting sensitive and essential resources.
- Use accessibility as a primary design factor in overall planning, design, and resource education. All features associated with accessibility should conform to the standards cited in the Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADAAG). In addition, the latest proposed draft accessibility guidelines for Outdoor Developed Areas prepared by the U.S. Access Board's Regulatory Negotiation Committee should be consulted for interim standards for the exhibit sites, the campground and picnic facilities, and access routes and trails associated with these areas.
- Recognize, as a part of the planning and design process, the diversity of visitors.
- Integrate accessible components into the design of new facilities and site improvements to allow for the access of all visitors.

Sustainability

- Institute cultural and natural resource treatment and maintenance methods that are environmentally and culturally sensitive and sustainable over the long term.
- Minimize areas of vegetative disturbance, soil compaction and excavation, and drainage pattern alteration.
- Undertake site design that incorporates holistic, ecologically based strategies aimed at contributing to the repair and restoration of natural systems.
- Promote biodiversity.
- Avoid disturbing sensitive ecosystem habitats and resources.
- Undertake vegetation management strategies based on NPS principles of sustainability.
- Use mitigating devices—such as retaining walls, closed drainage systems, and large areas of cut and fill—sparingly. Implement the least-intrusive activities and those involving stabilization first, and proceed subsequently to the most invasive as necessary. Limit major new interventions—such as new buildings—to areas that have previously been severely disturbed.
- Emphasize landform-based solutions over hardscape solutions. New interventions should respect and retain existing terrain versus major modifications to terrain features.
- Site new developments to take advantage of solar heating. Consider the direction of prevailing summer breezes and winter winds to help with cooling and ventilation in the summer, and shelter new facilities from winter winds. In general, consider the site's

ecology, including topography, soil types, vegetation, wildlife habitats, and groundwater, in order to integrate any new buildings with the ecosystem.

- Use locally indigenous available materials that are renewable, environmentally sensitive, and reflect the regional vocabulary of construction materials.
- Consider life-cycle costing of materials to assess the long-term wearing capacity and maintenance costs. Consider materials that are non-toxic, durable, long-lived, and require low maintenance.
- Explore the availability of recycled materials, and consider reusable materials.
- Use only stable, non-hazardous materials that do not emit toxins through off-gassing or soil leaching and avoid petroleum-based materials whenever possible.
- Consider monitoring the effects of developing and operating facilities on surrounding resources to ensure that the limits of acceptable change are not exceeded.

PROPOSED WIND CAVE HISTORIC DISTRICT TREATMENT CONCEPT AND RECOMMENDATIONS

Treatment Concept

The overarching treatment concept for the proposed Wind Cave Historic District includes:

- preservation and enhancement of all natural features and systems within the undeveloped areas surrounding the Headquarters Area and Elk Mountain Campground;
- rehabilitation of the Headquarters Area to ensure the preservation of historic features and systems while accommodating necessary changes to support the visitor experience and park operations, and to enhance aboveground and underground natural resources and sensitive ecosystems;
- rehabilitation of the Elk Mountain Campground to provide adequate visitor services while preserving Mission 66-era resources until they can be re-evaluated using a national significance context; and
- preservation of Wind Cave to ensure that the cave's cultural landscape areas and features and ethnographic values are protected and preserved without compromising the health of the cave ecosystem and the visitor experience.

Within the proposed historic district all contributing resources need to be protected with particular attention paid to the retention of the natural resources and the roadways with associated bridges and waysides. Additional consideration should be given to protecting resources that post-date the period of significance, particularly those associated with the Mission 66-era of development. Mission 66 resources are recognized as important cultural features associated with NPS development efforts in the 1950s and 1960s. Although these resources post-date the period of significance, they will soon meet the fifty-year cut-off date to be considered

eligible for the National Register of Historic Places. Management of the larger plant communities of open areas and forest should involve the integration of appropriate vegetation and habitat management with retention of the historic patterns of spatial organization—open and forested areas—and retention of viewsheds associated with waysides.

As indicated in Chapter 4, efforts should be undertaken to revise the existing National Register nomination to expand the current boundaries to include the entire land area associated with the original park boundary when the national park was established in 1903.

Treatment Recommendations

The following treatment recommendations provide a framework and plan for landscape management, planning and design of new interventions, maintenance, and interpretation. They are focused on maintaining the historic character of the landscape in the context of sustainable management of natural systems and features. Recommendations are primarily based on the condition assessments presented in Chapter 3 and they address ongoing and planned construction and repair work.

Treatment recommendations are organized by the following management zones:

- Undeveloped Area
- Headquarters Area
- Elk Mountain Campground
- Wind Cave
- SD 87 Corridor

The treatment plan maps are located at the end of this chapter and include:

- Maps 5-2 through 5-5 for the Undeveloped Area;
- Maps 5-6 through 5-17 for the Headquarters Area;
- Maps 5-18 through 5-20 for Elk Mountain Campground; and
- Maps 5-21 through 5-26 for the SD 87 Road Corridor

There are no treatment maps for the Wind Cave management zone.

Undeveloped Area

The Undeveloped Area encompasses all surface land areas outside the Headquarters Area and Elk Mountain Campground and extends to the proposed revised boundary of the Wind Cave Historic District.

Treatment recommendation by landscape characteristic:

Natural Systems and Features

- Continue natural resource management programs to ensure healthy **plant communities, wildlife habitat, and sensitive aboveground and underground ecosystems.**
- Minimize to the greatest extent feasible all land disturbance associated with the construction and repair of facilities and vehicular circulation to protect **landforms and terrain features.** These features and systems contribute to the historic landscape.
- Virtually all of the patterns of open and forested areas throughout the area and visible from public roads and trails survive from the period of significance. **Changes in vegetative patterns** should be undertaken primarily to maintain healthy ecosystems. However, reestablishing the historic edges of forest that were extant from the 1930s to 1941 could be attempted if plant communities and wildlife habitat would benefit.
- **Vegetation management** within the area should continue to be undertaken as required to ensure healthy ecosystems. Consideration should be given to employing vegetation management, including prescribed fires, as a means for preserving and possibly enhancing the integrity of historic spatial organization.
- Protect features in this area such as buildings, structures, waysides, historic plantings, and small-scale features from fires.
- Contain fires using firebreaks; these can be existing features such as roads or fencelines, or can be created through various temporary methods including wetlines, burning backlines and setting backfires. Avoid creating firebreaks that involve ground disturbance, such as trenching, as this has the potential to damage archeological resources or expose them to fire damage.
- Consider the visual impact of patches that are burned at different times. Utilize viewshed analysis to determine the best ways to burn areas in such a way as to retain historic vegetation character.
- Maintain grasses along the verges of roadways and around buildings and structures through mowing rather than prescribed fires.
- Conform to accepted procedures, safety recommendations, and state regulations for prescribed fires.
- Burn using methods that maintain a relatively low fire temperature to prevent damage to archeological and other resources. For instance, avoid using the “ring burn” format, where a fire is ignited from all sides and burns to the center of the area: this method creates a hotter fire in the center that can cause damage to features including archeological resources. It can also trap and endanger wildlife within the burn area, unlike other methods that permit an escape route.

- Continue efforts to control **exotic plant species**.

Vegetation

- Avoid adding **new tree and shrub plantings** along roadsides, waysides, and trails unless new evidence is available regarding historic period plantings in these locations.
- Control and remove all **invasive exotic plants** in all areas of the proposed historic district.
- Utilize native plants to stabilize and repair **damaged, eroding, and un-vegetated areas**.

Patterns of Spatial Organization

- Avoid altering the current spatial patterns of forest and open areas unless necessary to maintain healthy ecosystems when undertaking **vegetation management** efforts.

Circulation

- Consider treatment alternatives to **U.S. 385** that distinguish this system from the character of the historic SD 87 system. For example, the guardrails, curbing, bollards, and pedestrian pavement materials and design could be distinguished between the two systems. Retain the current road alignments—both vertical and horizontal—and road widths of U.S. 385. Avoid widening pavements, altering shoulders, cuts, fills, and graded drainage swales and ditches. The segments of U.S. 385 that are most sensitive to major alternations include the section between the southern boundary up to the turn off for the Headquarters Area, and the short section north of the Headquarters Area between the intersection with Headquarters Access Road and just west of the intersection with SD 87. These sections should remain substantially unaltered unless safety criteria dictate design changes. The section bypassing the Headquarters Area and the section extending from the SD 87 intersection to the western boundary are less sensitive to changes given that they were constructed after the period of significance.
- Retain the current road alignments—both vertical and horizontal—and road widths of the **road sections accessing the Headquarters Area** that departs from U.S. 385 from the north and south. Avoid widening pavements and altering shoulders, cuts, fills, and graded drainage swales and ditches. These sections should remain substantially unaltered unless safety criteria dictate design changes.
- Retain and maintain the **road accessing Elk Mountain Campground**. This road is associated with the Mission 66-era of development at the park and should be preserved until such time as it can be re-evaluated when the soon-to-be-available national Mission 66 design context is completed.
- Retain and maintain the **roads accessing water supply facilities**. One road runs up a hillside from the Historic Housing Area to underground water tanks and pump house. The second road accesses the Mixing Circle and then continues to an aboveground water tank. Both roads survive from the period of significance, and along with the Cold Brook

Canyon Trail and Wind Cave Canyon Trail, represent the last vestiges of the early park development period. Avoid widening and altering these roads including alteration or addition of cut and fill, and graded drainage swales and ditches. These roads should remain substantially unaltered unless safety criteria require design changes.

- Retain to the greatest extent feasible the current configuration of **waysides and pull-offs** along U.S. 385. The waysides are associated with Mission 66 development at the park, and should be preserved until they can be re-evaluated based on the soon-to-be-available national Mission 66 design context. Avoid adding any additional waysides and pull-offs. If new waysides and pull-offs are essential to ensure safety or enhance interpretation, then these new features should be very limited in number and should not be sited proximate to existing waysides and pull-offs. New construction should match the relative size—including average number of parking spaces—and materials of the existing waysides and pull-offs. Though it is preferable to distinguish new construction from historic features, it is preferable in this case to match the improved existing waysides and pull-offs in design and materials.
- Repaving existing **crushed stone road and parking surfaces** with asphalt will not detract significantly from the historic integrity of the corridor. Edge of pavement returns should be curved. However, it is preferable to retain crushed stone and other permeable surfaces, in part due to the potential negative impact on groundwater hydrology associated with adding impervious surfaces such as asphalt.
- Limit **striping and other pavement markings** to the minimum required for safety and wayfinding. The use of signs is preferable to pavement markings.
- Avoid the addition of concrete **curbing** unless historic documentation can be found to support its re-establishment. Concrete may be associated with Mission 66 alternations. Sheet flow from pavement onto adjacent unpaved ground is preferable to the concentrated drainage patterns resulting from curbing. Curbing may require new drainage ditches that in turn require erosion control measures and can result in additional landform changes which impact terrain integrity. If concrete curbing is required to control unauthorized access to non-paved areas, then consider low-profile mountable curbs versus standard six-inch-high curbing. The use of bollards and wheel stops is preferable to concrete curbing in locations that do not currently have curbing. Owing to maintenance issues, exposed aggregate low-profile curbing is preferable to colored concrete. If curbing is installed curb returns should be curved, and ends of curbs should curl into the landscape with sloped transitions to grade. Also consider local stone curbing versus concrete curbing.
- **Paved paths and ramps** at and connecting to wayside exhibits should be consistent in materials and design. Minimize pavement to what is required to accommodate visitation levels and to protect vegetation areas. Consider exposed aggregate concrete walks versus broom finish concrete. Owing to maintenance problems, avoid colored and patterned concrete. Edges of concrete walks should be configured using simple curved forms.

- **Bollards**, if used, should be consistent in materials and design. Bollards should be dark in color and should be rough-sawn wood, milled round posts, painted steel, or weathering steel. Avoid pressure-treated wood unless a non-toxic treatment is used, and the wood is coated with stain. Avoid galvanized metal, large boulders, and concrete.
- **Wheel stops**, if used, should be consistent in materials and design. They should match concrete curbing materials and finishes when and if curbs are employed. If no curbs are constructed then rough-sawn wood timbers may be appropriate.
- **Guardrails** should be consistent in materials and design. Avoid galvanized metal. If standard w-section guardrails must be used they should match existing guardrails of weathering steel (such as manufactured Corten weathering steel) mounted on rough-sawn wood timber posts. Avoid using boulders.
- Appropriate materials for **cattle guards** include concrete, galvanized metal, and weathering steel (such as manufactured Corten weathering steel).
- There are five designated publicly-accessed, **backcountry trails** within the area. These include portions of the Lookout Point Trail towards the north end of the area; the Cold Brook Canyon Trail; the Highland Creek Trail connecting between the Lookout Point Trail and the Wind Cave Canyon Trail; and the East Bison Flats Trail connecting with the Wind Cave Canyon Trail and running south to U.S. 385 near the southern boundary of the park. Of these trails, Lookout Point Trail, Cold Brook Canyon Trail and Wind Cave Canyon Trail survive relatively intact from the period of significance. Although by 1941, the end date of the period of significance, many old roads and two-tracks had vanished through deliberate obliteration or abandonment, the remaining trails served as a linkage to the early periods of occupation and use. Efforts to maintain the historic period trails should include avoiding major changes in alignment and improvements that would result in overdevelopment or obliteration of existing character.

Trails that depart the corridor from trailheads, waysides, and parking areas should be repaired, including undertaking limited drainage improvements, as required to maintain soil treads whenever feasible. Avoid asphalt surfaces. If use requires a paved surface then compacted crushed local stone or soil cement surfaces are appropriate. Repair trails to ensure safe surfaces without trip hazards where trails are proximate heavy visitor use areas. If new trails are required, then avoid the addition of new vehicle pull-offs to provide trailhead access. Link any new trails to existing trailheads to avoid additional newly developed facilities flanking the roadway. Retain and repair stone steps, log steps, and timber steps. Repaired and new water bars should be local stone, wood timbers, or milled round wood posts.

- It is preferable to retain any **surviving roadbeds and other constructed transportation-related landforms** unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.

- If **new parking facilities** are required to meet trail access needs, then such facilities should be minimized and sited in locations that avoid increasing visual intrusions within the viewshed of the road. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas.

Buildings and Structures

- Avoid the construction of **new buildings, bridges, or any other large-scale features**. If new buildings and structures are required, then such facilities should be sited in locations that avoid increasing visual intrusions within the viewshed of the roads and wayside pull-offs, and areas accessed by visitors. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas. If sites that are screened by terrain are not available or practical, then new buildings should be sited with existing forest areas that fall within the limits of forest areas extant during the period of significance.
- It is preferable to retain any **surviving constructed landforms** associated with missing buildings, structures, and site development unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low-growing native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.
- It is unlikely that any systems of **overhead power and telephone lines and poles** survive from the period of significance. The burial of these systems will not affect the integrity of the cultural landscape. However, ground disturbance may have impacts on potential archeological resources.
- Locate the **new wastewater lagoons** out of the viewshed of visitors. Site the lagoons so that existing undisturbed terrain serves to screen the facility. This is preferable to using vegetation to screen the new facility.
- Consider screening the **Mixing Circle** area using native vegetation.

Views

- Maintain **viewsheds** from the road corridor of open grassland areas that survive from the period of significance. This is important to ensure the continuation of the key visitor experience of the rhythm of open areas with more distant long views of vast landscape and topographic features alternating with more enclosed spaces with near views of forest edges.
- Maintain and enhance **designed views at wayside exhibit locations** and from vehicles. Avoid siting new features at wayside exhibit locations that would obscure or compromise the interpretive experience. These landscape characteristics are associated with the Mission 66-era development of the waysides and should be preserved.

Small-scale Features

- The informational panels for **existing wayside exhibits** will be replaced with more functional interpretive data. Prior to removing all panels, document the panels through photography. The panels and the carriers are associated with the Mission 66 period. Documentation of Mission 66-period interpretive features will be useful for future study. The Mission 66 wayside exhibit stone structures should be retained and repaired. The routed wood exhibit panels should also be documented prior to removal and replacement with new wayside exhibits.
- Consistent design standards for **directional, informational, and trail signs** should be established and implemented. Signs should be only as large in size as required to be functional. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes. Retain and maintain park entrance signs.
- Avoid adding any **new barrier fencing and gates** within the road corridor and at waysides and pull-offs unless necessary to protect resources, property, or to control access to restricted areas. If fencing is required it should be minimized to the greatest extent practicable. This fencing should be box wire with wood posts or narrow dark metal posts in lieu of wood posts. Gates should be dark colored metal frame with box wire.
- Consistent design standards for **site furnishings** including benches, trash receptacles, and related features should be established. Retain and maintain any remaining rustic features such as log benches. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes.
- Avoid the installation of any type of **site lighting** that will be visible from areas accessed by visitors. All lighting should have shielded light sources, should not over illuminate areas, be oriented downward, and all fixtures should be dark in color.

Archeological Features

- The **known and potential archeological resources** should be protected. Though some sites may not be individually-eligible for listing on the National Register, they may contain an archeological record. Public access and land disturbance within these sites should be restricted.

Headquarters Area

The Headquarters Area is the developed land within the grazing fence enclosure and includes:

- the historic Administration Building (Visitor Center) site and associated visitor and staff parking;
- the Historic Housing Area;

- the Picnic Area (former campground);
- the group of historic buildings including the Elevator Building, VIP Center (Recreation Hall), and Seasonal Residence (CCC Bunkhouse);
- the Post-WWII Housing Area; and
- the Maintenance Area.

Treatment recommendations by landscape characteristic:

Natural Systems and Features

- Continue natural resource management programs to ensure healthy **plant communities, wildlife habitat, and sensitive aboveground and underground ecosystems**.
- Minimize to the greatest extent feasible all land disturbance associated with construction and repairs of facilities and vehicular circulation to protect **landforms and terrain features**. These features and systems contribute to the historic landscape.
- Virtually all of the patterns of open grassland areas throughout the area survive from the period of significance. **Changes in vegetative patterns** should be undertaken primarily to maintain healthy ecosystems, not for historic scene restoration. However, it is important to maintain the primarily open grassland character.
- **Rehabilitate riparian plant communities** along drainageways to approximate their healthy pre-development character and condition. In addition to removal of invasive species, consider thinning shrub cover and reducing shrub masses to reduce moisture uptake by plants and thus increase infiltration of surface water into the groundwater system.
- Continue to manage vegetation to protect facilities and people from **wildland and prescribed fires** as required. Fuel reduction, tree pruning to reduce ladder effects, grassland and lawn mowing, and other related means for protection and control will not adversely impact the integrity of the area. (*See fire protection recommendations in the sections below for more detailed recommendations*).
- Continue environmentally sensitive means and methods to control **exotic plant species** while protecting sensitive aboveground and belowground resources.

Vegetation

- Introduced plantings of **shrubs and trees, as well as volunteer woody plants threaten the condition of existing facilities and landscape features**. Though historic photographs and planting plans indicate that shrubs were planted along the foundations of buildings during the period of significance and later, many of these plantings no longer survive. It appears from existing conditions fieldwork that the existing shrubs are volunteers resulting from suckering or re-seeding of the original plantings.

- Remove **shrubs and small saplings located at the base of all buildings**. These plants should be cut flush to the ground taking care not to damage the face of the buildings. Do not use herbicides; rely on mechanical means for removal. Repeated cutting of plants to control unwanted growth is preferable to introducing chemicals into the soil.

- Remove **shrubs and small saplings growing out of stone structures**, including the bridge on the north end of the Administration Building (Visitor Center), stone retaining walls flanking the paths accessing the cave Walk-in Entrance, stone barrier walls and stabilized slopes on the east flanks of the parking lots, and from the stone culvert head and end walls. These plants should be cut flush taking care not to damage or dislodge stones. Do not use herbicides; rely on mechanical means for removal. Repeated cutting of plants to control unwanted growth is preferable to introducing chemicals into the soil.

- Rehabilitate **riparian plant communities** along the drainageways in Wind Cave Canyon in the Headquarters Area to approximate their healthy pre-development character and condition (see Natural Systems section above). The current condition of these areas of vegetation is a result of changes in hydrology owing to landform changes from construction of roads and buildings; introduction of ornamental plantings; and long-term management practices spanning decades. Pre-development historic period photographs show fewer dense clusters of trees, shrubs, and other riparian plants than are evident today. Though native plants were installed during the CCC and Mission 66 periods, these plants, in addition to invasive species, have changed over time resulting in new vegetation conditions that lack historic integrity.

- Consider reducing the number of trees and thinning existing masses of shrubs in conjunction with control and eventual elimination of exotic species.

- When rehabilitating the plant communities associated with the canyon drainageways, retain sufficient specimen trees and groupings of trees to retain the historic character of the original planting concepts. Over time, as these trees decline, replace in-kind, matching species and location.

- Undertake measures to protect historic features such as buildings, structures, small-scale features, and plantings from damage by **prescribed fires or wildfire**. Modify vegetation around buildings and other features that are vulnerable to fires in order to lessen the risk of fire damage. The area where modifications to vegetation are made for the purpose of fire protection is known as a “defensible space.”⁴ The size of a defensible space around a feature in order to be effective depends on slope, aspect, surrounding vegetation, microclimate, and local weather. Consult with a fire protection specialist to determine the special needs of individual features. In general, undertake the following actions to

⁴ Kansas Forest Service publication, <http://www.kansasforests.org/fire/wui/protecthomedefense.shtml> (accessed November 2004).

prevent fire damage to the buildings and structures of the Headquarters Area as a result of wildfire or prescribed fires:

- Consider mowing as an option for vegetation management in areas where life safety concerns are an issue, such as the shoulders of public roads, since smoke from fires can cause traffic accidents.
- Monitor carefully wind direction and weather conditions; avoid undertaking prescribed fires on days when weather conditions might cause burn effects, such as smoke, to impair resources.
- Remove leaves and debris from roofs and gutters regularly to decrease chances of a burning ember setting the roof on fire.
- Establish a buffer zone of thirty feet, or 100 feet on slopes, around building clusters. Buffers should include minimal amounts of flammable vegetation; no accumulation of dead vegetation or flammable debris; and have plants that are healthy and green during the fire season. For example, such areas can include mown green grasses or other low native groundcover. The thirty-foot zone should be watered during fire season to maintain moisture. Small groups of shrubs and trees may be planted twenty to thirty feet from the structure, far enough apart to prevent fire spreading; and maintained to keep dead wood, ladder fuels, and other hazards to a minimum.
- Store firewood and lumber a minimum of thirty feet from structures to decrease fuel near buildings.
- Remove all dead and dying vegetation within the defensible space around the feature.
- Remove ladder fuels by pruning limbs on trees within thirty feet of a structure and twenty feet above the ground. Remove any dead branches and plant material as well. Likewise, prune limbs encroaching on power lines.
- Where trees and shrubs are planted, prune shrubs down and tree limbs up to create a large gap, which will prevent contact between the two layers that can result in fire crowning.
- Maintain firebreaks and windbreaks around the perimeter of building clusters to slow or stop fires.
- Avoid or remove areas of vegetation with continuous layers, such as dense shrub thickets, which allow fire to spread quickly.
- When fire protection recommendations conflict with goals for restoration of historic vegetation character, such as foundation plantings, consider ways to balance retention of the historic vegetation patterns while at the same time mitigating fire danger. For example, ensure that desirable plantings near buildings are kept moist and green during fire season or drought periods so as to minimize their potential as fuel.

- Consider maintaining a mown swath or similar firebreak around an entire cluster of historic buildings and vegetation, rather than treating individual buildings.
- Establish and continue **vegetation maintenance** practices that reinforce historic landscape character, including the following:
 - Maintain grasses on slopes of 3:1 or steeper at a taller height through less frequent mowing to effect better erosion control in these areas.
 - Mow frequently to maintain shorter turf grasses at a low height in the Historic Housing Area and the front lawn of the Administrative Building.
 - Thin or eliminate dense shrub thickets and restore prairie grasses; maintain grasslands through mowing or prescribed fires to reduce fuel and protect facilities from wildfire.
 - Undertake tree care to eliminate conditions resulting in hazard trees.
 - Undertake environmentally sensitive means and methods to control pests. Avoid the use of herbicides, pesticides, and insecticides and rely on mechanical means for controlling vegetation within the Headquarters Area.
 - Remove tree and shrub stumps by grinding in place or cutting flush with the ground. Document locations and specifics of removed plants to aid in replanting efforts. If grubbing of stumps is desirable, perform under supervision of an archeologist.
 - Continue environmentally sensitive means and methods to control **exotic plant species** while protecting sensitive aboveground and underground resources. Avoid the use of chemicals, and rely on mechanical means for control within the Headquarters Area.
 - Take advantage of opportunities for **new plantings** to repair damaged and disturbed areas, retain the historic character of planting patterns, and screen non-historic features and areas that impact the visitor experience.
 - Utilize native plants—focusing on the use of low vegetation such as grasses—to stabilize and repair damaged, eroding, and un-vegetated areas. Retain historic spatial patterns to the greatest extent feasible when undertaking revegetation efforts.
 - Undertake vegetation management strategies for **ornamental plantings** that will enable existing and new vegetation to more closely resemble the character of plantings from the period of significance. The vegetative character of the Headquarters Area today is different from the pre-development period owing to the installation of new plantings throughout the area—many of which were planted during the CCC period. Historic patterns of vegetation included the planting of clusters or groves of native trees associated with groups of buildings and the early campground—now the Picnic Area. This approach was intended to appear “natural,” in order to soften the visual effect of built features, and to create a scenic character that would appeal to visitors. Utilize this concept when modifying and managing vegetation in the Headquarters Area.

- Remove dead and dying trees, and trees that present an imminent safety hazard to visitors and staff.
- Replace in-kind any trees removed from the areas in front of the Administration Building (Visitor Center), at the visitor parking lot, within the picnic area, the Historic Housing Area, the environs of the Elevator Building and VIP Center (Recreation Hall). Match the existing locations and species. Though the historic period tree plantings were uniformly sized stands of trees, individual trees should be replaced as necessary versus removal of groupings, as there is no need to retain the uniform even-age character of the trees to support historic integrity.
- Retain the symmetrical **formal character of planting in the space in front of the historic Administration Building (Visitor Center)**. Though the NPS Rustic Style design sensibilities of the 1930s did not typically advocate symmetry in landscape design, grouped plantings at the Administration Building (Visitor Center) were symmetrical, reinforcing the more formal style of the architecture and creating a rather formal entry space fronting the building. The shrub groupings were located in a symmetrical manner flanking the main entrance walk and along the building foundation. While the shrubs are no longer the same in appearance, the trees flanking the building on either side of the façade are an important part of the design and should be retained and replaced in-kind.
- Options for rehabilitation of planting at the front of the Administration Building (Visitor Center) include:
 - 1. Manage the area as mowed lawn with tree groupings. Do not restore historic shrub plantings.
 - 2. Retain existing remnant shrub plantings, together with trees and mown grass cover. Do not add any additional shrubs.
 - 3. Add shrub plantings that reinforce the original design intent—a symmetrical arrangement of plants, shrubs, and lawn centered on the walkway and main entrance. Use historic photographs to guide design, including locations and massing.
- Avoid adding shrub plantings in the historic district that are not based on known historic plantings. If shrub plantings are desired to replicate historic planting patterns, specify only native, non-invasive shrub species. Maintain plantings in their designed form through pruning and mowing.
- Consider integrating new plantings into an interpretive program.
- Rehabilitate the **planted buffer dense grove of trees between the Administration Building (Visitor Center) parking area and the Historic Housing Area**. Retain existing trees in this area and consider adding more trees to improve the function of the buffer. During the historic period, this planting was added along the west side of the road across from the visitor parking area to buffer views between the housing area, which was

somewhat private in character, and the busy public space at the Administration Building (Visitor Center) and parking.

- Maintain **existing trees at the Historic Housing Area**. This area was designed in the CCC period with tree plantings of ponderosa pine and deciduous species scattered among the buildings in an open grove arrangement to provide some shade and privacy to residents. Little is known of any shrub plantings that may date from that time. However, today, non-historic volunteer shrubs are growing up against the exterior walls of buildings and in other locations such as steps, curbs, slopes, and walls, presenting a fire hazard in addition.
- Remove shrubs and other vegetation growing up against the walls of buildings and structures in the Historic Housing Area. These plants should be cut flush taking care not to damage adjacent buildings and structures or their surface finishes. As discussed earlier, rely on mechanical means for removal. Avoid the use of chemicals, which may have a negative impact on groundwater resources and also may prove harmful to historic building materials.
- Mow, as discussed earlier in the chapter, to remove excessive woody plant growth and maintain grass areas. Leave grass longer on slopes steeper than 3:1 to reduce erosion. Mow more frequently on more level areas adjacent to buildings to reduce the risk of fire damage.
- Restore and maintain the historic character of the **Picnic Area**. In the CCC period, this was the original campground. Tree plantings of native deciduous and pine species were added at that time to provide shade and some privacy for campsites around the edge of the loop, again utilizing the form of a naturalistic grove with open understory. Consider the following:
 - Retain the informal groves of trees around the perimeter of the former campsite loop. Remove dead or diseased trees, and prune up ladder fuels; replace in-kind any trees that are removed. Grind stumps in place or cut flush with the ground, as discussed earlier.
 - Remove or reduce the volume and density of shrub masses in the Picnic Area through mechanical removal. Reducing the shrubs will both reduce the risk of fire, and promote infiltration of surface water into the groundwater system.
 - Add a minimal number of trees, using native species already utilized in the Picnic Area, to screen views of the contemporary comfort station.
- At the **Elevator Building**, remove the currently oversized shrubs located in the planters on the terrace. Replace in-kind with smaller specimens or with non-invasive native deciduous species.

- Retain tree plantings in the **Post-WWII Housing Area**; maintain and treat grass and shrub areas as discussed earlier in this chapter and above in the recommendations for the Historic Housing Area.
- Add a minimal planting of trees to the east of the **Maintenance Area** cluster to screen maintenance structures, vehicles, and functions from view of the U.S. 385 scenic corridor.

Patterns of Spatial Organization

- Retain the current dynamic patterns of spatial character defined by **landforms and natural vegetation patterns** of open grasslands and forest cover.
- Retain the central paved spaces defined by buildings at the **Maintenance Area**.
- Retain the central space defined by the picnic pull-off and tree plantings at the **Picnic Area** (former campground).
- Retain the corridor space defined by the canyon and hillside features of Headquarters Road.
- Retain the front yard space defined by flanking pines and the front façade of the **Administrative Building (Visitor Center)**.
- Retain the small lawn and open field spaces defined by buildings and road edges within the **Historic Residential Area**.
- Retain the remaining open areas in **Wind Cave Canyon**. Create additional open character to improve the site ecology and to reestablish missing historic spatial character. The canyon has experienced increases of tree and shrub vegetation since the end of the period of significance, particularly in the section between the Elevator Building and the Picnic Area.

Circulation

- Retain the overall configuration of the **Administrative Building (Visitor Center) Parking Lot**. Avoid future major alterations that would result in the loss of the circulation patterns including roadways, walks, and spatial character.
- Retain the **Historic Housing Area system of roads and park**. Avoid alterations to the widths and horizontal and vertical alignments. Avoid adding any new drives and parking spaces. Do not allow vehicles to create parking areas within lawn or other planted areas. Retain stone curbing and avoid adding any new curbing.
- Retain the paved **Maintenance Area yard** spaces defined by building facades.

- Retain the **road serving the Elevator Building, the VIP Center (Recreation Hall), Post-WWII Housing Area, and the Maintenance Area**. Avoid alterations to the widths and horizontal and vertical alignments. Avoid adding any new parking spaces or lots.
- The **soil-surfaced two-track that begins at the Elevator Building and connects to the Administration Building (Visitor Center)** should either be improved or removed. If removed, consider retaining a vehicle corridor to allow for maintenance and construction access.
- Retain the **road accessing the water supply facility from the Historic Housing Area**. Avoid alterations to the widths and horizontal and vertical alignments. Avoid adding any new drives and parking spaces.
- Retain the **road and pull-offs at the Picnic Area** (former campground). If accessible facilities are required consider constructing one or more accessible picnic spaces. The accessible space should include a concrete parking space and a concrete pad for an accessible picnic table. A concrete path should connect the parking space and picnic table. The concrete pavements could have exposed brown aggregate finished to diminish any visual intrusions. The design should meet the U.S. Access Board's draft guidelines for Outdoor Developed Areas.
- Retain the **concrete walk segments fronting the parking lot and connecting to the Administrative Building (Visitor Center)** entrance, including the short segment extending straight out from the entrance to the parking lot.
- Retain the **road segment connecting the Maintenance Area with U.S. 385**. This road survives from the period of significance and is part of the surviving historic period road that runs from the Elevator Building, past the Maintenance Area, and adjoins the Wind Cave Canyon Trail road.
- Retain the **roadbed of the Wind Cave Canyon Trail** at the wastewater lagoon site as part of the work involving the obliteration of the lagoons and restoring the pre-development landforms.
- Retain the current road alignments—both vertical and horizontal—and road widths of the **road sections accessing the Headquarters Area** that departs from U.S. 385 from the south and north. Avoid widening pavements and altering shoulders, cuts, fills, and graded drainage swales and ditches. These sections should remain substantially unaltered unless safety criteria dictate design changes.
- Limit **striping and other pavement markings** to what is required for safety and wayfinding. The use of signs is preferable to pavement markings.
- If **new guardrails** are required they should be consistent in materials and design. Avoid galvanized metal. If standard w-section guardrails must be used they should match existing guardrails of weathering steel mounted on rough-sawn wood timber posts. Avoid using boulders.

- Appropriate materials for **cattle guards** include concrete, galvanized metal, and weathering steel.
- The **existing Prairie Vista Trail loop and associated connecting trails** linking the cave entrance and the Picnic Area should be repaired. The trail surface should be regraded in locations to remove trip hazards and improve drainage. The log steps should be re-set or replaced as required to eliminate tripping and falling hazards. The trail could be re-designed, including new alignments to meet accessibility requirements established in the U.S. Access Board's draft guidelines for Outdoor Developed Areas.
- Avoid to the greatest extent feasible any expansion or increase of **paved areas associated with the Post-WWII Housing Area**.
- Retain the **concrete walk linking the cave entrance and the Elevator Building**. Avoid increase in width and changes in alignment. The concrete walks follow the historic path alignment.
- Retain the **concrete walk and steps linking the parking lot and the path to the Elevator Building**. Replace the handrails with new ones that comply with federal accessibility design requirements. The handrails should be metal tubes and should be finished with dark neutral color paint.
- Retain the wood **handicap ramp at the north end of the Administration Building (Visitor Center)**.
- Retain the **vehicle turnaround** near the Picnic Area if required to meet circulation needs. Otherwise, this feature could be removed and the landform and vegetation restored to pre-development conditions.

Buildings and Structures

- Avoid the construction of **new buildings or any other large-scale structures or features within the Historic Housing Area**.
- Avoid the construction of **new buildings or any other large-scale structures or features proximate the Elevator Building**.
- If **new housing** is required within the Headquarters Area, construct new residential buildings within the Post-WWII Housing Area.
- Site **new maintenance buildings and facilities** within the existing Maintenance Area. The facades of new buildings should be aligned parallel with existing buildings.
- If **new administrative space** is required consider adaptively reusing one or more historic houses in the Historic Housing Area. Other potential sites include those proximate the surviving Seasonal Residence (CCC Bunkhouse) above the VIP Center (Power House) and the Maintenance Area.

- Retain and maintain the following **historic buildings and structures**. Minimize additions and alterations that diminish the historic period architectural character.
 - Administration Building (Visitor Center) (HS-1)
 - Elevator Building (HS-2)
 - Superintendent's Residence (HS-3)
 - Superintendent's Cottage (HS-4)
 - Employee Residence (Ranger Cabin) (HS-5)
 - Employee Residence (HS-6)
 - Employee Residence (HS-7)
 - Employee Residence (Dormitory/Mess) (HS-8)
 - Garage (Machine Shop) (HS-11)
 - Garage (Fire Cache) (HS-12)
 - Storage Building (Power House) (HS-13)
 - VIP Center (Power House) (HS-15)
 - Gas Station (Oil House) (HS-16)
 - Garage A (Carpenter Shop) (HS-17)
 - Garage C (Maintenance Shop) (HS-18)
 - Storage Shed (Carpenter Shop) (HS-25)
 - Seasonal Residence (CCC Bunkhouse)(HS-27)
 - Paint Locker (Coal Shed) (HS-30)
 - Walk-in Entrance (CCC portion) (HS 90)
 - Visitor Center Pedestrian Bridge
 - Stone Barrier Walls (HS-94)-6

- Retain the surviving **historic elements of the Administration Building (Visitor Center)**. Avoid any new additions to the front and end of the historic elements of the Administration Building (Visitor Center). Avoid any new additions to the rear of the building to the greatest extent feasible.

- Retain the **Cave Tour Assembly Shelter**. The architectural character is very compatible with historic period architectural design.

- Repair the **stone and wood pedestrian bridge at the north end of the Administration Building (Visitor Center)**. The masonry exhibited structural cracks and settlement. Undertake investigations to determine the cause of the cracking and settlement and undertake repairs. Every effort should be taken to retain the historic stone materials. All new stone should match existing stone. Match the mortar and joints. Vegetation should be removed from the structure and at the base of the structure. Consider selectively removing vegetation that is shading the bridge.

- Repair all **stone guardrails, retaining walls, headwalls**, and similar features. Masonry exhibits structural cracks and settlement. Undertake investigations to determine the cause of the cracking and settlement and undertake repairs. Every effort should be taken to retain the historic stone materials. All new stone should match existing materials. Match the mortar and joints. Vegetation should be removed from the structures and at the base of the structure. Investigate the causes of scouring at culverts. At culverts, repair the ditches to control undermining of stone structures. Use local stone to line ditches if riprap is required. Grouting local stone is preferable to concrete-lined ditches.
- Undertake investigations regarding the feasibility of **stormwater management facilities** that improve water quality from run-off.
- Restore the **existing wastewater lagoon site** to pre-development landforms. Retain the alignment of the Wind Cave Canyon Trail Road.
- There is a **new maintenance building** planned for construction in the yard among the existing maintenance buildings. Materials; finish; fenestration configurations and rhythm; and color of a new building must take clues from the surrounding existing structures. Another important factor in new construction is scale. If possible, a new maintenance building should achieve a proportional resemblance to the existing buildings. For example, a new maintenance building should ideally be no larger, longer, or taller than the existing maintenance building.
- Undertake investigations to determine the structural condition of the **Seasonal Residence (CCC Bunkhouse)** and the feasibility of retaining and adaptively reusing this building. Although this is a historic building, the compromised integrity of the architecture, deterioration of the physical fabric, and its subsidence down the slope of the hill, requires geotechnical analysis of the building foundation and site is necessary to determine if this structure should continue to be utilized. These findings will determine the appropriate treatment. If investigations indicated that the building cannot be saved, then it should be documented and demolished.
- The cave **Walk-in Entrance**, with the exterior revolving door and small vestibule, has not performed as well as intended, both programmatically and functionally. The entrance has periodic maintenance issues and an inability to provide an air lock in order to properly protect the cave entrance from harsh weather. Furthermore, its location obscures the historic cave entrance door, impeding the interpretation of this feature. Not only function, but form is a concern for this entrance. The urban revolving door is not appropriate to the natural surroundings nor does it relate architecturally to the strong character of the CCC buildings and other structures throughout the park, which are predominantly constructed of natural materials such as stone and wood. There are several buildings that could provide inspiration for the design of a new entrance. It is advised that any solution to the design of a new cave entrance be sensitive to the surrounding landscape. The following concepts describe different programmatic and architectural concepts that may be employed in a re-designed entrance. In all concepts the CCC-era door and stacked-stone entrance would be preserved.

- PROGRAM CONCEPT A: Construct an enclosed and airtight vestibule or lobby. It has been suggested that this lobby be large enough to hold up to 40 people, which is the equivalent of a large tour group. The purpose would be to gather visitors, orient them to the tour and cave background, and interpret the historic door and entrance to the cave before beginning the tour. The source of this concept is a review of the site history regarding early wood buildings proximate what is now know as the Walk-in Entrance.
- PROGRAM CONCEPT B: The current urban-style revolving door and assembly would be replaced with an entry of the same approximate size. The new structure would be designed with a rectangular form and roof based on historic building forms found within park. The structure would enclose an air-lock door mechanism.
- PROGRAM CONCEPT C: The concept is similar to concept B, having an exterior enclosure for minimal protection from weather when visitors gather to enter the cave. The current Cave Tour Assembly Shelter serves a similar purpose, however is separated from the cave entrance by many yards.
- PROGRAM CONCEPT D: This concept involves an open, uncovered entrance with a new protective door that approximates the CCC-era program. The CCC entrance of staked stonewalls and wood timber door would be enclosed and preserved as the secondary entrance.
- ARCHITECTURE CONCEPT A: The aesthetics of the entry may take clues from existing architecture within the park. It is not advisable to copy a historic style, but to emulate it in a contemporary fashion. The east end of the Elevator Building has a loggia of heavy timber and ashlar limestone that terminates into a slope. As another entrance to the caves, elements of this building would be appropriate to use for architectural inspiration for a new cave entrance.
- ARCHITECTURE CONCEPT B: The Fire Equipment Shed is partially underground and faced with random cut ashlar limestone. The roof is sod and blends into the landscape.
- ARCHITECTURE CONCEPT C: The Cave Tour Assembly Shelter is located between the Administration Building (Visitor Center) and the cave entrance. Its purpose is for protection of tourists from the elements when waiting for a tour in the caves. of recent construction, the pavilion used heavy timber framing reminiscent of other buildings in the park. A smaller version of this building fitted with walls of transparent material may be appropriate for the new cave entrance, as the building might better blend into the natural surroundings.
- LANDSCAPE ARCHITECTURE CONCEPT D: This concept involves creating a themed entrance with the appearance of natural stone outcrops. This scheme takes its inspiration from the original CCC-constructed entrance, but would not be a restoration of the original stacked-stone and wood door design.

Small-scale Features

- Bury all remaining **overhead power and telephone lines and poles**.
- Retain and repair all remaining **stone curbing**.
- Avoid constructing **new fencing** within the Headquarters Area. Retain the perimeter grazing control fencing. New fencing within the Maintenance Area should be designed to be minimally intrusive and less visible from housing areas and U.S. 385. Screen fencing should be neutral in color and should be compatible with the architectural character. Fencing required within housing areas should be designed to be minimally intrusive and should be compatible with the architectural character. Within housing areas avoid chain-link, plastic, or metal pickets. The preferable materials include rough-sawn wood posts, metal posts, or milled round wood posts, with box wire; or rough-sawn wood posts with rough-sawn non-decorative wood pickets. Screen fencing in the housing area should be rough-sawn wood posts with rough-sawn vertical boards.
- Consistent design standards for **interpretive signs and waysides** should be established and implemented. Avoid bright materials and finishes.
- Consistent design standards for **directional, informational, and trail signs** should be established and implemented. Signs should be only as large in size as required to be functional. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes.
- Consistent design standards for **site furnishings** including benches, trash receptacles, and related features should be established. Retain and maintain any remaining rustic features such as log benches. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes. The designs should be contemporary and simple in form.
- Consistent design standards for **site lighting** should be implemented. All lighting should have shielded light sources, should not over illuminate areas, should be oriented downward, and all fixtures should be dark in color. The designs should be contemporary and simple in form.

Elk Mountain Campground

Natural Systems and Features

- Continue natural resource management programs in the campground area to ensure healthy **plant communities, wildlife habitat, and sensitive ecosystems**.
- Minimize to the greatest extent feasible all land disturbance associated with construction and repairs of campground features and vehicular circulation to protect **landforms and terrain features**.

- **Changes in vegetative patterns** should be undertaken primarily to maintain healthy ecosystems, but also keep in mind that it is important to maintain the ponderosa grove/open grassland character of the campground environs.
- **Rehabilitate riparian plant communities** along Wind Cave Canyon Creek, as elsewhere in the historic district, to approximate their healthy pre-development character and condition.
- Continue to manage vegetation to protect facilities and people from **wildland and prescribed fires** as required. Fuel reduction, tree pruning to reduce ladder effects, grass mowing, and other related means for protection and control will not adversely impact the potential integrity of the area. (*See fire protection recommendations below for more detailed recommendations*).
- Continue environmentally sensitive means and methods to control **exotic plant species**.

Vegetation

- Retain and maintain **existing ponderosa pine and deciduous tree plantings** in the Elk Mountain Campground.
- Avoid adding **new tree and shrub plantings** until such time as the Mission 66 national context is available; at that time, consider any new evidence that becomes available regarding changes to historic period plantings in these locations.
- Control and remove all **invasive exotic plants** using environmentally sensitive means and methods that protect sensitive aboveground and belowground resources. Avoid the use of chemicals, and rely on mechanical means for control within the Elk Mountain Campground.
- Thin **existing masses of shrubs** in conjunction with control and eventual elimination of exotic species.
- Remove **dead and dying trees**, and trees that present an imminent safety hazard to visitors and staff.
- Undertake measures to protect buildings, structures, small-scale features, and plantings from damage by **prescribed fires or wildfire**, as described above in the Headquarters Area section. Because of the small number of built features in the Elk Mountain Campground, a lower level of fire protection is required. In particular:
 - Remove all dead and dying vegetation.
 - Remove ladder fuels by pruning limbs on trees within thirty feet of a structure and twenty feet above the ground. Remove any dead branches.

- Maintain seasonal firebreaks around the perimeter of the campground during fire season.
- Avoid or remove areas of vegetation with continuous layers, such as dense shrub thickets, which allow fire to spread quickly. Where trees and shrubs are planted, prune shrubs down and tree limbs up to create a large gap, which will prevent contact between the two layers that can result in fire crowning.
- When fire protection recommendations conflict with preservation goals, consider ways to balance retention of historic vegetation patterns while at the same time mitigating fire danger.
- Establish and continue **vegetation maintenance** practices that reinforce the existing landscape character, including the following:
 - Maintain grasses on slopes of 3:1 or steeper at a taller height through less frequent mowing to effect better erosion control in these areas.
 - Undertake more frequent mowing proximate buildings and structures in the developed areas to maintain shorter turf grasses at a low height.
 - Thin or eliminate dense shrub thickets and restore prairie grasses; maintain grasslands through mowing or prescribed fires to reduce fuel and protect facilities from wildfire.
 - Undertake tree care to eliminate conditions resulting in hazard trees.
 - Undertake environmentally sensitive means and methods to control pests. Avoid the use of herbicides, pesticides, and insecticides and rely on mechanical means for controlling vegetation at Elk Mountain Campground.
 - Remove tree and shrub stumps by grinding in place or cutting flush with the ground. Document locations and specifics of plants that are removed to aid in future replanting efforts. If grubbing of stumps is desirable, perform under supervision of an archeologist.
- Take advantage of opportunities for **new plantings** to repair damaged and disturbed areas, retain the historic character of planting patterns, and screen non-historic features and areas that impact the visitor experience.
 - Utilize native plants—especially low vegetation such as grasses—to stabilize and repair damaged, eroding, and un-vegetated areas. Retain historic spatial patterns to the greatest extent feasible when undertaking revegetation efforts.
- Maintain **existing trees** in the Elk Mountain Campground. This area was designed in the Mission 66 period, with tree plantings of ponderosa pine and deciduous species scattered among the campsites in an open grove arrangement to provide shade and some privacy

for campers, utilizing the form of a naturalistic grove with open understory. Consider the following:

- Retain the informal groves of trees sheltering the campsites. Remove dead or diseased trees, and prune up ladder fuels; replace in-kind any trees that are removed. Grind stumps in place or cut flush with the ground, as discussed earlier.
- Remove or reduce the volume and density of shrub masses through mechanical removal. Reducing the shrubs will both reduce the risk of fire, and promote infiltration of surface water into the groundwater system.

Patterns of Spatial Organization

- Retain the current patterns of spatial character within and surrounding the campground, as defined by **landforms and natural** vegetation of open grasslands and forest cover.
- Retain and maintain the **open grove character** of the shaded areas of the campground.
- Retain the **loop roads** and the **arrangement of campsites** around them.
- Maintain and retain the **amphitheater area** in its current arrangement.
- Retain the **campground road corridor**
- Retain the **scattered arrangement** of the existing locations of comfort stations and other buildings.

Circulation

- Retain the overall configuration of **Elk Mountain Campground circulation**. Avoid any major alterations that would result in the loss of the circulation patterns including roads, walks, and trails until such time as the Mission 66 context has been completed and reviewed to determine which extant features contribute to the historic character of the campground for this period.
- Retain and maintain the **existing campground road corridor**. Avoid alterations to the width and horizontal and vertical alignments. Avoid adding any new drives and parking spaces. Do not allow vehicles to create parking areas within lawn or other planted areas.
- Retain and maintain the **three loop roads**. Avoid alterations to the widths and horizontal and vertical alignments. Avoid adding any new drives and parking spaces. Do not allow vehicles to create parking areas within lawn or other planted areas.
- Retain and maintain the existing **campground walks**.
- Retain and maintain the **Elk Mountain Nature Trail**. Where necessary, re-grade the trail surface to remove trip hazards and improve drainage. Re-set or replace log steps as

required to eliminate hazards. Avoid making any irreversible changes to the trail until such time as the Mission 66 context has been completed and reviewed.

- Retain and maintain the existing **campsites**. If additional accessible facilities are required, consider constructing one or more new accessible campsites. The accessible site should include a paved parking space and pad for an accessible picnic table. A paved path should connect the parking space and picnic table. The pavements could be concrete with exposed brown aggregate, finished to diminish any visual intrusions. The design should meet the U.S. Access Board's draft guidelines for Outdoor Developed Areas.
- Limit **striping and other pavement markings** to what is required for safety and wayfinding. The use of signs is preferable to pavement markings.
- Appropriate materials for **cattle guards** include concrete, galvanized metal, and weathering steel.
- Avoid to the greatest extent feasible any expansion or increase of **paved areas associated with Mission 66**.

Buildings and Structures

- Avoid the construction of **new buildings or any other large-scale structure features** at the Elk Mountain Campground.
- Retain and maintain the following **Mission 66 period buildings and structures**. Avoid making additions and alterations until such time as the following can be evaluated based on the Mission 66 context to determine historical significance:
 - Campground Tender's Residence
 - Campground Comfort Stations (5)
 - Amphitheater Stage
 - Campground Woodshed
 - Campground Host Shed

Small-scale Features

- Bury all remaining **overhead power and telephone lines and poles**.
- Avoid constructing **new fencing** within the Elk Mountain Campground. Retain the perimeter grazing control fencing and existing wooden fencing within the campground.
- Retain and maintain **small-scale features at the amphitheater** including benches and lighting.

- Establish and implement consistent design standards for **interpretive signs and waysides, directional, informational, and trail signs**. Coordinate with design standards utilized in the Headquarters Area and throughout the park.
- Establish and maintain consistent design standards for **campsite furnishings** including picnic tables, fire pits, trash receptacles, information kiosks, benches, wheel stops, brochure boxes, and campsite markers. Retain and maintain any remaining Mission 66 period features. If new features are required, designs should be contemporary and simple in form.
- Implement consistent design standards for **campground lighting**. Lighting should be as minimal as possible for security and safety requirements. Use dark sky lighting standards by using shielded luminaires, only as bright as necessary; minimize up-lighting (full cutoff), and orient downward; use materials for fixtures that are dark in color. The designs should be contemporary and simple in form.

Wind Cave

Treatment Concept

The overarching treatment concept for the developed areas within Wind Cave is to restore the health of the cave ecosystem while preserving the essential historic characteristics to the greatest extent feasible. In light of the special conditions associated with sensitivity of the cave environment, the more appropriate treatment term—**conservation**—should be used in lieu of **preservation**. Preservation implies the freezing of the extant character of a cultural landscape. This historic preservation treatment approach, as well as a rehabilitation approach, may not allow for efforts to mitigate unhealthy conditions that threaten the cave ecosystem. Conversely, employing a conservation approach allows for the two imperatives—retention of historic characteristics and the restoration of cave health—to co-exist. It is very important to note that the very act of restoring the health of the cave areas impacted by humans can and should be viewed as an act of historic preservation. The cave environment—the geologically-rich spaces—should be viewed as the most important historic resource. Regardless of the extent of alteration, even destruction, to the cave during the period of significance, the visited cave areas are the sites and locations of the historic tourism development and use. Though not to be viewed as trivial, the constructed circulation- and access-related features and systems, blast rubble, and surviving artifacts are less important than the overall visitor experience associated with named features, spaces and passages. Without the healthy survival of the caves spectacular geologic resources, the cave would cease to retain historic integrity.

Based on the research performed for the CLR, collapses, electrical system/lighting replacement, and trail repair/replacement has continued in the years since the end of the period of significance—post-1941. The physical changes associated with collapses, infrastructure and utility system installations and alterations, and circulation improvements likely have altered the character of some debris deposits associated with the period of significance. Findings of the CLR research did not yield precise information regarding the extent and location of changes over time. It is logical, though speculative, to conclude that where post-1941 changes occurred (such as lighting and electric service line installations) the integrity of historic period deposition of debris

materials was effected to some extent (re-arrangement of materials, burial of cables, relocation of debris materials). It is also reasonable to conclude that there remain areas where blast rubble, rock debris and construction materials are likely to be substantially unaltered since the period of significance.

Most of the cave's current infrastructure—such as trail surface materials, stairs handrails, and lighting system components—either post-dates the period of significance or has been significantly altered since 1941. The aluminum and ferrous (iron) construction materials have not performed well or have damaged the cave environment and should be documented and replaced. The park is undergoing replacement of aluminum and iron handrails with stainless steel. The lighting system is also slated for replacement. To the greatest extent feasible new materials and replacement components should be non-reactive/non-leaching in the cave environment.

Treatment Recommendations

The following treatment recommendations provide a framework for historic cave resource management: planning and design of new interventions; maintenance; and interpretation within the cave. The following recommendations are focused on maintaining the historic character of the landscape in the context of sustainable management of natural systems and features.

Treatment recommendations by landscape characteristic:

Natural Systems and Features

- Continue **cave ecosystem restoration** activities based on defensible scientific investigations concerning impacts of introduced manmade materials. Avoid the removal or alternation of cultural materials before investigations and assessments have been completed. Continue to manage the cave to ensure it functions as a healthy cave system.
- Continue **cave restoration** activities based on defensible scientific investigations. Specifically, the removal of potentially harmful materials such as asphalt, debris blocking natural passages, and the dust covering cave surfaces and obscuring the cave's natural appearance at the time of its discovery and in the early years for exploration and development.
- Retain the **natural features and systems** within Wind Cave, which include cave passages and rooms of various configurations, natural cave openings, speleothems, weathering deposits and residues, subterranean lakes, cave biota, and fossils.
- Retain to the greatest extent feasible all **cave passages**. Cave passages vary in size and shape, with their shape being closely related to their manner of origin. Rooms are cavities within a cave system that are wider than a passage. Passages often follow existing fractures, fissures, and/or bedding planes, and rooms commonly occur at the intersection of those features. The “floor” or “walls” of many of the passages along the tour routes have been excavated or altered to ease access or allow further access. Avoid altering existing forms of passages and rooms unless absolutely required to ensure visitor and staff safety.

- Minimize the removal of rubble and debris to **re-open passages** to efforts that are essential to cave health. These passages may connect to other open spaces (rooms).
- Protect the **openings/blowholes** located above the cave. The original opening attributed to the cave's discovery is located north of the Administration Building (Visitor Center) and near to the Walk-in Entrance. This opening was altered from its original form, with later parts reconstructed and new structures added (stone wall). This opening breaches the surface and is only a small hole measuring less than two feet in diameter. If additional investigations determine surface and subsurface hydrology should be altered to allow water to flow into the cave via the Natural Entrance, then consider the following options:
 - Document and remove the existing masonry drainage barrier in its entirety. If a barrier is required to protect the public from damaging the resource and from injury, then consider the least intrusive means.
 - Document and remove a portion of the existing masonry drainage barrier to allow water to flow into the cave.
- Protect **subterranean lakes/pools** that occur at the cave's lowest level. The removal of deleterious cultural materials is associated with the protection of water bodies.
- Protect **speleothems**, or cave formations, from damage owing to visitor access, operations, construction, and maintenance to the greatest extent feasible.
- Protect cave resources related to the **residue of weathering**, including powdery wall coatings to sandy cave sediment, and large collapse features known as breakdown.
 - Retain wall coatings; they are colorful powders that cover some of the cave walls. Their yellow, pink, and brown hues come from weathered iron oxides. Near the Beauty Parlor are good examples of colorful wall coatings from the weathering of iron-rich dolomite.
 - Retain cave sediment including sand, silt, and clay that has been redistributed downward as the water level fluctuated up and down during the most recent stage of cave development. Some of the fine sediment dissolves away, while some re-precipitates as cemented crusts.
 - Retain breakdowns, piles of rubble from the collapse of cave roofs, including large boulders, slabs, and associated loose material. These materials and sites should be distinguished whenever feasible from rubble deposits that are the result of workers altering the cave passages. Club Room and Half Mile Hall contain some very large fallen blocks of ceiling rock.
 - Retain paleokarst consisting of ancient, truncated cave systems, often filled with geological debris. The Club Room, located along a fault, contains reddish Pennsylvanian-age cave fill, and the Bachelor's Quarters has good examples of early cave openings now filled with red, limy sediment.

- Continue investigations of **cave biota**. According to the GMP very little is known about the biota of Wind Cave. Undertake measures to protect endemic cave biota. Continue programs and actions to minimize and eliminate adverse impacts associated with alien biota such as the green alga (lamp flora) that grows on the surface of rocks in areas illuminated by the cave's lighting system.
- Protect to the greatest extent feasible the **fossils**. Commonly encountered fossils include clam-like brachiopods, gastropods, and colonial tabulate corals such as *Aulopora*. Fossils are readily visible in the cave ceilings in the passages between the Elk's Room and the Fairgrounds.
- Protect existing **physical modifications** of the passages along the tour routes including blasted and chiseled-out trails (*see Figure 5-1 Wind Cave Artificial Fill at the end of this chapter*). Remove trail construction debris if it: 1) includes foreign material such as asphalt, concrete, gravel, crushed stone aggregate, pea gravel, and sand; 2) covers speleothems such as popcorn or moonmilk, but not boxwork which is a speleogem; 3) is a safety hazard; or 4) it blocks a passage that has evidence of a post-1940 era disturbance. Leave trail construction debris if: 1) it is a constructed cultural feature such as walls, path edging, or path surfaces; 2) would cause damage to the cave if removed; or 3) it has interpretive value. Before beginning any major restoration projects Cave Resource Management Staff and Cultural Resource Management Staff should conduct a site inspection to confirm the work to be accomplished. Minimize new physical modification to those only required to ensure visitor and staff safety. Continue to undertake measures to educate visitors concerning the sensitivity of cave resources.
- Continue programs and actions regarding the removal of **toxic and other deleterious cultural materials** discarded and buried in the cave including ferrous and other metal fragments, asphalt, wood, paper, and concrete.
- Enhance cave **environmental conditions**. Visitors and staff cause variations in air temperatures, moisture, and chemistry, and leave behind waste material such as lint, hair, and shoe rubber. Electrical systems, including lighting, add heat to localized environments and encourage growth of algae.
- Continue programs and actions to minimize and eliminate **surface conditions and activities** that impact the cave. Buildings, roads, parking, and utilities are built directly over the top of the cave, and some cave passages are only a few feet below the surface. High nitrate levels have been found in cave water beneath the historic housing, and chloroform, toluene, acetone, benzene, styrene, methyl isobutyl keystone, ortho-xylene, para-xylene and caffeine have been detected in the cave. Continue cave monitoring and investigations related to surface conditions. Avoid the construction of new facilities over the cave except as necessary to meet park goals and objectives. Consider alternative locations for new park facilities.

Use

- Continue **recreational, interpretive, and scientific uses and activities** in the cave. However, avoid to the greatest extent feasible major alterations to the existing cave circulation systems to support increases in visitation levels. Continue park efforts to balance visitor education and enjoyment with resource protection.
- Consider limited **interpretive opportunities** associated with past means and methods concerning physical modifications of passages and circulation-related construction and infrastructure. The park should identify the appropriate location or locations for telling these stories.
 - If the development and enhancement of the interpretation of past efforts to alter the cave is implemented, then consider the following. Appropriate interpretive locations should exhibit the best example of alterations including rock debris piles and deposition dating to various periods of construction, construction-related dust-coated surfaces, altered passages, remnants of past lighting systems, and other similar features. The appropriate location(s) should demonstrate how passages were opened by the early explorers and the CCC, and ideally would exhibit evidence of the full range of past interventions. However, in no case should toxic or other deleterious materials remain. Ferrous and other metal fragments, asphalt, wood, paper, and concrete fragments should be removed. The use of these foreign materials historically should be interpreted through media outside the cave and/or via interpreters/educators.

Circulation

- Retain and maintain the current **tour routes** including Natural Entrance Tour, the Garden of Eden Tour, the Fairgrounds Tour, Candlelight Tour, and Wild Cave Tour.
- Design new circulation features to be as accessible when feasible. However, avoid substantial alterations to the existing circulation system and cave surfaces to achieve higher levels of **accessibility**. Continue to utilize the elevator access to provide an accessible visitor experience versus major alterations of existing tour routes.
- Retain to the greatest extent feasible all existing **paved and unpaved paths** including undisturbed natural surfaces, cut and carved stone, fitted-stone paths, stone masonry steps, and concrete paved paths and steps. Avoid constructing any new paths except as required to meet safety requirements including slope, surface friction, head clearance, and drainage. Some path edges have been lined with stones. Retain stones lining paths. Loose stones and related hazardous conditions, such as abrupt drops at the path edge, should be repaired by resetting stones and replacing missing stones. Hand-tight joints are preferable to grouting with cement. Avoid cutting stone and concrete to the greatest extent feasible. If cutting is required control fugitive dust by suppressing with water or vacuuming during cutting. Consider installing additional stone edging to control access, mitigate unsafe edge of path conditions, and to aid in the collection of lint and other materials falling

from visitors and staff. Retaining stone and concrete path surfaces is preferable to constructing and installing elevated walkways. If elevated walkways are required, then they should be constructed of materials such as stainless steel mounted on stainless steel supports and/or concrete supports, or supported directly on native rock.

- Continue to remove all ferrous metal, aluminum, and wood **steps, handrails, guardrails, and ladders**. Document all removals and replacements. Replace all metal steps, handrails, guardrails, and ladders with stainless steel fabricated structures. New concrete steps are acceptable. In any case, designing steps to contain materials falling from visitors and staff is preferable.
- Avoid the use of **coatings** such as paint, stains, and sealers within the cave. If safety markers and markers are required then mechanically attach reflective and/or colored materials directly to path surfaces and edges. Proper illumination and/or handrails is preferable to markers and markings. Monitor existing coated surfaces for flaking and loose materials. Frequently remove loose and flaking materials by scraping assisted by vacuums. Avoid chemical means of removal of coating.

Spatial Organization

- Retain and maintain the overall spatial organization of the cave tour routes by avoiding any **physical modifications** unless dictated by visitor and staff safety.
- Undertake all reasonable measures on the surface to mitigate cultural causes for cave-ins and other damage resulting from **management of the land areas and facilities above the cave**.

Views

- Continue cave illumination through electric lighting systems and hand-held devices to maintain **scenic and interpretive views**. The illumination of passages and geologic features should continue. However, the use of candles and the type and extent of electronic lights should be governed by the need to protect the cave ecosystem versus maintaining or recreating a historic condition other than general illumination to reveal features and spatial character, and provide for visitor and staff safety.

Structures

- Retain and maintain the **double-shaft elevator system** that descends to two stops within the cave. The elevators are enclosed in a concrete shaft and at each stop the entrances are enclosed by a concrete masonry unit antechamber that acts as an airlock. Avoid construction of additional elevator systems to meet increases in visitation.
- Retain and maintain **stabilization measures** including concrete reinforcing pillars and chain link stabilizing structures bolted to the bedrock. However, monitor concrete and metal elements for deterioration. Repair or replace measures as required to minimize deposition and migration of rust and concrete fragments.

Small-scale Features

- Continue the program of renovating the cave **lighting and electrical systems**. When existing systems features are encountered they should be documented before removal. If features are to remain they also should be documented. In terms of possible impacts to cultural features, the greatest impact is visibility. Hide from sight to the greatest extent feasible all cables, light fixtures, and electrical equipment with the exception of safety- and emergency-related items such as emergency telephones.
- Adequate illumination of steps, wet areas and other potentially hazardous conditions may require that lighting systems are partly visible. Consider mounting lighting fixtures directly to unexposed surfaces of handrails to achieve minimum footcandle illumination.
- Exposed wiring or cabling should be neutral in color. Consider wiring and cabling with sheathing that approximates the colors of the cave. Avoid bright colors and colors that contrast with the cave colors.
- Avoid destruction of cave surface to bury cables or conduit. Consider burial of cable and/or conduit in concrete walks when feasible. It is preferable to bury conduit under loose rock debris close to the trail/path system than to cut into existing undisturbed cave surfaces. However, in locations where cave surfaces have been altered by workers in the past, consideration may be given to trenching or burial in these areas proximate the trail/path system. The cutting of any surface—concrete or rock—should include fugitive dust suppression. The trail lighting and electrical system design should anticipate future path and trail alterations including paving and surface improvements and construction of any new elevated walks. These future conditions may offer opportunities for least intrusive cable/conduit routing.
- Avoid the use of cements or other adhesives in the mounting or fixing of electrical systems and fixtures. If fixtures and other elements must be mounted then consider bolting fixtures to a surface using stainless steel bolts and the suppression of fugitive dust.
- Balance the option of separate services with the impacts of boring into the cave and the siting of transformers within the historic landscape. It is preferable to avoid new borings and the addition of new transformers on the surface. Screen any new surface features using native shrub vegetation.
- Avoid the disturbance of **rock rubble and debris piles** unless required to meet objectives regarding cave ecosystem health. When disturbance, including removal, relocation, and rearrangement, is required consider the following:
 - See *Archeological Resources* below for recommendations concerning buried cultural features.

- Continue documentation means and methods including photographing before and after actions, and mapping locations of actions. Prepare field reports to supplement photography and mapping.
- Continue to remove all small rock debris and piles that are known to have been moved or altered after the period of significance (based on documentation) as part of efforts to remove toxic and deleterious materials such as asphalt and wood.
- Retain to the greatest extent feasible all rocks that appear to be intentionally placed along trails and paths. Though the date of origin of these edgings may not be known, they may have existed during the period of significance. If documentation can support a later date of construction, then removal may occur. However, undertake removal or reconstruction only to meet critical safety needs such as trip hazards and electrical and lighting infrastructure installation. The retention of the rock edging may help to control the spread of lint and other materials that fall from visitors and staff.
- Retain to the greatest extent feasible rubble located away from the trail and path system that is not blocking passages unless critical to maintaining cave ecosystem health. Though it cannot be readily verified, rubble located the farthest distance from the trails and paths may be the oldest and therefore date from early periods of work.
- Develop a consistent system of **site furnishings** including trash receptacles, benches, seats, and related features. The quantity of furnishings should be limited to only what is required to provide critical visitor support. Install only those furnishings that will not impact the cave environment. Select manufactured items or custom design and fabricate furnishings that are made of materials such as plastics and stainless steel versus wood and painted or galvanized metals. The designs should be simple in form, not decorative, and should be neutral in color.
- Protect and preserve **historic graffiti and markers**. All historic and contemporary graffiti and other markers such as survey monuments should be documented through photography and mapping locations. This effort will support historical documentation and preservation, as well as assist in the control of contemporary vandalism.

Archeological Resources

- **Cultural materials and artifacts** found on the surfaces and buried beneath debris should be managed as potential archeological resources. The cultural materials that have been encountered and removed or remain within the cave include wood fragments; metal fragments; imported construction materials including concrete and asphalt; remnants of electrical systems; and various items deposited, lost, or buried by workers, staff, and visitors over time since the initial period of exploration. After consultation with archeologists working for JMA, guidance was provided regarding how to approach the mitigation of the necessary removal of cultural materials. The park should continue to enhance its current practices of accurately documenting found materials including mapping locations, photography, recordation, and curation of artifacts and cultural materials. NPS historical archeologists should be consulted regarding the further

development of documentation procedures to ensure that the information value of found artifacts and materials is documented to the appropriate level. Materials that are not potentially threatening to the cave environment and are outside of visitor use areas should be left undisturbed. This allows all potentially threatening materials and those that obscure the natural and historic appearance of the cave to be removed while preserving the rest in the event additional research can reveal the location of undisturbed materials. The threshold for removing potentially harmful materials should be low since a healthy cave environment is the most important cultural resource.

Proposed SD 87 Historic District Treatment Concept and Recommendations

Treatment Concept

The overarching treatment concept for the proposed SD 87 Historic District is to rehabilitate the historic road corridor to support current and future levels of vehicular, pedestrian, and bicycle traffic and manage for natural resource values while preserving the historic character and significant features that make this resource unique.

Within this management zone all contributing resources need to be protected with particular attention paid to the retention of the scenic and natural resources and the roadway and associated bridges and waysides. Additional consideration should be given to protecting resources that post-date the period of significance, particularly those associated with the Mission 66-era of development. Mission 66 resources are recognized as important cultural features associated with NPS development efforts in the 1950s and 1960s. Although these resources post-date the period of significance, they will soon meet the fifty-year cut-off date to be considered eligible for the National Register of Historic Places. Management of the larger plant communities of open areas and forest should involve the integration of appropriate vegetation and habitat management with retention of the historic patterns of spatial organization—open and forested areas—and retention of viewsheds associated with waysides.

It is important to note that many discrete features—including wood bollards, concrete curbing, informational and wayfinding signs, wayside exhibits—that are present are associated with alterations and repairs occurring after the end of the identified period of significance—post-1941. Given that the focus of a rehabilitation approach is to preserve landscape character, even those post-dating the period of significance, and that many features can be traced to the Mission 66 period of change, the following recommendations stress the preservation of these small-scale features.

As indicated in Chapter 4, efforts should be undertaken to establish a National Register historic district for the road corridor in cooperation with other efforts to protect the scenic roads of the Black Hills.

Treatment Recommendations

The following treatment recommendations provide a framework and plan for landscape management, planning and design of new interventions, maintenance, and interpretation. The following recommendations are focused on maintaining the historic character of the landscape in

the context of sustainable management of natural systems and features. Recommendations are primarily based on the condition assessments presented in Chapter 3 and address ongoing and planned construction and repair work.

Treatment recommendations by landscape characteristic:

Natural Systems and Features

- Minimize land disturbance associated with construction and repair of vehicular circulation to protect **landforms and terrain features**. These features and systems contribute to the scenic experience of visitor established during the early stages of design and construction.
- Much of the rhythm of open and forested areas along the road corridor survives from the period of significance. Undertake any **changes in vegetative patterns** primarily to maintain healthy ecosystems, not for historic scene restoration. Avoid major alterations of the surviving historic spatial organization of the vegetation patterns visible from the roadway in order to protect historic integrity. However, reestablishing the historic edges of forest that were extant from the 1930s to 1941 could be attempted if the plant communities and wildlife habitat will benefit.
- Undertake **vegetation management**, including prescribed fire, within the viewshed of the road corridor as required to ensure healthy ecosystems. Consider employing fire management as a means for preserving and possibly enhancing the integrity of historic spatial organization.
- Continue efforts to control **exotic plant species**.

Vegetation

- Avoid adding **new tree and shrub plantings** along roadsides and waysides unless new evidence is available regarding historic period plantings in these locations.
- Control and remove all **invasive exotic plants** in all areas of the proposed historic district.
- Consider undertaking documentation and removal of **non-native species** at the **Game Preserve Headquarters** site. This site does not retain integrity so the retention of the last vestiges of developed area plantings is not critical to the historic integrity of the proposed historic district. Mitigate the removal of introduced plantings by augmenting the documentation contained in this CLR. Establish a native plant cover.
- Utilize native plants to stabilize and repair **damaged, eroding, and unvegetated areas**.
- Retain historic spatial patterns to the greatest extent feasible when undertaking **revegetation** efforts.

Patterns of Spatial Organization

- Retain the rhythm of late 1930s/early 1940s historic spatial character of the road corridor defined by landforms and natural vegetation patterns of open grasslands and forest cover. (*See other recommendations in this section that address spatial organization*).

Circulation

- Retain the current **road alignments**—both vertical and horizontal—and road widths. Avoid widening pavements, altering shoulders, cuts, fills, and graded drainage swales and ditches.
- Retain to the greatest extent feasible the current configuration of **waysides and pull-offs**. The waysides are associated with the Mission 66-era of development at the park and should be preserved until such time as they can be re-evaluated when the soon-to-be-available national Mission 66 design context is completed. Avoid adding any additional waysides and pull-offs. If new waysides and pull-offs are essential to ensure safety or enhance interpretation, then limit the number of these new features and avoid siting them proximate to existing waysides and pull-offs. New construction should match the relative size—including average number of parking spaces—and materials of the existing waysides and pull-offs. Though it is generally preferable to distinguish new construction from historic features, it is preferable in this case to match the improved existing waysides and pull-offs in design and materials.
- Re-paving existing **crushed stone road and parking surfaces** with asphalt will not detract significantly from the historic integrity of the corridor. Edge of pavement returns should be curved. However, it is preferable to retain crushed stone surfaces.
- Limit **striping and other pavement markings** to what is required for safety and wayfinding. The use of signs is preferable to pavement markings.
- Avoid the addition of concrete **curbing** unless historic documentation can be found to support re-establishment of concrete curbing. Concrete may be associated with Mission 66-era alternations. Sheet flows off of pavement are preferable to concentrated drainage resulting from curbing. Curbing may require new drainage ditches that require erosion control measures that may result in additional landform changes that impact terrain integrity. If concrete curbing is required to control unauthorized access of non-paved areas, then consider low-profile mountable curbs versus standard six-inch-high curbing. The use of bollards and wheel stops is preferable over concrete curbing in locations that do not currently have curbing. Owing to maintenance problems, exposed aggregate low-profile curbing is preferable to colored concrete. If curbing is installed curb returns should be curved. Ends of curbs should curl into the landscape with sloped transitions to grade. Also, consider local stone curbing over concrete curbing.
- **Bollards**, if used, should be consistent in materials and design. Bollards should be dark in color and should be rough-sawn wood, milled round posts, painted steel, or weathering

steel. Avoid pressure-treated wood unless a non-toxic treatment is used, and the wood is coated with stain. Avoid galvanized metal, large boulders, and concrete.

- **Wheel stops**, if used, should be consistent in materials and design. They should match concrete curbing materials and finishes when and if curbs are employed. If no curbs are constructed then rough-sawn wood timbers may be appropriate.
- **Guardrails** should be consistent in materials and design. Rough-sawn wood timbers backed by steel and mounted on rough-sawn wood timber posts are preferable. Milled round wood posts with milled round wood rails are appropriate as well. Avoid galvanized metal. If standard w-section guardrails must be used they should be weathering steel mounted on rough-sawn wood timber posts. Avoid using boulders.
- Appropriate materials for **cattle guards** include concrete, galvanized metal, and weathering steel.
- There are four designated publicly-accessed **backcountry trails** that intersect SD 87. These include the Sanctuary Trail towards the north end of the corridor; the Rankin Ridge Trail, a loop trail following in part a vehicle road accessing the tower site; and the Centennial and Lookout Point Trails at the southern end of the corridor. Trails that depart the corridor from trailheads, waysides, and parking areas should be repaired, including undertaking limited drainage improvements, as required to maintain soil treads whenever feasible. Avoid asphalt surfaces. If use requires a paved surface then compacted crushed local stone or soil cement surfaces are appropriate. Repair trails to ensure safe surfaces without trip hazards where trails are proximate heavy visitor use areas. If new trails are required, then avoid the addition of new vehicle pull-offs to provide trailhead access. Link any new trails to existing trailheads to avoid additional new developed facilities flanking the roadway. Retain and repair stone steps, log steps, and timber steps. Repaired and new water bars should be local stone, wood timbers, or milled round wood posts.
- **Paved paths and ramps** at and connecting to wayside exhibits should be consistent in materials and design. Minimize pavement to what is required to accommodate visitation levels and to protect vegetation areas. Consider exposed aggregate concrete walks over broom finish concrete. Owing to maintenance problems, avoid colored and patterned concrete. Edges of concrete walks should be configured using simple curved forms.
- Within the proposed historic district—including the Game Preserve Headquarters site—it is preferable to retain any **surviving roadbeds and other constructed transportation-related landforms** unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.
- If **new parking facilities** are required to meet trail access needs, then such facilities should be minimized and sited in locations that avoid increasing visual intrusions within the viewshed of the road. It is preferable to site such facilities in historically open areas

that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas.

Buildings and Structures

- Avoid the construction of **new buildings, bridges or any other large-scale features** within the proposed historic district. If new buildings are required, then such facilities should be sited in locations that avoid increasing visual intrusions within the viewshed of the road and wayside pull-offs. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas. If sites that are screened by terrain are not available or practical, then new buildings should be sited with existing forest areas that fall within the limits of forest areas extant during the period of significance.
- The **Rankin Ridge Fire Tower**, though constructed at the beginning of the Mission 66 program in 1956, should be managed as a historic resource. This, along with other features associated with Mission 66 alternations and additions, should be re-evaluated based on the soon-to-be-completed Mission 66 historic context.
- The 9/23/03 Federal Highway Administration Bridge Inspection Report for the **Beaver Creek Bridge** indicates several condition issues and recommendations for repair. This bridge should be retained.
 - When repairing the delaminated, spalled and cracked and missing sections of concrete bridge deck, barriers, and lower curbs, match existing shapes and design.
 - When stabilizing eroding and undermining areas at the base of abutments and wingwalls, undertake repairs in a manner that does not create major new intrusive constructed features such as grouted riprap and gabion-type measures. The repairs should approximate a natural-type condition of boulders and vegetation. In locations of stacked stone, repair or reconstruct these features matching the original wall patterns and materials.
 - Vegetation growing in the stacked stone retaining walls along approaches should be removed taking care not to damage the walls.
 - Replace missing curb stones.
 - Minimize the attachment of safety markers and reflectors to the extent only required to meet federal safety standards.
 - Do not alter the road alignment of the approaches unless dictated by safety requirements. If positive drainage is required at the approaches, avoid constructing ditches or other structures or measures that require demolition and removal of bridge components such as barriers and curbing. In addition, avoid constructing ditches or swales that are lined with riprap. Consideration should be given to designing ditches lined with local stone with fitted joints.

- Though the w-section weathering steel and wood post guardrails are preferable to galvanized materials, consider replacing with rough-sawn wood timbers backed by steel and mounted on rough-sawn wood timber posts.
- The 9/23/03 Federal Highway Administration Bridge Inspection Report for the **Pig Tail Bridge** indicates several condition issues and recommendations for repair. Although the Federal Highway Administration determined the bridge to be functionally obsolete since the load capacity is inadequate and the width too narrow for two lanes, this bridge should be retained. If the bridge structure must be reconstructed to meet load capacity and related safety requirements it is preferable to only replace the decking and/or the steel girders in a manner that approximates the original design. It is important to maintain to the greatest extent feasible the location and design of the bridge, and the alignment and variable widths of the approaches.
 - When repairing mortar joint deterioration of masonry portions of abutments and piers, undertake repairs retaining the masonry materials and joint patterns. If replacement is required, match stone and mortar materials.
 - When stabilizing eroding areas at the base of abutments, piers, and footings, undertake repairs in manner that does not create major new constructed features such as grouted riprap. The repairs should approximate a natural-like condition of boulders and vegetation. It is important to note that the underside areas of the bridge are visible to visitors.
 - Retain the timber guardrail features. Repair as required. If replacement is required, match the existing design.
 - When timber decking and rails are replaced, match the existing design.
 - Minimize the attachment of safety markers and reflectors to the extent only required to meet federal safety standards.
 - Do not alter the road alignment of the approaches unless dictated by safety requirements. Investigate all alternatives to altering the terrain of the bridge approaches to address safety requirements. Measures that should be considered prior to terrain alteration include, but should not be limited to, speed limit reductions, vegetation removal (sight distance enhancement), rumble strips, and enhanced warning signs.
 - Retain and repair round timber guardrails extending from the bridge rails. If bridge rail terminations are required for safety purposes, terminate using wood guardrails matching the existing guardrails. If these guardrails are deemed unsafe, then create a design that approximates the current guardrail design. If this is not feasible, consider using non-milled, rough-sawn wood timbers backed by steel and mounted on non-milled, rough-sawn wood timber posts. Avoid using galvanized or weathering steel w-section guardrails.

- The wearing surface should match the road wearing surface asphalt in terms of color. Minimize striping.
- Within the proposed historic district—including the Game Preserve Headquarters site—it is preferable to retain any **surviving constructed landforms** associated with missing buildings, structures, and site development unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.
- The construction of **new subsurface drainage systems** should be minimized. Area drains are preferable to curb inlets. Avoid concrete collars around grate openings to minimize visual impacts. Iron grates are preferable over galvanized metal. If storm drains are constructed utilize grease and grit traps.
- The construction of **new drainage ditches and swales** should be minimized and, if required, should be designed to fit into existing terrain to avoid visual intrusions. New swales and ditches should have rounded bottoms and sides. Side slopes should be 3:1 or shallower and should have a smooth transition into existing grades. Grass-lined swales and ditches are preferable to riprap-lined ditches. If riprap is required use local native stone with fitted joints. The alignment of swales should be curved, not angular. Consider integrating bio-infiltration when designing surface stormwater drainage systems.

Views

- Maintain **viewsheds** from the road corridor of open grassland areas that survive from the period of significance. This is important to ensure the continuation of the key visitor experience of the rhythm of open areas with more distant long views of vast landscape and topographic features alternating with more enclosed spaces with near views of forest edges.
- Maintain and enhance **designed views at wayside exhibit locations** and from vehicles. Avoid siting new features at wayside exhibit locations that would obscure or compromise the interpretive experience. These landscape characteristics are associated with the Mission 66-era development of the waysides and should be preserved.
- The **designed views of roadway structures from vehicles** should be maintained and enhanced. These include the view of Beaver Creek Bridge from the hairpin turn at the Centennial Trailhead location; the views of Beaver Creek Bridge from the road approaches; and the views of the Pig Tail Bridge from the road approaches. Avoid new plantings and prevent natural vegetation from obscuring these important historic views.

Small-scale Features

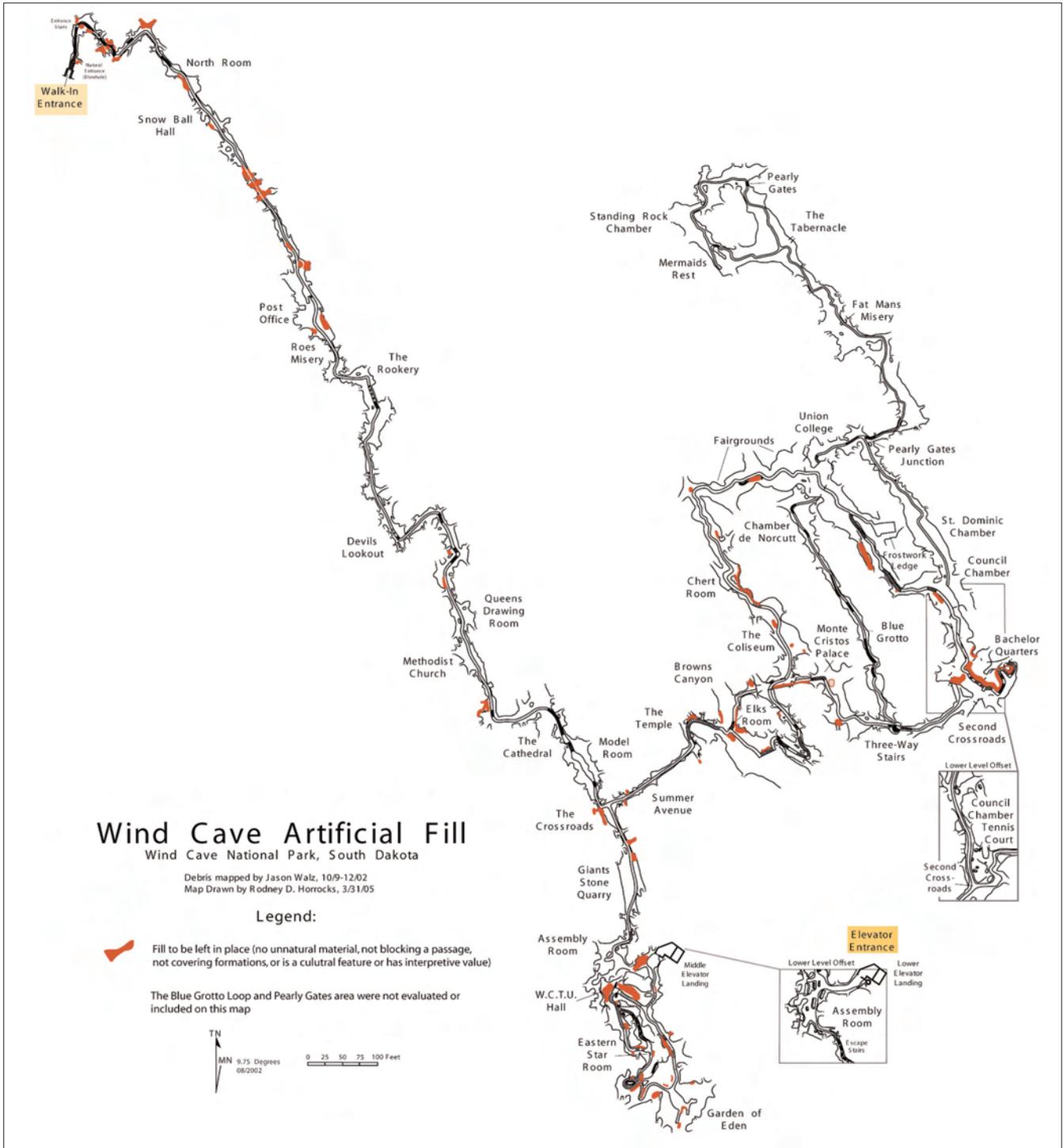
- The informational panels for **existing wayside exhibits** will be replaced with more functional interpretive data. Prior to removing all panels, document through photographs the panels. The panels and the carriers are associated with the Mission 66 period.

Documentation of Mission 66-period interpretative features will be useful for future study. The Mission 66 wayside exhibit stone structure should be retained and repaired. The wood exhibit panels should also be documented prior to removal and replacement with new wayside exhibits.

- Consistent design standards for **directional, informational, and trail signs** should be established and implemented. Signs should be only as large in size as required to be functional. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes. Retain and maintain park entrance signs.
- Avoid adding any **new barrier fencing and gates** within the road corridor and at waysides and pull-offs unless necessary to protect resources, property, or to control access to restricted area. If fencing is required it should be minimized to the greatest extent practicable. This fencing should be box wire with wood posts or narrow dark metal posts in lieu of wood posts. Gates should be dark colored metal frame with box wire.
- Consistent design standards for **site furnishings** including benches, trash receptacles, and related features should be established. Retain and maintain any remaining rustic features such as log benches. Appropriate materials include painted wood, painted metal, weathering steel. Avoid galvanized and other bright materials and finishes.
- Avoid the installation of any type of **site lighting** within the proposed historic district corridor.

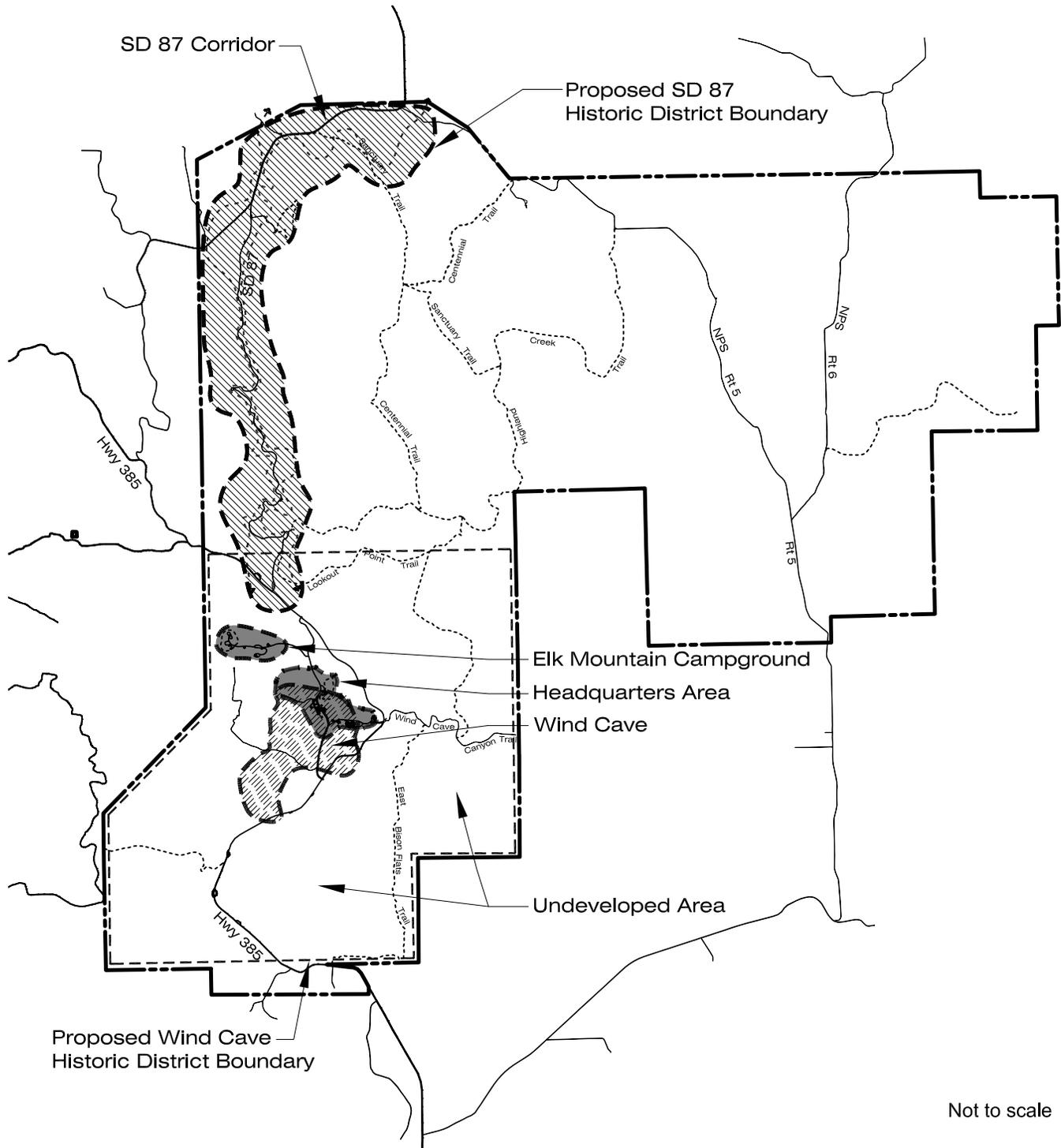
Archeological Features

- The **former Game Preserve Headquarters** site should be viewed as a sensitive archeological site. Though the site may not be individually-eligible for listing on the National Register, it may contain an archeological record that would yield important information regarding the early years of the Game Preserve operations and facilities. Land disturbance within the limits of historic period site development should be restricted.
- The **former Animal Corrals** site should be viewed as a sensitive archeological site. Though the site may not be individually-eligible for listing on the National Register, it may contain an archeological record that would yield important information regarding the early years of the Game Preserve operations and facilities. Land disturbance within the limits of historic period site development should be restricted.



Source: National Park Service, Wind Cave National Park.

Figure 5-1
Wind Cave Artificial Fill.



Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- - - Zone Boundary

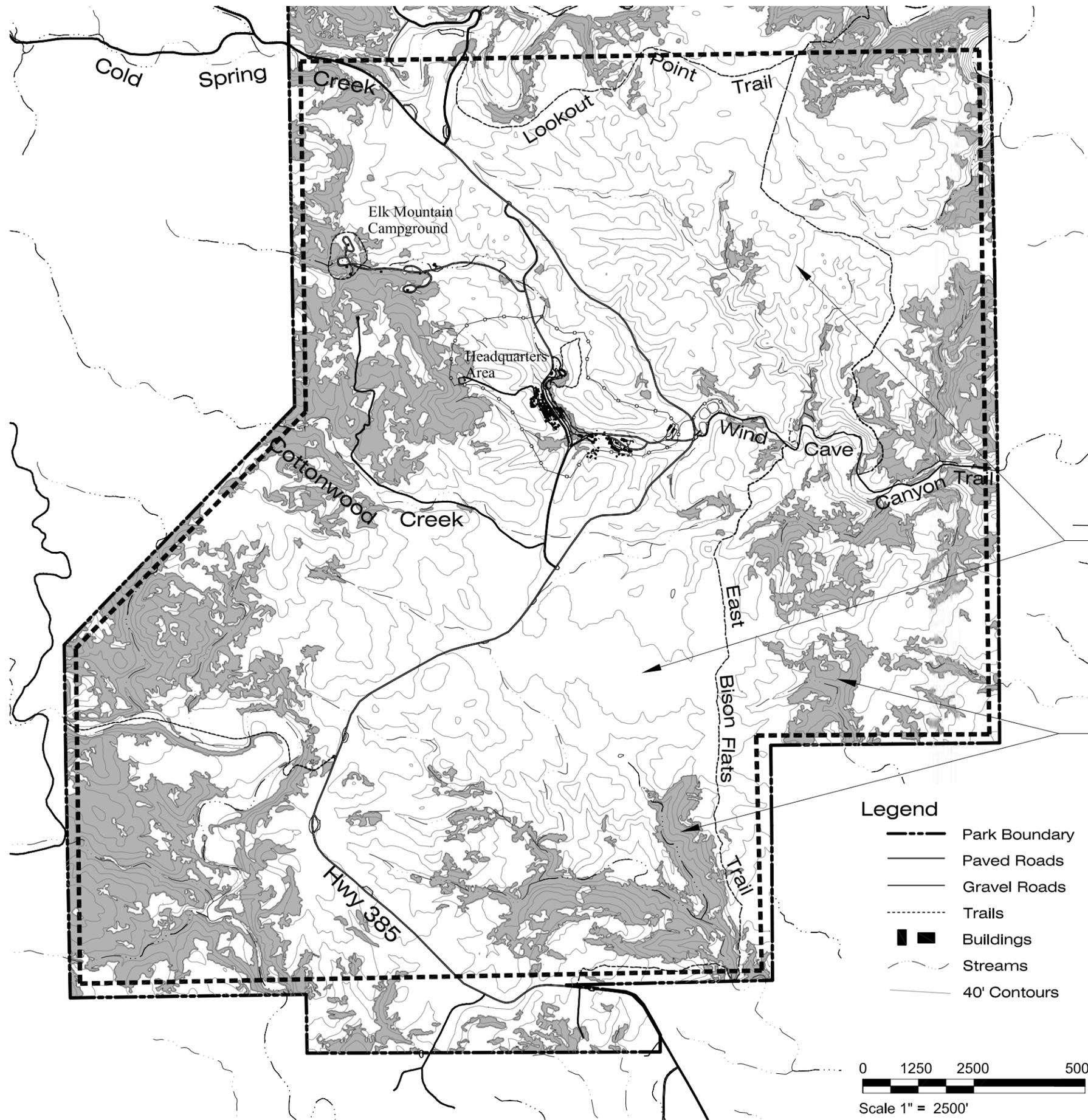
Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.

Wind Cave National Park

Map 5-1. Management Zones

Cultural Landscape Report
 Wind Cave National Park, South Dakota
 National Park Service
 May 2005





General Treatment Recommendations

Natural Systems and Features

- Continue natural resource management programs to ensure healthy **plant communities, wildlife habitat, and sensitive above- and below-ground ecosystems.**
- Minimize all land disturbances to protect **landforms and terrain features.**
- Undertake **changes in vegetative patterns** to maintain healthy ecosystems. Reestablishing the historic edges of forest that were extant during the 1930s to 1941 could be attempted if plant communities and wildlife habitat will benefit.
- Undertake **vegetation management** as required to ensure healthy ecosystems. Consideration should be given to employing prescribed fires as a means for preserving and possibly enhancing the integrity of historic spatial organization.
- Continue efforts to control **exotic plant species.**

Vegetation

- Avoid **new tree and shrub plantings** along roadsides, waysides, and trails unless new evidence is available regarding historic period plantings.
- Control and remove all **invasive exotic plants** in all areas of the proposed historic district.
- Utilize native plants to stabilize and repair **damaged, eroding, and unvegetated areas.**
- Retain historic spatial patterns when undertaking **re-vegetation** efforts.

Patterns of Spatial Organization

- Retain the current patterns of spatial character defined by **landforms and natural vegetation patterns** of open grasslands and forest cover.



Grassland in a gently sloping area.



Coniferous forest and woodland vegetation type at higher elevation.

Wind Cave National Park TREATMENT PLAN

Map 5-2. Proposed Wind Cave Historic District Undeveloped Area

Cultural Landscape Report

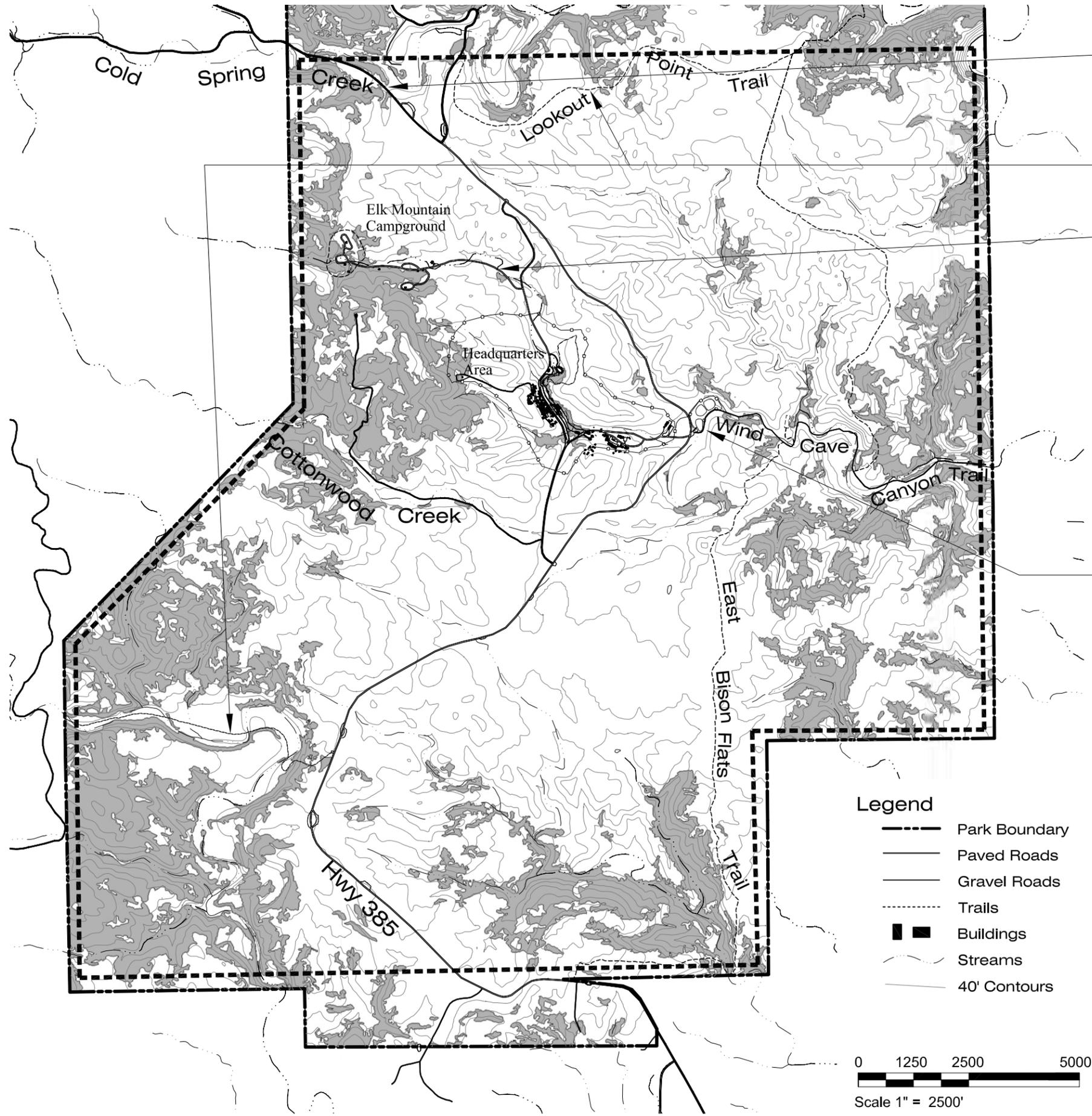
Wind Cave National Park, South Dakota

National Park Service

May 2005

Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical
maps provided by NPS.





General Treatment Recommendations

Circulation

- Consider treatment alternatives that distinguish **U.S. 385** from the character of the historic SD 87. Retain the current road alignments of U.S. 385. The segments of U.S. 385 that are most sensitive to major alterations include the section between the southern boundary up to the turn off for the Headquarters, and the short section north of the Headquarters between the intersection with the Headquarters access road and just west of the intersection with SD 87. These sections should remain substantially unaltered unless safety criteria dictate design changes.
- Maintain **historic period trails**. Avoid major changes in alignment and improvements that would result in overdevelopment or obliteration of existing character.
- Retain the current road alignments of the **Headquarters access road sections** that depart from U.S. 385 from the south and north.
- Retain and maintain the **road accessing Elk Mountain Campground**. This road is associated with the Mission 66-era of development at the park and should be preserved until such time as it can be re-evaluated under a national Mission 66 design context.
- Retain and maintain the **roads accessing water supply facilities**.
- Retain the current configuration of **waysides and pull-offs** along U.S. 385. Avoid adding any additional waysides and pull-offs.
- Retain **crushed stone surfaces**. Edge of pavement returns should be curved. Impervious surfaces should be avoided.
- **Paved paths and ramps** accessing wayside exhibits should be consistent in materials and design. Minimize pavement. Consider exposed aggregate concrete walks instead of broom finish concrete. Avoid colored and patterned concrete. Configure edges of concrete in simple curved forms.
- Repair **trails**, including limited drainage improvements and repair of hazardous surfaces. Use compacted crushed local stone or soil cement surfaces. If new trails are required, link them to existing trailheads. Retain and repair steps and new water bars should be local stone, wood timbers, or milled round wood posts.
- Retain any **surviving roadbeds and other constructed transportation-related landforms** unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.
- Retain the **road bed of the Wind Cave Canyon Trail** at the wastewater lagoons as part of the restoration of the pre-development landforms.
- **New parking facilities** should be minimized and sited to avoid visual intrusions within the viewshed of the road. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas.

Wind Cave National Park TREATMENT PLAN

Map 5-3. Proposed Wind Cave Historic District Undeveloped Area

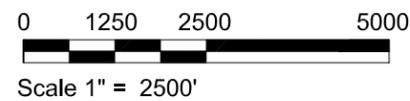
Cultural Landscape Report

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May 2005

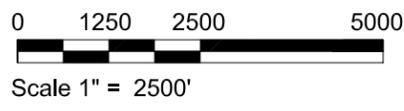
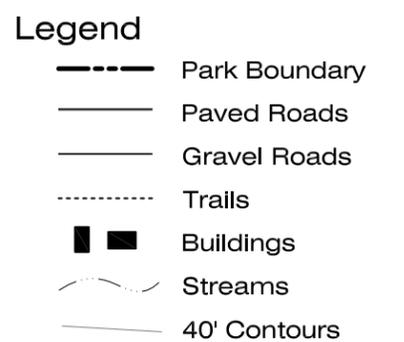
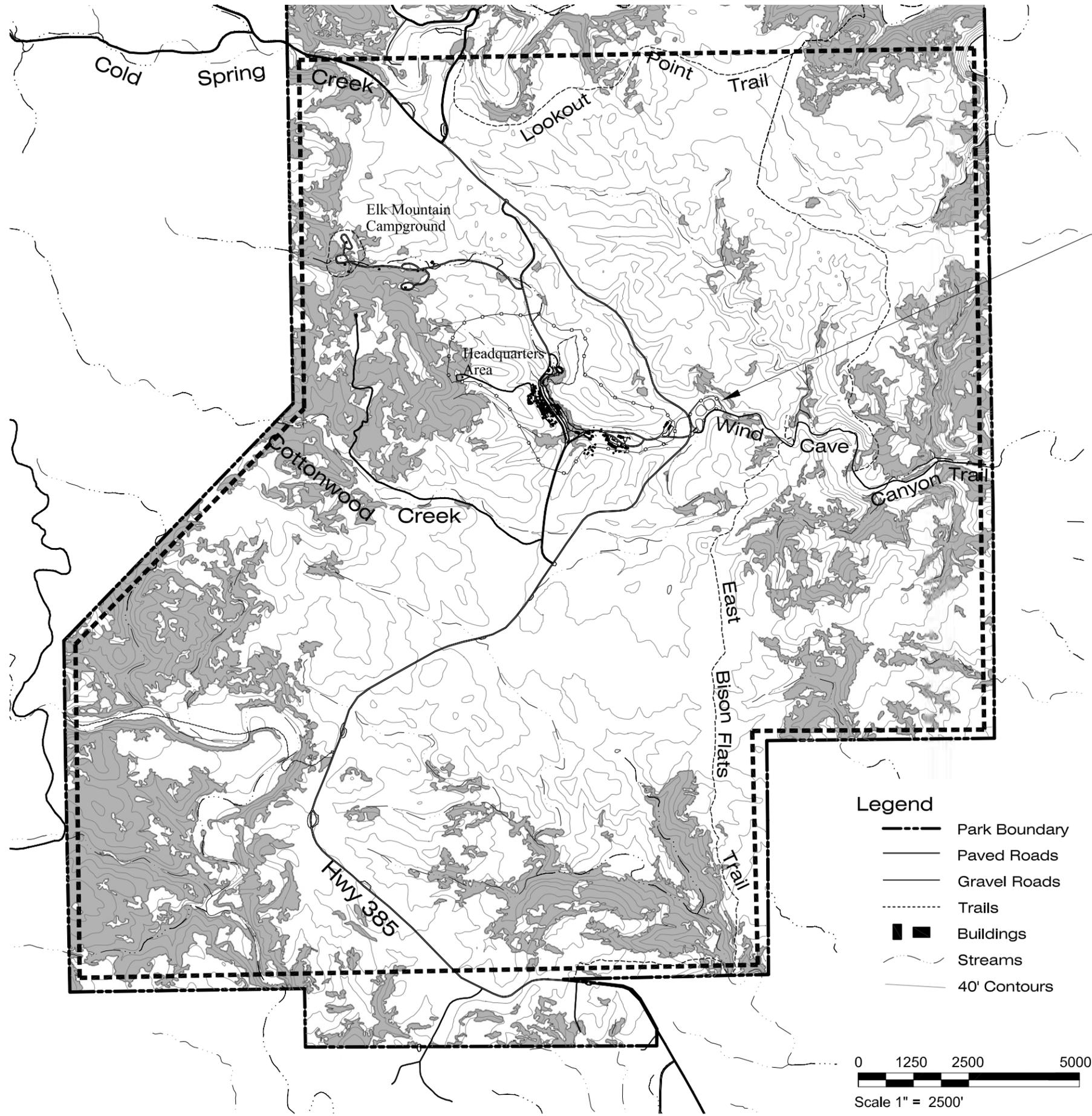


Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- Streams
- 40' Contours



Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.



General Treatment Recommendations

Buildings and Structures

- Avoid constructing **new buildings, bridges or any other large-scale features**. If new buildings or structures are required, then such new facilities should be sited to avoid areas accessed by visitors and visual intrusions within the viewshed of the roads and wayside pull-offs. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas.
- Retain any **surviving constructed landforms** associated with missing buildings, structures, and site development unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.
- Restore the **existing wastewater lagoons** to pre-development landforms. Retain the alignment of the Wind Cave Canyon Trail road.

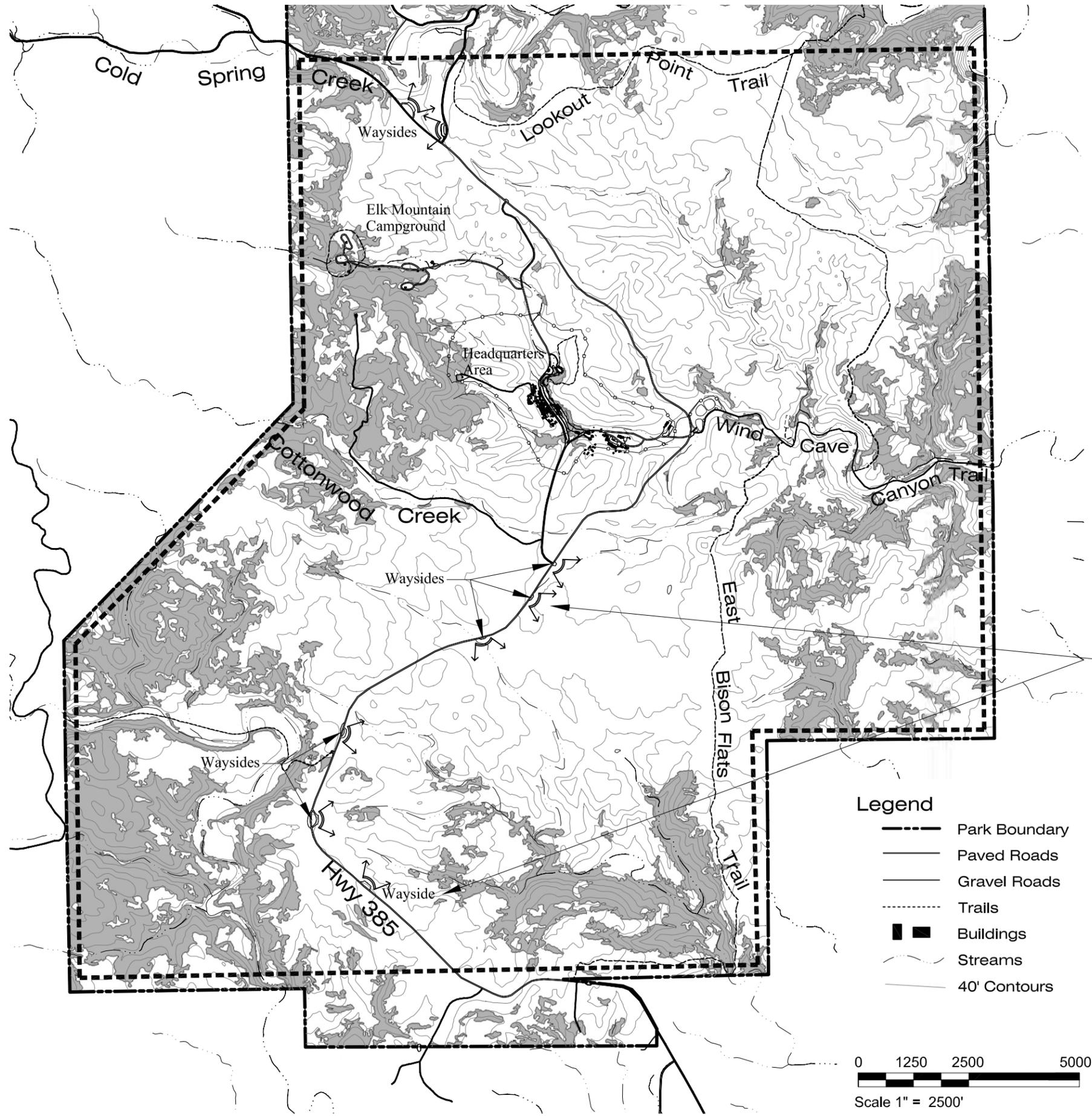
Wind Cave National Park
TREATMENT PLAN

Map 5-4. Proposed Wind Cave
Historic District
Undeveloped Area

Cultural Landscape Report
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May 2005

Map prepared by:
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Sources: DOQQs, GIS data, and historical
maps provided by NPS.





General Treatment Recommendations

Views

- Maintain **viewsheds** from the road corridor of open grassland areas that survive from the period of significance. This is important to ensure the continuation of the key visitor experience of the rhythm of open areas with more distant long views of vast landscape and topographic features alternating with more enclosed spaces with near views of forest edges.
- Maintain and enhance **designed views at wayside exhibit locations** and from vehicles. Avoid siting new features at wayside exhibit locations that would obscure or compromise the interpretive experience. These landscape characteristics associated with the Mission 66-era development of the waysides and should be preserved.

Small-scale Features

- Establish and implement consistent design standards for **directional, informational, and trail signs**. Signs should be only as large as required to be functional. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes. Retain and maintain park entrance signs.
- Avoid adding any new **barrier fencing and gates** within the road corridor and at waysides and pull-offs unless necessary to protect resources, property, or to control access to restricted area. If fencing is required it should be minimized. This fencing should be box wire with wood posts, or narrow dark metal posts in lieu of wood posts. Gates should be dark colored metal frame with box wire.
- Establish consistent design standards for **site furnishings** including benches, trash receptacles, and related features. Retain and maintain rustic features such as log benches. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes.
- Avoid the installation of any type of **site lighting** that will be visible from areas accessed by visitors. All lighting should have shielded light sources, should not over-illuminate areas, be oriented downward, and all fixtures should be dark in color.
- Prior to removing **existing wayside panels**, document through photographs. Retain and maintain the Mission 66 wayside exhibit stone structures. The routed wood exhibit panels should also be documented prior to removal and replacement with new wayside exhibits.



Pull-off along U.S. 385.



Fence along southern perimeter of park.

Wind Cave National Park TREATMENT PLAN

Map 5-5. Proposed Wind Cave Historic District Undeveloped Area

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May 2005

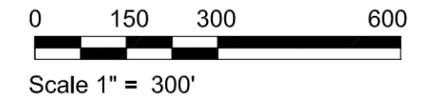
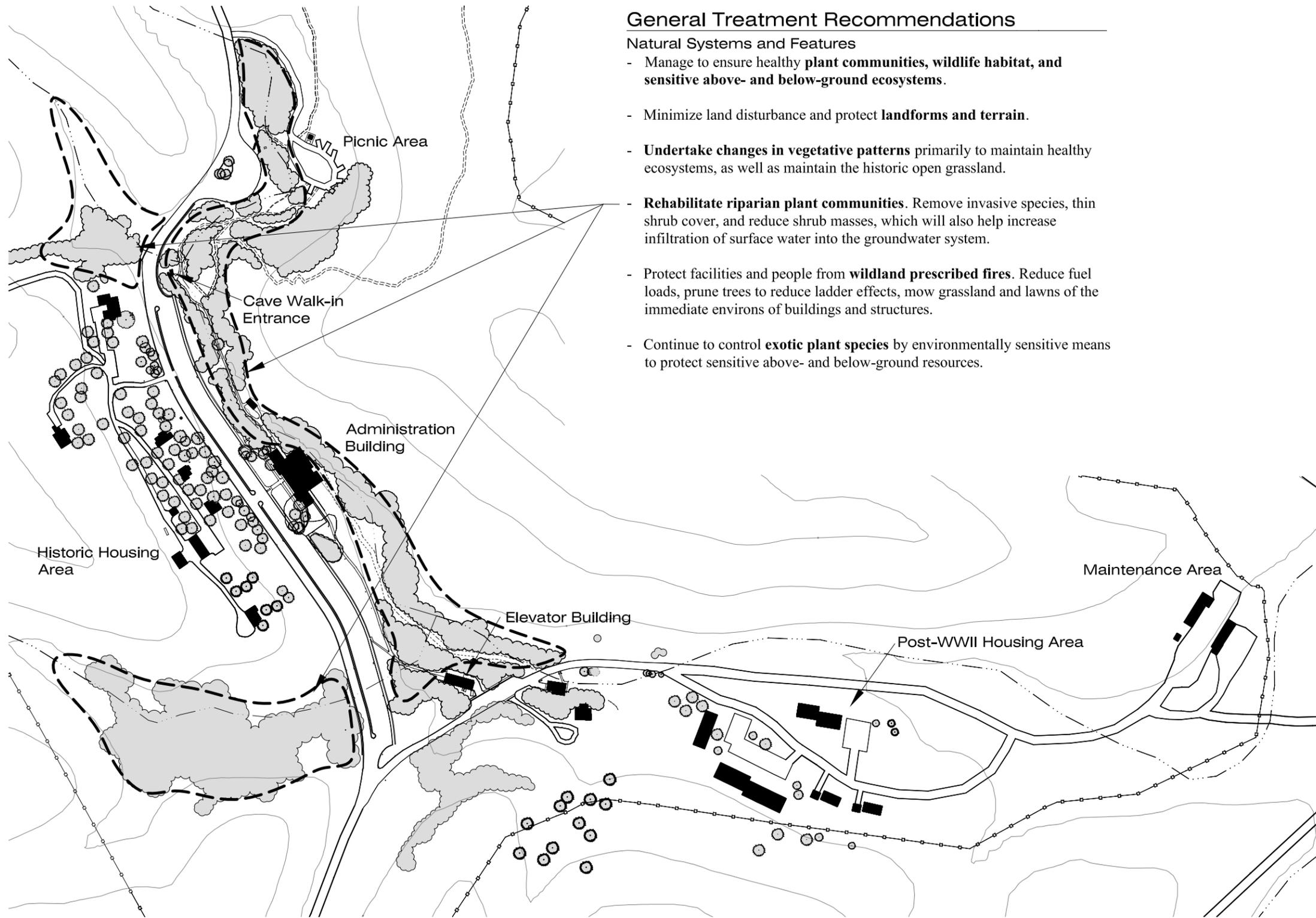
Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical
maps provided by NPS.



General Treatment Recommendations

Natural Systems and Features

- Manage to ensure healthy **plant communities, wildlife habitat, and sensitive above- and below-ground ecosystems.**
- Minimize land disturbance and protect **landforms and terrain.**
- **Undertake changes in vegetative patterns** primarily to maintain healthy ecosystems, as well as maintain the historic open grassland.
- **Rehabilitate riparian plant communities.** Remove invasive species, thin shrub cover, and reduce shrub masses, which will also help increase infiltration of surface water into the groundwater system.
- Protect facilities and people from **wildland prescribed fires.** Reduce fuel loads, prune trees to reduce ladder effects, mow grassland and lawns of the immediate environs of buildings and structures.
- Continue to control **exotic plant species** by environmentally sensitive means to protect sensitive above- and below-ground resources.

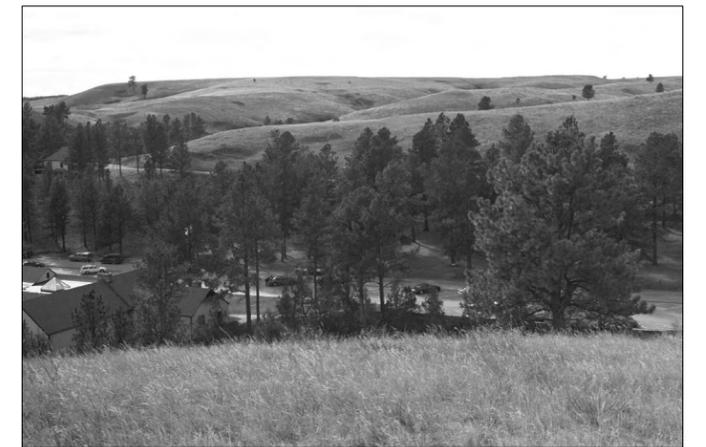


Wind Cave National Park TREATMENT PLAN

Map 5-6. Proposed Wind Cave Historic District Headquarters Area

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National Park Service
May 2005

Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.



General Treatment Recommendations

Patterns of Spatial Organization

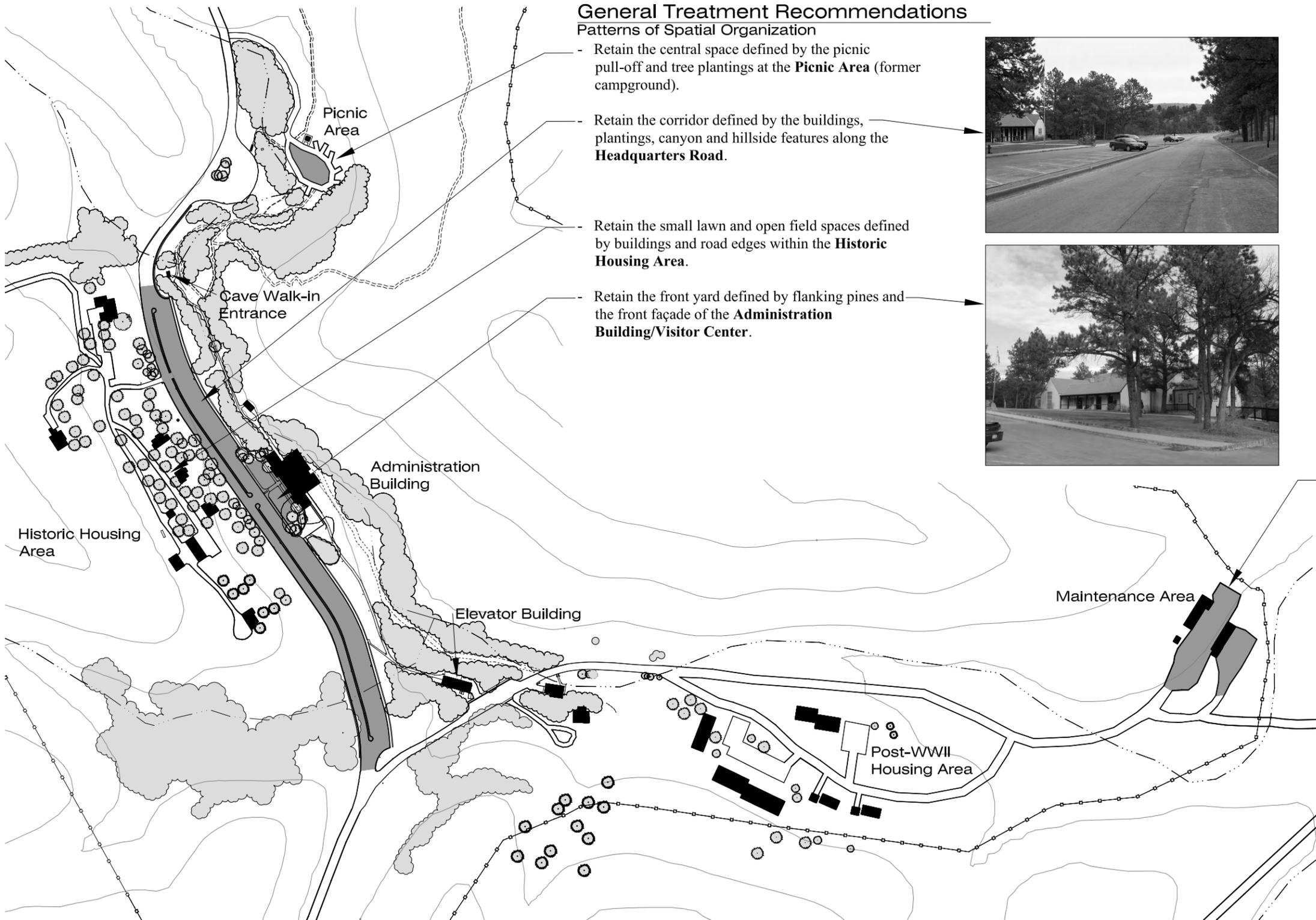
- Retain the central space defined by the picnic pull-off and tree plantings at the **Picnic Area** (former campground).
- Retain the corridor defined by the buildings, plantings, canyon and hillside features along the **Headquarters Road**.
- Retain the small lawn and open field spaces defined by buildings and road edges within the **Historic Housing Area**.
- Retain the front yard defined by flanking pines and the front façade of the **Administration Building/Visitor Center**.



- Retain the current patterns of spatial character defined by **landforms and natural vegetation patterns** of open grasslands and forest cover.
- Retain the remaining open areas in **Wind Cave Canyon**. Create additional open character to improve the site ecology and to reestablish missing historic spatial character. The canyon has increased in tree and shrub vegetation since the end of the period of significance, particularly in the section between the Elevator Building and the Picnic Area.



- Retain the central paved spaces defined by buildings at the **Maintenance Area**.



- Legend**
- Paved Roads
 - Gravel Roads
 - Road Traces
 - - - - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours

Wind Cave National Park TREATMENT PLAN

Map 5-7. Proposed Wind Cave Historic District Headquarters Area

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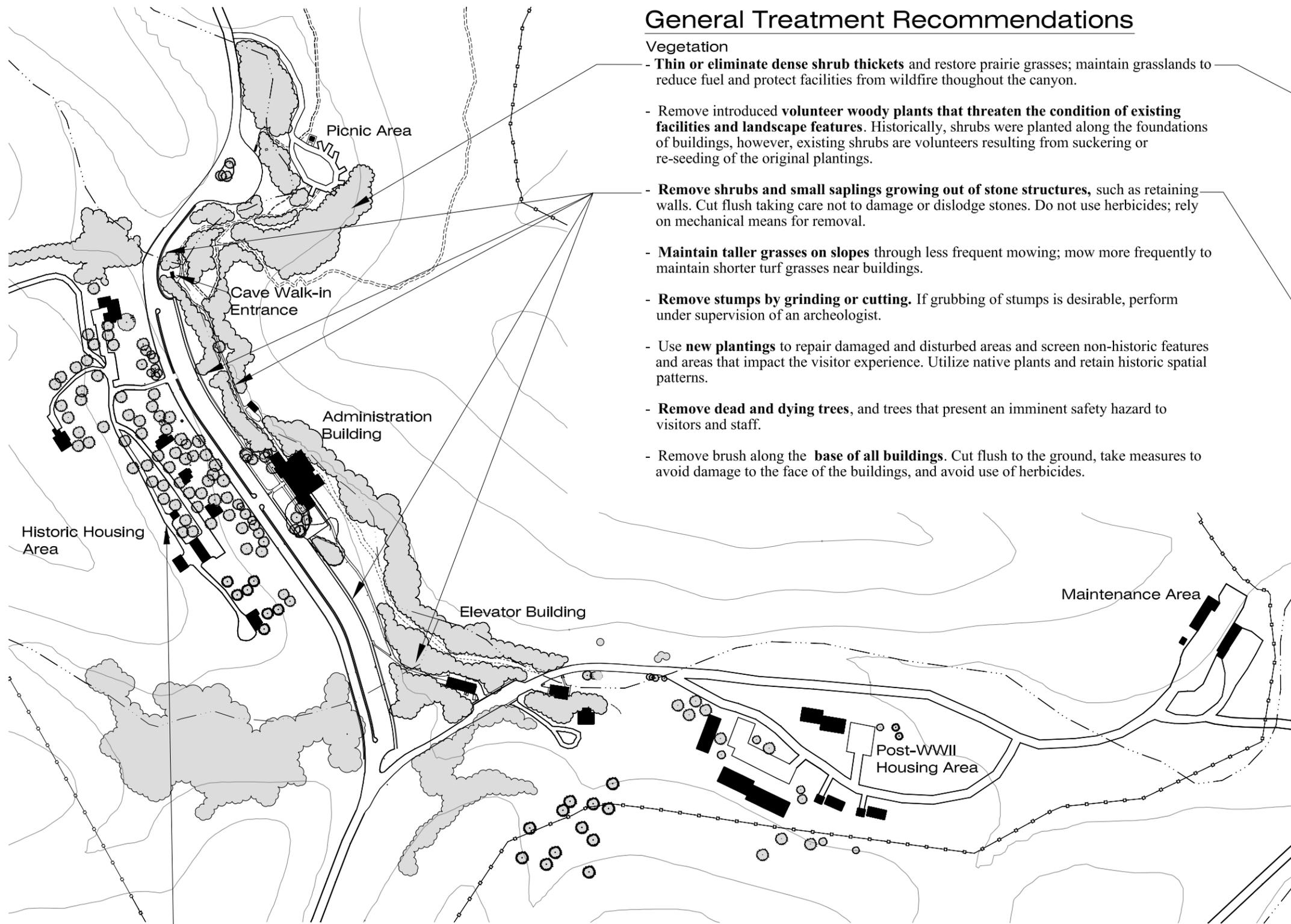
Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.



General Treatment Recommendations

Vegetation

- **Thin or eliminate dense shrub thickets** and restore prairie grasses; maintain grasslands to reduce fuel and protect facilities from wildfire throughout the canyon.
- Remove introduced **volunteer woody plants that threaten the condition of existing facilities and landscape features**. Historically, shrubs were planted along the foundations of buildings, however, existing shrubs are volunteers resulting from suckering or re-seeding of the original plantings.
- **Remove shrubs and small saplings growing out of stone structures**, such as retaining walls. Cut flush taking care not to damage or dislodge stones. Do not use herbicides; rely on mechanical means for removal.
- **Maintain taller grasses on slopes** through less frequent mowing; mow more frequently to maintain shorter turf grasses near buildings.
- **Remove stumps by grinding or cutting**. If grubbing of stumps is desirable, perform under supervision of an archeologist.
- Use **new plantings** to repair damaged and disturbed areas and screen non-historic features and areas that impact the visitor experience. Utilize native plants and retain historic spatial patterns.
- **Remove dead and dying trees**, and trees that present an imminent safety hazard to visitors and staff.
- Remove brush along the **base of all buildings**. Cut flush to the ground, take measures to avoid damage to the face of the buildings, and avoid use of herbicides.



- Legend**
- Paved Road
 - Gravel Road
 - ⋯ Road Trace
 - - - - Trail
 - Buildings
 - Fencing
 - Trees
 - Stream
 - 40' Contour

- Remove brush along the **base of all buildings**. Cut flush to the ground, take measures to avoid damage to the face of the buildings, and avoid use of herbicides.



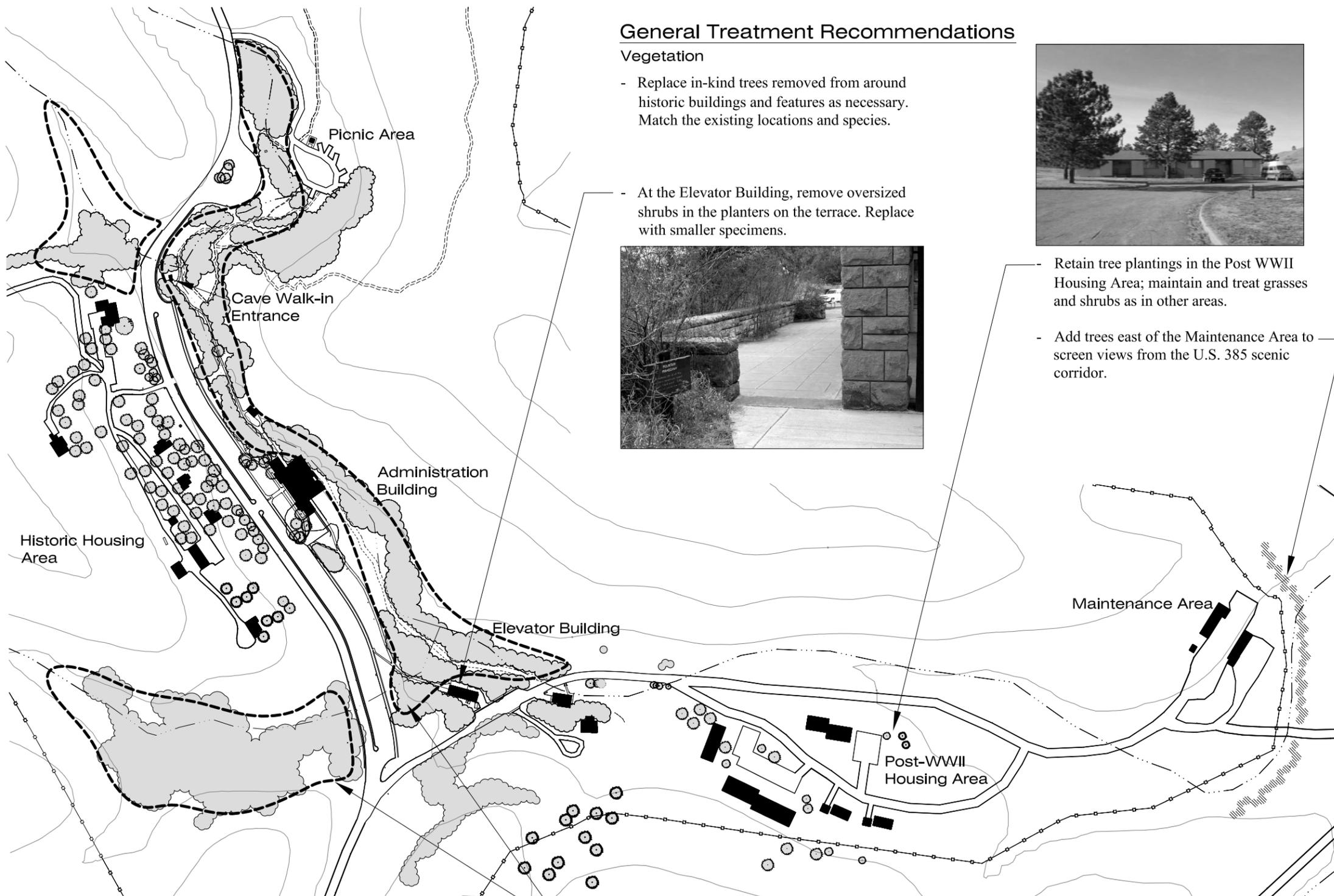
Wind Cave National Park TREATMENT PLAN

Map 5-8. Proposed Wind Cave Historic District Headquarters Area

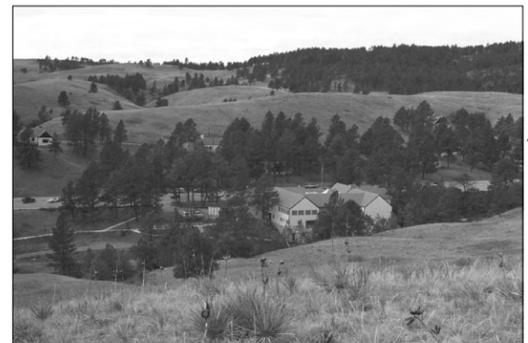
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Map prepared by:
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Sources: DOQQs, GIS data, and historical maps
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- Legend**
- Paved Roads
 - Gravel Roads
 - Road Traces
 - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours
 - Riparian Areas



General Treatment Recommendations

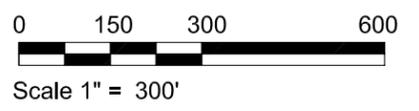
Vegetation

- Replace in-kind trees removed from around historic buildings and features as necessary. Match the existing locations and species.
- At the Elevator Building, remove oversized shrubs in the planters on the terrace. Replace with smaller specimens.



- Retain tree plantings in the Post WWII Housing Area; maintain and treat grasses and shrubs as in other areas.
- Add trees east of the Maintenance Area to screen views from the U.S. 385 scenic corridor.

- When rehabilitating **riparian plant communities**, consider treatment of introduced plantings in these areas. Consider reducing the number of trees and thinning existing masses of shrubs in conjunction with control and eventual elimination of exotic species. Retain specimen trees and groupings of trees to retain the historic character of the original planting concepts. Replace in-kind, matching species and location.



**Wind Cave National Park
TREATMENT PLAN**

**Map 5-9. Proposed Wind Cave
Historic District
Headquarters Area**

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Map prepared by:
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Sources: DOQQs, GIS data, and historical maps provided by NPS.

General Treatment Recommendations

Vegetation

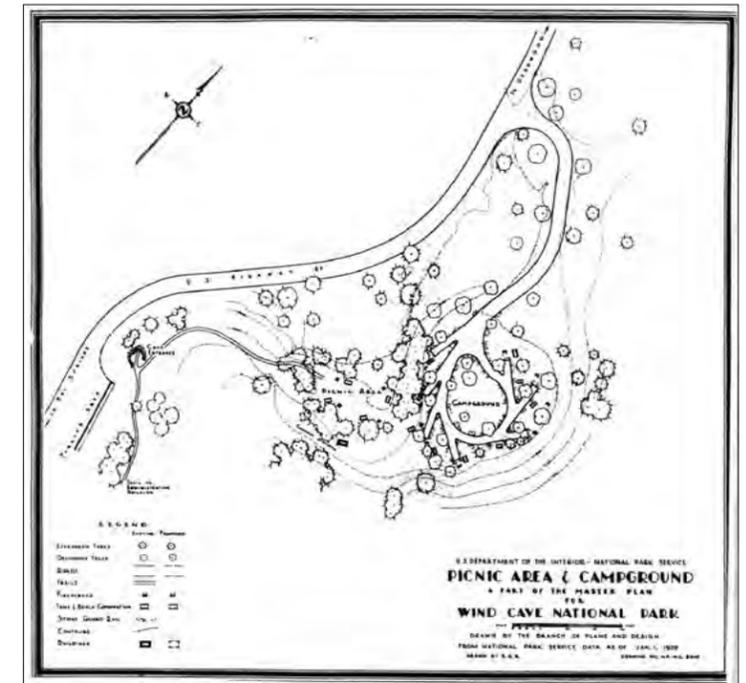
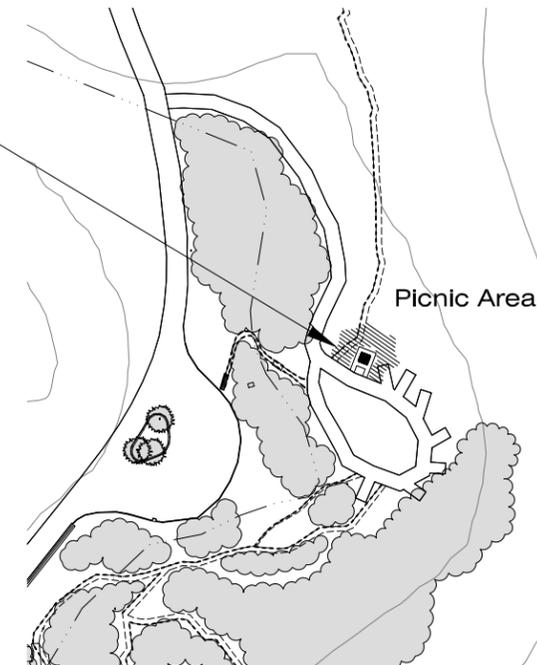
- Add native trees and shrubs to **screen views** of the picnic area comfort station.
- Restore and maintain the historic character of the **Picnic Area**. Retain the informal groves of trees around the former campsite loop. Replace in-kind any trees that are removed. Remove or reduce shrub masses to promote infiltration of surface water into the groundwater system.
- Rehabilitate the **buffer of trees** between the Administration Building parking area and the historic housing area.
- Maintain existing tree plantings of ponderosa pine and deciduous species in an open grove arrangement at the **Historic Housing Area**.
- Consider integrating new plantings in public areas into an **interpretive program**.



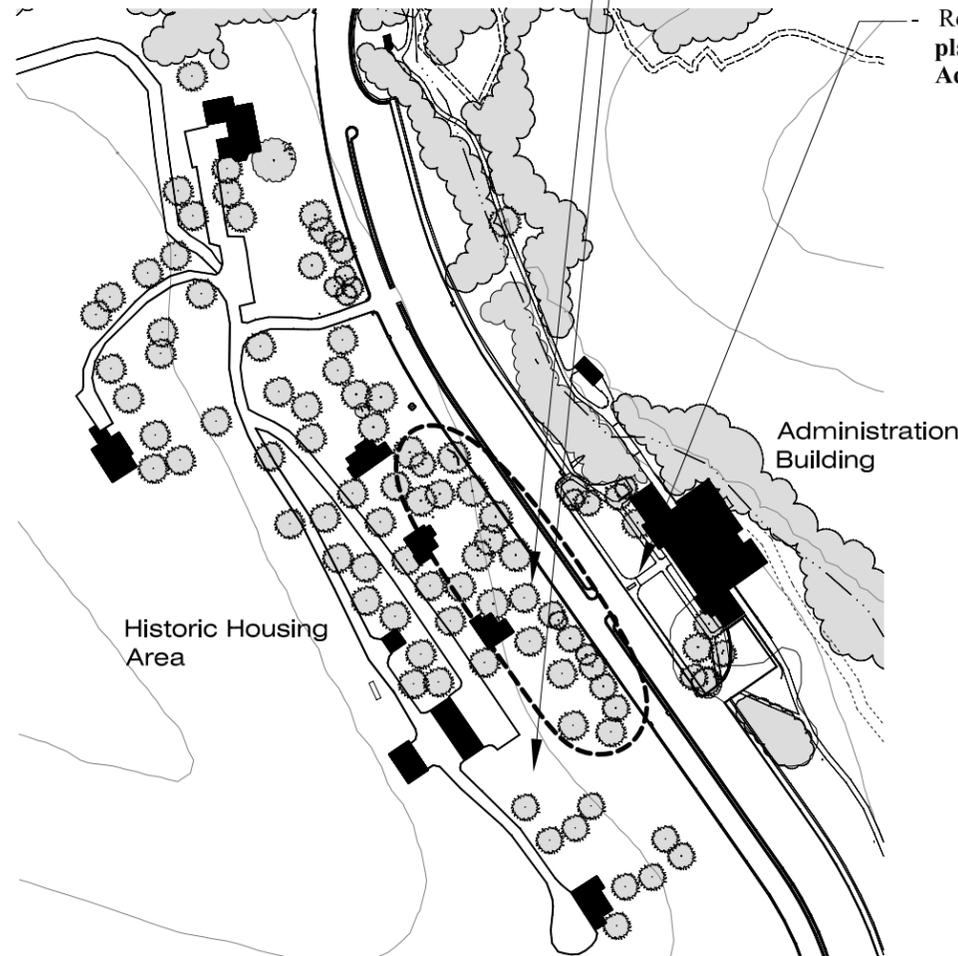
Vegetation character, Headquarters Area, 1935.



Tree buffer between parking lot and historic housing area.



Plan of Campground (now Picnic Area), 1939.
(Wind Cave National Park Archives)



Retain the **symmetrical, formal character of planting** in the space in front of the historic **Administration Building/Visitor Center**.



Administration Building, 1939, just after planting.



Administration Building, 2003.

Legend

- Paved Roads
- Gravel Roads
- Road Traces
- Trails
- Buildings
- Fencing
- Trees
- Streams
- 40' Contours



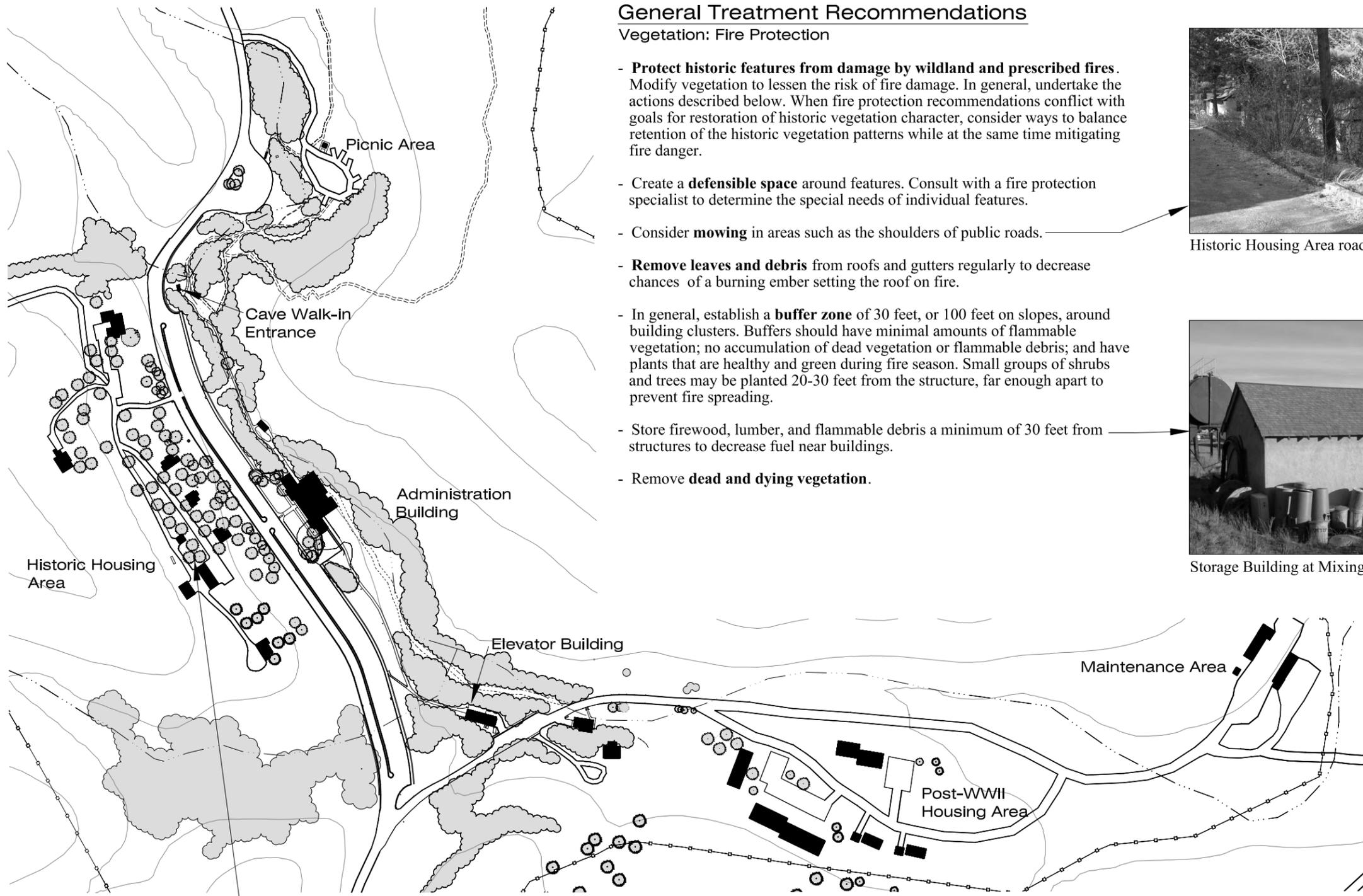
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Wind Cave National Park TREATMENT PLAN

Map 5-10. Proposed Wind Cave Historic District Headquarters Area

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- Legend**
- Paved Roads
 - Gravel Roads
 - ⋯ Road Traces
 - - - Trails
 - Buildings
 - Fencing
 - Trees
 - Streams
 - 40' Contours

General Treatment Recommendations

Vegetation: Fire Protection

- **Protect historic features from damage by wildland and prescribed fires.** Modify vegetation to lessen the risk of fire damage. In general, undertake the actions described below. When fire protection recommendations conflict with goals for restoration of historic vegetation character, consider ways to balance retention of the historic vegetation patterns while at the same time mitigating fire danger.
- Create a **defensible space** around features. Consult with a fire protection specialist to determine the special needs of individual features.
- Consider **mowing** in areas such as the shoulders of public roads.
- **Remove leaves and debris** from roofs and gutters regularly to decrease chances of a burning ember setting the roof on fire.
- In general, establish a **buffer zone** of 30 feet, or 100 feet on slopes, around building clusters. Buffers should have minimal amounts of flammable vegetation; no accumulation of dead vegetation or flammable debris; and have plants that are healthy and green during fire season. Small groups of shrubs and trees may be planted 20-30 feet from the structure, far enough apart to prevent fire spreading.
- Store firewood, lumber, and flammable debris a minimum of 30 feet from structures to decrease fuel near buildings.
- Remove **dead and dying vegetation**.



Historic Housing Area roadside.



Prescribed fire. (Konza Prairie, Kansas)



Storage Building at Mixing Circle.

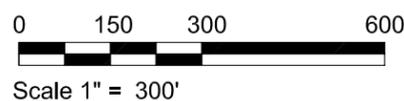


Prescribed fire at Wind Cave in the 1950s.



Storage Building, Historic Housing Area.

- Remove ladder fuels by **pruning limbs on trees within 30 feet of a structure up 20 feet above the ground**. Where trees and shrubs are planted, prune shrubs down and tree limbs up to create a large gap, which will prevent contact between the two layers that can result in fire crowning.
- Maintain firebreaks and windbreaks around the perimeter of building clusters to slow or stop fires.
- Avoid or remove areas of vegetation with continuous layers, such as dense shrub thickets, which allow fire to spread quickly.



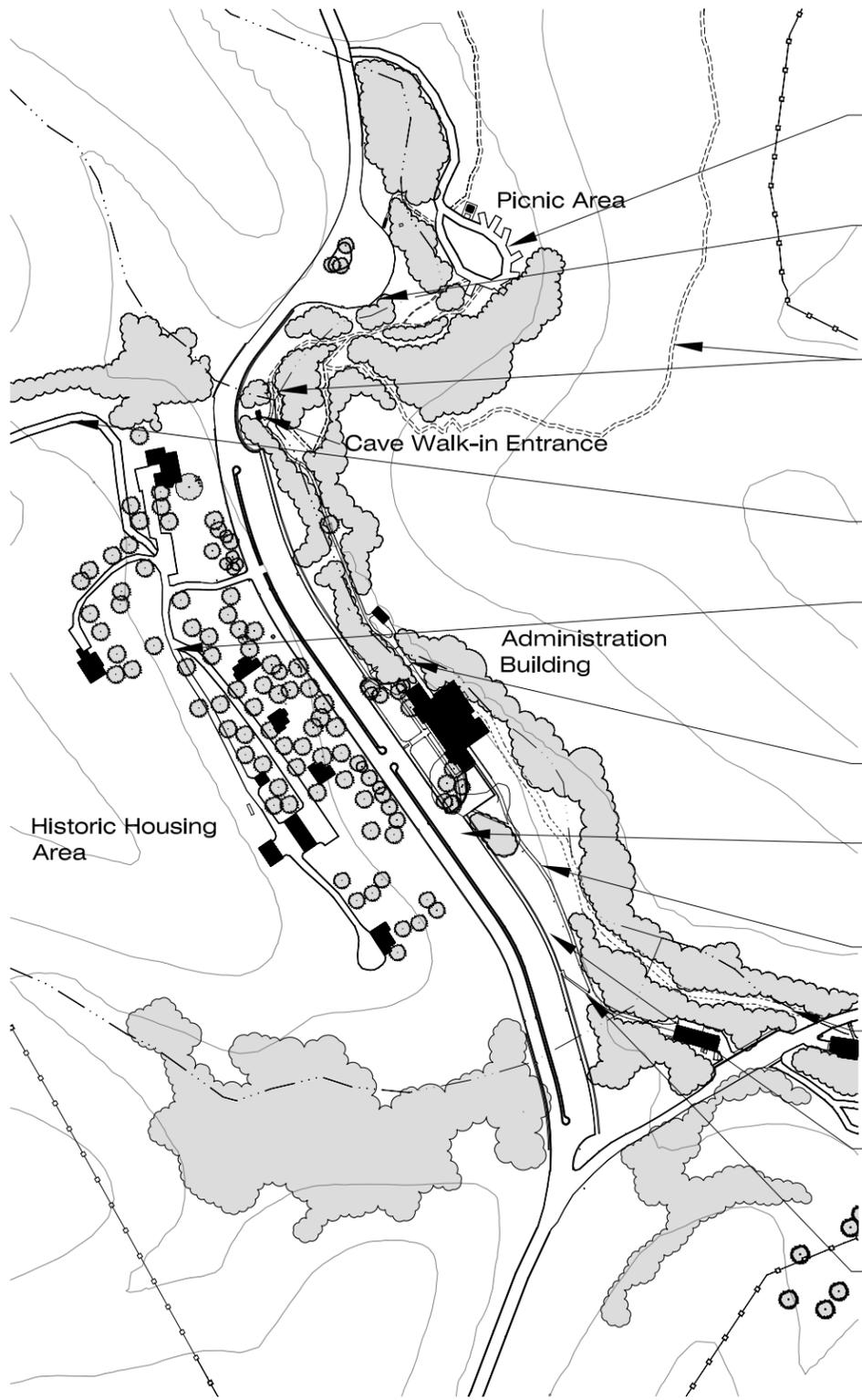
Wind Cave National Park TREATMENT PLAN

Map 5-11. Proposed Wind Cave Historic District Headquarters Area

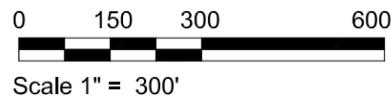
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Wind Cave National Park, South Dakota
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May 2005



Map prepared by:
John Milner Associates, Inc.
Sources: DOQQs, GIS data, and historical maps provided by NPS.



- Legend**
- Paved Road
 - Gravel Road
 - Road Trace
 - Trail
 - Buildings
 - Fencing
 - Trees
 - Stream
 - 40' Contour



General Treatment Recommendations

Circulation

- Retain the **road and pull-offs at the Picnic Area**. If accessible facilities are required consider altering one or more existing picnic spaces.
- Retain the **vehicle turnaround** near the picnic area if required to meet circulation needs. Otherwise, this feature could be removed and the landform and vegetation restored to pre-development conditions.
- Repair **Prairie Vista Trail and associated trails** linking the cave entrance and the picnic area. Regrade where necessary to remove trip hazards and improve drainage, re-set or replace log steps as required to eliminate hazards. Consider re-design for improved accessibility.
- Retain the **road accessing the water supply facility from the Historic Housing Area**.
- Retain the **Historic Housing Area system of roads and parking**. Avoid alterations to the widths and alignments. Avoid adding any new drives and parking spaces. Do not allow vehicles to create parking areas within lawn or other planted areas. Retain stone curbing and avoid adding any new curbing.
- Retain the wood **handicap ramp at the north end of the Administration Building/Visitor Center**.
- Retain the overall configuration of the **Administration Building/Visitor Center Parking Lot**.
- Retain the **concrete walk linking the cave entrance and the Elevator Building**.
- Improve or remove the **soil-surfaced two-track that begins at the Elevator Building and connects to the Administration Building**. If removed, consider retaining a vehicle corridor for maintenance access.
- Retain the **concrete walk segments fronting the parking lot and connecting to the Administration Building/Visitor Center** entrance, including the short segment extending straight out from the entrance to the parking lot.
- Retain the **concrete walk and steps linking the parking lot and the path to the Elevator Building** and replace the handrails.



Wind Cave National Park TREATMENT PLAN

Map 5-12. Proposed Wind Cave Historic District Headquarters Area

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Map prepared by:
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General Treatment Recommendations

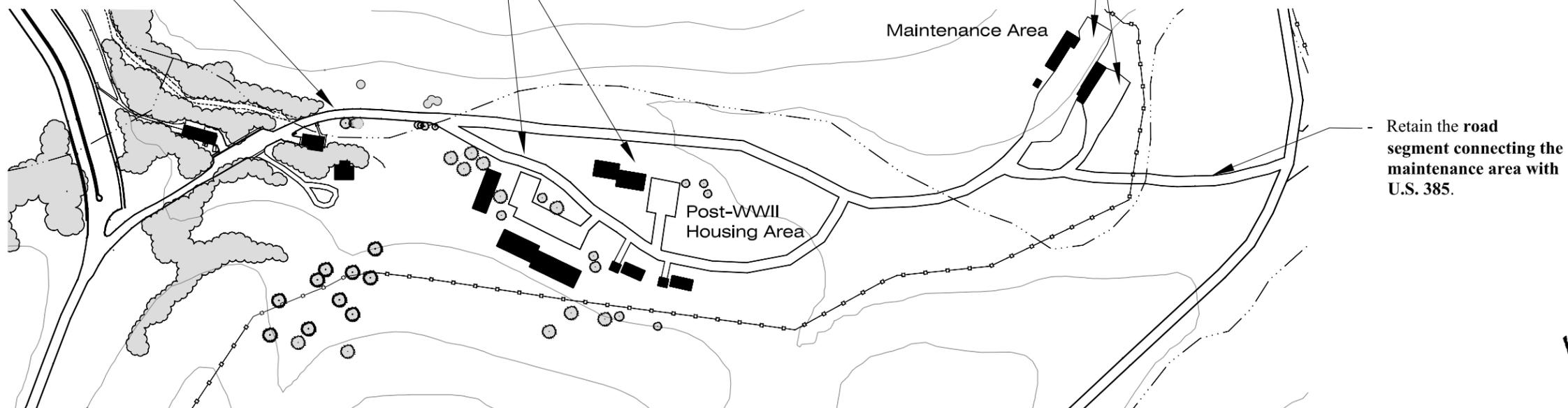
Circulation



- Retain the road serving the Elevator Building, the VIP Center, Post WWII Housing Area, and the Maintenance Area.

- Avoid expansion or increase of paved areas.

- Retain the paved Maintenance Area spaces.

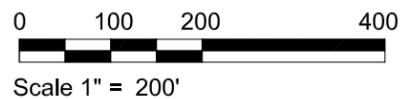


- Retain the road segment connecting the maintenance area with U.S. 385.

Wind Cave National Park TREATMENT PLAN

Legend

- Paved Road
- Gravel Road
- Road Trace
- Trail
- Buildings
- Fencing
- Trees
- Stream
- 40' Contour



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Map 5-13. Proposed Wind Cave Historic District Headquarters Area

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General Treatment Recommendations

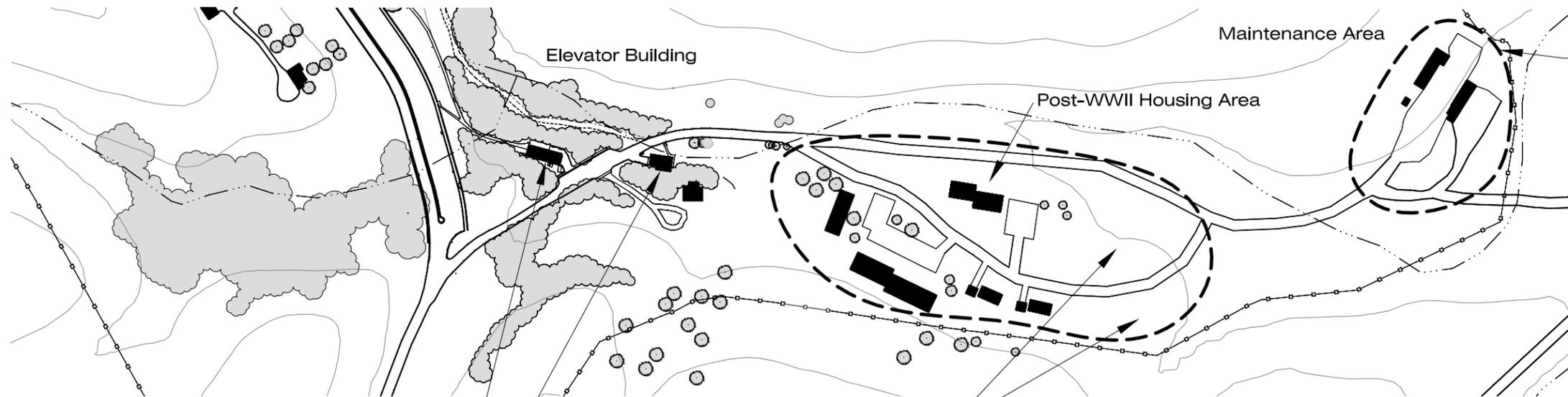
Buildings and Structures

The majority of the buildings are from the CCC era (1933-1941). The **established architectural language** makes use of natural materials and disturbs the natural experience as little as possible. These characteristics can be used to guide future building to fit in with the historic setting. The residence at left illustrates some of the **defining characteristics** that uphold the harmonious and aesthetic atmosphere of the park:

- Consistent medium-sloped roof with dark-stained clapboard peaks
- Simple cornice and narrow overhang
- Simple operable double-hung windows with this proportion
- Exterior walls in rough finished stucco
- Simple lintels and sills on windows
- Consistent color scheme of earth tones found in the surrounding environment (browns, yellows)
- Field stone or ashlar foundations and porches
- Set among trees, in natural green settings whenever possible



- There is a **new maintenance building** planned for construction in the yard among the existing maintenance buildings. Materials, finish, fenestration configurations and rhythm, and color of a new building must take clues from the surrounding existing structures. Another important factor in new construction is scale. If possible, a new maintenance building should achieve a proportional resemblance to the existing buildings. For example, a new maintenance building should ideally be no larger, longer or taller than the existing building.



- Legend**
- Paved Roads
 - Gravel Roads
 - ⋯ Road Traces
 - Trails
 - Buildings
 - Fencing
 - ☺ Trees
 - ~ Streams
 - 40' Contours
 - Building Clusters

- If **new housing** is required construct new buildings within the Post WWII Housing Area.
- Avoid the construction of **new buildings or any other large-scale features proximate the VIP Center.**
- Avoid the construction of **new buildings or any other large-scale features proximate the Elevator Building.**



Scale 1" = 300'

Map prepared by:
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 Sources: DOQQs, GIS data, and historical maps provided by NPS.

- Site **new maintenance buildings** and facilities within the existing Maintenance Area. New buildings should be aligned parallel with existing buildings.

Wind Cave National Park
 TREATMENT PLAN

Map 5-14. Proposed Wind Cave Historic District
 Headquarters Area

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General Treatment Recommendations

Buildings and Structures

- Avoid the construction of **new buildings or any other large-scale features within the historic housing area.**

- If **new administrative space** is required consider adaptively reusing one or more historic houses in the historic housing area. Other potential sites are proximate the surviving Seasonal Residence (CCC Bunkhouse) and the Maintenance Area.

- Repair the **stone and wood pedestrian bridge at the north end of the Administration Building/Visitor Center.** The masonry exhibits structural cracks and settlement. Undertake investigations to determine the cause of the cracking and settlement and undertake repairs. Every effort should be taken to retain the historic stone materials. All new stone should match existing. Match the mortar and joints. Remove vegetation from the structure and around its base. Consider thinning vegetation that is shading the bridge.

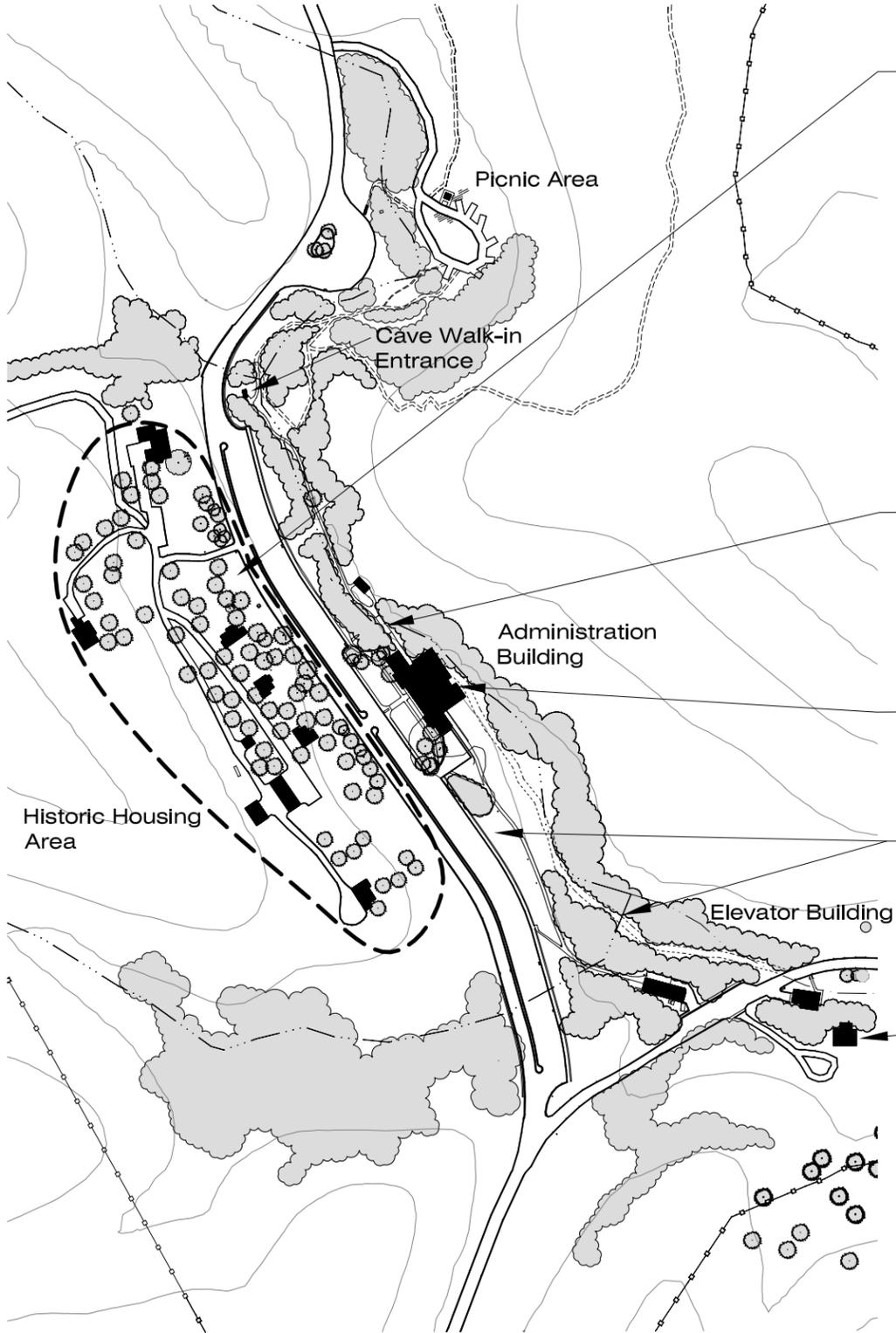
- Retain the surviving **historic elements of the Administration Building/Visitor Center.** Avoid any new additions to the front and end of the historic elements of the Administration Building/Visitor Center. Avoid any new additions to the rear of the building to the greatest extent feasible.

- Repair all **stone guardrails, retaining walls, headwalls,** and similar features. Undertake investigations to determine the cause of cracking and settlement, and then repair. Make every effort to retain the historic stone materials, and match all new stone, mortar, and joints to existing. Investigate the causes of scouring at culverts and repair ditches to control undermining of stone structures. Use local stone to line ditches if riprap is required. Grouting local stone is preferable to concrete-lined ditches.

- Undertake investigations to determine the structural condition of the **Seasonal Residence (CCC Bunkhouse)** and the feasibility of retaining and adaptively reusing this building. Due to the compromised integrity of the architecture, deterioration of the fabric as well as its subsidence down the slope of the hill, a geotechnical analysis of the building foundation and site is necessary to determine the stability and salvagability of this structure. These findings will determine the appropriate treatment. If investigations indicate that the building cannot be saved, then it should be documented and demolished. If demolished, a new building of similar character and size could be sited in this location.



Seasonal Residence (CCC Bunkhouse)



- Legend**
- Paved Road
 - Gravel Road
 - ⋯ Road Trace
 - - - - Trail
 - Buildings
 - Fencing
 - Trees
 - Stream
 - 40' Contour

0 150 300 600
Scale 1" = 300'

Wind Cave National Park TREATMENT PLAN

Map 5-15. Proposed Wind Cave Historic District Headquarters Area

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Elevator Building.

ARCHITECTURE CONCEPT A: The aesthetics of the entry can take clues from existing architecture within the park. It is not advisable to try to copy a style of the past, but to emulate with the use of similar materials in a contemporary fashion. The east end of the Elevator Building has a loggia of heavy timber and ashlar limestone that terminates into the slope to the right in this photograph. As another entrance to the caves, elements of this building would be appropriate to use for architectural inspiration for a new cave entrance.



Fire Cache.

ARCHITECTURE CONCEPT B: The Fire Cache is partially underground and faced with random cut ashlar limestone. The roof is sod and blends into the landscape. This option could allow for a dark lobby area that would help the eyes of the visitor to start to adjust to the light levels inside the cave, as they begin the tour experience.



Cave Tour Queue Pavilion.

ARCHITECTURE CONCEPT C: The Cave Tour Queue Pavilion is located between the Administration Building and the Walk-in Cave Entrance. Its purpose is for protection of tourists from the elements when waiting for a tour of the caves. It has been recently constructed, using heavy timber construction reminiscent of other buildings in the park. A smaller version of this building enclosed in glass may be appropriate for the new cave entrance as the building would become semi-transparent which would help to minimize its impact on the natural surroundings.



CCC-constructed rustic cave entrance.

LANDSCAPE ARCHITECTURE CONCEPT D: This concept involves creating a themed entrance with the appearance of natural stone outcrops. This scheme takes its inspiration from the original CCC-constructed entrance, but would not be a restoration of the original stacked-stone and wood door design.

- PROGRAM CONCEPT A: An enclosed and airtight vestibule or lobby is to be constructed. It has been suggested that this lobby be large enough to hold up to 40 people, which is a large tour group size. The purpose would be to gather, introduce, and interpret the historic door and entrance to the cave, as well as orientation to the cave itself, before descending into the earth.
- PROGRAM CONCEPT B: The current urban revolving door and assembly can be replaced with an entry of the same basic size, in a more appropriate style and efficient construction.
- PROGRAM CONCEPT C: Similar to concept B with an exterior enclosure for minimal protection from weather when gathering to enter the cave. The current Cave Tour Queue Pavilion serves a similar purpose, however is separated from the cave entrance by several yards.



Existing cave entrance with revolving door.



CCC cave entrance door.

General Treatment Recommendations

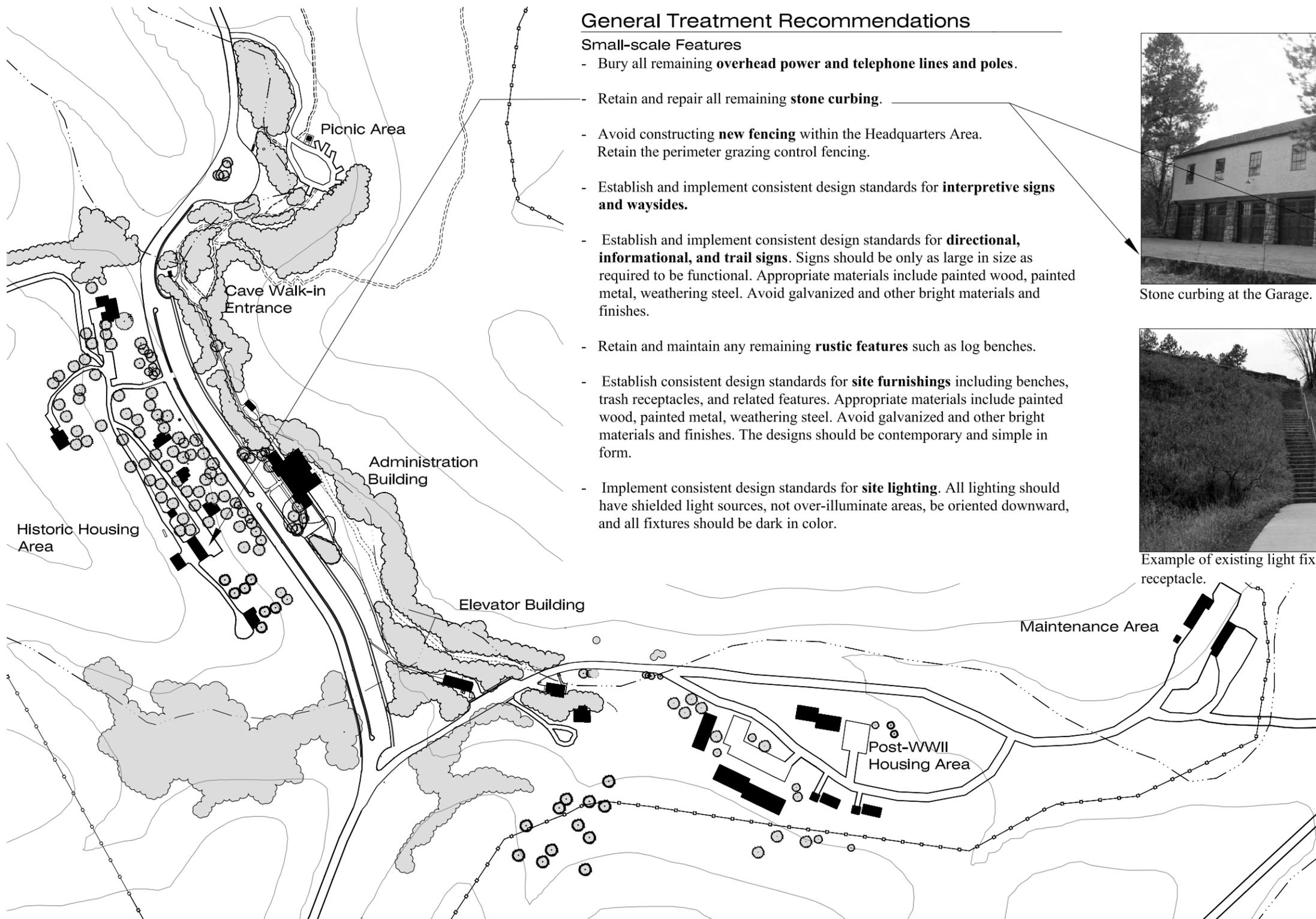
Buildings and Structures: Cave Entrance

- The **Walk-in Cave Entrance**, with the exterior revolving door and small vestibule, has not performed as well as intended, either programmatically or functionally, with periodic maintenance issues and its inability to provide an air lock for the proper protection from weather to the cave entrance. Furthermore, its relative position to the historic cave entrance door obscures this artifact that is a monument to the history of the interpretation of the cave itself. Not only function, but form is a concern for this entrance. The urban revolving door is not inappropriate to the natural surroundings nor does it relate architecturally to the strong character of the CCC buildings and other structures throughout the park, which are predominantly constructed of natural materials such as stone and wood. There are several buildings that could serve to lend inspiration for the construction and aesthetic of a new entrance. It is advised that any solution to the design of a new cave entrance be very sensitive to the surrounding landscape, as to disturb the natural surroundings and flora as little as possible. Two main issues to be addressed in this discussion are program and architecture.

Wind Cave National Park TREATMENT PLAN

Map 5-16. Proposed Wind Cave Historic District Headquarters Area

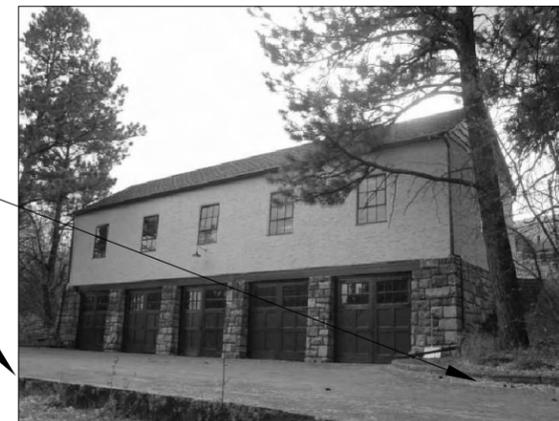
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General Treatment Recommendations

Small-scale Features

- Bury all remaining **overhead power and telephone lines and poles.**
- Retain and repair all remaining **stone curbing.**
- Avoid constructing **new fencing** within the Headquarters Area. Retain the perimeter grazing control fencing.
- Establish and implement consistent design standards for **interpretive signs and waysides.**
- Establish and implement consistent design standards for **directional, informational, and trail signs.** Signs should be only as large in size as required to be functional. Appropriate materials include painted wood, painted metal, weathering steel. Avoid galvanized and other bright materials and finishes.
- Retain and maintain any remaining **rustic features** such as log benches.
- Establish consistent design standards for **site furnishings** including benches, trash receptacles, and related features. Appropriate materials include painted wood, painted metal, weathering steel. Avoid galvanized and other bright materials and finishes. The designs should be contemporary and simple in form.
- Implement consistent design standards for **site lighting.** All lighting should have shielded light sources, not over-illuminate areas, be oriented downward, and all fixtures should be dark in color.



Stone curbing at the Garage.



Example of existing light fixture, handrail, and trash receptacle.

Legend

- Paved Road
- Gravel Road
- Road Trace
- Trail
- Buildings
- Fencing
- Trees
- Stream
- 40' Contour

0 150 300 600



Scale 1" = 300'

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Wind Cave National Park TREATMENT PLAN

Map 5-17. Proposed Wind Cave Historic District Headquarters Area

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General Treatment Recommendations

Vegetation

- Retain and maintain **existing ponderosa pine and deciduous tree plantings** in the Elk Mountain Campground.
- Avoid adding **new tree and shrub plantings** until such time as the Mission 66 national context is available to evaluate the site; at that time, consider any new evidence that becomes available regarding changes to historic period plantings in these locations.

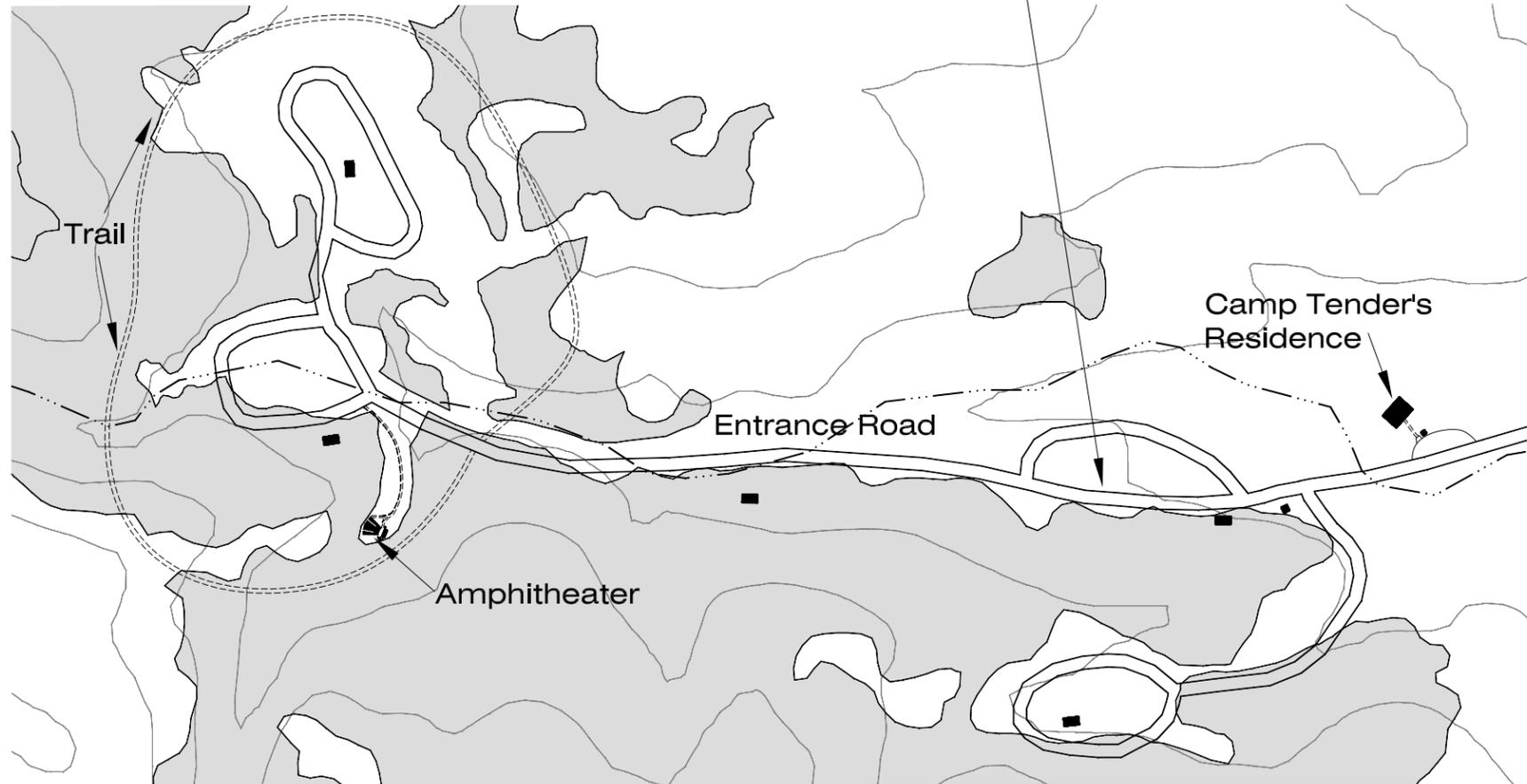


Campground entrance road vegetation.

- Establish and continue **vegetation maintenance** practices that reinforce the existing landscape character, including the following:
 - Mow more frequently to maintain shorter turf grasses at a low height on campsites and road shoulders.
 - Thin or eliminate dense shrub thickets and restore prairie grasses; maintain grasslands through mowing or prescribed fire to reduce fuel and protect facilities from wildfire.
 - Undertake tree care to eliminate conditions resulting in hazard trees.
 - Undertake environmentally sensitive means and methods to control pests. Avoid the use of herbicides, pesticides, and insecticides and rely on mechanical means for controlling vegetation at Elk Mountain Campground.
 - Remove tree and shrub stumps by grinding in place or cutting flush with the ground. Document locations and specifics of plants that are removed to aid in future replanting efforts. If grubbing of stumps is desirable, perform under supervision of an archeologist.



Campground vegetation.



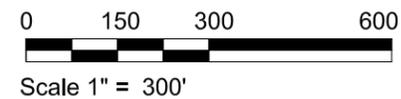
- Take advantage of opportunities for **new plantings** to repair damaged and disturbed areas, retain the existing character of planting patterns.
- Maintain **existing trees** in the Elk Mountain Campground. This area was designed in the Mission 66 period, with tree plantings of ponderosa pine and deciduous species scattered among the campsites in an open grove arrangement to provide shade and some privacy for campers, utilizing the form of a naturalistic grove with open understory. Consider the following:
 - Retain the informal groves of trees sheltering the campsites. Replace in-kind any trees that are removed.
 - Remove or reduce the volume and density of shrub masses through mechanical removal. Reducing the shrubs will both reduce the risk of fire, and promote infiltration of surface water into the groundwater system.



Open groves and grass cover among campsites.

Legend

- Paved Roads
- Gravel Roads
- - - Trails
- Buildings
- Fencing
- Trees
- Streams
- 40' Contours



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 Sources: DOQQs, GIS data, and historical maps provided by NPS.

Wind Cave National Park
 TREATMENT PLAN

Map 5-18. Proposed Wind Cave Historic District
 Elk Mountain Campground

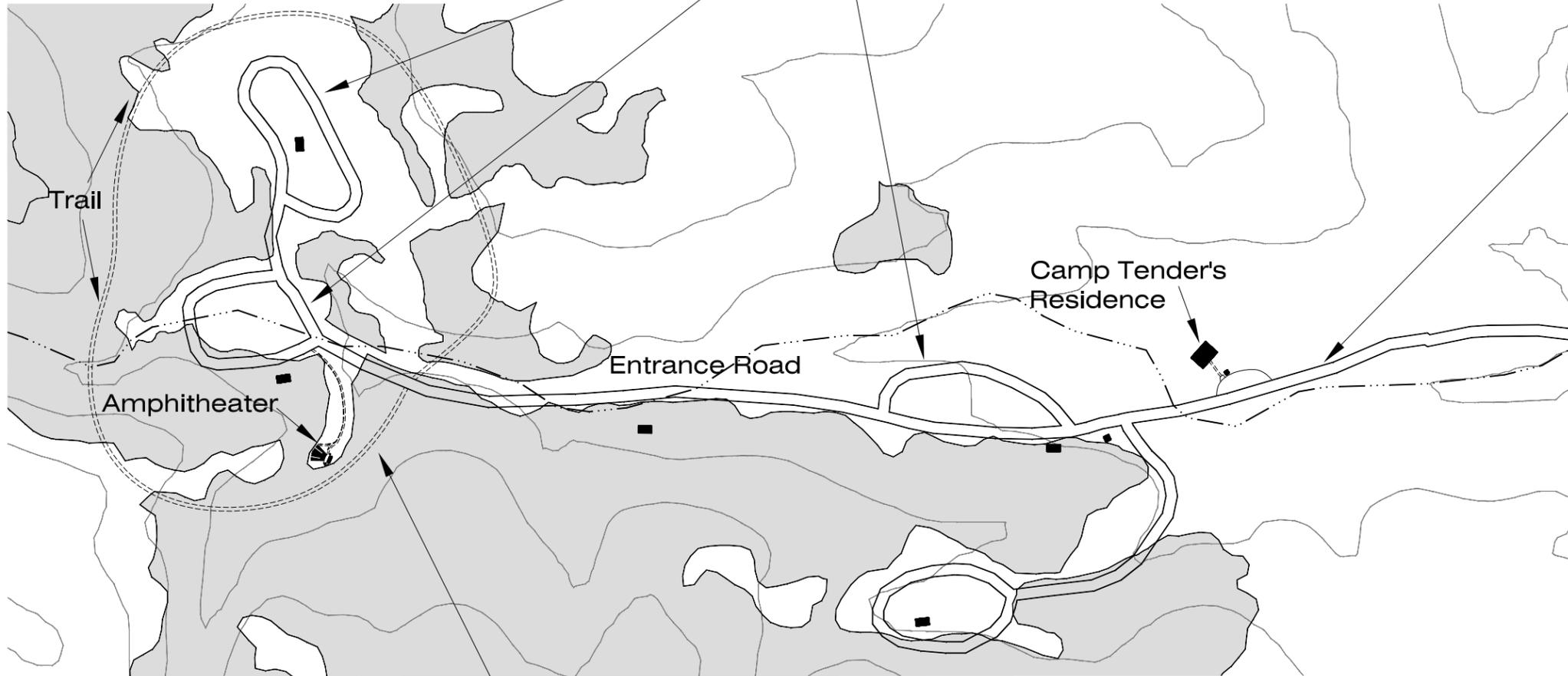
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General Treatment Recommendations

Circulation

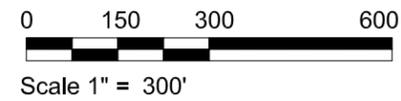
- Retain the overall configuration of **Elk Mountain Campground circulation**. Avoid any major alterations that would result in the loss of the circulation patterns including roads, walks, and trails until such time as the Mission 66 context has been completed and the site evaluated to determine which extant features contribute to the historic character of the campground for this period.
- Retain and maintain the existing **campground paths**.
- Retain and maintain the existing **campsites**. If additional accessible facilities are required, consider constructing one or more new accessible campsites.



- Retain and maintain the **Elk Mountain Nature Trail**. Where necessary, regrade the trail surface to remove trip hazards and improve drainage. Re-set or replace log steps as required to eliminate hazards. Avoid making any irreversible changes to the trail until such time as the Mission 66 context has been completed and the site evaluated.

Legend

- Paved Road
- Gravel Road
- - - - - Trail
- Buildings
- Fencing
- Trees
- Stream
- 40' Contour



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Retain and maintain the **campground loop roads** using guidelines for the road corridor.



Retain and maintain the **existing campground road corridor**. Avoid alterations to the width and horizontal and vertical alignments. Avoid adding any new drives, parking spaces, or curbing. Do not allow vehicles to create parking areas within lawn or other planted areas.

Wind Cave National Park TREATMENT PLAN

Map 5-19. Proposed Wind Cave Historic District Elk Mountain Campground

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General Treatment Recommendations

Small-Scale Features

- Avoid constructing **new fencing** within the Elk Mountain Campground. Retain the perimeter grazing control fencing and existing wooden fencing within the campground.
- Establish and implement consistent design standards for **interpretive signs and waysides, directional, informational, and trail signs**. Coordinate with design standards utilized in the Headquarters Area and throughout the park.
- Bury all remaining **overhead power and telephone lines and poles**.

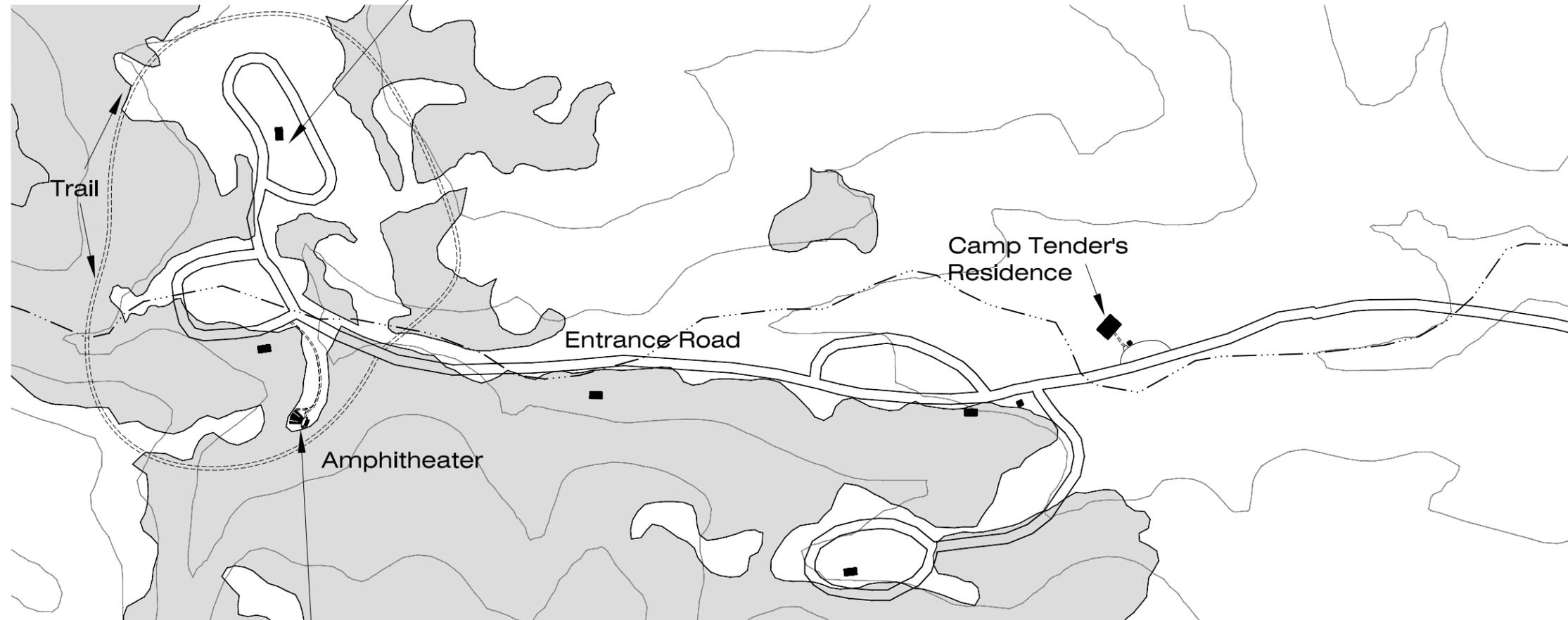


Campground loop.

- Establish and maintain consistent design standards for **campsite furnishings** including picnic tables, fire pits, trash receptacles, information kiosks, benches, wheel stops, brochure boxes, and campsite markers. Retain and maintain any remaining Mission 66 period features. If new features are required, designs should be contemporary and simple in form.
- Implement consistent design standards for **campground lighting**. Lighting should be as minimal as possible for security and safety requirements. Use dark sky lighting standards.



Typical campsite.



Legend

- Paved Road
- Gravel Road
- Trail
- Buildings
- Fencing
- Trees
- Stream
- 40' Contour



- Retain and maintain **small-scale features at the amphitheater** including benches, lighting, and fire circle.



Amphitheater stage.

Wind Cave National Park TREATMENT PLAN

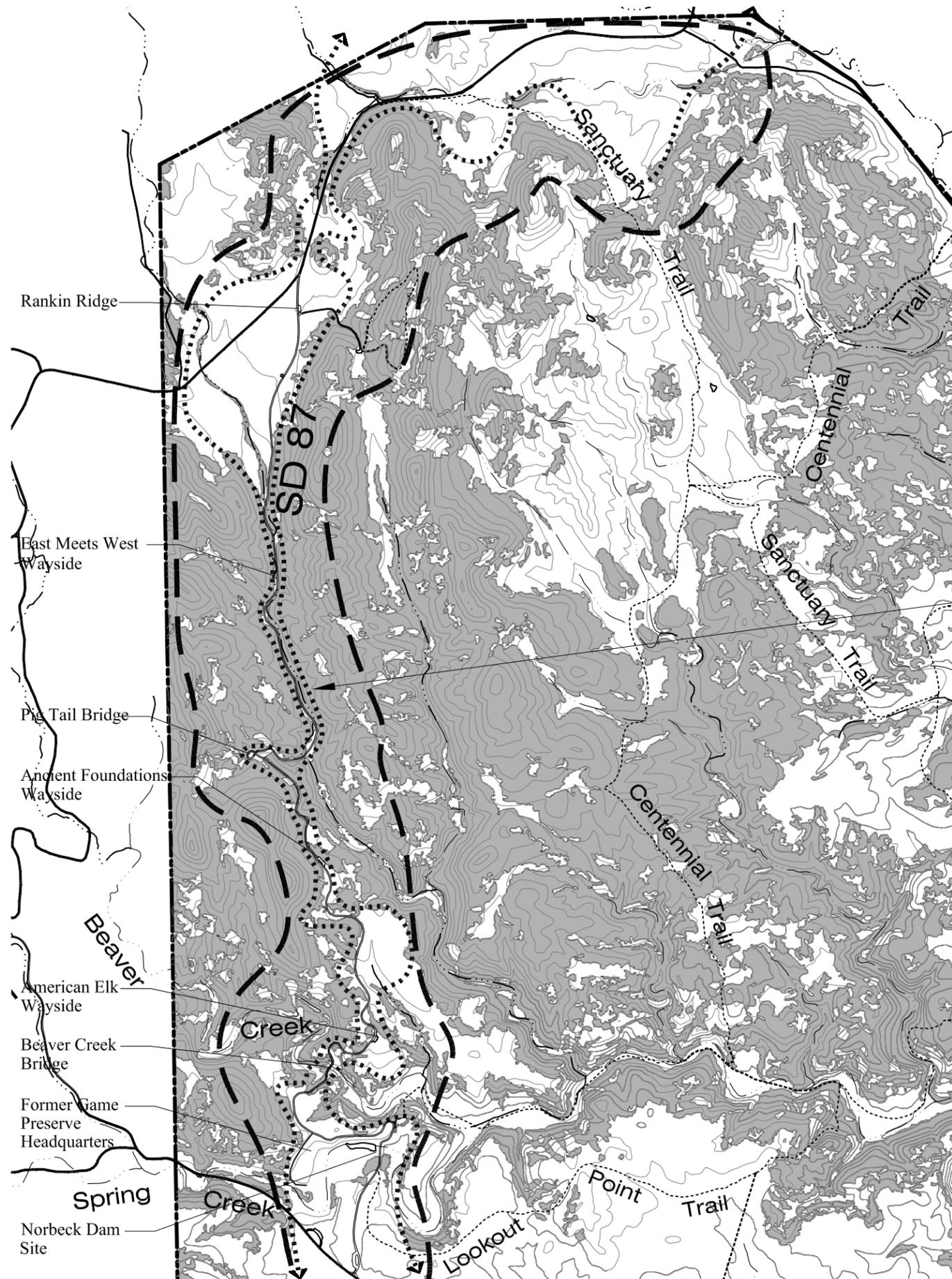
Map 5-20. Proposed Wind Cave Historic District Elk Mountain Campground

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Treatment Recommendations

Natural Systems and Features

- Minimize land disturbance associated with road construction and repair to protect **landforms and terrain features**. These features and systems contribute to the scenic experience of visitors.
- Much of the rhythm of open and forested areas along the road corridor survives from the period of significance. Undertake **changes in vegetative patterns** primarily to maintain healthy ecosystems. Avoid major alterations of the surviving historic spatial organization of vegetation patterns visible from the roadway to protect historic integrity. Consider reestablishing the historic edges of forest that were extant during the 1930s to 1941 if the plant communities and wildlife habitat will benefit.
- Undertake **vegetation management** within the viewshed of the road corridor to ensure healthy ecosystems. Consider employing prescribed burning as a means for preserving and enhancing the integrity of historic spatial organization.
- Continue efforts to control **exotic plant species**.

Vegetation

- Avoid adding **new tree and shrub plantings** along roadsides and waysides unless supported historic evidence.
- Control and remove all **invasive exotic plants**.
- Utilize native plants to stabilize and repair **damaged, eroding, and non-vegetated areas**.
- Retain historic spatial patterns during **re-vegetation** efforts.

Patterns of Spatial Organization

- Retain the rhythm of late 1930s early 1940s historic spatial character of the road corridor defined by **landforms and natural vegetation patterns** of open grasslands and forest cover.



Typical pull-off along SD 87.



Approach to Beaver Creek Bridge.

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- Streams
- 40' Contours



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 Sources: DOQQs, GIS data, and historical maps provided by NPS.

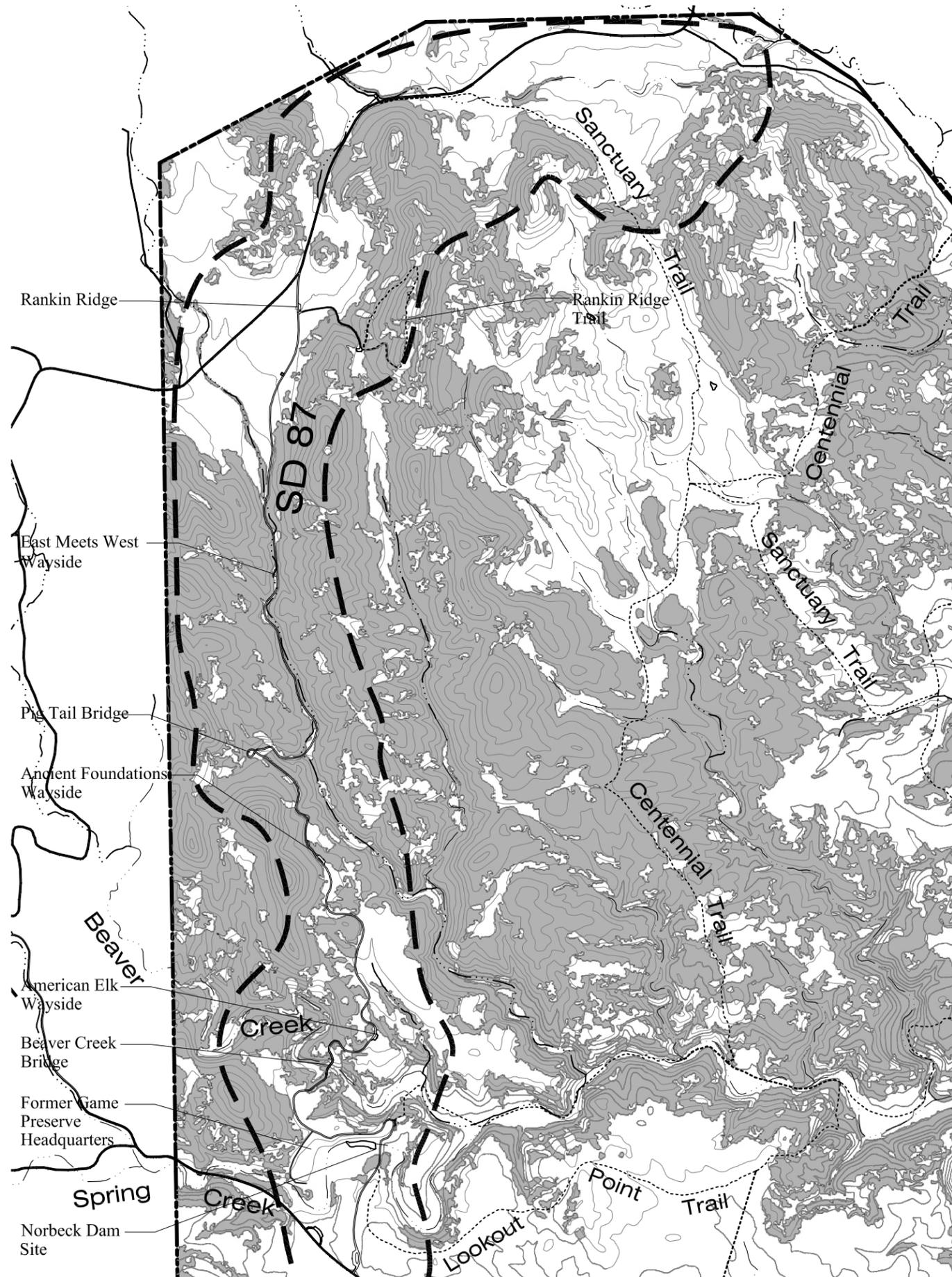
Wind Cave National Park TREATMENT PLAN

Map 5-21. Proposed SD 87 Road Corridor Historic District

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Treatment Recommendations

Circulation

- Retain current **road alignments** and widths. Avoid widening pavements, altering shoulders, cuts, fills, and graded drainage swales.
- Retain the current configuration of **waysides and pull-offs**. Preserve Mission 66-era wayside stone structures. New construction should match the scale and materials of the existing waysides and pull-offs.
- Retain **crushed stone surfaces**. Edge of pavement returns should be curved.
- Limit **striping and other pavement markings** to what is required for safety and wayfinding. The use of signs is preferable to pavement markings.
- Avoid the addition of concrete **curbing** unless supporting historic documentation. Sheet flow is preferable to concentrated drainage patterns resulting from curbing.
- **Wheelstops**, if used, should be consistent in materials and design. If no curbs are constructed then rough-sawn wood timbers may be appropriate.
- **Guardrails** should be consistent in materials and design. Rough-sawn wood timbers backed by steel and mounted on rough-sawn wood timber posts are preferable. Milled round wood posts with milled round wood rails is appropriate as well. Avoid galvanized metal.
- Repair **trails**, including limited drainage improvements and repair of hazardous surfaces. Use compacted crushed local stone or soil cement surfaces. If new trails are required, link them to existing trailheads. Retain and repair steps. New water bars should be local stone, wood timbers, or milled round wood posts.
- **Paved paths and ramps** accessing wayside exhibits should be consistent in materials and design. Minimize pavement. Consider exposed aggregate concrete walks over broom finish concrete. Avoid colored and patterned concrete. Configure edges of concrete walks in simple curved forms.
- **New parking facilities** should be minimized and sited to avoid visual intrusions within the viewshed of the road. It is preferable to site such facilities in historically open areas that are screened from road views by terrain features. This approach minimizes the clearing of existing forest areas.



View approaching Beaver Creek Bridge.



Timber steps along Rankin Ridge Trail.



Pull-off along SD 87.

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- ~ Streams
- 40' Contours



Map prepared by:
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Sources: DOQQs, GIS data, and historical maps provided by NPS.

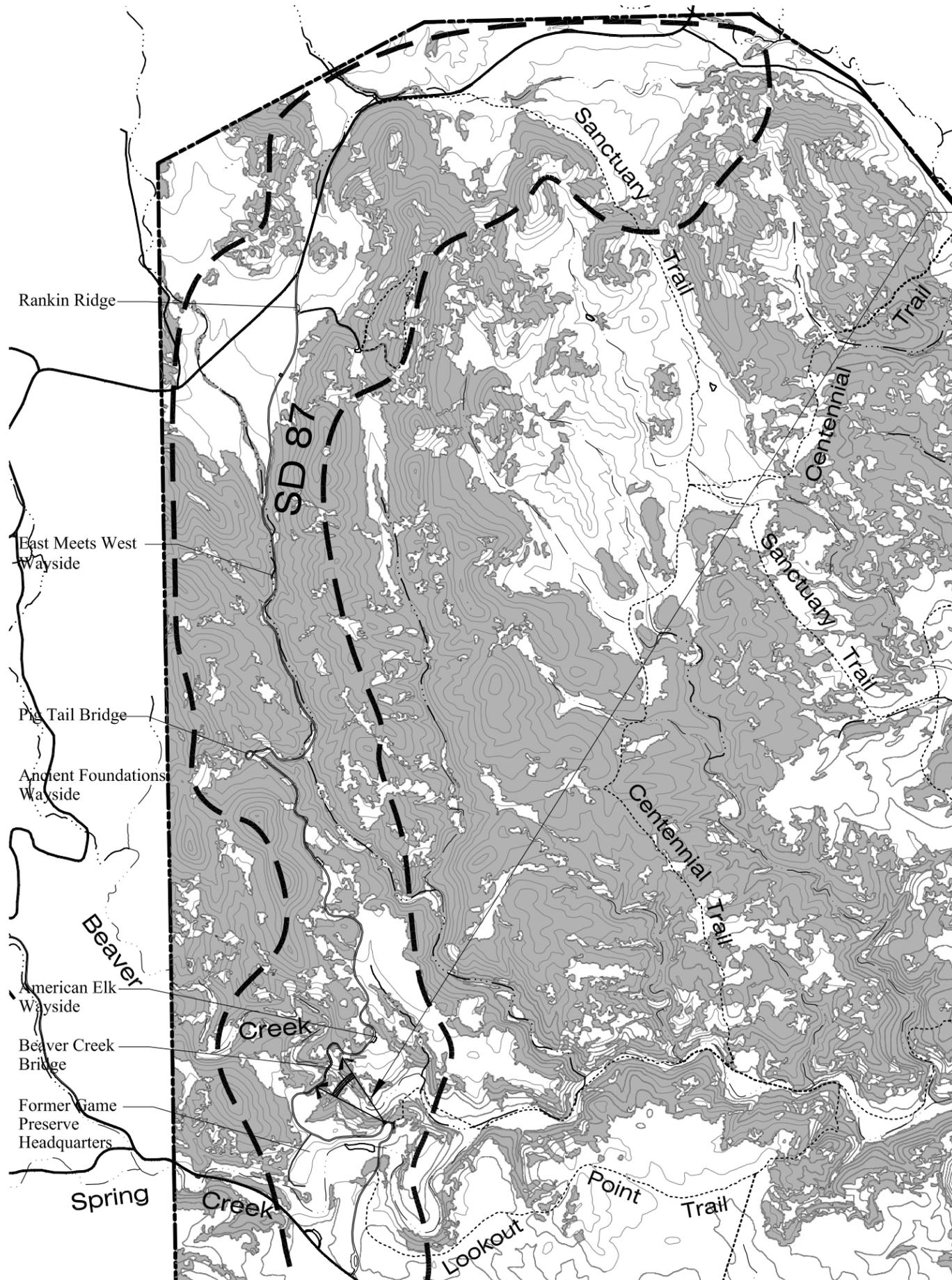
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Map 5-22. Proposed SD 87 Road Corridor Historic District

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Treatment Recommendations

Views

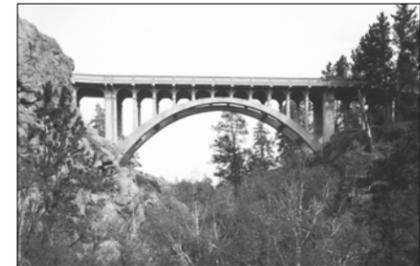
- Maintain **viewsheds** of open grassland areas to provide a key visitor experience: the rhythm of open areas with more long panoramic views, alternating with more enclosed spaces with near views of forest edges.
- Maintain and enhance **designed views at wayside exhibit locations**. Avoid siting new features at waysides that would compromise the interpretive experience. Existing wayside features are associated with the Mission 66-era and should be preserved.
- Maintain and enhance the **designed views of roadway structures**. These include the view of Beaver Creek Bridge from the hairpin turn at the Centennial Trailhead location; the views of Beaver Creek Bridge from the road approaches; and the views of the Pig Tail Bridge from the road approaches. Avoid new plantings and prevent natural vegetation from obscuring these important historic views.

Small-scale Features

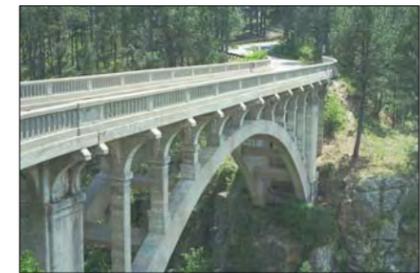
- Prior to removing **existing wayside panels**, document through photographs. Retain and maintain the Mission 66 wayside exhibit stone structures. The routed wood exhibit panels should also be documented prior to removal and replacement with new wayside exhibits.
- Establish and implement consistent design standards for **directional, informational, and trail signs**. Signs should be only as large as required to be functional. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes. Retain and maintain park entrance signs.
- Avoid adding any **new barrier fencing and gates** within the road corridor and at waysides and pull-offs unless necessary to protect resources, property, or to control access to restricted area. If fencing is required it should be minimized. This fencing should be box wire with wood posts, or narrow dark metal posts in lieu of wood posts. Gates should be dark colored metal frame with box wire.
- Establish consistent design standards for **site furnishings** including benches, trash receptacles, and related features. Retain and maintain rustic features such as log benches. Appropriate materials include painted wood, painted metal, and weathering steel. Avoid galvanized and other bright materials and finishes.
- Avoid the installation of any type of **site lighting** within the proposed historic district corridor.



Pig Tail Bridge along SD 87.



Retain view of Beaver Creek Bridge from SD 87.



Beaver Creek Bridge along SD 87.



View approaching Beaver Creek Bridge.



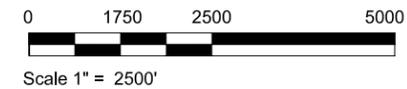
Timber and stone interpretive exhibit.



Timber interpretive exhibit.

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- ~ Streams
- 40' Contours



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Sources: DOQQs, GIS data, and historical maps provided by NPS.

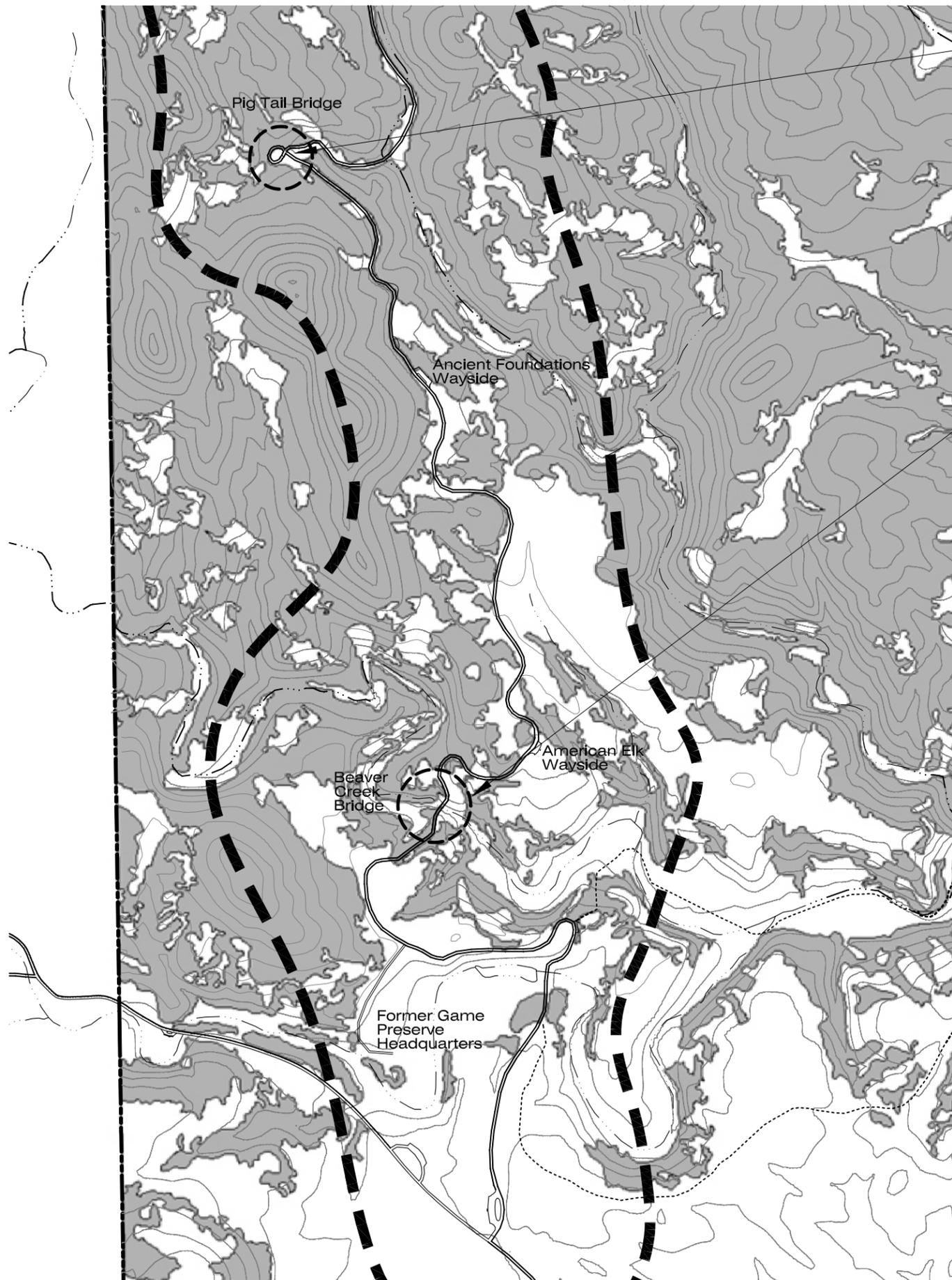
Wind Cave National Park TREATMENT PLAN

Map 5-23. Proposed SD 87 Road Corridor Historic District

Cultural Landscape Report

Wind Cave National Park, South Dakota
National Park Service
May 2005





Treatment Recommendations

Pig Tail Bridge

- Maintain the location and design of the bridge, and the alignment and widths of the approaches.
- Retain masonry materials and joint patterns when repairs are necessary.
- Minimize major new constructed features when stabilizing eroding areas at abutments, piers, and footings.
- Retain the timber guardrail features. Repair as required, matching existing design.
- Match existing design when replacing timber decking and rails.
- Minimize the attachment of safety markers and reflectors.
- Retain road alignment of the approaches unless dictated by safety requirements.
- Retain and repair round timber guardrails extending from the bridge rails.
- Minimize striping and match color of bridge wearing surface with the road wearing surface asphalt.

Beaver Creek Bridge

- Match existing forms and design when repairing delaminated, spalled and cracked, and missing sections of concrete bridge deck, barriers, and lower curbs.
- Minimize new construction when stabilizing eroding areas at abutments, piers, and footings. Repairs should approximate a natural condition of boulders and vegetation. In locations of stacked stone, repair or reconstruct these features matching the original wall patterns and materials.
- Remove vegetation growing in the stacked stone retaining walls.
- Replace missing curb stones.
- Minimize safety markers and reflectors.
- Avoid altering the road alignment of the approaches unless dictated by safety requirements. Avoid constructing ditches or other structures or measures that require demolition and removal of bridge components such as barriers and curbing. In addition, avoid constructing ditches or swales that are lined with riprap. Consider lining ditches with local stone with fitted joints.
- Consider replacing the w-section weather steel and wood post guardrails with rough-sawn wood timbers backed by steel and mounted on rough-sawn wood timber posts.



Pig Tail Bridge.



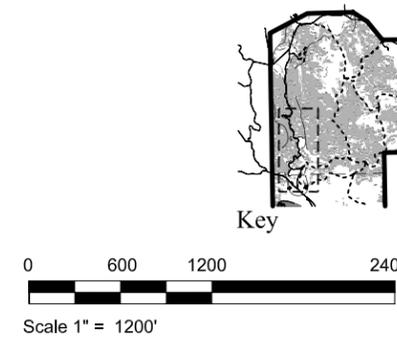
Approach to Beaver Creek Bridge.



Beaver Creek Bridge.

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- ~ Streams
- 40' Contours



Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.

Wind Cave National Park TREATMENT PLAN

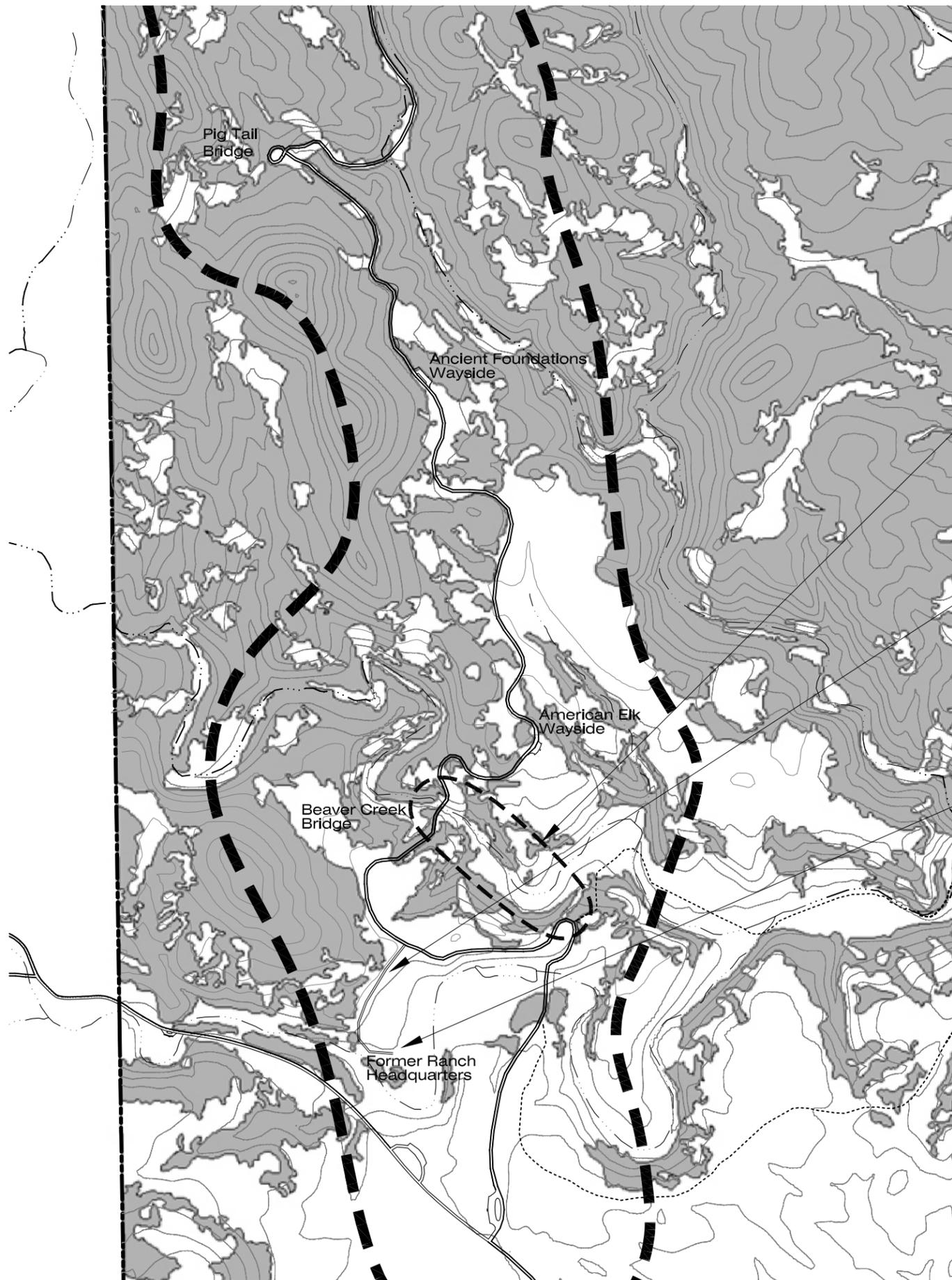
Map 5-24. Proposed SD 87 Road Corridor Historic District

Cultural Landscape Report

Wind Cave National Park, South Dakota
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Treatment Recommendations



Views

- Maintain and enhance the **designed views of roadway structures**. These include the view of Beaver Creek Bridge from the hairpin turn at the Centennial Trailhead location; the views of Beaver Creek Bridge from the road approaches; and the views of the Pig Tail Bridge from the road approaches. Avoid new plantings and prevent natural vegetation from obscuring these important historic views.

Circulation

- Within the proposed historic district—including the Game Preserve Headquarters site—it is preferable to retain any **surviving roadbeds and other constructed transportation-related landforms** unless obliteration is essential to protecting sensitive ecosystems. Retain and stabilize constructed landforms with low native vegetation. If these forms are required to be removed, then undertake archeological clearing and documentation of the demolition, and establish native vegetation cover.

Vegetation

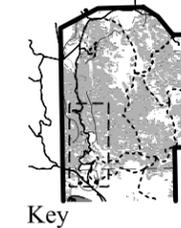
- At the Game Preserve Headquarters site undertake documentation and removal of **non-native species**. This site does not retain integrity so the retention of the last vestiges of developed area plantings is not critical to the historic integrity of the proposed Historic District. Mitigate the removal of introduced plantings by augmenting the documentation contained in this CLR. Establish native plant cover.



Former Game Preserve Headquarters exotic vegetation.

Legend

- Park Boundary
- Paved Roads
- Gravel Roads
- Trails
- Buildings
- Streams
- 40' Contours



Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.

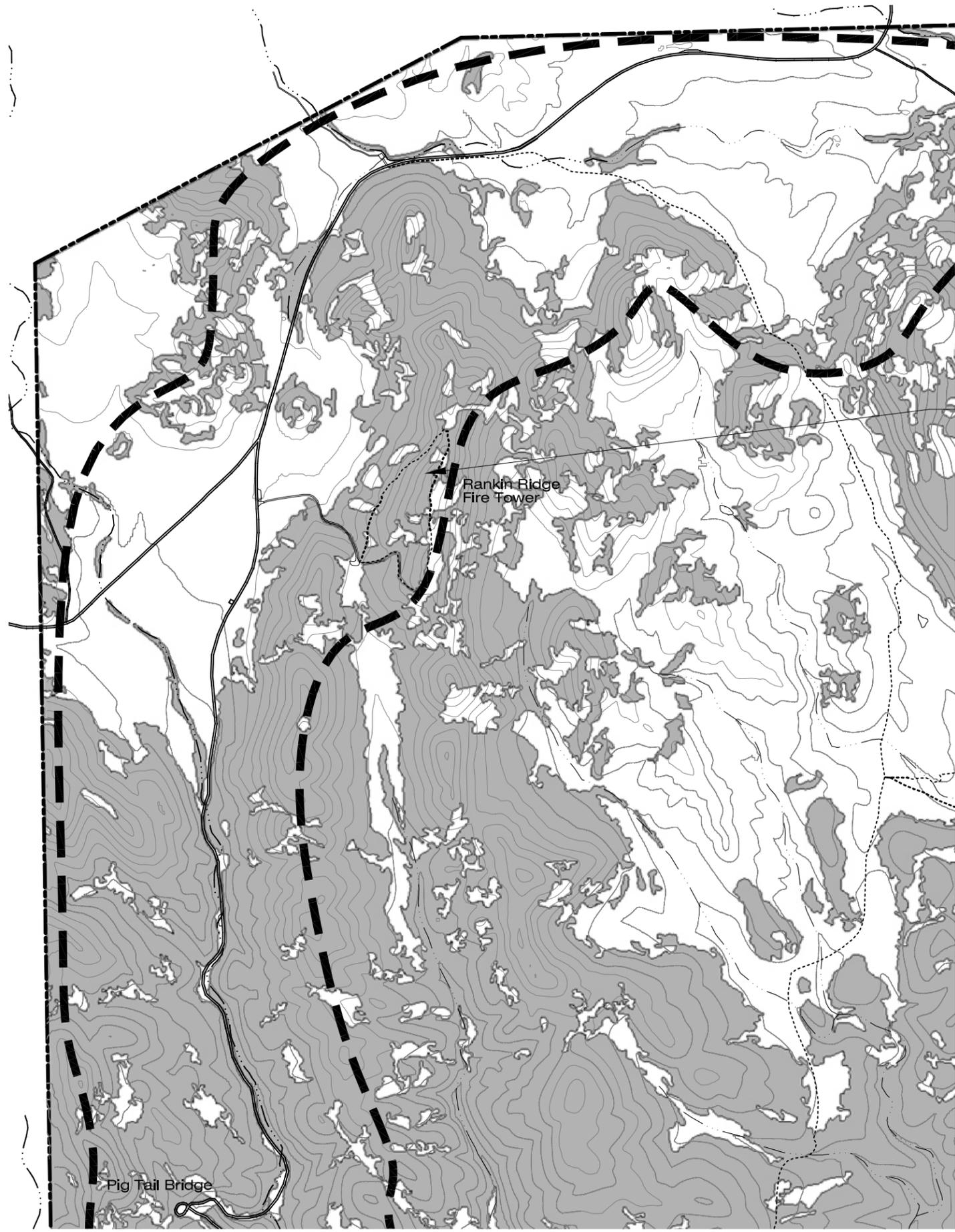
Wind Cave National Park TREATMENT PLAN

Map 5-25. Proposed SD 87 Road Corridor Historic District

Cultural Landscape Report

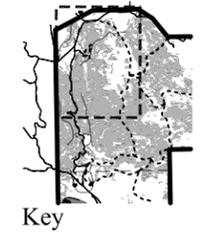
Wind Cave National Park, South Dakota
 National Park Service
 May 2005



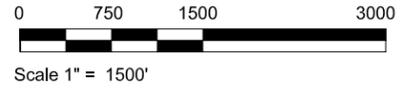


Treatment Recommendations

- Rankin Ridge Fire Tower
- Manage the **Rankin Ridge Fire Tower** as a historic resource, though constructed at the beginning of the Mission 66 program in 1956.



- Legend
- Park Boundary
 - Paved Roads
 - - - Gravel Roads
 - - - Trails
 - Buildings
 - - - Streams
 - 40' Contours



Map prepared by:
John Milner Associates, Inc.
 Sources: DOQQs, GIS data, and historical maps provided by NPS.



Rankin Ridge Fire Tower.

Wind Cave National Park
 TREATMENT PLAN

Map 5-26. Proposed SD 87
 Road Corridor
 Historic District

Cultural Landscape Report
 Wind Cave National Park, South Dakota
 National Park Service
 May 2005





CHAPTER SIX

IMPLEMENTATION RECOMMENDATIONS

CHAPTER SIX

IMPLEMENTATION RECOMMENDATIONS

INTRODUCTION

Chapter 5 of this report provides recommendations for treating the cultural and natural landscape resources of the proposed SD 87 Historic District and the proposed revised Wind Cave Historic District. The treatment plan concepts for each historic district are outlined and describe the end result of the implementation of the treatment plan.

This chapter provides an implementation process for projects identified below—for both proposed historic districts—that constitute components of the treatment plan over an extended period of time. This chapter outlines a phasing plan that prioritizes the projects, and places them in an appropriate implementation sequence to accommodate necessary research, planning, design, implementation, and management actions. Phasing recommendations are not intended to stand alone out of context of other current and future park planning initiatives. The phasing plan has been developed with guidance from NPS staff to guide and inform planners and managers to support efforts to make decisions regarding resource management, and to support the process of securing necessary funding. Some projects require further investigation or research prior to implementation. Others require additional review within the framework of long-range planning efforts.

The phasing recommendations focus on three major phases of implementation that span a fifteen-year period. Each phase relates to a five-year period. The goals and specific recommended treatments for each phase are identified below. A limited number of recommendations have not been included in the phasing plan. These are associated with issues that have been introduced as considerations for long-range planning that are most likely beyond the fifteen-year time frame of the phasing plan. Depending on such factors as funding, the goals for park management, and the completion of related planning documents, there are others that may ultimately shift into subsequent phases. In addition, the recommended projects do not account for any communications and consultations with tribes associated with park lands and resources.

PHASE ONE (YEARS 1-5)

The treatment efforts recommended for Phase One include the following projects. Project descriptions have been developed for research, planning, and landscape projects in bold text.

- **Create and enter PMIS statements for funding Historic Structure Reports (HSR); prepare HSRs for all historic buildings and structures;**

- **Prepare a Vegetation Management Plan for the Headquarters Area;**
- **Redesign the Walk-in Entrance and the Natural Entrance, including doorway, immediate environs, correct drainage problems if necessary, and new wayside exhibit;**
- Complete the treatment of the Seasonal Residence (CCC Bunkhouse) based on a completed HSR;
- Repair Pig Tail Bridge;
- **Repair the terrace pavements and replace plantings at the Elevator Building;**
- Create a unified design for all wayside exhibits;
- Improve universal accessibility in the Headquarters Area;
- Complete additional cultural landscape-related directed research based on NPS review of research questions posed in the CLR;
- Complete the new cave lighting system;
- Complete the Wind Cave safety railing project;
- Repair Beaver Creek Bridge;
- Complete the new wastewater lagoon facility and restore the existing lagoon area to its approximate pre-development condition; and
- **Remove unwanted volunteer vegetation located at all building foundations in the Headquarters Area.**

PHASE TWO (YEARS 6-10)

The treatment efforts recommended for Phase Two include the following projects. Project descriptions have been developed for the research, planning, and landscape projects in bold text.

- Design and construct a new maintenance facility;
- **Develop park-wide landscape design standards;**
- **Prepare a Determination of Eligibility for Mission 66 resources;**
- **Prepare a National Register of Historic Places Nomination for the SD 87 historic road corridor based on the information included in this CLR;**

- **Revise the Wind Cave Historic District Nomination including expansion of the district based on the information included in this CLR;**
- **Prepare a monitoring and control plan for invasive plant species;**
- Continue to undertake Wind Cave path improvement projects;
- **Repair the historic stone barrier walls at Administration Building parking lot;**
- **Repair the historic foot bridge at Administration Building (Visitor Center);**
- **Repair the historic rock-faced culverts;**
- **Repair stone retaining wall along concrete walk in Wind Cave Canyon that adjoins the Administration Building;**
- **Rehabilitate plantings within Wind Cave Canyon between the Walk-in Entrance and the Elevator Building; and**
- Bury overhead power and telephone lines.

PHASE THREE (YEARS 11-15)

The treatment efforts recommended for Phase Three include the following projects. Project descriptions have been developed for the research, planning, and landscape projects in bold text.

- **Prepare a Traditional Cultural Property National Register Nomination for Wind Cave National Park (NP);**
- **Remove exotic vegetation at the Game Preserve Headquarters site;**
- Continue Prairie Vista Trail improvements;
- Evaluate and document homestead sites;
- **Develop a new parking concept for the Historic Housing Area;**
- Prepare and implement a blast rubble removal program;
- **Install screen plantings at the Mixing Circle;**
- **Install screen plantings at the Maintenance Area; and**
- **Rehabilitate and maintain the historic vista of Beaver Creek Bridge from SD 87.**

PROJECT DESCRIPTIONS, RECOMMENDATIONS FOR ADDITIONAL RESEARCH AND EXPERTISE TO COMPLETE PROJECTS, AND PLANNING-LEVEL BUDGET DATA

INTRODUCTION

The recommendations indicated and listed previously in this chapter relate to a series of cultural resource-related projects that should be considered for implementation at the park. Projects, including tasks, additional research and physical investigations, and expertise necessary to complete each project, are briefly described below. The breakdown of tasks for each project does not include project management, compliance-related reviews, and other management elements typically undertaken by National Park Service personnel as part of the research, planning, design, and construction phases of a project.

Project budget data has been developed for each of the projects involving construction. All budget data presented in this chapter should be used for general planning purposes only. Construction budget data is based on average costs typical in 2005 and do not account for inflation. The budget data has been developed using National Park Service Class C planning-level cost-estimating data and 2005 R.S. Means cost estimating data. Professional fees and other fees for services are based on current and past experience estimating order of magnitude fees for services. The annual costs associated with maintenance and landscape management are beyond the scope of this project and have not been addressed in this document. It is important to note that all project budget data is intended to support planning efforts and initiatives and should not be used to establish final project budgets, and that readily-available cost data for some of the project elements is very limited. John Milner Associates, Inc., (JMA), endeavoring to support subsequent planning efforts, has included very rough estimates for some project elements. In some cases, additional studies are required to determine the full extent of the scope of projects and their costs. In others, it is not possible to determine order of magnitude or conceptual-level project budget costs due to the fact that significant additional research or planning and feasibility studies are first required to develop sufficient levels of information to support cost estimating.

Photogrammetric topographic mapping should be undertaken to support planning and design work within the developed areas. A high level of accuracy can be achieved based on the altitude of the photography. If low-altitude photography is undertaken, the photographs could support base maps sufficient for many of the implementation projects. At the time of the preparation of this CLR this type of mapping was unavailable. Otherwise, transit-run surveys will be required to undertake design and construction documentation for site projects.

RESEARCH, PLANNING, AND IMPLEMENTATION PROJECT DESCRIPTIONS

The following section includes descriptions of recommended research, planning and/or implementation projects.

NPS PMIS Statements for Funding Historic Structure Reports (HSRs) and Preparation of HSRs for Historic Buildings and Structures

Project Description

This project involves the creation of PMIS statements to obtain funding for Historic Structure Reports (HSRs) and the preparation of HSRs for all contributing historic buildings and structures at Wind Cave National Park. The purpose of completing the HSRs is to create critical historic, condition, and treatment information to guide and support repair, maintenance, and preservation work. This project should include two phases: the completion of the PMIS statements and the completion of the HSRs. The HSRs could be undertaken for collections of buildings such as the Historic Housing Area, or for individual structures, such as the Administration Building.

Additional Studies Needed

A reconnaissance survey should be completed to determine the general condition of historic buildings and structures to support prioritization of HSRs. In addition, NPS regional and park staff should factor in space needs, planned improvements, and threats to historic buildings and structures as part of the prioritization process.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Complete reconnaissance condition survey and prioritization plan.	Regional and park cultural resource manager, park maintenance staff, and historical architect.		Use CLR to support effort.
2. Create PMIS statements.	Regional and park cultural resource manager, park maintenance staff, and historical architect.		Use CLR and reconnaissance survey to support PMIS statements.
2. Prepare the HSRs	NPS staff and/or contractors; historical architect, architectural historian, building materials conservator, historical engineer.	Historic Housing Area Buildings \$200,000 - \$250,000 Maintenance Buildings \$85,000 - \$125,000 Elevator Building/VIP Center/Seasonal Residence \$100,000 - \$150,000 Pig Tail and Beaver Creek Bridges \$150,000 - \$200,000 Administration Building \$150,000 - \$175,000	Including Cave Walk-in Entrance, pedestrian bridge, and retaining walls flanking the parking lot.

Vegetation Management Plan for the Headquarters Area

Project Description

This project involves preparing an area-wide vegetation management plan that includes appropriate approaches to management and maintenance; techniques for the monitoring and control of invasive plants; suitable plant choices for plant replacement; subarea designs; an inventory of existing and desired plants; and additional information for managing contemporary vegetation in a historic setting. Specifically, the plan should include items such as turf and grass field mowing heights and schedules; schedules for periodic and cyclical vegetation maintenance; tree care; an appropriate plant palette; and correct plant installation methods. Evaluations of current vegetation conditions should be made by qualified natural resource personnel—such as ecologists and biologists, landscape architects, arborists, and horticulturists. Vegetation management recommendations should be guided by the recommendations in this CLR. Consideration should be given to utilizing GPS and GIS to create a digital database of plants and areas of vegetation and digital mapping. Additional inventory of exact genus and species names for plants in the Headquarters Area may be necessary to implement maintenance plans. In addition, a review of existing landscape maintenance practices and capabilities should be undertaken.

Additional Studies Needed

No additional studies required.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. GPS and GIS base mapping and database development.	Regional and/or park staff; historical landscape architect, arborist, horticulturist, maintenance specialist.		
2. Preparation of the plan.	Regional and/or park staff or contractor; historical landscape architect, arborist, horticulturist, maintenance specialist.	\$50,000 - \$75,000	Fees depend on availability and level of detail of digital mapping and level of detail of maintenance requirements.
3. Implementation of the plan.	Park resource management and maintenance staff; and/or contractors.		
4. Monitoring and assessment of vegetation management over time.	Park resource management and maintenance staff; and/or contractor.		

Rehabilitation of the Wind Cave Walk-in Entrance and Natural Entrance and Environs

Project Description

This project involves the rehabilitation of the Wind Cave Walk-in and Natural entrances and their environs to support efforts to mitigate impacts on the cave ecosystem and to create a more appropriate design that is compatible with the historic character of the area. The major scope elements include the re-design of the Walk-in Entrance; the re-design of the Natural Entrance barrier wall; and improvements to approach paths, signs, exhibits, and vegetation. Given the proximity and subterranean linkage of the Natural Entrance and Walk-in Entrance, the re-design of these features should be undertaken in a coordinated manner. Preliminary studies and conceptual designs should include both entrances in order to assure their aesthetic and functional compatibility. However, it may be feasible to implement rehabilitation of each entrance separately. A watershed-scale storm water management analysis will be required to support the design phase.

Additional Studies Needed

Pre-design efforts that are required include the development of programming and design criteria including the number, type, and frequency of visitors and groups of visitors to support the design of circulation and interior spaces. Scientific studies may need to be undertaken to create design criteria to guide the design of airflow through the Walk-in Entrance and water flow into the Natural Entrance. Additionally, pre-design services should establish means and methods for construction access and staging areas to guide design and construction mitigation.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Pre-Design services	NPS regional and park staff and/or contractor; architect, landscape architect.	\$10,000-\$15,000	Scientific investigations, programming, phasing recommendations, construction access analysis.
2. Design through construction documentation.	NPS or contractor; architect, landscape architect, engineers.	\$50,000-\$100,000	The design fee will depend on the scope of construction, and whether the project is phased.
3. Construction phase.	Contractor.	\$200,000-\$750,000	Costs will vary depending on selected design and if the project is phased.
4. Archeological monitoring.	NPS archeologists.		
5. Post-construction evaluation.	Regional and park staff.		

Rehabilitation of the Elevator Building Terrace

Project Description

This project involves the rehabilitation of the Elevator Building terrace including repair of the masonry walls, replacement of the concrete pavements, repair of the concrete pavement under roof, and replacement of plantings in accordance to guidance in an HSR. The project may also include new and/or repaired site furnishing such as benches and signs. Cracking and spalling of the concrete pavement was observed particularly in areas that are exposed to weather elements and poor drainage. The concrete pavement under the roof appeared in good condition and may only need minor repairs. Existing pavement identified for replacement and repair should be documented with measured drawings prior to any action being taken. The new concrete sections should be based on measured drawings in order to ensure that the new concrete matches the historic materials and joint patterns. The existing shrubs have outgrown their planters and should be replaced with native shrubs that will be smaller in size at maturity in order to prolong the need for their replacement in the future. Replacement shrubs should match the existing in habit and form, and could be a dwarf or smaller forms of the existing native plant, if available.

Additional Studies Needed

The design phase of this project should be undertaken after the completion of an HSR for the building and its immediate environs.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Design through construction documentation.	NPS or contractor; historical landscape architect, civil and structural engineer.		Engineers may be needed if the walls require replacement (structural design) and if the drainage design is complicated.
2. Construction phase.	Contractor.	\$50,000 - \$250,000	The construction cost will vary depending on the amount of replaced wall and concrete pavement.

Volunteer Vegetation Removal at Building Foundations in Headquarters Area

Project Description

This project involves removing volunteer woody vegetation including shrubs, trees, and other unwanted vegetative growth from the base of buildings and growing out of stone structures. Due to sensitive cave ecosystems, removal efforts should rely solely on hand and mechanical means, rather than chemical applications. In addition, mechanical removal must be undertaken carefully in order to avoid damage to historic stone features. It is important to note that removal (flush cutting to the ground) will likely have to occur annually until plant death is achieved. Prior to undertaking removal efforts, park natural resource managers and a historical landscape architect should mark vegetation to be removed. This work should follow the completion of the Vegetation Management Plan for the Headquarters Area.

Additional Studies Needed

Consideration should be given to investigating potential herbicides that will not impact sensitive ecosystems including the cave and groundwater. Scientific data should support the selection of a low- or no-impact chemical treatment process. The employment of a chemical approach to control and eliminate woody vegetation should not impact historic building materials. This product research effort could be undertaken as part of the preparation of the Landscape Management Plan for the Headquarters Area. If undertaken separately, then integrate the findings of this investigation into the Vegetation Management Plan for the Headquarters Area.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Research and investigate low- or no-impact herbicides.	NPS regional and/or park natural resource specialists and park maintenance staff.		This should be undertaken as part of the Landscape Management Plan for the Headquarters Area.
2. Mark vegetation to be removed.	NPS natural resource specialist, landscape architect, or qualified maintenance staff.		Marking vegetation is required prior to each phase of treatment.
2. Remove vegetation.	Park maintenance staff.		Avoid damage to historic building materials and other contributing features.
3. Monitor and evaluate removal techniques.	Park maintenance staff.		Revise control and removal techniques based on monitoring.

Park-wide Landscape Design Standards

Project Description

This project involves the preparation of a park-wide design guide, including typical details and identification of manufactured products, illustrating standards for new landscape features and systems. Such features might include paths; walks; trails; site furnishings, such as benches, signage, and lighting; and parking area features, such as bollards, wheelstops, and curbing. The design guide would augment NPS system-wide standards with Wind Cave-specific guidelines and standards. Design of these features should be compatible with surrounding historic and environmental character of the site. The guide could help reduce costs and could support more sustainable maintenance procedures. This project would address typical types of landscape features and would not include site-specific design or planting design. This project should be coordinated with interpretive planning and exhibit design efforts. The plan should also address the issue of retaining existing functional site furnishings and features until the end of their useful life.

Additional Studies Needed

No additional studies required.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Design process and guide preparation.	NPS staff or contractor; historical landscape architect and park maintenance staff.	\$15,000-\$25,000	

Determination of Eligibility for Mission 66 Resources

Project Description

This project involves the preparation of a Determination of Eligibility (DOE) for Wind Cave's numerous Mission 66-era designed resources. The DOE should address all Mission 66 designed resources versus addressing individual resources. The findings of the DOE should be integrated with the National Register Nomination process for the proposed SD 87 and proposed revised Wind Cave historic districts.

Additional Studies Needed

The NPS is currently addressing the significance of designed buildings and landscapes at the national and regional level. Other parks and regions have completed projects that address the issue of the significance of Mission 66 resources. These evaluations are in the form of HSRs, CLRs, DOEs, and National Register-level evaluations. The NPS is in the process of collecting studies involving evaluations of Mission 66 resources. In addition, national and regional context studies are in progress. The DOE process at Wind Cave National Park will necessarily involve coordination and consultation of these other NPS efforts.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Contact, coordinate with and consult with other NPS entities.	NPS or contractor; regional and park cultural resource specialists.		
2. Preparation of DOE.	NPS or contractor; regional and park cultural resource specialists	\$20,000-\$30,000	

National Register of Historic Places Nomination for the SD 87 Historic District

Project Description

This project involves preparing a National Register Nomination for the SD 87 Historic District proposed in this CLR. Consideration should be given to incorporate the historic SD 87 corridor within a larger historic district, including all historic scenic roads within the Black Hills that are related to and interconnect with Custer State Park, Mount Rushmore National Memorial, and Wind Cave National Park. Placing the Wind Cave National Park section of SD 87 within such a historic district is preferable and would allow for the evaluation of this section as part of a complete system versus a stand-alone segment. This project should be undertaken in coordination with any South Dakota state agencies that have an interest in the affected road systems and their preservation, such as the state's transportation and state park agencies and the State Historic Preservation Officer (SHPO). In addition, interested groups and parties should be consulted.

Additional Studies Needed

It may be preferable to complete a DOE. However, this CLR includes sufficient data for the SHPO to determine the eligibility of the proposed district.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. SHPO review of CLR or a DOE to determine eligibility.	NPS regional and park cultural resource specialists.		
2. Preparation of National Register Nomination.	NPS staff or contractor; regional and park cultural resource specialists.	\$25,000-\$40,000	This is the fee range for completing a National Register Nomination for the SD 87 segment in the park and does not address costs associated with addressing the larger system of historic roads.

Revise the Wind Cave Historic District Nomination

Project Description

This project involves revising the existing Wind Cave Historic District National Register Nomination to include an expanded historic district and revised historical documentation and identification of contributing resources based on recommendations in this CLR. Consideration should be given to the possibility of cooperating with the National Forest Service to determine if lands formerly a part of Wind Cave National Park and within their jurisdiction should be evaluated for inclusion in the proposed revised historic district.

Additional Studies Needed

It may be preferable to complete a DOE. However, this CLR includes sufficient data for the SHPO to determine the eligibility of the proposed revised district.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. SHPO review of CLR or a DOE to determine eligibility.	NPS regional and park cultural resource specialists.		
2. Preparation of National Register Nomination.	NPS staff or contractor; regional and park cultural resource specialists.	\$35,000-\$50,000	This is the fee range for completing a National Register Nomination for the proposed revised historic district in the park and does not address costs associated with addressing National Forest lands.

Invasive Plant Species Monitoring and Control Plan

Project Description

This project involves the preparation of a plan for the monitoring, control, and removal of invasive plant species that threaten the park’s ecosystems and cultural landscape. The park has already developed data to support plan preparation and has already undertaken physical measures to control invasive plant species. This project should be viewed as a continuation and enhancement of current efforts and practices. The plan should build on existing GIS data resulting in a digital plan that is updated and revised on a continual basis. The invasive plant control plan for the park should integrate the data and address the procedures of all on-going efforts to control invasive exotic plants. In addition, all efforts toward rehabilitating the CCC-period plantings and native plant communities in developed areas should be coordinated with plan preparation. The scope of the monitoring and control plan should include identification of types and locations of invasive exotic plant species present in the park. This data should be used to support control measures and assist in long-term monitoring. The plan would include a detailed description of specific, appropriate methods of control and removal based on knowledge of each invasive plant species, the extent to which they exist in and harm native vegetation, and local or regional efforts to contain them. Prior to implementing control methods, develop a monitoring system that will identify areas where control methods have been insufficient and/or successful, and where new invasive plants occur. Carefully consider the potential impact of eradication measures on aboveground and underground resources.

Additional Studies Needed

Consideration should be given to investigating potential herbicides that will not impact sensitive aboveground and underground ecosystems. Scientific data should support the selection of a low- or no-impact chemical treatment process. The employment of a chemical approach to control and eliminate woody vegetation should not impact historic building materials.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Preparation of the monitoring and control plan.	Regional and park natural resource management staff, landscape architect.		
2. Monitoring of field conditions and updating of the plan.	Park natural resource management staff.		

Repair Stone Barrier Walls at Administration Building Parking Lot

Project Description

The condition of the stone barrier walls at the parking lot includes loose and dislodged stones, cracking, and failed mortar. These conditions may be the result of age, improper design, improper construction, use, and drainage problems. This project includes a physical investigation of the walls to identify underlying causes of current conditions, such as drainage or foundation problems. Repairs should include resetting of existing stones, replacement of stone where necessary, and repair of mortar joints. This project should be implemented based on the completion of the recommended HSR for the Administration Building and should be coordinated with efforts to remove vegetation from the structures.

Additional Studies Needed

This project should be completed based on the recommended HSR for the Administration Building. In addition, special investigations may be required depending on the findings of the HSR. These could include mortar testing, destructive testing to determine the source of any structure problems, and drainage analysis.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Complete any required special investigations.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.		Costs depend on the final scope of work.
2. Complete design through construction documents.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.	\$25,000-\$50,000	Fees depend on the final scope of work.
3. Construction phase.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator, preservation tradespersons.	750 l.f. @ \$125/l.f.- \$260/l.f. \$100,000-\$200,000	Costs depend on the final scope of work.

Repair Footbridge at Administration Building/Visitor Center

Project Description

The condition of the stone and wood footbridge includes loose, settled, and dislodged stones, cracking, and failed mortar. These conditions may be the result of age, improper design, improper construction, use, and drainage problems. The wood timbers may also exhibit problems and should be investigated for rot, cracking, and other problems. This project includes a physical investigation of the stone and wood structure to identify underlying causes of current conditions, such as drainage or foundation problems, vegetation, and shade. Repairs should include resetting of existing stones, replacement of stones where necessary, and repair of mortar joints. This project should be implemented based on the completion of the HSR for the Administration Building and should be coordinated with efforts to remove vegetation from the structure.

Additional Studies Needed

This project should be completed based on the recommended HSR for the Administration Building. In addition, special investigations may be required depending on the findings of the HSR. These could include mortar testing, destructive testing to determine the source any structure problems, and drainage analysis.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Complete any required special investigations.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.		Costs depend on the final scope of work.
2. Complete design through construction documents.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.	\$15,000-\$25,000	Fees depend on the final scope of work.
3. Construction phase.	NPS or contractor; historical architects, historical landscape architects, engineers, building materials conservators, preservation tradespersons.	\$50,000-\$100,000	Costs depend on the final scope of work.

Repair Rock-faced Culverts

Project Description

The rock headwalls of culverts in the Headquarters Area are deteriorated, with loose stones and vegetative growth in and around the structures. This project begins with an investigation into the structural and drainage conditions of the headwalls and also the culverts. This includes identifying joint failures and areas of scouring in culverts and ditches that may be undermining the stone structures. Repairs would include resetting of existing stones and addition of new stone where necessary, and re-pointing of mortar joints. Every effort should be made to retain the historic stone materials, and match new stone, mortar, and joints to existing materials. Cleaning of stone and mortar surfaces should be carried out by hand, using substances that have been tested so as to ensure they will not harm aboveground or underground resources or damage the stone or mortar. The project also includes removal of vegetation from in and around the rock-faced culverts. Removal of vegetation should be carried out by hand or mechanically. If chemical means are necessary, use only substances that have been tested to ensure they will not harm aboveground or underground resources. If restoring the culverts to their historical condition is not feasible or sufficient to resolve deterioration issues, undertake a new design to resolve the problems while preserving as much of the original materials and appearance of the culvert as possible. Use local stone to line ditches if riprap is required. Grouting local stone is preferable to concrete-lined ditches.

Additional Studies Needed

No additional studies are recommended at this time.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Complete any required special investigations.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.		Costs depend on the final scope of work.
2. Complete design through construction documents.	NPS or contractor; historical architect, historical landscape architect, engineer, building materials conservator.	\$10,000-\$30,000	Fees depend on the final scope of work.
3. Construction phase.	NPS or contractor; historical architects, historical landscape architects, engineers, building materials conservators, preservation tradespersons.	\$40,000-\$125,000	Costs depend on the final scope of work.

Repair Low Stone Retaining Wall Along Concrete Walk in Wind Cave Canyon

Project Description

The low stone retaining wall edging the recently constructed concrete walk in Wind Cave Canyon has become obscured by overgrown vegetation, and by successive layers of path surfacing and soil accumulation over time. The section that needs to be addressed is between the Walk-in Entrance and the north end of the Administration Building. Though obscured in places, much of the face of the wall remains and should be repaired. It is not known whether the wall is continuous or in segments. This project includes a physical investigation of the wall's condition to determine any underlying structural problems and the extent of other condition issues. Repairs should include resetting of existing stones and replacement of missing stones where necessary, re-pointing of mortar joints as required, removal of vegetation in and abutting the wall, and cleaning of the wall. Every effort should be made to retain the stone materials, and match new stone, mortar, and joints to existing materials. The project also includes removal of overgrown vegetation from in and around the wall to ensure vegetation does not cause damage and also to increase visibility of the wall. Removal of vegetation and cleaning of stone and mortar surfaces should be carried out by hand, using substances that have been tested to ensure they will not harm aboveground or underground resources or damage the stone or mortar. In addition, any asphalt found in the course of this work should be removed and disposed of off-site. Retain and protect the recent concrete walk throughout the project area.

Additional Studies Needed

No additional studies are recommended at this time. The structural investigation and design work could be completed without a detailed survey since all work would likely focus on repair of the wall.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Physical investigation of structural problems.	NPS or contractor; civil engineer, historical landscape architect, building materials conservator.	\$1,500-\$2,000	
2. Design through construction documentation.	Historical landscape architect, civil engineer, building materials conservator.	\$8,000-\$12,000	The documentation should focus on specifications and annotated existing conditions photographs.
3. Construction phase.	NPS staff or contractor; historical landscape architect, qualified preservation tradespersons.	Assume 500 l.f. @ \$80 per l.f. \$40,000	
4. Archeological monitoring.	NPS archeologist.		

Rehabilitate Plantings within Wind Cave Canyon in the Headquarters Area

Project Description

This section of Wind Cave Canyon currently has overgrown vegetation, including invasive exotic species and overgrown thickets of introduced and volunteer native vegetation. The final scope of this project should be based on the park’s Vegetation Management Plan for the Headquarters Area when complete. In general, the project should include the selective removal of plants, including all invasive exotics, and thinning or removal of thickets of overgrown native vegetation and woody plants in the project area. Removal of vegetation should be carried out by hand or mechanically. If chemical means are necessary, only substances that have been tested to ensure they will not harm aboveground or underground resources should be used. New plantings including a variety of appropriate native species would be added. This project also includes opportunities for temporary and/or permanent interpretation of native plants and the challenges of balancing historic preservation and ecological restoration. Existing plant identification signs could be retained and repaired; additional signs of the same type could be added. Alternatively, these small signs could be retained and new waysides with more information added; or the small signs could be eliminated and all information about the plantings conveyed on new waysides.

Additional Studies Needed

This project should be undertaken after the completion of the Headquarters Area Vegetation Management Plan. Design should be coordinated with park interpretive plans and/or planning.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Design through construction documentation.	NPS or contractor; historical landscape architect, park natural and cultural resource staff, park chief of interpretation, exhibit designer.	\$25,000-\$45,000	The Harpers Ferry Center could undertake wayside exhibit planning, design, and production work.
2. Construction Phase.	Contractor.	Selective clearing; assume 5 acres: \$25,000 Shrub plantings; assume 4,000 shrubs: \$140,000 Tree plantings; assume 100 trees: \$30,000 Signs/exhibits: \$10,000	
3. Archeological monitoring.	NPS archeologist.		

Traditional Cultural Property National Register Nomination for Wind Cave National Park

Project Description

Wind Cave is likely eligible for listing on the National Register of Historic Places as a traditional cultural property. This project includes the preparation of a National Register Nomination for the park as a whole. This project could be completed as a single document for the entire park, or as a series of documents covering areas or features of particular significance. The project requires qualified anthropologists and ethnographers to research and compile documentation and complete and submit the National Register Nomination process.

Additional Studies Needed

Additional research may be required; however, much relevant information has already been gathered in a broad and detailed 2003 ethnographic study by Patricia Albers, *The Home of the Bison: An Ethnographic and Ethnohistorical Study of Traditional Cultural Affiliations to Wind Cave National Park* (September 29, 2003: U.S. National Park Service).

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Complete the nomination.	NPS or contractor; regional and park culture resource staff.	\$50,000-\$75,000	Fee depends on the study area and level of communications and consultations with tribes.

Remove Exotic Vegetation at the Game Preserve Headquarters Site

Project Description

This project involves removal of exotic invasive and non-native plants at the Game Preserve Headquarters site where there is a concentration of remnants of introduced plants. Because some of these plants are associated with historic cultural uses the project involves documentation of plants prior to removal. Removal should be undertaken based on knowledge of each species, and appropriate methods to eradicate or remove them. Removal of vegetation should be primarily carried out mechanically. If chemical means are necessary, use only substances that have been tested to ensure they will not harm aboveground or underground resources. Documentation and removal of plants should be followed up by revegetation of areas with appropriate native plants. An ongoing control and maintenance regime should be implemented as needed to support the establishment of native vegetation on the Game Preserve Headquarters site. This project should be coordinated with like efforts throughout the park. The obliteration of constructed earthen terrain features associated with the Game Preserve Headquarters should only be undertaken if required to maintain the health of native plant communities.

Additional Studies Needed

Work should be based on the completion of the recommended Invasive Plant Species Monitoring and Control Plan for the park.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Documentation of cultural vegetation prior to removal.	Park cultural and natural resource specialists.		
2. Eradication of plants.	Park staff or contractor; cultural and natural resource specialist, maintenance staff.	Assume one acre @ \$2,000-\$3,000/acre	
3. Disturbed land reclamation with native plants.	Park staff or contractor; natural resource specialist, maintenance staff.	Assume one acre @ \$8,000-\$10,000/acre	
4. Monitor removal and maintain re-vegetated areas.	Park natural resource specialist and maintenance staff, archeologist.		

Develop a New Parking Concept for the Historic Housing Area

Project Description

The Historic Housing Area's system of roads is a major contributing feature to the historic character of the Headquarters Area. Currently, parking in this area has resulted in some problems, such as vehicles parked off the pavement and on grass surface areas. This project includes the assessment of parking needs and development of alternative solutions. A minimally intrusive solution for current parking needs would be developed, while preserving the historic circulation features in the Historic Housing Area. Consideration should be taken to protect sensitive features and utilize the recommendations identified in this CLR, including considering potential impacts on the character of adjacent historic features; avoiding alterations to the widths and alignments of roads in this area; protection of lawns and planted areas from damage; retention of stone curbing; and views from visitor areas.

Additional Studies Needed

Parking needs assessment and accessibility study.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Parking assessment and plan.	NPS staff or contractor; historical landscape architect, cultural and natural resource specialists.	\$ 10,000-\$20,000	Fee depends on the extent of the needs assessment and the number of options explored.

Screen Plantings at the Mixing Circle

Project Description

The Mixing Circle is a materials storage and staging area that should be buffered to reduce visual intrusions in areas accessed by visitors in vehicles and/or on foot. This project involves mitigating views through native plantings. The recommended method of screening involves the installation of native evergreen plantings at varying heights along an alignment between the Mixing Circle and the road corridors.

Additional Studies Needed

A viewshed study should be undertaken to determine the visible areas of existing and proposed buildings and structures at the Mixing Circle area to ensure that screen plantings will be effective when the plantings are 10-15 years of age. The viewshed study would involve establishing lines of sight from along the affected roadways. The lines of sight would then be documented using field photography and site maps. Consideration should also be given to potential future uses of and changes to the site, in concert with park-wide planning efforts. If digital elevational data is available, GIS could be utilized to undertake a seen area analysis (viewshed study).

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Viewshed study.	NPS or contractor; landscape architect.	\$1,000- \$3,000	Fee depends on the method used to analyze the viewshed.
2. Design through construction documents.	NPS or contractor; landscape architect, park staff.	\$5,000-\$8,000	
3. Construction phase.	Park staff or contractor; qualified maintenance staff.	Assume 40-50 native evergreen trees, 10-15 ft. \$20,000-\$25,000	
4. Monitor ground-disturbing activities.	NPS archeologist.		

Screen Plantings at the Maintenance Area

Project Description

The Maintenance Area buildings and materials storage areas are highly visible from the U.S. 385 scenic road corridor. Though the buildings are not visually-intrusive, the vehicles and services areas do intrude into the visitor experience. This project involves mitigating less desirable views through native plantings. The recommended method of screening involves the installation of native evergreen plantings at varying heights between the eastern perimeter of the Maintenance Area and the U.S. 385 corridor.

Additional Studies Needed

A viewshed study should be undertaken to determine the visible areas of existing and proposed buildings and structures to ensure that screen plantings will be effective at the time the plantings are 10-15 years of age. The viewshed study would involve establishing lines of sight from along the affected roadway. The lines of sight would then be documented using field photography and site maps. Consideration should also be given to potential future uses of and changes to the site, in concert with park-wide planning efforts. If digital elevational data is available GIS could be utilized to undertake a seen area analysis (viewshed study).

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Viewshed study.	NPS or contractor; landscape architect.	\$1,000- \$3,000	Fee depends on the method used to analyze the viewshed.
2. Design through construction documents.	NPS or contractor; landscape architect, park staff	\$5,000-\$8,000	
3. Construction phase.	Park staff or contractor; qualified maintenance staff.	Assume 40-50 native evergreen trees, 10-15 ft. \$20,000-\$25,000	
4. Monitor ground-disturbing activities.	NPS archeologist.		

Rehabilitate Designed Vista of Beaver Creek Bridge

Project Description

This project involves rehabilitating a historic vista northward from the overlook point on a hairpin curve of SD 87. The vista to be enhanced through selective clearing and tree pruning should be demarcated from the overlook and bridge ends. The demarcated areas should be carefully field-checked to ensure no natural or cultural resources will be adversely affected. Thinning and clearing of woodland vegetation should be selective and undertaken in increments starting with minimal changes until an acceptable view is created. Removal of vegetation should be carried out mechanically. Continue this approach when controlling woody plant regeneration after clearing. Monitor cleared areas for invasive plants subsequent to clearing activities.

Additional Studies Needed

No additional studies are required.

Project Implementation Process:

Task	Expertise Needed	Budget Data	Notes
1. Selective clearing plan.	NPS or contractor; landscape architect, park cultural and natural resource specialists, park maintenance staff.	\$5,000-\$10,000	Fee depends on the level of fieldwork and the level of detail of the plan.
2. Mark trees and vegetation to be selectively cleared and pruned.	NPS or contractor; landscape architect, park cultural and natural resource specialists, park maintenance staff.	\$1,000-\$3,000	Fee depends on the level of fieldwork.
3. Tree thinning – sparse clearing and pruning.	NPS or contractor; landscape architect, park natural resource specialists, park maintenance staff.	\$4000-8000/acre	
4. Monitoring of selectively cleared areas.	Park natural resource specialists, park maintenance staff, archeologist.		



APPENDIX A

LANDSCAPE FEATURE INVENTORY

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods			
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC	Condition
Natural System and Features						
P-N-01	Gobbler Pass	C	•			Good
P-N-02	Gobbler Ridge	C	•			Good
P-N-03	Gobbler Canyon	C	•			Good
P-N-04	Limestone Spring	C	•			Good
P-N-05	Fossil Ridge	C	•			Good
P-N-06	Windy Point	C	•			Good
P-N-07	Bison Flats	C	•			Good
P-N-08	Cottonwood Creek	C	•			Good
P-N-09	Elk Mountain	C	•			Good
P-N-10	Wind Cave Canyon	C	•			Fair
P-N-11	Prairie Dog Canyon	C	•			Good
P-N-12	Negro Canyon	C	•			Good
P-N-13	Lookout Point	C	•			Good
P-N-14	Cold Spring Creek	C	•			Good
P-N-15	Beaver Creek	C	•			Good
P-N-16	Reaves Gulch	C	•			Good
P-N-17	Curley Canyon	C	•			Good
P-N-18	Limestone Canyon	C	•			Good
P-N-19	Rankin Ridge	C	•			Good
P-N-20	Highland Creek	C	•			Good
P-N-21	Dry Creek	C	•			Good
P-N-22	Red Valley	C	•			Good
P-N-23	Fuson Canyon	C	•			Good
P-N-24	Boland Ridge	C	•			Good
P-N-25	Blacktail Creek	C	•			Good
P-N-26	Wetlands	C	•			Good
P-N-27	Sinkholes	C	•			Good
P-N-28	Caves	C	•			Good
P-N-29	Buffalo Wallows	C	•			Good
P-N-30	Ponderosa Pine Forest	C	•			Good
P-N-31	Mixed-Grass Prairie	C	•			Good
P-N-32	Riparian Vegetation	C	•			Good
P-N-33	Other Springs	C	•			Good
Spatial Organization						
P-SO-01	U.S. 385	C	•	•	•	Good
P-SO-02	SD 87	C	•	•		Good
P-SO-03	NPS 5	C	•			Good

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods				Condition
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC		
P-SO-04	NPS 6	C	•			Good	
P-SO-05	Trails	UD	•	•	•	Good	
P-SO-06	Hills and Valleys	C	•			Good	
P-SO-07	Prairie	C	•			Good	
P-SO-08	Fenced Research Areas	NC			•	Good	
P-SO-09	Corral area	NC			•	Good	
Circulation							
P-C-01	U.S. 385	C	•	•	•	Good	
P-C-02	SD 87	C	•	•	•	Good	
P-C-03	NPS 5	C	•	•		Fair	
P-C-04	NPS 6	C	•	•		Fair	
P-C-05	Pull-offs/Parking	UD		•	•	Fair	
P-C-06	Wildlife Handling Facility Access Road	UD	•	•		Poor	
P-C-07	Rankin Ridge Access Road and Parking	NC			1960	Fair	
P-C-08	Centennial Trailhead Access Road & Parking	NC			•	Fair	
P-C-09	Wildlife Preserve Access Road	C	•	•		Fair	
P-C-10	County Route 391	UD				Good	
P-C-11	Residential Driveway	C	•			Fair	
P-C-12	Water Utilities Access Road (same as P-C-16)	C	•			Good	
P-C-13	Minor County Roads	UD				Good	
P-C-14	East Bison Flats Trail	UD				Good	
P-C-15	Cold Brook Canyon Trail	C	•	•	•	Good	
P-C-16	Wind Cave Canyon Trail	C	•	•	•	Good	
P-C-17	Lookout Point Trail	C	•	•	•	Good	
P-C-18	Rankin Ridge Trail	NC			•	Good	
P-C-19	Centennial Trail	NC			1988-89	Good	
P-C-20	Sanctuary Trail	UD				Good	
P-C-21	Highland Creek Trail	UD				Good	
P-C-22	Boland Ridge Trail	UD				Good	
P-C-23	Road Traces	UD	•	•		Poor	
Topographic Modifications							
P-T-01	Road Corridors	C	•	•		Good	
P-T-02	Old Norbeck Dam	C		•		Poor	
P-T-03	Quarries	C	•	•		Poor	
P-T-04	Building Sites	C	•	•		Poor	

C= Contributing; NC= Non-Contributing; UD = Undetermined		Associated Historic Periods				
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC	Condition
Vegetation						
P-Ve-01	Remnants at Game Preserve	C	•	•		Poor
Buildings and Structures						
P-B-01	Cabin at Wildlife Handling Facility	NC			•	Good
P-B-02	Storage Building at Fire Tower	NC			•	Good
P-S-01	Rankin Ridge Fire Tower	NC			•	Good
P-S-02	Beaver Creek Bridge (HS 99)	C			1930	Good
P-S-03	Pig Tail Bridge (HS 98)	C			1930	Good
P-S-04	Stockpens, Cattle Chutes, etc.	NC			•	Fair
P-S-05	Booth at Shooting Range	NC			•	Poor
P-S-06	Pump House	NC			•	Good
P-S-07	Stone/Timber Shelter	NC			•	Poor
P-S-08	USGS Gauging Station	NC			•	Good
P-S-09	Timber Bridge	UD				Poor
Small-Scale Features						
P-SS-01	Stone Entrance Gates	NC			•	Good
P-SS-02	Cattle Guards	NC			•	Good
P-SS-03	Entrance Signs	NC			•	Good
P-SS-04	Informational Signs	NC			•	Good
P-SS-05	Traffic Signs	NC			•	Good
P-SS-06	Interpretive Signs	UD			•	Good
P-SS-07	Post and Wire Fencing	UD			•	Good
P-SS-08	Trail Markers	NC			•	Good
P-SS-09	Wheelstops	NC			•	Good
P-SS-10	Curbs	NC			•	Good
P-SS-11	Metal Gates	NC			•	Good
P-SS-12	Timber Bench on Rankin Ridge Trail	NC			•	Good
P-SS-13	Stone and Timber Steps on Rankin Ridge Trail	NC			•	Good
P-SS-14	Concrete Wildlife Tanks	NC			•	Good
P-SS-15	Culverts	UD			•	Good
P-SS-16	Foot Bridges	NC			•	Good
P-SS-17	Hydrant at Game Preserve	UD			•	Good
P-SS-18	Cattle Gates	NC			•	Good
Views and Vistas						
P-V-01	Along U.S. 385	C	•	•		Good
P-V-02	Along SD 87	C	•	•		Good

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods			
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC	Condition
P-V-03	Along NPS 5	C	•	•		Good
P-V-04	Along NPS 6	C	•	•		Good
P-V-05	From Rankin Ridge Fire Tower	NC			•	Good

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods				Condition
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC		
Natural System and Features							
H-N-01	Cave Openings/Blowholes	C	•			Good	
H-N-02	Wind Cave Canyon	C	•	•		Fair	
H-N-03	Elk Mountain	C	•			Good	
H-N-04	Cottonwood Creek	C	•			Good	
H-N-05	Unnamed Drainages	C	•			Good	
H-N-06	Ponderosa Pine Forest	C	•			Good	
H-N-07	Mixed-grass Prairie	C	•			Good	
H-N-08	Riparian Vegetation	C	•			Fair	
Spatial Organization							
H-SO-01	U.S. 385 Corridor	C		•	•	Good	
H-SO-02	Headquarters Road Corridor	C		•	•	Good	
H-SO-03	Headquarters Surrounds	C		•	•	Good	
H-SO-04	Residence Area Surrounds	NC		•		Good	
H-SO-05	Maintenance Area Surrounds	C		•		Good	
H-SO-06	Picnic Area Surrounds	C		•		Good	
H-SO-07	Campground Road Corridor	NC			•	Good	
H-SO-08	Campground Surrounds	NC			•	Good	
H-SO-09	Mixing Circle Surrounds	UD		•		Poor	
H-SO-10	Mixing Circle Service Road Corridor	C	•	•		Good	
H-SO-11	Road Corridor to Water Storage/Pump House	C	•	•		Good	
H-SO-12	Wastewater Lagoon Surrounds	NC			•	Good	
H-SO-13	Prairie	C	•			Good	
Circulation							
H-C-01	U.S. 385	NC		•	•	Good	
H-C-02	Headquarters Road (HS-93)	C		1938		Good	
H-C-03	Headquarters Parking Lot	C		•	•	Good	
H-C-04	Historic Residences Access Road	C		•		Good	
H-C-05	Maintenance Yard	C		•		Good	
H-C-06	Maintenance Road	C		•		Good	
H-C-07	Residential Loop	NC			•	Good	
H-C-08	Residential Parking Lots	NC			•	Good	
H-C-09	Wastewater Lagoons Access Road	C	•			Fair	
H-C-10	Underground Water Tanks Service Road	C				Good	
H-C-11	Mixing Circle Service Road	C	•	•		Fair	
H-C-12	Campground Road	NC			1963	Good	
H-C-13	Campground Loop A	NC			1963	Good	
H-C-14	Campground Loop B	NC			1963	Good	

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods				Condition
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC		
H-C-15	Campground Loop C	NC			1963	Good	
H-C-16	Picnic Area Drive	C	•			Good	
H-C-17	Headquarters Walks	C		•	•	Good	
H-C-18	Campground Walks	NC			•	Good	
H-C-19	Residential Walks	NC			•	Good	
H-C-20	Prairie Vista Trail	NC			•	Good	
H-C-21	Elk Mountain Trail	NC			•	Good	
Topographic Modifications							
H-T-01	Grading for Roads and Parking	C	•	•	•	Good	
H-T-02	Building Sites	UD	•	•		Fair	
H-T-03	Wastewater Lagoons	NC			•	Good	
H-T-04	Buried Water Tanks	NC			•	?	
Vegetation							
H-Ve-01	CCC Plantings at Headquarters Area	C	•			Fair	
H-Ve-02	Maintenance Area Landscape	C	•			Poor	
H-Ve-03	Residential Area Landscape	NC			•	Good	
H-Ve-04	Campground Landscape	NC				Good	
H-Ve-05	Mixing Circle Landscape	UD				Poor	
H-Ve-06	McDonald Gravesite Lilacs	C		•		Poor	
Buildings and Structures							
H-B-01	Administration Building / Visitor Center (HS-1)	C		1935-36		Good	
H-B-02	Elevator Building (HS-2)	C		1938		Good	
H-B-03	Superintendent's Residence (HS-3)	C		1934		Fair	
H-B-04	Superintendent's Cottage (HS-4)	C	1905			Good	
H-B-05	Employee Residence (Ranger Cabin) (HS-5)	C	1924			Fair	
H-B-06	Employee Residence (HS-6)	C		1934		Good	
H-B-07	Employee Residence (HS-7)	C	1932			Fair	
H-B-08	Employee Residence (Dormitory/Mess) (HS-8)	C	1931			Fair	
H-B-09	Garage (Machine Shop) (HS-11)	C		1934		Fair	
H-B-10	Garage (Fire Cache) (HS-12)	C		1937		Fair	
H-B-11	Storage Building (Power House) (HS-13)	C	1931			Fair	
H-B-12	VIP Center (Power House) (HS-15)	C		1935		Fair	
H-B-13	Gas Station/Oil House (HS-16)	C		1940		Fair	
H-B-14	Garage A/Carpenter Shop (HS-17)	C		1939		Fair	
H-B-15	Garage C/Maintenance Shop (HS-18)	C		1934		Fair	
H-B-16	Storage Shed (HS-25)	C		1934		Good	
H-B-17	Seasonal Residence (CCC Bunkhouse) (HS-27)	C		1934		Poor	

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods				Condition
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC		
H-B-18	Paint Locker (Coal Shed) (HS-30)	C		1939		Good	
H-B-19	Residence (Quarters B-40)	NC			1989	Good	
H-B-20	Residence (Quarters B-41)	NC			1989	Good	
H-B-21	Apartment Building (Quarters B-42)	NC			1965	Good	
H-B-22	Apartment Building (Quarters B-43)	NC			1965	Good	
H-B-23	Apartment Building (Quarters B-44)	NC			1989	Good	
H-B-24	Picnic Area Comfort Station	NC			1997	Good	
H-B-25	Campground Tender's Residence	NC			1963	Good	
H-B-26	Campground Comfort Station	NC			1963	Good	
H-B-27	Campground Comfort Station	NC			1963	Good	
H-B-28	Campground Comfort Station	NC			1963	Good	
H-B-29	Campground Comfort Station	NC			1963	Good	
H-B-30	Campground Comfort Station	NC			1963	Good	
H-B-31	Pump House	UD				Good	
H-S-01	Walk-in Cave Entrance (HS 90)	C/NC		1935		Fair	
H-S-02	Amphitheater Stage	NC			1963	Good	
H-S-03	Amphitheater Projection Booth	NC			2004	Good	
H-S-04	Campground Woodshed	NC			1999	Good	
H-S-05	Campground Host Shed	NC			1998	Good	
H-S-06	Aboveground Water Tank	NC			1963	?	
H-S-07	Underground Water Tanks	NC	1903s			?	
H-S-08	Wastewater Lagoons	NC			1964	?	
H-S-09	Cave Tour Assembly Shelter	NC			1964	Good	
H-S-10	Administration Building / Visitor Center Pedestrian Brid	C		c.1935		Fair	
H-S-11	Picnic Area Stone Footbridge	UD				Fair	
H-S-12	Stone Barrier Walls (HS-94)	C		1937		Fair	
H-S-13	Rock Faced Culverts (HS-95)	C		1930s		Fair	
	Small-Scale Features						
H-SS-01	Metal Post and Wire Fencing	NC			•	Fair	
H-SS-02	Post and Rail Fencing	UD				Fair	
H-SS-03	Cattle Guards	NC			•	Good	
H-SS-04	Weather Station	NC			•	Good	
H-SS-05	Propane Tank	NC			•	Good	
H-SS-06	Overhead Lighting	UD				Fair	
H-SS-07	Flagpole	UD				Good	
H-SS-08	Fire Hydrants	NC			•	Good	
H-SS-09	Park Sign	NC			•	Good	
H-SS-10	Informational Signage	NC			•	Good	
H-SS-11	Interpretive Signage	UD			•	Good	

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods				Condition
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC		
H-SS-12	Benches	NC			•	Good	
H-SS-13	Trash Receptacles	NC			•	Good	
H-SS-14	Telephone Pedastals	NC			•	Good	
H-SS-15	Campground Site Furnishings	NC			•	Good	
H-SS-16	Benches at Amphitheater	NC			•	Good	
H-SS-17	Fire Rings at Amphitheater	NC			•	Good	
H-SS-18	Alvin McDonald's Memorial	C	•			Good	
H-SS-19	Materials at Mixing Circle	NC			•		
H-SS-20	Site Furnishings at Maintenance Area	NC			•	Good	
Views and Vistas							
H-V-01	Views from U.S. 385 Corridor	C		•	•	Good	
H-V-02	Views from Headquarters Road	C		•	•	Good	
H-V-03	Views from Vista Trail	C		•	•	Good	

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods			
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC	Condition
Natural Systems and Features						
C-N-01	Pahasapa Formation	C	•			Good
C-N-02	Passages	C	•	•	•	Good
C-N-03	Rooms	C	•	•	•	Good
C-N-03	Natural Cave Openings/Blowholes	C	•			Good
C-N-04	Speleothems	C	•			Good
C-N-05	Weathering Deposits	C	•			Good
C-N-06	Subterranean Lakes	C	•			Good
C-N-07	Cave Biota	C	•	•	•	Fair
C-N-08	Fossils	C	•			Good
Spatial Organization						
C-SO-01	Passages	C	•			Good
C-SO-02	Bridal Chamber (North Room)	C	•			Good
C-SO-03	Crystal Palace	C	•			Good
C-SO-04	Post Office	C	•			Good
C-SO-05	Roe's Misery	C	•			Good
C-SO-06	Beauty Parlor	C	•			Good
C-SO-07	Devil's Lookout	C	•			Good
C-SO-08	Methodist Church	C	•			Good
C-SO-09	Model Room (Oddfellows Hall)	C	•			Good
C-SO-10	Crossroads	C	•			Good
C-SO-11	Masonic Hall	C	•			Good
C-SO-12	Elks Room	C	•			Good
C-SO-13	Chert Room	C	•			Good
C-SO-14	Fairgrounds	C	•			Good
C-SO-15	Exposition Hall	C	•			Good
C-SO-16	Bachelor's Quarters	C	•			Good
C-SO-17	Garden of Eden	C	•			Good
C-SO-18	Eastern Star Room	C	•			Good
C-SO-19	Assembly Room	C	•			Good
C-SO-20	Three Way Stairs	C	•			Good
C-SO-21	Blue Grotto	C	•			Good
C-SO-22	Chamber de Norcutt	C	•			Good
C-SO-23	Catacombs	C	•			Good
C-SO-24	Pearly Gates	C	•			Good
C-SO-25	Badlands	C	•			Good

C= Contributing; NC= Non-Contributing; UD = Undetermined			Associated Historic Periods			
Map ID#	Feature	C/NC/UD	Pre NPS	CCC	Post CCC	Condition
Circulation						
C-C-01	Natural Entrance Tour Trail	C	•	•	•	Good
C-C-02	Fairgrounds Tour Trail	C	•	•	•	Good
C-C-03	Garden of Eden Tour Trail	C	•	•	•	Good
C-C-04	Candlelight Tour Trail	C	•	•	•	Good
C-C-05	Wild Cave Tour Trail	C	•	•	•	Good
C-C-06	Elevators	C		•		Good
C-C-07	Steps	C		•		Fair
Topographic Modifications						
C-T-01	Passage Enlargements	C	•	•	•	Good
Structures						
C-S-01	Elevator Shaft and Airlocks	C		•	•	Good
C-S-02	Concrete Retaining Structures	UD				Good
C-S-03	Chain-link Reinforcing	NC			•	Good
Small-Scale Features						
C-SS-01	Lights	NC			•	Poor
C-SS-02	Electrical Cabling	NC			•	Poor
C-SS-03	Transformer Boxes	NC			•	Poor
C-SS-04	Phone Boxes	NC			•	Fair
C-SS-04	Metal Gates	NC			•	Fair
C-SS-05	Handrails	C/NC	•	•	•	Fair
C-SS-05	Aluminum Steps	NC			•	Good
C-SS-06	Painted Survey Marks	C		•		Poor
C-SS-07	Metal Survey Markers	C		•		Good
C-SS-08	Wood Board Ladder	C	•			Poor
C-SS-09	Graffiti	C	•	•	•	Poor
C-SS-10	Construction Debris	UD	•	•	•	?
C-SS-11	Early Explorer Artifacts	C	•			?
C-SS-12	Benches	NC			•	Fair
C-SS-13	Trash Receptacles	NC			•	Fair
Views and Vistas						
C-V-01	Illuminated Areas	C	•	•	•	Fair



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PHOTOGRAPHS

All historic photographs were obtained from the digital photograph collection at the Archives and Library Collection, Wind Cave National Park. Accession numbers follow:

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