FORT LARNED

NATIONAL HISTORIC SITE • KANSAS

NATIONAL PARK SERVICE



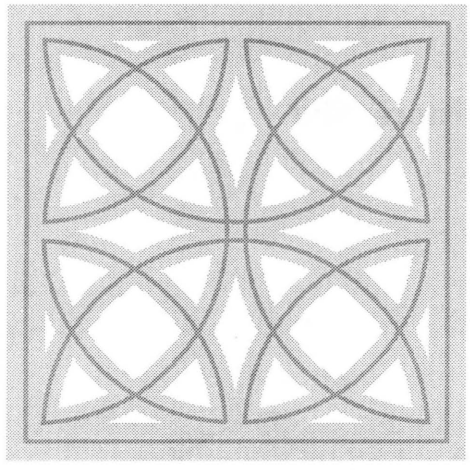
Cultural Landscape Report

FORT LARNED

NATIONAL HISTORIC SITE • KANSAS

National Park Service

United States Department of the Interior



Cultural Landscape Report

Quinn Evans / Architects ■ Land and Community Associates

MAY 1999

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Fort Larned Cultural Landscape Report

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Introduction

Fort Larned National Historic Site (NHS), which is administered by the National Park Service (NPS), U.S. Department of the Interior, is located six miles west of Larned, Kansas, adjacent to Kansas Route 156—the principal access route to the NHS *(Exhibit 1)*. The NHS includes two discontiguous units—a historic nineteenth-century military fort on the banks of the Pawnee River, and a 44-acre site six miles south of the fort that contains preserved ruts from a portion of the Santa Fe Trail, an important nineteenth-century transportation corridor. The core of the historic fort (approximately 22 acres) is the quadrangle of nine military buildings arranged around the historic parade ground. Historically the fort was a larger complex that included additional service and support structures, company gardens, and agricultural fields. The site includes 718.39 acres of land, including 410.46 acres in NPS fee simple ownership, 269.20 acres of scenic easements, and 38.73 acres owned by the state, most of which is the right-of-way for Route 156. The fort landscape includes 82 acres of riparian woodland and 324 acres of reconstructed prairie.

Fort Larned

Fort Larned is significant for its role in protecting travel along the Santa Fe Trail, which extended from Franklin, Missouri, to Santa Fe, New Mexico. A combination of factors, including the U.S. acquisition of new southwest territories following the Mexican War and activity associated with the 1849 and 1858 gold rushes, increased traffic along the trail and contributed to conflicts between new settlers and travelers and Native Americans in the area. Forts such as Larned were established in response to an increased need for security and defense, primarily for westward freight and mail shipments. Fort Larned, in cooperation with Fort Union and Fort Lyon, played a significant role in protecting commerce along the Santa Fe Trail.

Construction on the present Fort Larned site began in 1860 at a strategic bend in the Pawnee River. The site was selected in response to both natural characteristics and the need to protect travel on the Santa Fe Trail. The fort developed initially with adobe and frame structures which proved difficult to maintain in the severe central Kansas environment. Subsequently, these early buildings and structures were replaced with the existing complex of 1865–1868 sandstone buildings. Fort Larned offered travelers a safe resting place during long, hard journeys west as well as protection. Some trail users stopped at the fort to make repairs or replenish supplies at the sutler's store. From 1860, the fort provided guard detachments for mail stages and wagon trains; this role became more significant following the War Department's 1864 prohibition on travel west of Fort Larned without an armed escort.

An agency of the Indian Bureau (Department of the Interior) was located at Fort Larned through most of the 1860s. A separate and distinct operation without military involvement, the agency's major responsibility was distribution of annuities to Indian tribes in payment for maintaining peace and

staying on reservations. Scattered tribes of Cheyenne, Arapahoe, Kiowa, and Comanche camped on the prairie near the fort where they came to receive their supply allotments.

Fort Larned was associated with significant military policies, events, and operations during the 1860s. Major General Winfield S. Hancock used the fort as his base in 1867 for the unsuccessful campaign against the Plains tribes which intensified hostilities with Native Americans. The defeat of Black Kettle's Cheyennes on November 27, 1868, ended organized Indian hostilities in the Fort Larned area.

As a result of the Fort Larned agency closing in 1868, Native Americans in the vicinity moved to new reservations in Indian Territory. This migration reduced responsibilities for the fort; soldiers from Fort Larned, however, did provide protection for workers constructing the Santa Fe Railroad in the early 1870s. In July 1878 all personnel except a small guard force were reassigned from the fort to other posts. On March 26, 1883, the Fort Larned reservation was transferred from the War Department to the General Land Office, U.S. Department of the Interior. The fort's buildings and land were sold at public auction the following year and adapted for use as a private ranch.

The fort, which was designated a National Historic Landmark in 1961, was authorized for acquisition by Congress in 1964 and acquired by NPS in 1966. NPS is restoring the existing complex of buildings to represent its military use and appearance during the period from 1868 to 1878. In 1969 NPS undertook a prairie reconstruction of the agricultural fields adjacent to the fort to re-create the natural appearance of fort's environs during the historic period. The blockhouse was reconstructed in 1988.

Santa Fe Trail Ruts

The portion of the Santa Fe Trail within the NHS near Fort Larned retains deep-worn wagon ruts that still mark the trail route. The trail site includes a viewing platform that provides visitors with an overall view of the trail and its environs. The site also includes buffalo wallows—indentations in the otherwise nearly level landscape. A variety of regional wildlife—prairie dogs, meadow larks, burrowing owls, hawks, and occasionally an eagle—can be observed in the Trail Ruts area. Presently, the large prairie dog population in the vicinity is perceived as a threat to the preservation of the historic ruts.

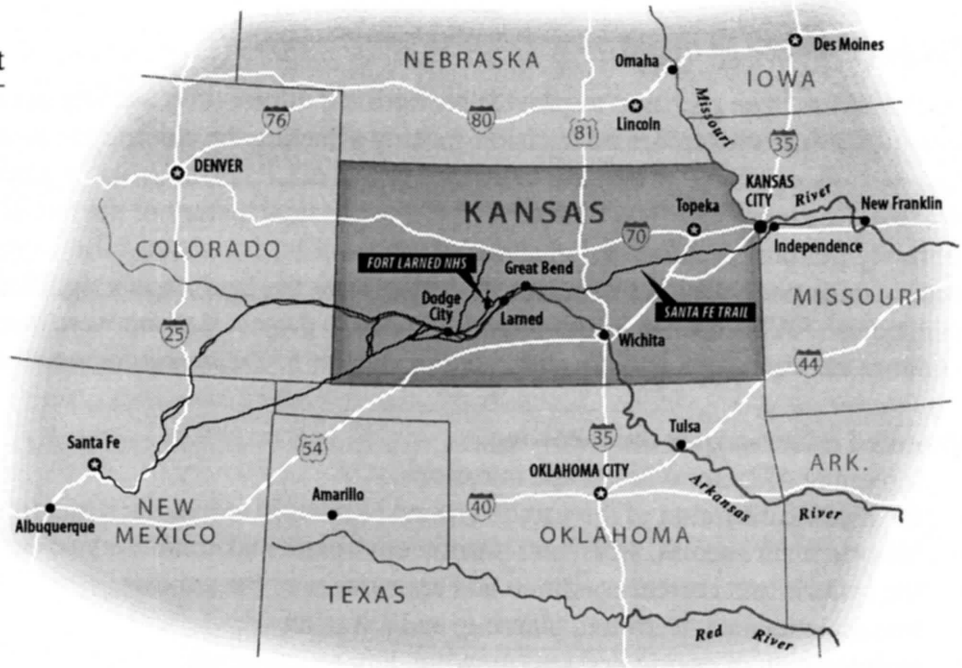
NHS and Project Boundaries

Fort Larned National Historic Site lies primarily within section 32 of township 21S, range 17W. The project boundaries include all land contained within the NHS and also includes all land visible from the NHS. NPS holds and administers protective easements on some of these adjacent and visible areas. The northern boundary of the NHS extends east and west along a line 400' north of the centerline of Kansas Route 156. On the east, the boundary extends south along the line between sections 29 and 28 and sections 32 and 33, then moves west 0.25 mile and continues south. The southern boundary is an east–west line 0.25 mile north of the boundary between township 21S and 22S, except for an additional rectangular parcel at the southeast corner of the NHS. The western boundary is a north–south line 0.125 mile west of the boundary between sections 31 and 32, with a trapezoidal parcel at the northwest corner. The non-contiguous portion of the NHS, the trail ruts unit, is a rectangular parcel approximately 2000' north-to-south by 1000' east-to-west, lying near the southwest corner of section 19, township 22S, range 17W.

Regional Context

N

Scale: 1" = 180 miles



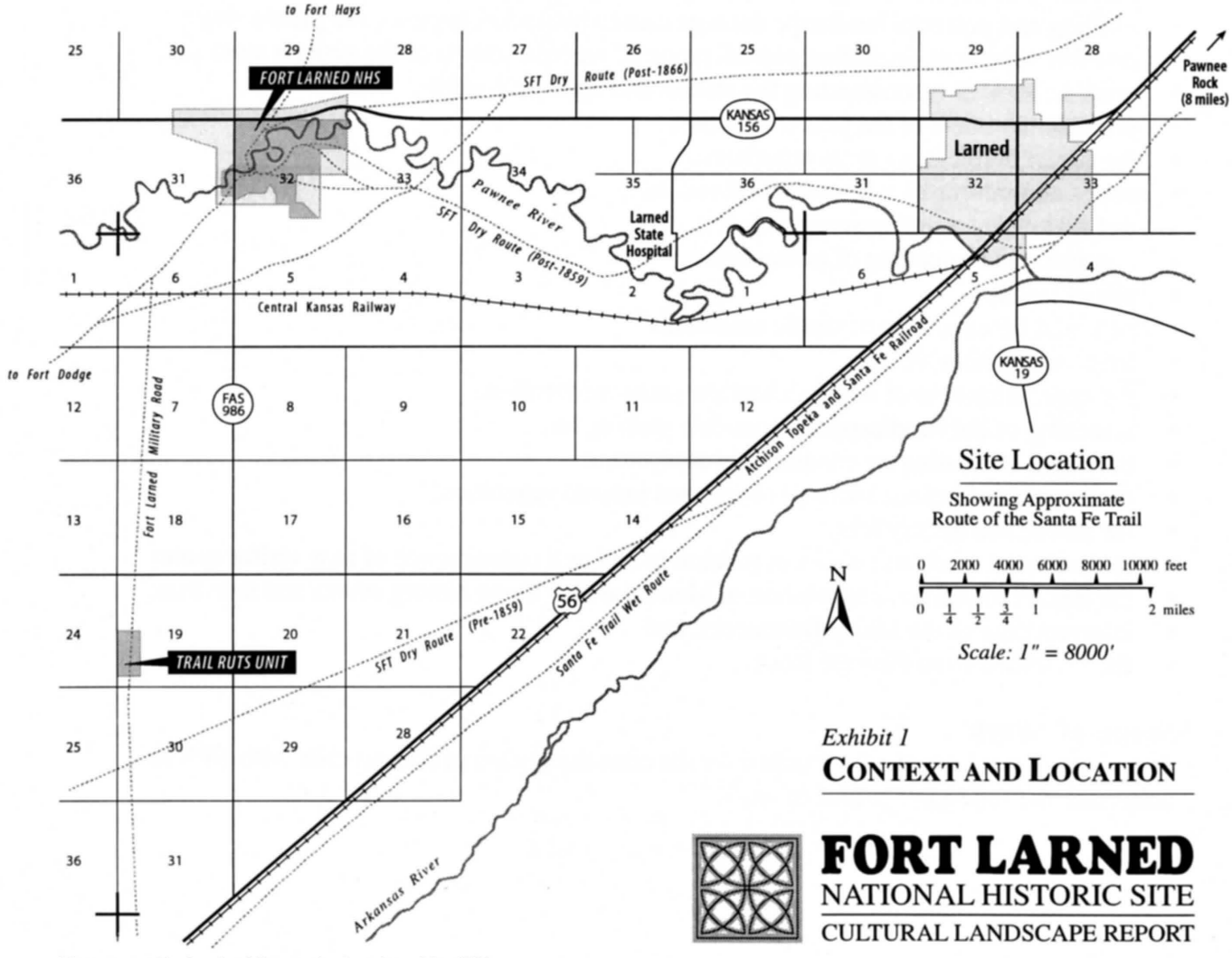


Exhibit 1

CONTEXT AND LOCATION

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

Maps prepared by Land and Community Associates, May 1996.
Revised June 1997, July 1998, November 1998, April 1999.

Project Background

This CLR has been prepared to provide background information and site documentation that can serve as the basis for informed decision-making affecting the cultural landscape of the Fort Larned National Historic Site. A cultural landscape report (CLR) is the primary guide to treatment and use of a historic landscape. The CLR describes the physical history of the landscape, analyzes character-defining features and qualities which contribute to the historic significance of the site, and recommends preservation treatments consistent with the landscape's significance, condition, and planned use. A number of issues identified prior to project start-up were discussed in team meetings between NPS and are addressed in chapter 5, *Treatment Recommendations*.

Identified issues include the following:

- screening of cultural landscape intrusions;
- the historic elevation of the parade ground in relation to historic structures;
- historic plant species, sizes, and historic environmental conditions;
- the historic and current condition and appearance of the oxbow;
- tree maintenance, retention, planting, and removal;
- maintenance of prairie grasses (mowing, haying, burning);
- feasibility of implementing sustainable practices;
- existing and potential landscape damage caused by pocket gophers and prairie dogs;
- possible treatment (including consideration of reconstruction) of the sutler's store site;
- consideration of reconstructing the stables and adjutant's office;
- possible treatment of the post cemeteries;
- the use of herbicides / grass retardants;
- edges and interfaces with walks, drives, etc.;
- turf maintenance and mowing policies;
- treatment and screening of power lines;
- use of signs;
- potential for extension of scenic easements;
- irrigation system(s);
- the appropriateness of memorialization versus re-creation;
- screening of the handicapped-accessible parking lot;
- treatment of existing air conditioning equipment;
- propagation of genetic material of selected historic vegetation;
- the nature and history trail;
- re-routing of roads and walks in relation to and as a consequence of new visitor center;
- the impact of and accommodation of Memorial Day living history events and activities;
- interpretation of the Indian Bureau era; and
- the viewshed from Pawnee Rock.

Scope of Work

The scope of work for the CLR called for the consultant team in consultation with NPS to undertake the following phases of work:

Phase I: Site History, Existing Conditions, and Analysis
This phase of work included development of a narrative history and historical base maps of the physical development of the landscape from the pre-military period through the era of NPS ownership. The research methodology was designed to emphasize investigations of land use practices and subsistence activities at the fort during the 1860s and 1870s. Plant species present at the fort during the period of significance (1868-1878) were identified where possible. The site history also addressed how human occupancy affected the site. This methodology was influenced by the need to support the prior NPS decision to interpret and represent physically this historical period. A major management objective has been to recreate as closely as possible "... an atmosphere of 1860s–1870s ..." in accordance with the site's *Statement for Management.* As a result, subsequent periods were given secondary emphasis. Both the *Fort Larned General Management Plan* and the Fort Larned *Statement for Management* have identified the 1868–1878 period as the time period most appropriate for interpretation and architectural restoration.

Phase I also included documentation of existing conditions, including a site map and brief descriptions of existing resources, their condition, and use.

The final element of Phase I included an evaluation of the fort's significance and landscape integrity and determination of a historic period for the cultural landscape.

Phase II: Treatment Recommendations
During Phase II the consultant team developed a narrative and graphic cultural landscape treatment plan based on the information developed for documentation and analysis in Phase I. The plan addresses the following issues:

- specific cultural landscape subunits for treatment and maintenance;
- screening to protect viewsheds;
- universal accessibility and fire access;
- suggestions for interpretation of non-extant associated resources;
- recommendations for treatment of the riparian area;
- identification of major site drainage issues;
- vegetation/groundcover issues both inside and outside the historic core, including the reconstructed prairie and the trail ruts unit; and
- preliminary plans addressing vegetation, circulation, and other features of the core quadrangle area.

All recommendations have been developed in accordance with NPS Management Policies, *NPS Cultural Resources Management Guideline* (NPS-28), *The Secretary of the Interior's Standards for Historic Preservation* and draft *Guidelines for the Treatment of Historic Landscapes*, and the Uniform Federal Accessibility Standards (UFAS).

Multi-disciplinary CLR Team

The consultant team has been headed by Quinn Evans / Architects (QE/A) of Ann Arbor, Michigan, with Land and Community Associates (LCA) of Charlottesville, Virginia, and Ames, Iowa, as the CLR sub-consultant. QE/A conducted concurrent architectural investigations. LCA's multi-disciplinary team of landscape architects, architectural historian, and historical architect / cultural landscape specialist accomplished this scope of work.

Investigation Methodology

Phase I included a site visit to the NHS and project start-up meeting by QE/A and LCA personnel. This preliminary site visit also included a site reconnaissance, review and collection of materials available for the project, and a discussion of the issues related to the NHS cultural landscape. LCA personnel also visited Fort Scott, another nineteenth-century Kansas fort, to become familiar with a similar site and related issues. A follow-up site visit to Fort Larned included site documentation of existing conditions; site photography of views and vistas, plantings, furnishings, paving, structures, and other landscape features and relationships; collection of additional materials; and a review and further discussion of relevant issues with NPS staff. Historical research was an integral part of Phase I, with investigations based primarily in the archives and files of the NHS but also at the Santa Fe Trail Interpretive Center. Field investigations were conducted in March 1996 to document, verify, and map existing conditions of the cultural landscape. There was a subsequent site visit in July 1997. Mapped data occurs in the CLR's *Historical Data, Existing Conditions, Analysis,* and *Treatment Recommendations* sections. The 1996 aerial survey of the NHS provided the basis for mapping existing conditions.

In chapter 4, *Analysis*, historic documentation and existing conditions information were used to evaluate the significance and integrity of the cultural landscape, to define its period of significance, and to identify character-defining features and qualities of the NHS landscape. Additional areas for future research were identified. Finally, the cultural landscape treatment recommendations in chapter 5, *Treatment Recommendations*, have been developed that are consistent with the landscape's significance, condition, planned use, and NPS policy. The preliminary design addresses the historic core quadrangle area, including plantings and pedestrian circulation for universal access. Appropriate vegetative species and maintenance practices have been recommended for the parade ground.

Management Summary

The CLR is the latest in a series of efforts to recognize, manage, and administer the NHS. Public visitation of the fort as a historic site began during the ranching era. The first formal indication of NPS interest in the site occurred in 1955 when Merrill Mattes visited the site on behalf of NPS; Mattes recommended the fort for national designation. The Mattes site visit report was used to generate congressional interest in the site. Public Law 88-541 authorized acquisition and use of the site "to commemorate the significant role played by Fort Larned in the opening of the West." The enabling legislation authorized land acquisition in either fee simple ownership or through easement. NPS interprets its purpose at Fort Larned as preserving, protecting, interpreting, and administering the site for the public. A combined document approved by NPS in 1994, *General Management Plan Amendment, Development Concept Plan, and Interpretive Prospectus,* is the most recent management and planning document; it updated a 1978 master plan. This document was intended to guide site development through 2004. While it does not address the cultural landscape specifically, its implementation has many landscape implications. This CLR is intended to supplement the *General Management Plan Amendment, Development Concept Plan, and Interpretive Prospectus* and address both short- and long-term landscape issues related to the overall planning, preservation, development, and interpretation of the site.

Summary of Findings

Fort Larned is a significant cultural landscape, primarily because of its historical associations with westward migration along the Santa Fe Trail and with U.S. efforts—both peaceful and military—to address conflicts between Native Americans and travelers and settlers in Kansas and other areas of the west and southwest, particularly during the period 1868–1878. This period has been identified as the cultural landscape period of significance. Although some historic landscape features and qualities are no longer extant, the fort still retains the essential spatial organization of its nineteenth-century core quadrangle of sandstone buildings and evokes the feeling of an isolated, military outpost in a prairie setting.

Landscape rehabilitation has been identified as the most appropriate treatment approach for the NHS. Cultural landscape assessments support a landscape rehabilitation approach intended to reinforce and facilitate interpretive efforts to evoke—but not re-create—the landscape of the period 1868–1878. Although a number of extant cultural landscape features and qualities exist at the NHS, the number, distribution, and locations of identified non-extant cultural landscape features would make an overall treatment approach of restoration or reconstruction inappropriate.

Cultural landscape treatment recommendations were developed consistent with a landscape rehabilitation approach. The recommendations address design and management issues identified during pre-planning and planning meetings with NHS staff and as an outgrowth of the CLR process. Where applicable, treatment recommendations incorporate sustainable landscape management practices and environmental conservation efforts appropriate to the fort's local environmental context. Priority was given to treatment recommendations that meet both preservation and sustainability needs.

Seven cultural landscape management zones within the NHS have been identified to serve as the basis for implementing the CLR treatment recommendations. Recommendations address specific issues related to the historic core, reconstructed prairie, Pawnee River and oxbow corridors, the Trail Ruts unit, visitor use areas, maintenance area, and adjacent easement properties. Recommendations for each of these areas as well as the entire NHS have been organized by related concerns such as buildings and structures, circulation and parking, vegetation, site furnishings and objects, signage and interpretation, viewshed protection, utilities and site management, special events, and future research needs. While most of the recommendations can be implemented as funds become available, a few require additional research before determining a final course or scope of action. Other recommendations—particularly those related to circulation alterations and improvements—are dependent upon completion of the new visitor center, currently planned for construction on the north side of the Pawnee River; collectively such recommendations constitute a second phase of implementation.

Many of the recommendations for the first phase of implementation relate to the historic core and propose treatments such as

- improving the accessibility of historic and non-historic circulation on the parade and in adjacent areas through resurfacing with chip and seal bituminous paving;
- removing trees on the parade to better represent the historic appearance of the fort during the period 1868–1878;
- reducing turf mowing requirements through the use of low-maintenance varieties of buffalograss;

- implementing accessibility strategies for ingress and egress associated with historic buildings;
- reconstructing (with appropriate supporting research) the sutler's complex, adjutant's office, and cavalry stables;
- interpreting other non-extant buildings and features within the historic core from the period of significance with ground-level interpretive panels;
- exploring the possibility of removing or mitigating the visual effects of objectionable views of agricultural structures on adjacent and nearby properties;
- developing cooperative solutions to viewshed intrusions with neighboring property owners;
- using a variety of approaches to continue trapping pocket gophers; and
- establishing emergency vehicular links between the parade and adjacent service roads.

Similarly, phase one treatment recommendations for other areas of the NHS cover a wide variety of issues such as

- continuing planning for the new visitor center on the proposed site west of the historic core;
- continuing prairie reconstruction efforts informed by findings of recent sod analysis;
- adopting effective prairie management practices such as periodic burning or haying;
- professionally evaluating the effects of modifying or removing drainage and irrigation ditches south of the historic core;
- interpreting non-extant structures and features outside the historic core from the period of significance with low-scale interpretive panels related to the existing history and nature trail;
- siting additions to the maintenance facility where they can be screened from view from the historic core by adjacent river corridor vegetation;
- encouraging the resettlement rather than eradication of the prairie dog community at the Trail Ruts unit;
- controlling runoff and resulting soil deposition at the Trail Ruts unit from adjacent agricultural areas through the use of siltation fences and drainage structures; and
- maintaining easement areas as open reconstructed prairie or agricultural fields.

Phase two treatment recommendations for both the historic core and the entire NHS are closely related to construction of the visitor center, and include such issues as

- removing the present entrance road, highway bridge, and related parking areas;
- establishing a new, pedestrian approach route for visitors at the southwest corner of the historic core;
- eliminating service roads within and adjacent to the historic core that are unrelated to the existing history and nature trail;
- realigning remaining service roads and additions to the history and nature trail with the approximate known location of the Santa Fe Trail;
- investigating the use of ground source heat pumps to reduce the visual impact of mechanical systems;
- reorienting the present picnic area to the state highway and establishing only an internal pedestrian connection with other portions of the NHS; and
- developing new identification signage for the park on adjacent easement properties.

Supporting documentation and reports related to implementation of the treatment recommendations are presented in chapter 7, *Appendices*.



HISTORICAL DATA

Historical Data

Site History

Fort Larned was established in 1859; it was officially named in honor of Col. Benjamin F. Larned in 1860. Larned was paymaster general of the U.S. Army from 1854 to 1862. The fort was involved in both peaceful initiatives and military campaigns with Native American tribes in its vicinity.

Fort Larned was the central post in a network of military posts protecting commercial activity along the Santa Fe Trail. Posts such as Fort Leavenworth (1827), Fort Mann (1847), Fort Atkinson (1850), Fort Union (1851), Fort Lyon which was originally called Fort Wise (1869), Fort Zarah (1864), Camp Nichols (1865), Fort Dodge (1865), and Fort Aubry (1865) as well as Fort Larned (1859) were located along the trail. Other forts not on the trail, but part of this military network, included Fort Riley (1853), Fort Harker (1864), Fort Hays (1865), and Fort Wallace (1865). Together, these posts defined the southwestern military frontier of the United States at this time.

The Native American population in the vicinity of Fort Larned was relocated to reservations farther south in the 1860s. Consequently, Fort Larned served its original purpose for only a short time. Most personnel were reassigned from the fort in 1878. By 1883 the fort had been transferred from the War Department to the General Land Office, U.S. Department of the Interior. The fort was sold at auction in 1884 and used as a private ranch until its acquisition by NPS in 1966. It was authorized as a National Historic Site in 1964.

The history of the site has been divided into the following six chronological periods that reflect the evolution of use and ownership that have determined landscape development and character:

- pre-1860
- 1860–1865
- 1866–1878
- 1879–1901
- 1902–1965
- 1966–1996

A discussion of the site history of each individual period follows.

Pre-1860 *(Exhibit 2)*
The existing Fort Larned site on the south bank of the Pawnee River, eight miles upstream from the confluence with the Arkansas River, was known to the Comanches as *Manka-Guadalde-Pa,* in honor of a Comanche chief, Manka-Guadal, who was killed at the site. The Kiowas knew the site as *Aikon-Pa* meaning "dark timbers" or "shady river." Many Native American tribes of the Central Plains lived in the vicinity of the Santa Fe Trail, which opened as a commercial route in 1821–1822. The trail accommodated two-way travel with both east- and west-bound wagons. The trail was not limited to travelers from U.S. states and territories; Mexican wagons also used the trail.

Native American tribes in the vicinity included primarily the Cheyenne, Kiowa, Arapaho, and Comanche tribes. Buffalo, which were a major source of food, clothing, and shelter for Native American tribes, grazed in the vicinity of the fort and were an essential part of Native American life in this area. Native Americans would have camped and hunted buffalo in vicinity of the present Fort Larned site; it is likely that, as a result, they would have worn trails into the landscape, and that their horses and ponies would have grazed on prairie grasses.

The best available description of the vicinity during this early period comes from *The Road to Santa Fe, The Journal and Diaries of George Champlin Sibley and Others Pertaining to the Surveying and Marking of a Road from the Missouri Frontier to the Settlements of New Mexico 1825–1827.* Natural characteristics are described in great detail:

> At half past 10 we reached the Pawnee fork, and camped on the bank, a little below the fording place, at Some large Elm Trees .... The Creek appears to be too full now to venture to cross it with the Waggons[sic]; besides the banks require some digging at the ford. Here we have a beautiful camping place, & very fine range for the Horses. The Pawnee River here is about 40 yards wide, banks pretty high, bottom sandy, Water at present Muddy. Timber Elm, Ash, Elder, Cotton Tree, Willow, and Grape Vines .... I rode upon the Ridge, from the top of which, I could distinctly trace the course of the Pawnee River for a great distance by the fringe of Trees along its banks .... The Grass is very good, but Buffalo are scarce, which seems to indicate the recent presence of Indians .... I presume that some of the Pawnees and Recaras (Arikaras) may have been in this quarter not long since, this being the usual Summer Resort of those People particularly the Pawnees ... .[1]

The traveler's account also mentioned prairie dogs and ants in the Pawnee vicinity as well as "coarse gravel and hard stones, some of the latter as large as Hen's Eggs" which had been "thrown out by the Prairie dogs and Ants."[2]

Westward emigration from the more populated eastern areas of the United States began to have an effect on Native American culture and subsistence in this area. Native American tribes viewed travelers along the Santa Fe Trail as a threat to their culture and way of life. Clashes between trail travelers and tribes were almost inevitable as travel and settlement of the southwestern U.S. frontier increased following the end of the Mexican War and the discovery of gold farther west.[3] Ever-increasing trail travel and the establishment of stage coach stations along the trail especially contributed to these conflicts. Trail travelers began to join together in caravans for greater protection. Native Americans were particularly interested in seizing the horses used for trail transportation.

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[1] *The Road to Santa Fe, The Journal and Diaries of George Champlin Sibley and Others Pertaining to the Surveying and Marking of a Road from the Missouri Frontier to the Settlements of New Mexico 1825–1827*, Kate L. Gregg, ed., (Albuquerque: University of New Mexico Press), 72–75.

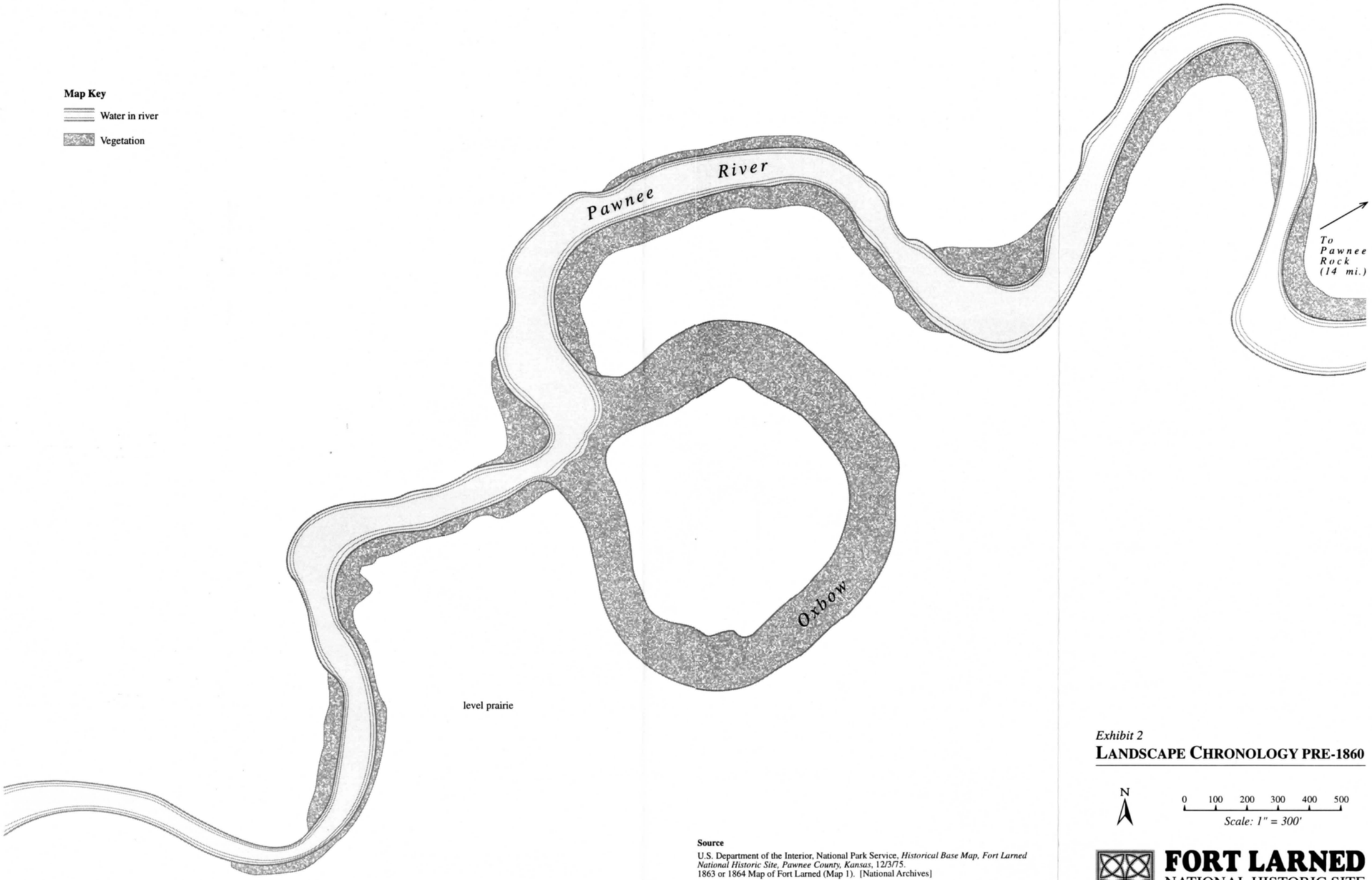
[2] *The Road to Santa Fe*, 72.

[3] Leo Oliva, *Fort Larned,* (Kansas State Historical Society, 1985), 1.

Map Key

Water in river

Vegetation



Map prepared by Land and Community Associates, May 1996.
Revised July 1997, April 1999.

Source

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.
1863 or 1864 Map of Fort Larned (Map 1). [National Archives]

Exhibit 2

LANDSCAPE CHRONOLOGY PRE-1860

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

One of the important campsites for these caravans developed at the Pawnee River crossing in the vicinity of the present restored fort near where the trail broke into two alternate routes. The establishment of the first military camp in the vicinity was in response to Kiowa attacks on mail parties near the Pawnee River in 1859.[4] The Colorado gold rush of 1858 had stimulated increased use of the trail.

In 1859, the army sent a small detachment to the Pawnee River to prevent Native American interference with a mail station being constructed. A small garrison remained all winter at the site known as Camp Alert, and escorted mail coaches and guarded the station. The camp, several miles downstream from the present site, was the forerunner of Fort Larned. Even in the early days of the young camp, a "sutler" operated a store where soldiers and travelers could purchase goods such as tobacco, toiletry articles, clothing, whiskey, fruit, and other personal items not supplied by the military.[5] Soldiers also spent much of their leisure time at the sutler's where there were often games of cards and other recreational activities.

The establishment of a fort in this vicinity followed classic principles for this period: it was "founded in response to the friction generated by the westward movement of Americans into the domain of the Plains Indians."[6] The fort apparently could be categorized as typical of the middle period of western fort development as described by Robert W. Frazer in his *Forts of the West: Military Forts and Presidios and Posts Commonly Called Forts West of the Mississippi River to 1898.* This middle period of fort development extended from 1846 through the 1880s. The period followed the initial development period of 1804–1845, a period characterized by the events leading to the Mexican War and maintenance of a network of posts "in advance of the frontier of settlement" that established a barrier between the settler and the Native Americans. After 1845 American policy shifted to controlling Native Americans. As a result, forts such as Fort Larned developed along major overland routes with the primary purpose of protecting transportation and commerce. The final phase of fort development (which occurred after the 1880s and following the deactivation of Fort Larned) was associated with concentrating forts in large communities served by railroads so that troops could be dispersed by rail as the need arose.[7]

1860–1865 *(Exhibit 3)*
Development of the present fort—the final site in this vicinity—occurred during the period 1860–1865. The original reservation was described consistently thoughout the 1860s and 1870s as a four-mile square.[8] In 1860 Captain Henry Wessells arrived at Camp Alert (which would be renamed Fort Larned) and selected a new site a few miles away at a strategic bend in the Pawnee River. Construction began in the same year at this location, the present Fort Larned site. The site was selected in response to both natural characteristics and the need to protect the Santa Fe Trail. The site provided abundant wood, water, and grass. It could be conveniently supplied from Fort Riley and it could command the strategic middle section of the Santa Fe Trail through Kansas. The fort became known as a safe place where travelers could rest, make repairs, and replenish supplies at the sutler's store.

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[4]John Albright and Douglas D. Scott, *Historic Furnishing Study Historical and Archeological Data Fort Larned National Historic Site, Kansas,* (hereinafter cited as Albright and Scott) (Denver: Denver Service Center, 1974), 13.
[5]Albright and Scott list several pages of inventories from the sutler in Appendix G of that document.
[6]Albright and Scott, 14.
[7]Robert W. Frazer, *Fort of the West: Military Forts and Presidios and Posts Commonly Called Forts West of the Mississippi River to 1898,* ix–xvii.
[8]See Map 4 for a delineation of the U.S. military reservation.

The fort developed initially with both tents and adobe and frame structures. The poorly constructed buildings—some of which had sod roofs—leaked and required constant repairs. Such temporary construction techniques were not unique to Fort Larned, but were typical of other frontier forts as well. Other forts in Kansas, including Fort Leavenworth and Fort Scott, also developed at first with temporary structures.[9] The 1864 inspection report was extremely critical of the fort's structures:

> The huts are built of adobe, of a very inferior quality, the sod being sandy, and they are covered by little crooked poles, with dirt and grass thrown on same, and I do assure you the sight presented in the huts occupied for quartermaster and commissary stores was awful. The water had been streaming down amongst the corn, flour, beans, and everything else, and by this rain alone over 100 sacks of corn were ruined ... . I think the men's time could be much better employed in the erection of stone buildings, instead of going every few days on fruitless scouts, as there is good building stone within 3 miles of the place.[10]

Leo Oliva in *Fort Larned* provides descriptions of the layout of the early fort. The adobe barracks and major storehouses were two large structures north of the parade; each was approximately 210' x 24' in size.[11] The west building was a barracks for a company of soldiers and the commissary storehouse; the east building housed another company and the quartermaster storehouse. Each barracks had its own kitchen and mess room. There were two sets of laundresses' quarters on the north side of the post, each 70' x 18'. An approximately 74' x 19' hospital with its own kitchen and dispensary were also located on the north. The bakery was near the hospital, a dugout in the bank of the creek. The corrals were located east across a dry ravine, an old ox-bow of the Pawnee.

The officers' quarters were located in an adobe building 144' x 19' in size, south of the parade. Officers' stables were in dugouts in the creek bank. Shops for blacksmith, carpenter, and saddler were located in a 50' x 20', tent-like, canvas-and-pole structure southwest of the barracks and commissary. There were two 20' x 20' adobe buildings: one was a storehouse, which also may have been used briefly as a magazine, and the other the guardhouse or jail. There were privies near the barracks, hospital, and officers' quarters. There may have been other auxiliary structures as well. Although none of these structures survives, the foundations of many have been located.

There was a dedicated formal parade during this period; it appears as a large, open area. It is not known if there was any particular maintenance of the buffalograss growing on the parade. Other landscape features developed during this period included at least two corrals, the central flagpole and a site drainage system. The fort's first cemetery was developed during this period—east of the post and partially enclosed by the adjacent dry oxbow. A bridge over the Pawnee River was constructed near the sutler's complex; a dry ford across the river on the west side of the fort was also present at this time.

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[9]Francis Paul Prucha, ed., *Army Life on the Western Frontier; Selections from the Official Reports Made Between 1826 and 1845 by Colonel George Croghan.* Norman: University of Oklahoma Press, 1958, 51.
[10]T. I. McKenny, Major and Inspector-General to Maj. C.S. Charlot, Assistant Adjutant-General, Department of Kansas, copy of letter, history file, Fort Larned National Historic Site, KS.
[11]Oliva, 11.

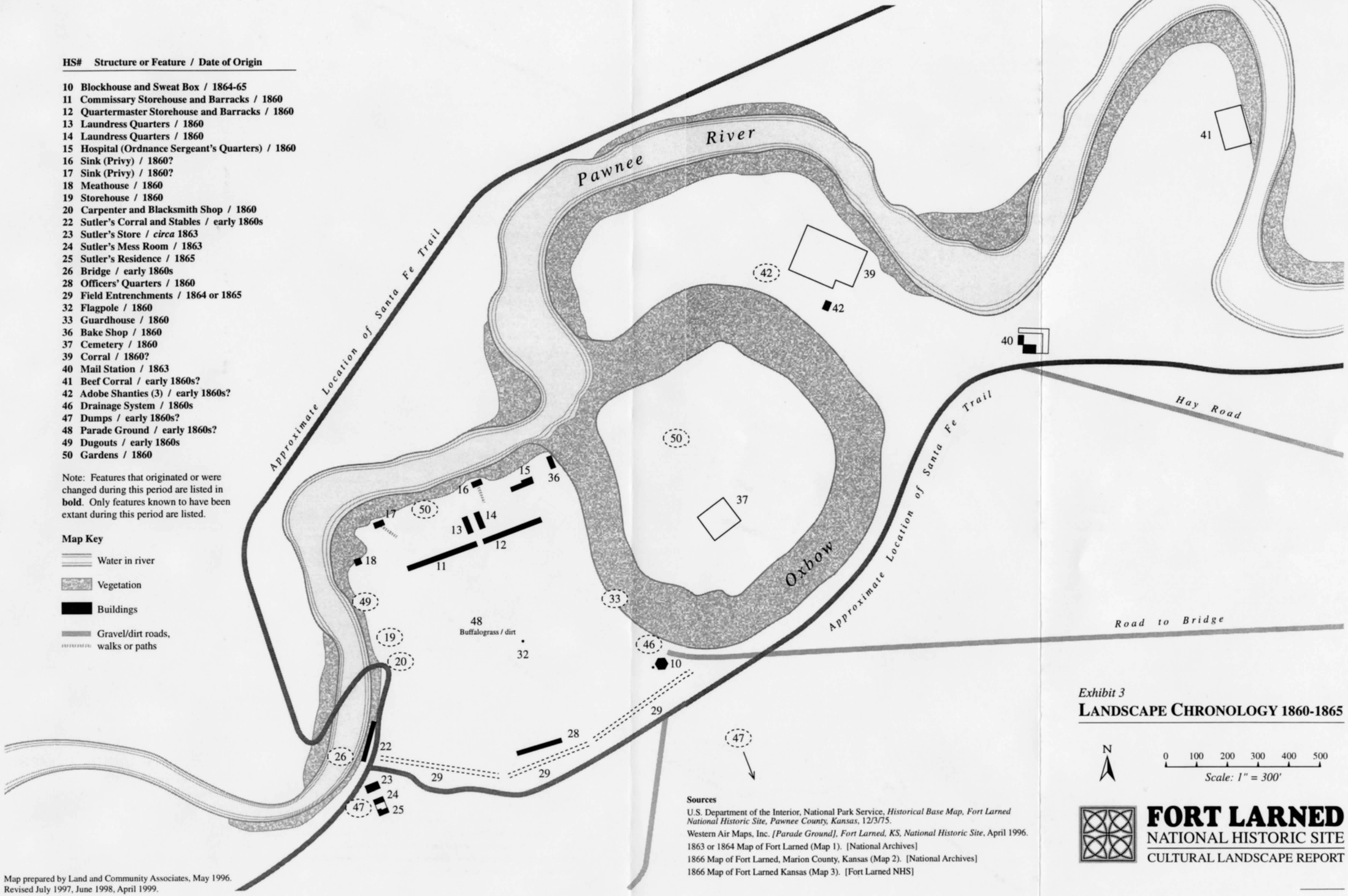
HS# Structure or Feature / Date of Origin

10 Blockhouse and Sweat Box / 1864-65
11 Commissary Storehouse and Barracks / 1860
12 Quartermaster Storehouse and Barracks / 1860
13 Laundress Quarters / 1860
14 Laundress Quarters / 1860
15 Hospital (Ordnance Sergeant's Quarters) / 1860
16 Sink (Privy) / 1860?
17 Sink (Privy) / 1860?
18 Meathouse / 1860
19 Storehouse / 1860
20 Carpenter and Blacksmith Shop / 1860
22 Sutler's Corral and Stables / early 1860s
23 Sutler's Store / *circa* 1863
24 Sutler's Mess Room / 1863
25 Sutler's Residence / 1865
26 Bridge / early 1860s
28 Officers' Quarters / 1860
29 Field Entrenchments / 1864 or 1865
32 Flagpole / 1860
33 Guardhouse / 1860
36 Bake Shop / 1860
37 Cemetery / 1860
39 Corral / 1860?
40 Mail Station / 1863
41 Beef Corral / early 1860s?
42 Adobe Shanties (3) / early 1860s?
46 Drainage System / 1860s
47 Dumps / early 1860s?
48 Parade Ground / early 1860s?
49 Dugouts / early 1860s
50 Gardens / 1860

Note: Features that originated or were changed during this period are listed in **bold**. Only features known to have been extant during this period are listed.

Map Key

- Water in river
- Vegetation
- Buildings
- Gravel/dirt roads, walks or paths



Map prepared by Land and Community Associates, May 1996.
Revised July 1997, June 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.
Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.
1863 or 1864 Map of Fort Larned (Map 1). [National Archives]
1866 Map of Fort Larned, Marion County, Kansas (Map 2). [National Archives]
1866 Map of Fort Larned Kansas (Map 3). [Fort Larned NHS]

Exhibit 3

LANDSCAPE CHRONOLOGY 1860-1865

N

0 100 200 300 400 500
Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

The first known diagram of the fort *(Map 1)* dates from 1863 or 1864. Although its legend is difficult to decipher, the diagram does provide documentation for the fort's layout and organization. The diagram depicts a bridge over the Pawnee at some distance east of the fort; identifies the "Road to Santa Fe"; the road leading from the bridge to the garrison at a distance of 2507 yards; the road from the bridge to the mail station at a distance of 2150 yards; the road from the mail station to Santa Fe; and a brick kiln near the wood road, west of the fort. It also depicts the parade ground and garden, two complexes of buildings (including one associated with the quartermaster corral), and two distinct types of vegetation—riverine and prairie.

Four sketches by Private Robert F. Roche, Co. G, 2nd infantry, drawn between May and November 1860 provide the earliest known depiction of the fort in this period *(Figure 1)*. Viewed together, the sketches provide a panoramic view of the fort. The sketches show considerable tree cover with a number of dense clumps of deciduous trees in the fort vicinity. Tents and small modest structures, of both wood and adobe, are shown in informal but largely linear groupings. Comparisons with later views of the site indicate that this deciduous vegetation would decline steadily as a result of cutting to provide firewood for the fort.

Little is known regarding the operation of the sutler in this period except that he moved his business along with the fort to this location and that he operated out of a tent. The sutler's encampment was depicted in greater detail in a separate sketch by Private Roche that also included the private's dwelling, the kitchen tent, and an ambulance wagon.[12] By 1863, the sutler had constructed the fort's first stone structure; by 1865, the establishment also included a saloon and billiards room.

There were at least two wells at the post at this time, although most drinking water came from the creek. Well water had a high mineral content and was not considered desirable for drinking.[13] A medical report consistently indicates that since most of the wells were filled with sulphurous water, they were not in use and that water was "drawn in a wagon from the creek and poured into barrels standing in the yards."[14] Each kitchen had at least one water barrel.[15]

In 1860 Captain Henry Wessells arrived at Camp Alert with additional troops. The size of the force varied; in September there were 270 soldiers, but the force was reduced during the winter to just 60. The size of the force would remain at this size for the next two years as a result of the need to assign soldiers—not to the west, but to Civil War duties. During the Civil War, Colorado, Wisconsin, and Kansas volunteers and even Confederate prisoners supplemented the meager force of regular soldiers at Fort Larned. Former Confederate soldiers who had been held as Union prisoners were permitted to leave prison to volunteer as "galvanized soldiers" for service in the West.

The 1864 cavalry inspection report for the fort reveals some limited information about the fort's landscape character but deals primarily with the issue of replacing horses. The report mentions

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[12]The sketch is reproduced by Oliva on page 11.
[13]Oliva, 12.
[14]John S. Billings, *Report on Barracks and Hospitals with Descriptions of Military Posts,* (New York: Sol Lewis, 1974), 299.
[15]Albright and Scott, 47.

horses grazing on good grass "during the day when not on duty." It also reports that the troops had been on escort duty for mail coaches and government trains.[16]

George Huss, a former soldier at the fort, described Fort Larned in a 1913 letter to the newspaper *The Tiller and Toiler* as he remembered it from his service at the fort in the 1860s:

> In a few days we relieved some volunteer regiment who were glad of our coming to their relief. After they marched out we took their places that occupied, such as they were, dugouts along the banks of the creek and around a peculiar imitation of a bed of a creek that at that time formed a half circle; and on the higher ground, or the island as we called it, was our burying ground.
>
> And also, there were some quarters built up with adobe, quite thick and warm, arrow-proof at that, so we felt quite safe while in them. All the officers' quarters were built out of adobe and covered with poles and long grass with a couple of feet of earth on top. Then the Indian and buffalo were the prevailing element.[17]

According to one report, the near extinction of the buffalo by 1880 was unimaginable in 1865 when the 11th Indiana Cavalry rode near Larned.[18]

Apparently there had been attempts at gardening as early as 1859 at Fort Larned.[19] An 1861 garden planted by soldiers was destroyed by hot winds and grasshoppers. The commander also attributed the garden's failure to poor soil and lack of water.[20]

Through most of the decade of the 1860s, an agency of the Indian Bureau (Department of the Interior) was located at Fort Larned. The agency was a separate and distinct operation without military involvement; its major responsibility involved distributing annuities of clothing and other goods to Indian tribes in payment for maintaining peace and staying on reservations. During the years that Fort Larned was an annuity distribution post, scattered tribes of Cheyenne, Arapahoes, Kiowas, and Comanches camped in tepees on the prairie near the fort. Their annuities included allotments of such supplies as bacon, wheat, flour, coffee, sugar, beef, tobacco, clothing, beads, blankets, tools, cooking utensils, gunpowder, and lead.

The long-expected Native American uprising finally occurred in 1864 when the various Plains tribes mounted a major campaign to drive the new settlers and travelers from their territory. As part of this campaign, members of the Kiowa tribe raided Fort Larned on July 17, 1864. Although there was no major damage to the fort, the Kiowas did succeed in stealing almost all of the post's horses and mules. Hostile actions continued along the trail throughout the rest of the year.

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[16]Reproduced copy attached to correspondence in history files, Fort Larned National Historic Site, KS; handwritten citation is for National Archives, Record Group 159, Inspector General Reports, 1864: Kansas, Box 8.
[17]F.C.L. Geo. W. Huss, Box 257, Colfax, Iowa, to *The Tiller and Toiler,* reprinted in *"75 Years Ago in 1913,"* and reproduced in history file, Fort Larned National Historic Site, KS.
[18]Albright and Scott, 15.
[19]Records relating to Fort Larned, KS, Medical History of Posts, vols. 164 and 167, Record Group 94: Records of the Adjutant General's Office, National Archives and Records Administration, Washington, D.C., Microcopy NNO 70-451 (hereinafter referred to as NARA RG94), 117–118.
[20]Madeleine Buck, "A History of Fort Larned," typed manuscript, Santa Fe Trail Center and Museum, Larned, KS

Colonel J.C. McFerran, traveling from Kansas City to Santa Fe, reported that "Both life and property on this route is almost at the mercy of the Indians .... You cannot imagine a worse state of things than exists now on this route."[21] As a result of such dangerous conditions, the War Department banned travel west of Fort Larned without an armed escort. Following the War Department prohibition, Fort Larned provided guard detachments for mail stages and wagon trains. Fort Larned was the eastern end of the escort system; Fort Union, New Mexico was the western point. On the first and fifteenth days of each month an escorted caravan would depart from each point. The escort system substantially reduced the number of raids on wagon trains.

In response to concentrations of Kiowas and Comanches near the fort during the 1864 Indian War, construction began in the same year of a blockhouse, the post's first permanent stone military structure. The hexagonal structure included an underground passageway to a well and provisions store. Since Fort Larned was never attacked, the blockhouse eventually took on an unintended use as a guardhouse when the old jail became too dilapidated to hold prisoners.[22]

The entrenchments developed on the site during this period may have been dug concurrent with construction of the blockhouse. The earthwork was described as so extensive that a thousand men could not line it. This number well-exceeded the number of soldiers assigned to this location. Without an adequate number of troops, the ditch actually was a hazard that would have provided a convenient approach for attack.[23] The 1864 inspection criticized the fortification: "An attempt has been made to throw up breast-works around it, or one-third of it, as the Pawnee Creek, on which it is built, defends the other two-thirds. This breastwork averages about 20 inches high, with the ditch on the inner side." According to the same report, Fort Larned was "only a fort in name as there are no defenses."[24]

A number of peace efforts were pursued in 1865 and troops were moved in and out of Fort Larned during the year as deemed necessary.

1866–1878 *(Exhibit 4)*

The period 1866–1878 was the period of peak operation for the fort. The first two years—1866 to 1868—represent the fort's major period of development when its primary and permanent structures were completed. It is likely that this is the period during which the landscape changed most dramatically from natural prairie to a developed landscape although its environs remained a "visible rolling prairie."[25] The area south of the post was described as rising to a "wilderness of solid hills offering shelter to herds of bison," while the area to the north was considered a "desolate prairie" with buffalograss and "various species of cactus."[26] An internal circulation network of roads and paths developed to connect the interrelated functions of the fort and accommodate the many carts and wagons that traversed the site daily. Much of the site's naturally-occurring deciduous vegetation was cut as firewood during this period. The second cemetery was developed northwest of the fort complex on the opposite side of the river in 1869 and use of the old cemetery was discontinued.

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[21]Oliva, 16.
[22]Oliva, 21.
[23]Dwight Stimson, *Historic Structures Report*, (Omaha: National Park Service, 1966), 53.
[24]T. I. McKenny, Major and Inspector-General to Maj. C.S. Charlot, Assistant Adjutant-General, Department of Kansas, copy of letter, history file, Fort Larned National Historic Site, KS.
[25]NARA RG94, 9.
[26]NARA RG94, 9.

An annotated map from 1866, *Fort Larned, Marion County, Kansas (Map 2)* depicts the plan of the fort in this period. The map names and identifies the locations of the embankment, sutler's store, the post office, the sutler's residence, the magazine (blockhouse), officers' quarters, guard house, shops building, laundresses, quartermaster's store, and the commissary store, hospital, bakery, graveyard in the oxbow, and stables and corrals. The annotations above the map provide additional information such as dimensions, building materials, and types of fencing. The map provides a good description of fencing at the beef corral. The annotation gives the dimension as 108' by 180' with 344' of pickets that were 9" in diameter and 7' high, 124' of post and board fence that was 5' high; 128' of worm fence with 5'-poles that were staked and ridered [?] and double pine gates that were hung with strap iron hinges.

Another plan from 1866, *Fort Larned Kansas (Map 3)* depicts the layout of the fort in this period but also includes architectural elevations for the sutler's residence, sutler's mess rooms, and sutler's store, and costs of improvements for the sutler's store, mess house, dwelling, and stables. The plan clearly indicates the development of the sutler's complex at the edge of the fort. It is also known that the sutler developed a pig sty as part of the complex; runoff from the pig operation contaminated the river which was used for drinking water and for bathing.[27]

An 1867 survey signed by M.R. Brown, Chief Engineer of the U.S. Corps of Engineers, and entitled *U.S. Military Reservation at Ft. Larned Kansas (Map 4)* has several useful notations and identifies circulation systems related to the fort. The Santa Fe Dry Route, the Santa Fe Stage Road, the trail to Old Fort Hays, the trail to Fort Dodge, and the trail to the lime kiln and quarry are all clearly delineated. It also identifies the dry creek, level prairie, graveyard, stage station, new quarry, plateau, other quarries, and an excellent quarry. The survey is helpful in confirming the dwindling supplies of wood with the notations "very thinly scattered timber" and "no wood" in two areas along the Pawnee River.

The end of the Civil War made regular troops available to Fort Larned and other western forts. The assignment of regular troops coincided with the construction of a more permanent installation at Fort Larned. Captain Almon F. Rockwell , an officer of the Quartermaster Department, was in charge of construction between June 1867 and April 1868. The temporary work forced lived at the fort site in tents and dugouts.[28] A sketch of the fort by Theodore R. Davis was published in Harper's Weekly in 1867 and shows dugout structures along the banks of Pawnee Fork as well as a number of tents *(Figure 2)*. The sketch emphasizes the visual dominance of the tall flag pole and flag which would have been visible for miles around; indeed, the flag was described during this period as visible six to fifteen miles away "in all directions of the plain."[29] The accompanying commentary in *Harper's* is not at all complimentary of the fort in this period. The article gives the following brief description printed beneath the sketch:

> Fort Larned has been built for some years. Like most of the posts in Indian country, it consists of a number of mud-houses with badly constructed defenses, consisting simply of breastworks ... .

[27]General Review comments on CLR Part 1 Submission, July 18, 1996.
[28]Oliva, 22.
[29]NARA RG94, 12.

Section

30 | 29

31 | 32

HS# Structure or Feature / Date of Origin

1 Barracks / 1867-68
2 Barracks / 1867-68
3 Shops Building / 1867
4 New Commissary Storehouse / 1867-68
5 Old Commissary Storehouse / 1866
6 Quartermaster Storehouse / 1867
7 Officers' Quarters / 1867-68
8 Commanding Officer's Quarters / 1867
9 Officers' Quarters / 1867-68
10 Blockhouse and Sweat Box / 1864-65
13 Laundress Quarters / 1860
14 Laundress Quarters / 1860
15 Hospital (Ordnance Sergeant's Quarters) / 1860
16 Sink (Privy) / 1860?
17 Sink (Privy) / 1860?
21 Icehouse / 1867
22 Sutler's Corral and Stables / early 1860s
23 Sutler's Store / *circa* 1863
24 Sutler's Mess Room / 1863
25 Sutler's Residence / 1865
26 Bridge / early 1860s
27 New Sutler's Store / 1867
29 Field Entrenchments / 1864 or 1865
30 Teamster Quarters / 1867
31 Corral / early 1870s?
32 Flagpole / 1860
34 Hospital Steward's Quarters / 1874
35 Stable / 1867
37 Old Cemetery / 1860 (use discontinued 1869)
38 New Cemetery / 1869
40 Mail Station / 1863
43 Adjutant's Office / 1867
44 Wash House / late 1860s?
45 Guardhouse Foundation / 1867
46 Drainage System / 1860s, **1870s**
47 Dumps / early 1860s?
48 Parade Ground / early 1860s?, **ca. 1868**
50 Gardens / 1860, **1870**

Note: Features that originated or were changed during this period are listed in **bold**. Only features known to have been extant during this period are listed.

Map Key

Water in river

Vegetation

Buildings

Gravel/dirt roads, walks or paths

Pawnee River

Approximate Location of Santa Fe Trail

Some 'leveling' of ground in this area

48 Buffalograss / dirt

Oxbow

Hay Road

Road to Bridge

Map prepared by Land and Community Associates, May 1996.
Revised July 1997, June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

1866 Map of Fort Larned, Marion County, Kansas (Map 2). [National Archives]

1866 Map of Fort Larned, Kansas, showing the Sutler's Complex (Map 3).

1867 Survey of the U.S. Military Reservation at Fort Larned (Map 4).

1876 Map of Fort Larned (Map 5). [*Outline Description of the Posts in the Military Division of the Missouri*]

Figures 3–11.

Exhibit 4

LANDSCAPE CHRONOLOGY 1866-1878

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

The complex of sandstone buildings still extant today were built with civilian labor with stone from nearby quarries and replaced the early frame and adobe structures which had not fared well in the harsh Kansas climate. The post's appearance was considered "materially improved" with the removal of the old adobe quarters and the "leveling" of the space north and northwest of the adjutant's office.[30] An 1867 sketch by A. Hunnius depicts the fort during construction with adobe barracks and the old officers' quarters, and shows a number of tents still in use *(Figure 3).* A photograph taken during the winter of 1867–1868 also documents the complex prior to completion. It depicts all the major buildings except the new commissary storehouse which was completed in 1868 *(Figure 5).* The landscape is mostly bare with a few stumps and clumps of native shrubs visible at the edges of the parade. The landscape of sheltering deciduous vegetation depicted by Private Roche in 1860 *(Figure 1)* has given way by this date to a bare and utilitarian landscape that reflects the need to cut almost all available wood for use in heating and cooking. A contemporary medical report relates that "The creek near the post and the dry ravine were once skirted with trees, but all have been cut down except 2 or 3."[31] The same report continues that even the supply of wood at Walnut Creek which was fifteen to twenty miles distant was "limited and soon will be exhausted."[32]

The fort complex included nine buildings arranged around a 400'-square parade ground. The principal facade of each building, except the utilitarian trade shops to the east, oriented inward toward the parade. Despite its remote location, the fort was a formal and regularly-arranged quadrangle befitting an impressive military installation. Covered porches and verandahs attached to the barracks and officers' quarters provided protected transitional areas between the fort's residential areas and the more public area of the parade. The officers' quarters were located on the west side of the parade; the commanding officer's quarters, the first of the officers' quarters to be completed, occupied the central location of Officers' Row and was flanked by two identical duplex structures for other officers. During the peak period of operation, existing officers' housing was insufficient. Some officers lived in crowded conditions while others even lived in tents. Barracks for enlisted men were on the north side of the parade *(Figure 10).*

Storehouses and shops were located on the east and south sides of the parade. The quartermaster's storehouse was west of the commissary storehouse on the south side. The shops building on the north end of the east side housed a bakery, saddler shop, wheelwright and carpenter shop, and blacksmith shop. The entries to these service functions oriented east and away from the parade and front facades of the officers' quarters. It may be that orienting the major approaches to the shops away from the parade not only provided better access for horses, mules, and wagons but also maintained a more formal and uniform appearance of the facades on the parade, regardless of function. Similarly, kitchens were located to the rear of the barracks and could be serviced without interfering with the orderly and formal appearance of the quadrangle. Several wooden structures, including the adjutant's office and stables, also were constructed, the former as part of the quadrangle development. There were also an icehouse and quarters for the hospital steward. The blockhouse, the first of the military's permanent stone structures, also was located beyond the formal quadrangle next to the oxbow. The fort's earthworks developed in 1864–65 were obliterated during the construction of 1867.[33]

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[30]NARA RG94, 150.
[31]NARA RG94, 12.
[32]NARA RG94, 12.
[33]Quoted by Dwight Stimson, *Historic Structures Report,* (Omaha: National Park Service, 1966), 53.

Henry Stanley, a news reporter who visited the fort in 1867, noted the changes in the fort's appearance as a result of the new construction:

> A complete change had been effected at Fort Larned .... The shabby vermin-breeding adobe and wooden houses have been torn down, and new and stately buildings of hewn sandstone stand in their stead."

Captain William H. Forwood, surgeon at Fort Larned, described the fort in 1868 as

> a vaste rolling prairie of scanty vegetation and rapidly merging to the west into those arid and sterile wastes which skirt the base of the Rocky Mountains.

He continued that the fort was

> bounded on the north and west sides by the creek and on the east by a dry shallow ravine, an old bed of the creek, which once supported a large growth of trees. To the south a flat prairie extends six miles to the Arkansas River, beyond which a low range of sand hills terminates the view.[34]

By 1867 the sutler was operating a diverse operation that consisted of a sutler's house, a mess hall and icehouse, a carriage house, a chicken house, a smokehouse, and two stables.[35] Map 3 provides the best indication of the layout and character of the sutler's complex. A *circa* 1878 photograph of the sutler's store, however, gives no indication of this complex *(Figure 9)*. The photograph indicates an untidy environment with a missing window, and a stove, table, and other items stored or discarded near the entry door and makeshift entry stairs. The exterior condition may well indicate that the photograph dates from the deactivation period. A sign located on the north facade above a window identified the store and would have been visible from the parade and the portion of the trail that crossed the river. The sign appears to have been a simple one of wooden construction with painted lettering. It is not known if there were signs on the other facades but there was none on the west facade. The one-story, sandstone sutler's store resembled the other buildings of the fort complex, but was located outside the main cluster of the quadrangle. The sutler's store served as the fort's recreational center and major focus of social activity.

Other opportunities for recreational activities at the fort were limited, although by 1871 there was a library.[36] Soldiers engaged in athletic games such as baseball, horseshoe pitching, and foot races. Apparently horse racing was another diversion,[37] but there is no evidence that an actual track was developed. In addition to hunting buffalo, soldiers at the fort also found an abundance of other wildlife. The natural setting of the fort environs provided habitat for wolves, prairie dogs, prairie chickens, ground squirrels, wild turkey, foxes, deer, antelope, and a variety of birds.[38] At least

[34]NARA RG94, 9.
[35]Albright and Scott, 23.
[36]Albright and Scott, 24–25.
[37]Albright and Scott, 24.
[38]A recent book, *Wild Animals and Settlers on the Great Plains,* by Eugene Fleharty (Norman: University of Oklahoma Press, 1995) provides an excellent account of wildlife in western Kansas during the period coinciding with Fort Larned's period of significance. There are several specific references to the fort and its vicinity.

one officer, a major, kept a wolf as a pet since the damaging effect of its chain on stone work was noted in correspondence by the fort surgeon.[39]

Since antelope and buffalo were still abundant in the fort vicinity, they supplemented the beef cattle shipped to the fort. Buffalo were described in 1868 as being in "better condition than the beef cattle at the post" and as covering the countryside in "vast herds."[40] Buffalo accounts from other Kansas locations, such as one particularly descriptive narrative from Junction City, would probably apply to the Fort Larned vicinity: "... for miles in every direction as far as the eye could see, the *hills* were *black* with these shaggy monsters of the prairie, grazing quietly upon the richest pasture of the world."[41] Buffalo traveled in gigantic herds. Contemporary accounts reflect the awe-inspiring sight of vast herds on the Kansas prairie:

> I had such a view of buffaloes as I never could have expected, never would enjoy again. ... As far as the western horizon, the whole earth was black with them. The desire to shoot, kill, and capture utterly passed away. I only wished to look and look till I could realize or find some speech for the greatness of nature that silenced me."[42]

The demand for leather from buffalo hides began in earnest in 1871 and brought about the demise of the American buffalo. A combination of the depletion of South American cattle and the perfection of American techniques in tanning commercial quality leather in the 1870s made buffalo hunting in the American West a profitable enterprise. Hide hunting teams responded in great numbers to circulars distributed along the Kansas frontier that advertised for the purchase of buffalo hides.[43]

No mention has been found concerning the presence of buffalo bones in the fort vicinity but it is likely that there would have bones on the prairie at least from time to time. There was also a substantial demand for the buffalo bones left behind by hurried hide hunters.[44] Contemporary news accounts describe millions of pounds of bones being shipped out of Kansas in the 1870s.[45] The extinction of the buffalo during the same period as the fort's operation meant the slaughter of an almost incomprehensible number of buffalo. Accounts of single buffalo hunting groups could boast of kills in excess of a thousand buffalo.[46] The effects of this scale of hunting on the fort or the extent of soldier participation in buffalo hunting and bone salvage are not known.

Fishing, as well as hunting, provided a way for soldiers to spend their free time. Larned and Pawnee County newspapers from the 1870s expressed concern about dwindling quantities of fish in the Pawnee River as a result of overfishing.[47] A news account from 1873 reported that soldiers

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[39]Albright and Scott, 18.
[40]NARA RG94, 101.
[41]Fleharty, 46.
[42]Fleharty, 6.
[43]Eugene D. Fleharty, *Wild Animals and Settlers on the Great Plains,* (Norman: University of Oklahoma Press, 1995), 55–67.
[44]Buffalo bones were used as fertilizer, in refining sugar, and for manufacturing combs, knife handles, and other objects.
[45]Fleharty, 65.
[46]Fleharty, 67.
[47]Fleharty, 288.

from the fort had captured two hundred wild turkeys in a single day's hunt.[48] It is assumed that there would have been geese and white cranes (egrets) in the fort vicinity since there are accounts of these birds eating wheat crops in Pawnee County and also of their being hunted.[49] The abundant wildlife was not always beneficial to the soldiers, but also presented a degree of danger to life at the fort. There were rattlesnakes in the fort vicinity; rabies was also a threat on the prairie. Wolves and skunks were known to contract rabies, and were able to pass the disease on to dogs and cats.[50] There is at least one known account of a rabid wolf entering the post and the death of a soldier as a result of the bite of the rabid animal.

Contemporary descriptions of the developed post are complimentary, with Surgeon Forwood relating that "... on the whole the post presents a bright and handsome appearance."[51] He also states that the yard fences were whitewashed and "the facings of the buildings" were painted white. There were vines growing "luxuriantly" in front of the officer's quarters in 1869.[52] Boardwalks also were developed in this period as indicated by correspondence directing construction of a board walk from the "rear of the Company Quarters to the men's sink with branches leading to each of the Co. Qr."[53]

By the 1870s photographs indicate that Officers' Row was a well-developed residential sector within the quadrangle. There are several photographs of the row during that period, including a *circa* 1875 photograph of the Commanding Officer's Quarters *(Figure 6)* and an April 1879 photograph of the south Officers' Quarters *(Figure 11)*. Tall wooden fences defined the rear and side yards and a wooden boardwalk extended along the front of the three officers' quarters. The rear yards were described as "large" with "high fences."[54] The backyards accommodated the typical domestic needs of the period; privies, water barrels, and stables were developed west of the quarters to the rear.[55] The surgeon's report describes each of the officers' quarters as opening "into a yard common to all the occupants on that side of the building ... ."[56] Each had a small porch to the rear and to the side of the kitchen.[57]

The surgeon reported that the drainage of the fort was "entirely superficial, and not good, but this is of less importance on account of the scanty rain fall."[58] Contemporary reports describe "parched earth" that "absorbs every drop of moisture."[59] Rain was a problem from time to time, and rain, as well as droughts, affected the fort's landscape. Apparently ditches were needed to

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[48]Fleharty, 45.
[49]Fleharty, 190.
[50]Fleharty, 215.
[51]NARA RG94, 12.
[52]NARA RG94, 133.
[53]National Archives and Records Administration, Microfilm Record Group 393, Washington, D.C., Roll 2 Letters Sent. The exact location of these walks and the configuration of the branches presently cannot be determined from existing documentation.
[54]NARA RG94, 10.
[55]NARA RG94, 10.
[56]John S. Billings, Report on Barracks and Hospitals with Descriptions of Military Posts, (New York: Sol Lewis, 1974), 300.
[57]NARA RG94, 10.
[58]Billings, 300.
[59]NARA RG94, 10.

alleviate the effects of extremely heavy rainfall. A May 1872 report, which gives an account of flooding, mentions drains and ditching:

> Rain has fallen nearly every twenty four hours during the entire month. On the night of the 18th the Pawnee Fork commenced rising, and by 10 A.M. next morning was up to the string pieces of the bridge: 21 feet above the ordinary water mark. The height of this freshet is believed to be unprecedented since June 1860. The water subsided during the next three or four days, leaving the creek in much better sanitary condition than before the freshet. The dry channel east of the parade was filled with water, much of which remained but is rapidly being drained by ditching.
>
> The drains have all been opened; the banks and bed of the creek have been carefully policed; the Commissary and Quartermaster Store house, Work Shops, Bake House, Corral and Guardhouse drained and put in good order, and in fact the whole garrison has undergone a system of thorough police and is now in excellent sanitary condition.[60]

The fort was associated with significant military policies, events, and operations during the late 1860s. Major General Winfield Scott Hancock used Fort Larned as his base in 1867 for the campaign against the Plains tribes; this unsuccessful campaign resulted in intensified hostilities with Native Americans.

Three infantry companies and one cavalry company moved into the new barracks in 1867; the kitchen wings, however, were not completed until 1868. The 10th Cavalry—an African American company with white officers—was known as the "Buffalo Soldiers." This term was applied to all African-American troops serving in the West. Apparently racial tensions between the white companies and the Buffalo Soldiers resulted in the burning of the 10th Cavalry stables, horses, stores, and equipment. As a result, the 10th Cavalry was assigned to camp about a half-mile away from the fort—ostensibly to guard the wood pile—but more likely to reduce racial tensions and avoid conflict between troops of different races.

Information about much of the landscape is available only by inference. Woodpiles and haystacks, for example, are mentioned in official correspondence[61] because both had been subject to thievery, indicating the value and scarcity of wood and agricultural products in the fort vicinity.

The 1876 *Outline of Posts* describes the "surrounding country" as a "rolling prairie, with poor soil and not adapted to agriculture; gardens have proved repeated failures." The outline continues that the land is "well watered, but not well timbered; ... grass good."[62] The *Outline* also includes an 1876 plan of the fort *(Map 5)* that indicates no change in arrangement or organization from that shown for 1866 in Maps 3 and 4.

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[60]NARA RG94, 265. While providing a limited amount of information concerning drains, this report also discusses the effects of a flood.

[61]Albright and Scott cite letters describing such acts of thievery, 18.

[62]*Outline of Posts,* Facsimile Edition (Fort Collins: The Old Army Press, 1972).

The fort landscape was sparse and rocky, but was maintained as a military installation. The ground cover visible in photographs from this period would indicate that even the parade was fairly rough and vegetated with prairie grass and weeds. There appears to have been no manicured lawn. A report by Assistant Surgeon Forwood, however, describes the parade *circa* 1869 as "perfectly level and covered with buffalo grass with wide gravel walks all around in front of the buildings."[63] Even so, the grass did not fare well during the summer months when portions of the parade would be "perfectly bare of grass and its surface ... perpetually given off in dust."[64] There are indications, however, that the parade ground was periodically mowed with horse-drawn mowers.[65] Apparently fort maintenance was under the charge of the Provost Sergeant who directed the daily policing of the garrison by a team of prisoners.[66]

The environs of the fort consisted of tallgrass prairie that characterized eastern and central Kansas. These vast expanses of grass were highly susceptible to prairie fires, often started by lightning, which occurred with some degree of predictability during the summer months. Conditions generally were dry during the summer; according to contemporary descriptions, the native prairie grasses were totally brown by mid-summer. As a result, there were almost daily prairie fires by the end of July.[67]

Several attempts were made at gardening. According to army regulations, the hospital garden was under the control of the fort surgeon; other gardens—company and officers' gardens—were the responsibility of other staff. Gardens would have been considered desirable to supplement the requisite army rations: fresh or salt meat, bread, flour or corn meal, beans or peas, rice or hominy, coffee or tea, sugar, vinegar, salt, pepper, potatoes, and molasses.[68] However, a succession of gardens fell victim to heavy rains, hail, drought, winds, insects, and prairie fires.

Grasshopper plagues were a particular problem for farmers in Kansas; plagues have been documented in Kansas for the years 1820, 1848, 1850, 1860, 1868, and 1874.[69] Kansas newspapers advised settlers to plant trees to attract more birds, introduce non-native species of birds, and to pass laws regulating the killing of inset-eating birds to control the menacing grasshopper. The cutting of trees along streams and rivers had made riparian environments less suitable as bird habitats and had resulted in an increase in insect populations.

In 1868 there were a "few very small gardens" initiated by officers adjacent to their quarters. These gardens were described as receiving a "good deal of personal attention" and possessing an

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[63]NARA RG94, 12. An analysis of sod samples taken from under HS-7 and HS-8 in February, 1996, used methods that allowed both macrofloral and phytolith remains to be studied. A large quantity of uncharred seed and root fragments from the grass family Poaceae was found in the macrofloral study, especially remains from buffalograss seeds and roots. Phytoliths are silica bodies produced by plants that are placed into the soil when the plants decay. The phytolith record in the soil under HS-7 and HS-8 was dominated by groups of cells indicative of short grasses such as buffalograss. Therefore, both the macrofloral and phytolith evidence indicates the abundant presence of buffalograss in the prairie at the time of construction of Fort Larned.
[64]NARA RG94, 129.
[65]FOLS-N-002.000, Prairie Restoration Project Statement, June 28, 1996. 2.
[66]Albright and Scott, 26.
[67]NARA RG94, 118.
[68]*Revised United States Army Regulations of 1861*, (Washington, D.C.: Government Printing Office, 1863), 244.
[69]Fleharty, 126.

appearance that would encourage post gardens another year.[70] Garden utensils were ordered during the spring of 1869 despite the fact that previous gardens had not fared well. According to the fort surgeon's account,

> The experiment of gardening has been tried here every spring since 1859 & has proved to be total failure in every instance. Garden vegetables cannot be successfully raised here any more than they can in the Desert of Sahara. Early in April, even in March, the grass begins to spring up with low places along the ... spring peas, beans, corn and radishes planted in May come up rapidly; by the first of June present a most promising appearance. The June rains ruin corn once in three or four days. Short violent bursts in which the young plants are ... nearly doused. A little later, these storms are preceded by a shower of large hail which nearly covers the ground. But now in the early part of July, the rains cease. The few plants that are left receive their final death blow from the hot South West winds (&) parching sun which extracts moisture and green color from every leaf even of the hardy natural grasses and burns the prairie brown in every direction. By the end of July the light of prairie fires skirts the horizon every evening. To guard the young plants against the flood of June, high ground might be selected and irrigation resorted to when the rains cease, but no system of irrigation beyond that of hauling of carrying water from the creek could be practiced here ... ."[71]

The surgeon continued that it was still possible that "the lesser class of garden vegetables, especially the succulent vegetables" could be successfully cultivated using irrigation. The surgeon also listed the damaging effects of severe hail storms on vegetables, violent rains from the southwest, swarms of summer grasshoppers, and a sun so hot that it baked the earth and made it impenetrable to plant roots.

Despite these obstacles, gardening appears to have been at least fairly successful in 1869. The gardens planted that year continued to do well through August and "afforded their owners several grateful messes of minor vegetables."[72] It should be noted, however, that conditions in 1869 appear to have been more moderate than in many years since there are also accounts of occasional rain showers, the parade retaining its "fresh appearance, and even of the prairie remaining green until the end of summer."[73] In April of 1870, "the various company commanders having no further intimation of a campaign" began preparing the company vegetable gardens.[74] Company C sited its garden directly opposite the hospital on the left bank of the creek; this garden was enclosed with a sod wall and there was a pump to irrigate it from the creek.[75] Company D and Company K developed gardens on the right bank and built a "wide wooden fence" as an enclosure.[76]

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[70]NARA RG94, 131.
[71]NARA RG94, 117–118.
[72]NARA RG94, 133.
[73]NARA RG94, 133.
[74]NARA RG94, 165.
[75]NARA RG94, 165.
[76]NARA RG94, 165.

The 1871 description of the fort included in the *Outline Description of U.S. Military Posts and Stations in the Year 1871* is not especially complimentary but provides several glimpses into the character of the landscape and its vegetation. It describes the post in the following way:

> The land on the reservation may be considered poor. Heretofore no crops or gardens have been successful, notwithstanding several experiments have been made; this season being a favorable one, experiments on a small scale have thus far been successful. It is more than probable that with care a vegetable garden could in ordinary seasons, be cultivated by irrigation, so as to repay the labor expended. The land is well watered, but not well timbered, a few elm, ash, and black walnut, and cottonwood trees. Grass (buffalo) is good. Soil, light and sandy. Streams rise in the spring, with the melting of the snow, and at intervals during the rainy season, which ordinarily lasts from the first of June to the end of August, and are not fordable at such times. The climate is healthy and mild; average temperature, winter 44°; summer 70°. No settlements proper, but two ranches, one four miles and a quarter southeast and the other two miles and a half northeast from post.[77]

Vegetables were grown successfully in other years as well. Apparently there were many early vegetables produced in 1874.[78] The annual report for 1875 reported that the company gardens had been successful and that "Crops are good all through this valley and farmers are now engaged in harvesting their grain. Corn is looking well. No damage was done in this vicinity by the grasshoppers this year."[79] Typical garden plants would have included lettuce, radishes, greens from young beets, spinach, peas, beans, onions, cabbage, cucumbers, and squash. The hospital cook also had responsibility for a small garden for hospital use as well as for the hospital's dairy cow.[80] No specific information has been identified to date of a farming operation to feed mules and horses. Grain for livestock was shipped to the fort, and civilian contractors were hired annually to put up hay. There also are references, however, to "huge wagons fresh loaded from the field ... " and the garrison duty of hauling hay.[81] The surgeon's reports mention "bottom land ... covered with good grass, from which hay is obtained for the post."[82] These reports refer to the Arkansas River valley to the south. The fort's many wood-burning stoves created a demand for wood.[83] Wood was cut at the fort, at Walnut Creek, and was also secured on contract from civilians.

The fort would have been very dark at night. The bakery was the only place where work was conducted at night. According to the fort's furnishings study, "Fort Larned must have been a

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[77]*Outline Descriptions of U.S. Military Posts and Stations in the Year 1871,* (Washington, D.C.: Government Printing Office, 1872), Quartermaster General's Office, War Department, 205.
[78]Albright and Scott, 148.
[79]Typed transcript of Annual Report for 1875 of Quartermaster at Fort Larned, Kansas by Lieut. C. B. Hall, 19th Infantry, A. A. Q. M., July 1, 1875, consolidated Correspondence File, MSS, Quartermaster General's Office, Army and Air Corps Branch, National Archives and Records Administration (Record Group 92), history file, Fort Larned National Historic Site, KS.
[80]Albright and Scott, 147.
[81]NARA RG94, 101.
[82]Billings, 299.
[83]Albright and Scott, 35–37.

rather cheerless and dimly lit post, brightened only by candles."[84] The report continues that "it seems clear that after sunset there was little light at the camp on Pawnee Fork."[85]

Cattle, oxen, horses, and mules would have been prevalent at Fort Larned. It is likely that they had a major role in defining and animating the fort grounds and environs. Many herds of cattle were driven by the fort, and herds frequently grazed near the fort. At times there were as many as 2100 head at a time. Local ranchers, who were under contract to the army to provide meat, kept cattle near the fort.[86] Beef cattle usually were supplied live to the post and kept in corrals. A contemporary account of a corral described it as "... built with poles on the 4 sides of a square and roofed with piles of hay."[87] Cattle were slaughtered about 0.5 mile from the post "at a point on the creek east of the corral .[88] Hogs at free-range evidently were a problem for the fort during this period.

There were stables for both horses and mules, and there were both government and private horses at the fort.[89] Officers were allowed two private horses each, and there also were cavalry horses stabled at the fort. Mules, however, were the most common transport animals at Fort Larned and also were used for riding.[90] During construction more than 200 mules were used to haul wagons. They also hauled stone, sand, and lumber, and served escort duty.[91] Following construction, there was a reduced number of mules. In 1870 there were 52 mules at the fort, used primarily to haul wood, and pull the ambulance, water wagon, and mail wagon.[92] There was considerable internal circulation at the fort: the water wagon and refuse carts made daily rounds, and the ambulances provided transport of officers and families.

There is documentation referring to both stone-lined wells and water barrels. The barrels stood in the yards at the rear of buildings and were supplied by the water wagons with water from the creeks. The number of wells depended on the need of each building; each set of quarters had a well as did each of the two barracks. The description of the fort included in the *Outline Description of U.S. Military Posts and Stations in the Year 1871* confirms that the water was supplied from Pawnee Creek and wells.[93] Reports by Surgeon Forwood, however, consistently described the water from most of the post's several wells as "sulfurous and not used."[94] Four of the wells were described as furnishing "good cold water impregnated however with the carbonates of lime."[95] The officers, it appears, preferred creek water which was described as "softer and less sulfurous than that of the wells in rear of the quarters."[96] An 1878 photograph of the infantry barracks well house shows a wooden, roofed structure, linked to the barracks by a boardwalk, with a large

[84]Albright and Scott, 35.
[85]Albright and Scott, 35.
[86]Albright and Scott, 48–49.
[87]NARA RG94, 12.
[88]NARA RG94, 12.
[89]Albright and Scott, 50–53.
[90]Albright and Scott, 49.
[91]Albright and Scott, 39.
[92]Albright and Scott, 39.
[93]*Outline Descriptions of U.S. Military Posts and Stations in the Year 1871*, 205.
[94]NARA RG94, 12.
[95]NARA RG94, 12.
[96]NARA RG94, 12.

wooden bucket standing next to the well *(Figure 8)*. Visible in the background is the old adobe hospital at the left and the hospital steward's quarters to the right.

The flag pole was a two-piece pole—more than 100' tall—set in the center of the parade. The flag was visible for many miles as travelers approached the fort.[97] The flag was of regulation size and design as described in the Revised United States Army Regulations of 1861:

> "The garrison flag is ... made of bunting thirty-six feet fly, and twenty feet hoist, in thirteen horizontal stripes of equal breadth, alternately red and white, beginning with the red. In the upper quarter, next to the staff, is the Union, composed of a number of white stars, equal to the number of states, on a blue field, one-third the length of the flag, extending to the lower edge of the fourth red stripe from the top. The storm flag is twenty feet; the recruiting flag, nine feet nine inches by four feet four inches.[98]

The flagpole was destroyed by lightning in 1877.[99]

A bridge was built across the Pawnee about a hundred yards above the fort in 1868. The bridge was described as a "good substantial bridge."[100] An 1878 view of the fort shows wagon ruts that indicate a portion of the fort's interior circulation. No trees are visible in this view from the southeast corner of the parade. Patches of both grass and bare earth are visible on the ground plane *(Figure 7)*.

In 1869, use of the first cemetery was discontinued and a new cemetery established. The deplorable condition of the first cemetery was observed in 1868 by Lieutenant Thompson:

> I would respectfully yet earnestly invite your attention to the National Cemetery at this Post which is at present ... in a miserable condition having no walls or fences around it, with scarcely any head or foot boards to the graves and the whole presenting a picture of neglect.[101]

The old cemetery was not rehabilitated or embellished; instead a new cemetery was developed. Interments in the new cemetery had already occurred by the fall of 1869. The inspection report filed at that time reported that "a new site has been selected and interments made there. The bodies should be removed from the old to the new and a fence completed around the latter ... ."[102] Assistant Surgeon Forwood also reported on the two cemeteries in a report for the same period:

> ... on this island ... the hay stacks are placed & the old burying ground is in the centre; but a new site for a cemetery has been selected 3/4 of a mile north of the post on a little elevation ... & the bodies will at some future time be removed to that place.

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[97]Assistant Surgeon Forwood estimated that the flag was visible "6 to 15 miles in different directions over the plain." Copy of Page 5, typewritten transcript of Fort Larned Medical History, MS, Adjutant General's Office, Army and Air Corps Branch, National Archives (Record Group 94), history file, Fort Larned National Historic Site, KS.

[98]*Revised United States Army Regulations of 1861*, 475.

[99]Oliva, 21.

[100]NARA RG94, 101.

[101]Quoted by Dwight Stimson, *Historic Structures Report* (Omaha: National Park Service, 1966), 48.

[102]Quoted by Dwight Stimson, 49.

> The new burying ground is about one acre of ground in the form of a square & is being enclosed by a high picket fence. It is in full view from the post.[103]

The reinterments are believed to have occurred between 1870–1872. By May 1873, there were twenty known and forty-one unknown interments in the new cemetery which was described in that year as "one-hundred and forty-four (144) feet square ... surrounded by a board fence in fair order; the Cemetery is about 1/4 mile from the flag staff in a northwesterly direction."[104]

The Indian Bureau Agency at the fort was abolished in 1868 and the Native Americans in the Fort Larned vicinity moved to reservations at Camp Supply and Fort Sill,[105] leaving Fort Larned with reduced responsibilities. General Order No. 6 by Major M. H. Kidd to Fort Larned issued the order for all civilians "unless they have written permission from these headquarters" to leave the fort.[106] In July 1868 all personnel except a small guard force were reassigned from Fort Larned to other posts. Ironically, the need for the fort was disappearing just as its permanent complex of buildings was being completed. The newly constructed fort remained in operation as a quiet garrison. By 1871 escorts were no longer needed for wagon trains, but railroad survey and construction crews did receive military protection. The fort continued to be a place of assistance and refuge. A band of Kaw Indians, for example, who had been unsuccessful in hunting the diminishing buffalo, visited the fort to request rations. The fort's troops also transported supplies to settlers needing assistance following the grasshopper invasion of 1874. Soldiers from Fort Larned provided protection for workers constructing the Santa Fe Railroad in the early 1870s. Completion of the railroad was the final stage of obsolescence for the fort; the railroad replaced the Santa Fe Trail as the major westward route. The Atchison, Topeka, and Santa Fe Railroad reached Larned in 1872.

Given this level of activity and staffing, it is not surprising that many fort structures were reported to be in poor condition in the Annual Report for 1875. The report describes old adobe structures as "rapidly falling to pieces," "beyond repair," and "hardly fit for occupation."[107] In 1878 Fort Larned was placed in the hands of caretakers and all military personnel and supplies transferred to other forts in Kansas. Portions of the land were leased to ranchers.

Leo Oliva makes the observation that Fort Larned had been always a "small post destined for a temporary existence."[108] According to Oliva, Fort Larned was a "base of operations, not a true fortification, and troops were shuttled to and from as well as through the post as they were needed at various points of trouble on the Plains."[109] In the short period of the fort's existence eleven regular army and thirteen volunteer regiments were stationed at the fort, with the 3rd Infantry serving the longest at almost six years. Sixteen units served at the fort for less than a year's

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[103]Quoted by Dwight Stimson, 49.
[104]Quoted by Dwight Stimson, 49.
[105]Billings, 299.
[106]Copy of General Order No. 6 by order of Major M. H. Kidd to Headquarters Fort Larned Kansas, history file, Fort Larned National Historic Site.
[107]Typed transcript of *Annual Report for 1875 of Quartermaster at Fort Larned*, Kansas by Lieut. C. B. Hall, 19th Infantry, A. A. Q. M., July 1, 1875, consolidated Correspondence File, MSS, Quartermaster General's Office, Army and Air Corps Branch, National Archives (Record Group 92), history file, Fort Larned National Historic Site, KS.
[108]Oliva, 49.
[109]Oliva, 49.

duration. Oliva reflects that the "constant turnover of officers and men at the post made it unlikely that many post traditions were established."[110]

1879–1901 *(Exhibit 5)*
By this period, the fort setting had changed considerably from its early days. The buffalo was largely extinct, railroad transportation had replaced the wagon trail, and prairie settlers were becoming established farmers and ranchers. A small detachment of troops stayed at the fort to guard government property following its deactivation. Settlers were interested in the disposition of the 10,240-acre military reservation. During this period, civilians were able to cut firewood on the military reservation for a fee.[111] Legislation introduced by Kansas Senator Preston B. Plumb and enacted in 1882 provided for the transfer of the reservation to the General Land Office, survey and appraisal of the reservation's land, sale of the land in 160-acre quarter sections, and sale of the post as one unit either at auction or by private sale.[112]

On March 26, 1883, the Fort Larned reservation was transferred from the War Department to the General Land Office, U.S. Department of the Interior. A portion of the reservation became part of the federal land grant to the Atchison, Topeka and Santa Fe Railroad; a portion was sold directly to settlers by the General Land Office, and a portion was sold through nearby Larned land receivers H. M. Bickel and Henry Booth.[113] The buildings and land on the actual fort segment of the reservation were sold at public auction in 1884 to the Pawnee Valley Stockbreeders Association for a bid of $11,056.

Despite financial difficulties, the Pawnee Valley Stockbreeders Association adapted the former fort for use as part of its ranching operation following their receipt of a land patent on June 12, 1885. A transcript of a June 5, 1885, article by George Fell in the Larned *Chronoscope* describes the conversion of the fort into a stock farm:

> Mr. Sage has had a fine bridge about 250 feet long built across Pawnee Fork directly north of the officers quarters. The three buildings on the west formerly occupied by the officers have been repaired and painted and look as nice as new. The two buildings on the north, formerly used as quarters by the soldiers ... have been fitted up as stables in the most approved manner, and ... the Durhams and Herefords calmly and quietly chew their cud. The two buildings on the south side ... are being re-fitted for stables as well as the two on the east of nearly equal size. ... The Parade Ground about 3 1/2 acres in extent is neatly fenced, leaving a fine gravel roadway between it and [the] buildings. ... The old ice house still stands upon the creek bank ... and on the opposite bank stands a veteran giant elm at least twenty-five feet in circumference. ... Three wind engines have been erected, one for grinding feed, one for pumping water for stock at the stables, and another for pumping water for use at the house. The island near the 'guard house' has been planted to fruit trees, vines and shrubbery and in a few years will be a beautiful spot.[114]

[110]Oliva, 49.
[111]Copy of Letter from Maj. R. H. Offley to Assist. Adj. Gen., 18 April 1880, history file, Fort Larned National Historic Site.
[112]Oliva, 77.
[113]Oliva, 77.
[114]George Fell, extract from article in Larned *Chronoscope*, 5 June 1885, history file, Fort Larned National Historic Site.

Section
30 | 29
31 | 32

HS# Structure or Feature / Date of Origin

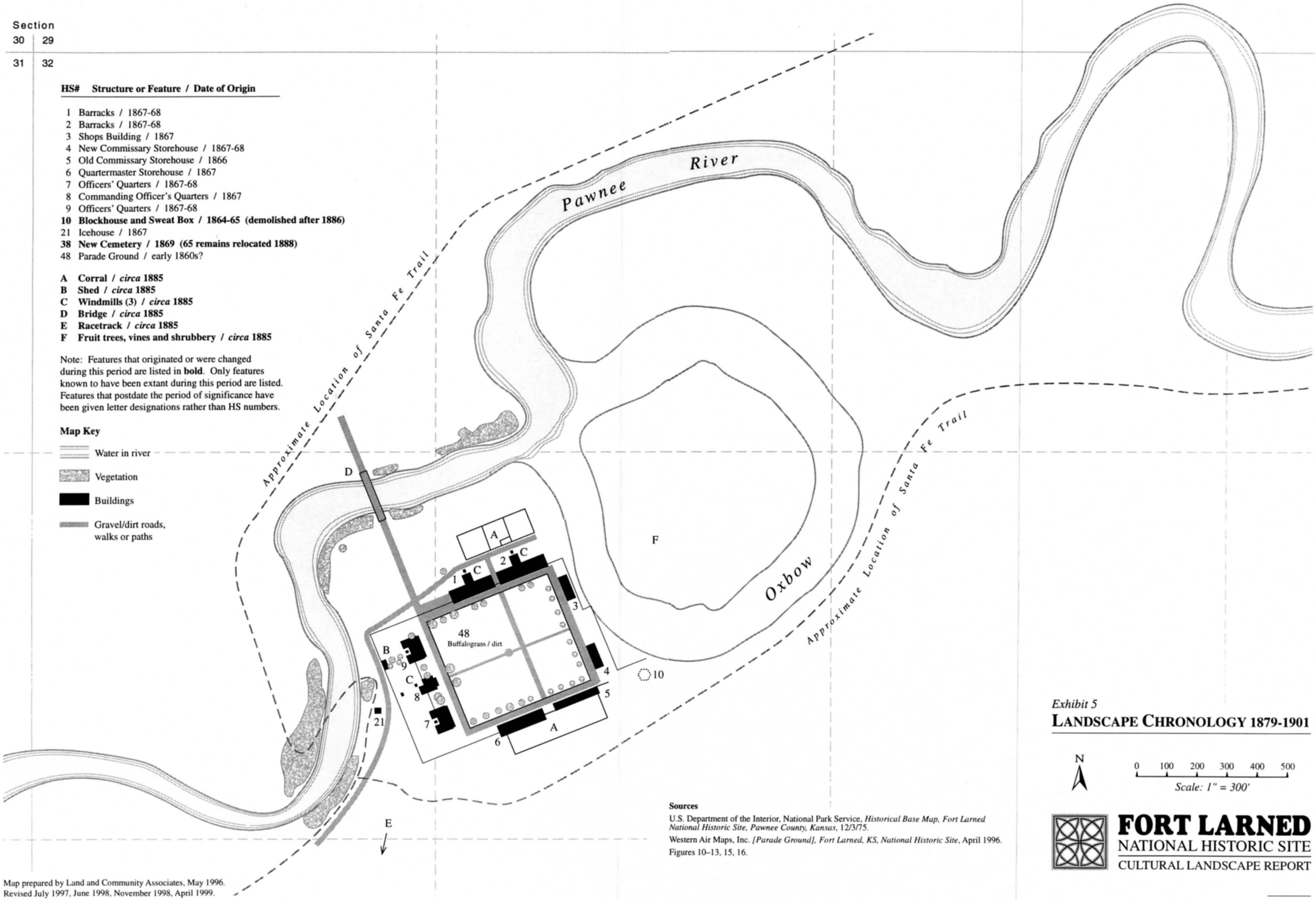
1 Barracks / 1867-68
2 Barracks / 1867-68
3 Shops Building / 1867
4 New Commissary Storehouse / 1867-68
5 Old Commissary Storehouse / 1866
6 Quartermaster Storehouse / 1867
7 Officers' Quarters / 1867-68
8 Commanding Officer's Quarters / 1867
9 Officers' Quarters / 1867-68
10 Blockhouse and Sweat Box / 1864-65 (demolished after 1886)
21 Icehouse / 1867
38 New Cemetery / 1869 (65 remains relocated 1888)
48 Parade Ground / early 1860s?

A Corral / *circa* 1885
B Shed / *circa* 1885
C Windmills (3) / *circa* 1885
D Bridge / *circa* 1885
E Racetrack / *circa* 1885
F Fruit trees, vines and shrubbery / *circa* 1885

Note: Features that originated or were changed during this period are listed in **bold**. Only features known to have been extant during this period are listed. Features that postdate the period of significance have been given letter designations rather than HS numbers.

Map Key

Water in river
Vegetation
Buildings
Gravel/dirt roads, walks or paths



Map prepared by Land and Community Associates, May 1996.
Revised July 1997, June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Figures 10–13, 15, 16.

Exhibit 5

LANDSCAPE CHRONOLOGY 1879-1901

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

An 1886 photograph documents the appearance and condition of the former fort during the Pawnee Valley Stockbreeders Association ownership *(Figure 12).* The photograph indicates use of some storehouses as barns, some fencing, and at least two windmills for pumping water. A sketch, which was published in *The Official Atlas of Kansas 1887,* clearly delineates the extent of the adapted fort with its new corrals built to accommodate livestock, a race track, and the windmills described in the *Chronoscope (Figure 15).* A few shade trees are evident, particularly in the residential area of the ranch along the former Officers' Row. The intersecting walks of the former parade have been retained. Following the Pawnee Valley Stockbreeders Association's default on its mortgage, one of its members, Charles Wilbur, purchased the fort property in 1891, and sold it to Johanna Frorer of Illinois in 1893.

The military cemetery located approximately one-quarter mile northwest of the quadrangle, the second on the post, was abandoned in 1878 with the closing of the post. There are conflicting accounts in secondary research materials concerning the exact date and number of bodies removed from this cemetery and reinterred in the Fort Leavenworth National Cemetery, also in Kansas. It appears, however, that between sixty and seventy bodies were exhumed and transported to Fort Leavenworth for reburial in the late 1880s, most likely either in 1886 or 1888. The reinterred graves are marked "Unknown U.S. Soldier." It is possible that some unknown graves of civilians buried at Fort Larned—and possibly even those of a few soldiers—remain at Fort Larned.[115]

Sometime after 1886, the blockhouse was demolished as were some of the auxiliary buildings. A circa 1900 photographic montage gives an indication of the ranching activity that was the new land use for the fort *(Figure 16).* The evidence of fencing, shade trees, and pastures for grazing mark the complete transition from the fort period with its sparse and utilitarian landscape to the more lush and developed stockbreeding ranch.

1902–1965 *(Exhibit 6)*

In 1902 Frorer sold the fort buildings and approximately 3,000 acres to Edward Everitt Frizell. Frizell and his family developed a successful ranch and livestock operation that made use of the fort structures which they had adapted for new uses. These adaptive uses resulted in the preservation of the basic structures and layout of the core quadrangle. The Frizells used the former commanding officer's quarters as a family residence; the two flanking officers' quarters were used for employee housing. The former barracks were connected and remodeled into a large barn. The bakery and shops building and the new commissary storehouse were used as machine shops. The old commissary storehouse and quartermaster storehouse were converted into barns and storage facilities. The former parade ground, now fenced, was used to graze livestock.[116]

The Frizell family's long ownership and occupancy of Fort Larned Ranch resulted in the continuity of the former fort's post-military land uses. A mid-1950s aerial photograph of the Frizell ranch *(Figure 23)* clearly depicts the adapted fort and its immediate environs. The ranch was a highly

[115]A copy of a 1988 news clipping from the Fort Larned National Historic Site files and supplied by NPS historian George Elmore describes the relocation of the graves to Fort Leavenworth. The clipping entitled "From Our Files" is a reprint of an 1888 news account of the exhumations. Since the account indicates that individual graves were difficult to locate, it is not unlikely that some human remains may not have been relocated from this cemetery. Two graduate theses in the Fort Larned National Historic Site archives give the removal/reinterment date as 1886.
[116]Oliva, 79.

efficient, modern operation that made use of the underlying structure and arrangement of the fort. The adjacent oxbow—which had been bermed and cut off from the Pawnee River—was now irrigated for use as a water storage pond. The Frizell family also constructed berms along the south bank of the Pawnee River at this time to aid in flood control. The two former barracks, connected and converted into an imposing, two-story barn, are scarcely recognizable (See also *Figure 25*). The former bakery, shops, and storehouses also were joined into two long buildings on the east and south sides of the old quadrangle. Roads, silos, corrals, trees, and fences are very much in evidence in the photo, as are fields which have been cultivated in grains and grasses. U.S. Route 156 (present Kansas Route 156) is visible in the background.

The Frizells appreciated the historic importance of the fort and welcomed visitors. Members of the family have been interviewed by NHS staff in recent years. Although informative about the site and the family's use of it, these interviews revealed little information pertaining to the landscape. During the 1950s, signs on adjacent Route 156 directed visitors to the fort.

In 1940, the Frizells sold a 0.46-acre right-of-way to the State of Kansas along the Route 156 frontage of the ranch. An additional 2.4 acres were transferred in 1958. In about 1960, the state developed a picnic area on this parcel. A 1959 schedule of prices for the project included eight concrete or wood picnic tables, three roof structures to shade individual picnic tables, and two shelter houses, as well as a combination tool shed and comfort station, well, fireplace, and picnic grill. Numerous plant materials, including ponderosa pine, blue pfitzer juniper, and eastern redbud, were specified for the landscape.

Merril J. Mattes of the NPS visited the site in 1955 and recommended that it be designated as "historic." In 1957 the Fort Larned Historical Society was founded to develop a tourist attraction at the site and to promote federal acquisition of the former fort from the Frizell family. The fort opened for public visitation in 1957 and a museum and a visitor center were developed. The fort was designated a National Historic Landmark in 1960. In 1964, the U.S. Congress authorized the NPS to incorporate Fort Larned into the park system as a National Historic Site. Throughout this transition period agricultural activity continued on the site until it was acquired by the Department of the Interior.

1966–1996 *(Exhibit 7)*

Fort Larned National Historic Site was authorized by an Act of Congress (Public Law 88-541, 78 STAT. 748) on August 31, 1964. The Act limited the acquisition of land for the fort to 750 acres (303.75 hectares) and established a development budget of $1,273,000.[117] Property totaling 718.39 acres (290.72 hectares), both in fee simple ownership and land held in easements, was acquired by NPS on October 14, 1966. The 44.44-acre (17.98-hectare) parcel containing the Santa Fe Trail ruts formed the only non-contiguous unit of the NHS. In 1985, the Federal Government was granted concurrent jurisdiction at Fort Larned National Historic Site by the State of Kansas.

For the first few years of the park's existence the Fort Larned Historical Society continued to play a major role in the operation of the site. In 1974 the society organized the Santa Fe Trail Center

[117]The development ceiling was subsequently increased to $4,273,000 by Public Law 94-578, 90 STAT. 2733 on October 21, 1976.

Section
30 | 29
31 | 32

US 156

FAS 986

HS# Structure or Feature / Date of Origin

1 Barracks / 1867-68
2 Barracks / 1867-68
3 Shops Building / 1867
4 New Commissary Storehouse / 1867-68
5 Old Commissary Storehouse / 1866
6 Quartermaster Storehouse / 1867
7 Officers' Quarters / 1867-68
8 Commanding Officer's Quarters / 1867
9 Officers' Quarters / 1867-68
48 Parade Ground / early 1860s?

A Corrals / *circa* 1885 onward
C Windmill (1) / *circa* 1885
F Frizell Ice House / *circa* 1910
G Berm / *circa* 1940s
H Fence at former parade / *circa* 1940s
I Silos (3) / *circa* 1940s?
J Chicken Coop and surrounding Pigpens / *circa* 1940s & 1950s
K Metal Flagstaff / 1957
L Picnic Area / *circa* 1960
M Picnic Wayside Exhibit / *circa* 1960
N Highway Bridge / 1963

Note: Features that originated or were changed during this period are listed in **bold**. Only features known to have been extant during this period are listed. Features that postdate the period of significance have been given letter designations rather than HS numbers.

Map Key

- Water in river
- Vegetation
- Buildings
- Fence
- Levee
- Gravel/dirt roads, walks or paths
- Asphalt roads, walks or paths

Pawnee River

Approximate Location of Santa Fe Trail

Approximate Location of Santa Fe Trail

Oxbow

L
M
N
G
A
2
I
1
3
H
48
K
4
I
5
J
9
C
8
7
6
A
A
F

Map prepared by Land and Community Associates, May 1996.
Revised July 1997, June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.
Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.
(Picnic Area Construction Drawing, date)
Figures 17-26.

Exhibit 6

LANDSCAPE CHRONOLOGY 1902-1965

N

0 100 200 300 400 500
Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

and opened a new museum and library related to the Santa Fe Trail, located on Route 156 just west of the Larned town limits.

A few changes at the fort are evident in a late 1960s aerial photograph *(Figure 26)* from the site's appearance in the mid-1950s under Frizell ownership *(Figure 23)*. Most notable of these are the removal of the silos at the northeast and southeast corners of the quadrangle and the apparent restoration of the original building massing of the shops building and new commissary storehouse on the east side of the parade. The barn massing of both the barracks and the quartermaster storehouse do not yet appear to have been altered. The parade, however, is open once more, and no corrals or similar fencing are evident. An oblique aerial photograph taken from the east in 1971 *(Figure 27)* shows essentially the same site conditions as the *circa* 1960s aerial.

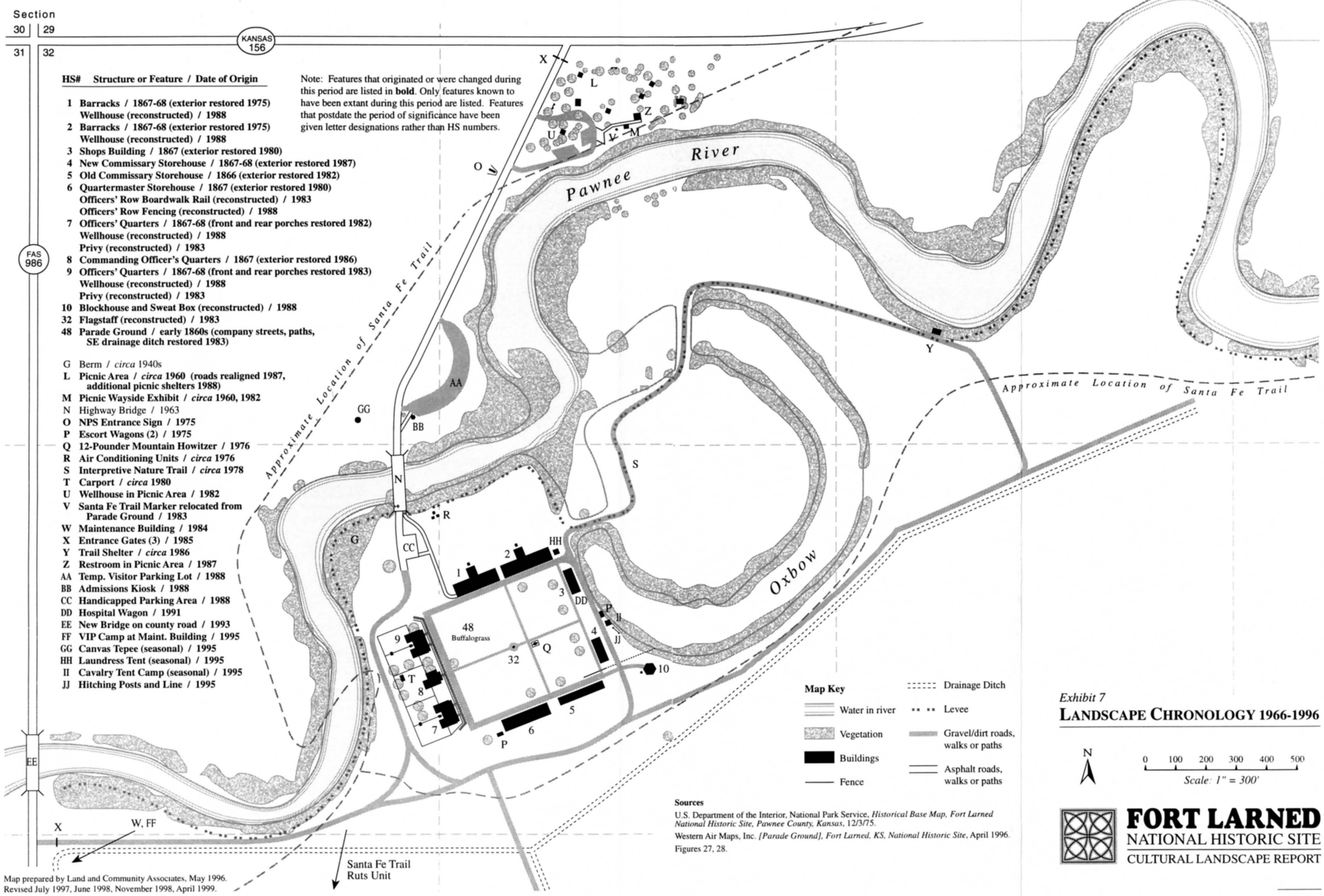
Since 1966 NPS has restored the complex of historic buildings to represent its military use in 1868. Removal of non-historic structures associated with the Frizell ranching operations began shortly after NPS acquisition of the site, and was completed by August 1968. Exterior restoration of the historic structures continued through the 1970s and into the 1980s, with the exteriors of the nine original buildings essentially complete by 1987. Several reconstruction projects were undertaken in 1983, with the construction of privies behind both the north and south Officers' Quarters and the installation of a 99' flagstaff[118] on the parade. Well houses behind the two Officers' Quarters and the two barracks were reconstructed in 1988. The most extensive reconstruction at the fort, that of the blockhouse, was completed in the same year. A number of other auxiliary structures that originally had been constructed of wood or adobe, such as the sutler's complex and the hospital, have not been reconstructed but exist as known archeological sites. New construction at the park included a well house at the picnic area in 1982, maintenance facility building in 1984, picnic area restroom in 1987, and an entrance fee collection booth in the temporary visitor parking area in 1988.

Comparison of the 1971 aerial photo *(Figure 27)* with a 1993 oblique aerial photograph *(Figure 28)* indicates the significant changes undertaken by NPS over the intervening twenty years. The agricultural / ranching overlay of the Frizell period is no longer apparent. Vegetation is again sparse, although there are more deciduous trees than during the fort's period of operation, both on the parade and along the Pawnee River and oxbow. The oxbow itself is now dry. The original fort buildings have been restored to remove the additions that had converted them into barns and other ranch uses, and other buildings such as the blockhouse have been reconstructed to give a more accurate picture of the fort's appearance during the late 1860s. Once again the impressive flagstaff marks the fort's place in the surrounding Kansas landscape.

Landscape rehabilitation at the fort also began shortly after NPS acquisition. In 1969, the park undertook prairie reconstruction of the adjacent agricultural fields to re-create the more natural appearance of the fort's environs during its period of operation. The previous year, trees killed by Dutch elm disease were removed and others pruned of dead wood in an effort to halt its spread. After 1974 water was no longer pumped into the oxbow. In 1981 the picnic area was acquired from the State of Kansas, and in 1983 the DAR Santa Fe Trail marker was moved from the parade

[118]According to Superintendent Steve Linderer, reconstruction of a 100'-tall flagstaff would have necessitated installation of a navigational warning light, in accordance with FAA regulations.

ground to the picnic area. That same year saw the restoration of crushed sandstone and gravel company streets and paths at the parade ground, the drainage ditch at the southeast side of the parade, and the boardwalk rail along Officers' Row. Board fencing with simulated whitewashing was reconstructed at Officers' Row in 1988. The visitor center parking lot was removed in 1987 and replaced by a temporary lot north of the Pawnee River. During 1987 the roads in the picnic area were realigned, and a new picnic shelter and fire boxes installed the following year. In 1995, a buffalo hide tepee was purchased for use as an interpretive object adjacent to the park entrance road. A laundress's tent and a cavalry tent camp were also acquired for seasonal interpretation within the historic core.



HS# Structure or Feature / Date of Origin

1 Barracks / 1867-68 (exterior restored 1975)
Wellhouse (reconstructed) / 1988
2 Barracks / 1867-68 (exterior restored 1975)
Wellhouse (reconstructed) / 1988
3 Shops Building / 1867 (exterior restored 1980)
4 New Commissary Storehouse / 1867-68 (exterior restored 1987)
5 Old Commissary Storehouse / 1866 (exterior restored 1982)
6 Quartermaster Storehouse / 1867 (exterior restored 1980)
Officers' Row Boardwalk Rail (reconstructed) / 1983
Officers' Row Fencing (reconstructed) / 1988
7 Officers' Quarters / 1867-68 (front and rear porches restored 1982)
Wellhouse (reconstructed) / 1988
Privy (reconstructed) / 1983
8 Commanding Officer's Quarters / 1867 (exterior restored 1986)
9 Officers' Quarters / 1867-68 (front and rear porches restored 1983)
Wellhouse (reconstructed) / 1988
Privy (reconstructed) / 1983
10 Blockhouse and Sweat Box (reconstructed) / 1988
32 Flagstaff (reconstructed) / 1983
48 Parade Ground / early 1860s (company streets, paths, SE drainage ditch restored 1983)

G Berm / *circa* 1940s
L Picnic Area / *circa* 1960 (roads realigned 1987, additional picnic shelters 1988)
M Picnic Wayside Exhibit / *circa* 1960, 1982
N Highway Bridge / 1963
O NPS Entrance Sign / 1975
P Escort Wagons (2) / 1975
Q 12-Pounder Mountain Howitzer / 1976
R Air Conditioning Units / *circa* 1976
S Interpretive Nature Trail / *circa* 1978
T Carport / *circa* 1980
U Wellhouse in Picnic Area / 1982
V Santa Fe Trail Marker relocated from Parade Ground / 1983
W Maintenance Building / 1984
X Entrance Gates (3) / 1985
Y Trail Shelter / *circa* 1986
Z Restroom in Picnic Area / 1987
AA Temp. Visitor Parking Lot / 1988
BB Admissions Kiosk / 1988
CC Handicapped Parking Area / 1988
DD Hospital Wagon / 1991
EE New Bridge on county road / 1993
FF VIP Camp at Maint. Building / 1995
GG Canvas Tepee (seasonal) / 1995
HH Laundress Tent (seasonal) / 1995
II Cavalry Tent Camp (seasonal) / 1995
JJ Hitching Posts and Line / 1995

Note: Features that originated or were changed during this period are listed in **bold**. Only features known to have been extant during this period are listed. Features that postdate the period of significance have been given letter designations rather than HS numbers.

Map prepared by Land and Community Associates, May 1996.
Revised July 1997, June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

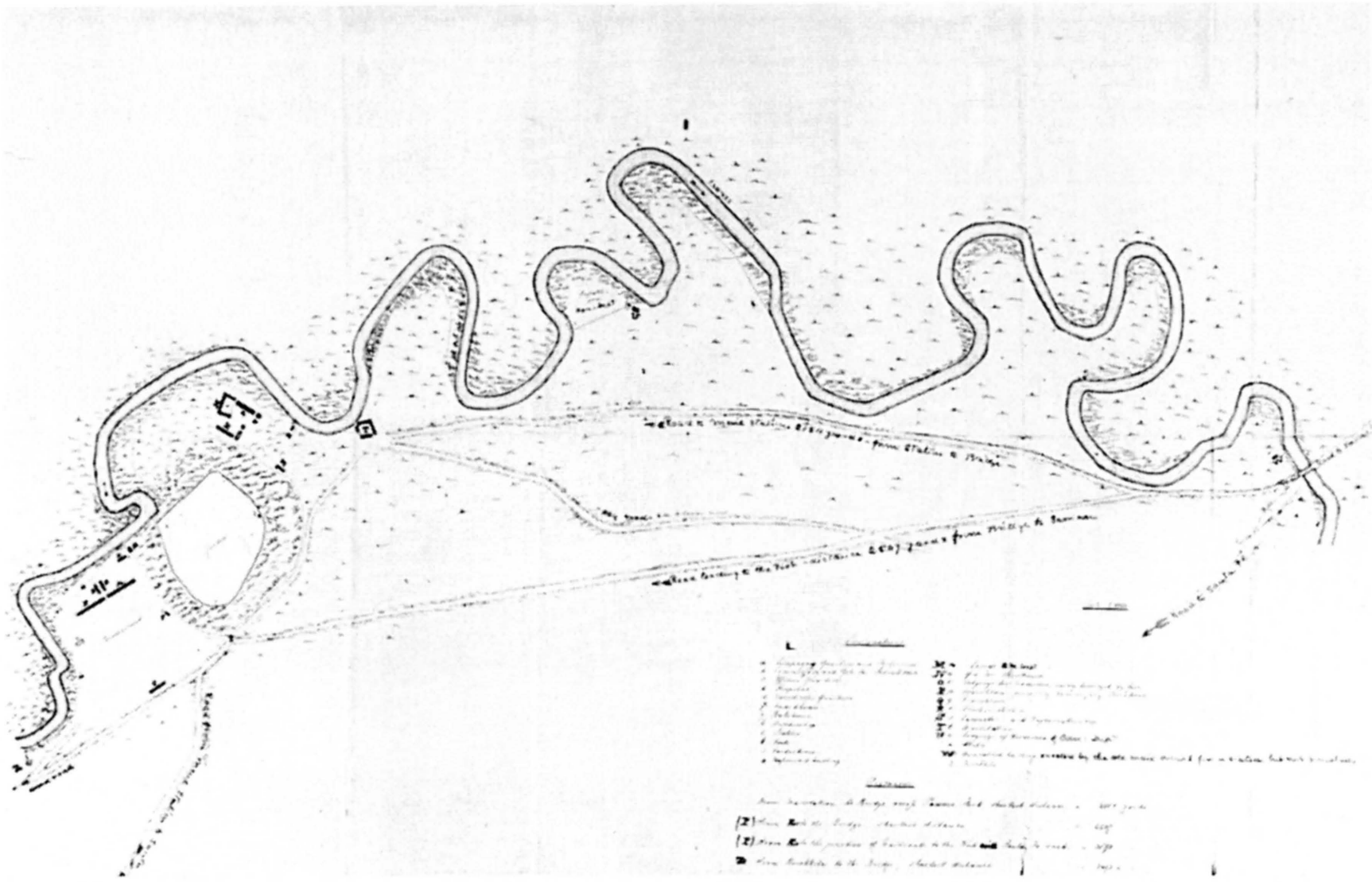
Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Figures 27, 28.

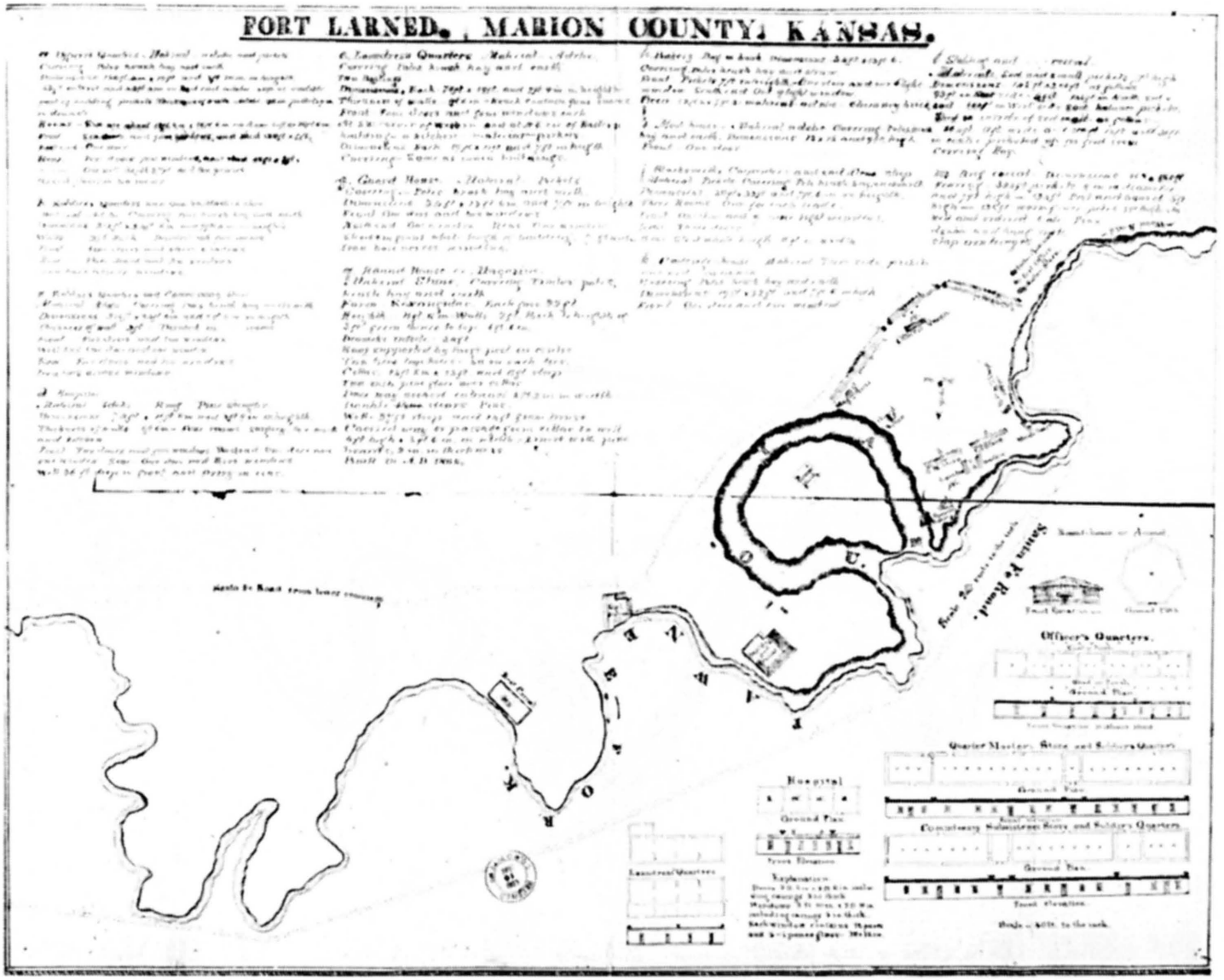
Exhibit 7

LANDSCAPE CHRONOLOGY 1966-1996

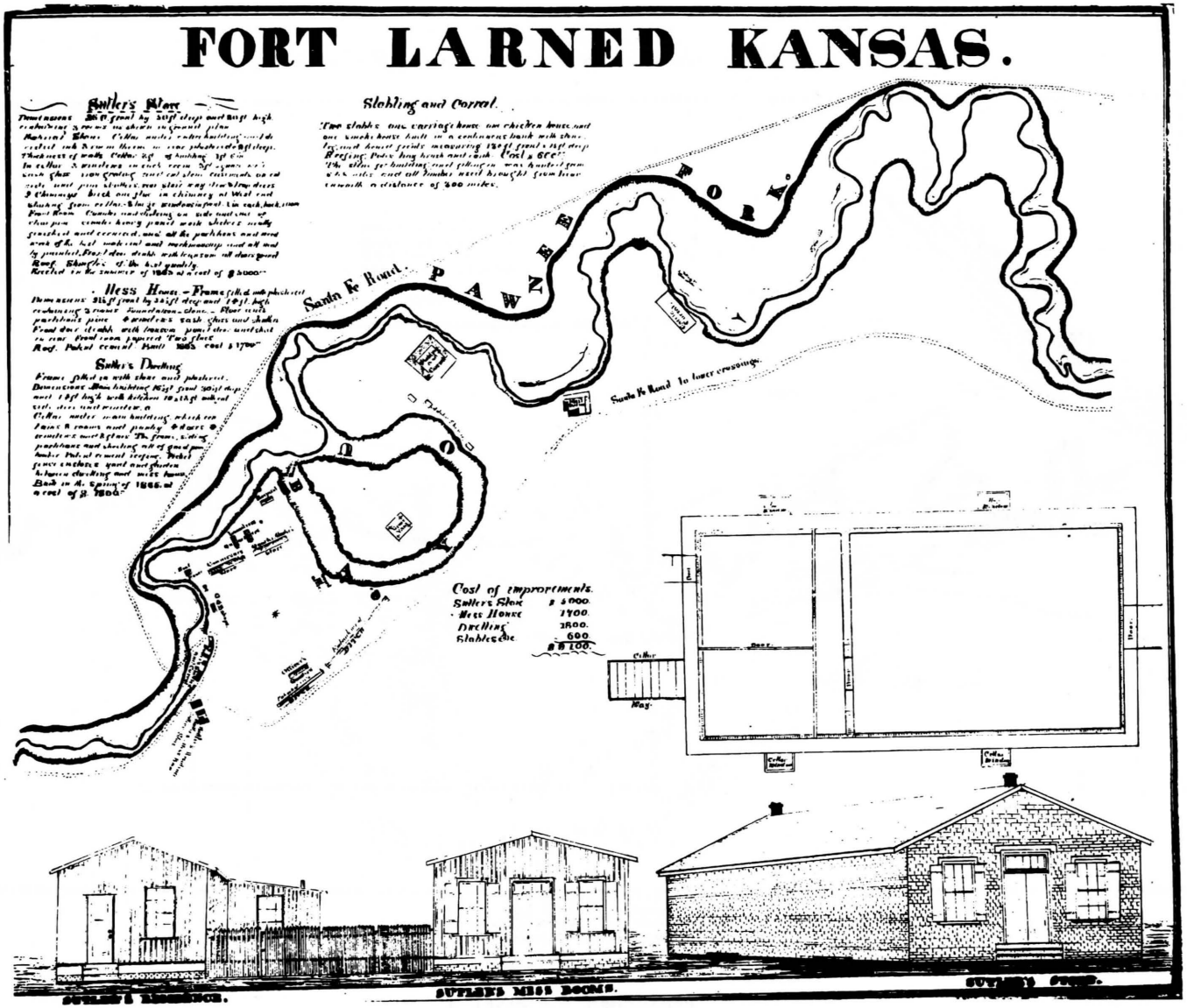
FORT LARNED
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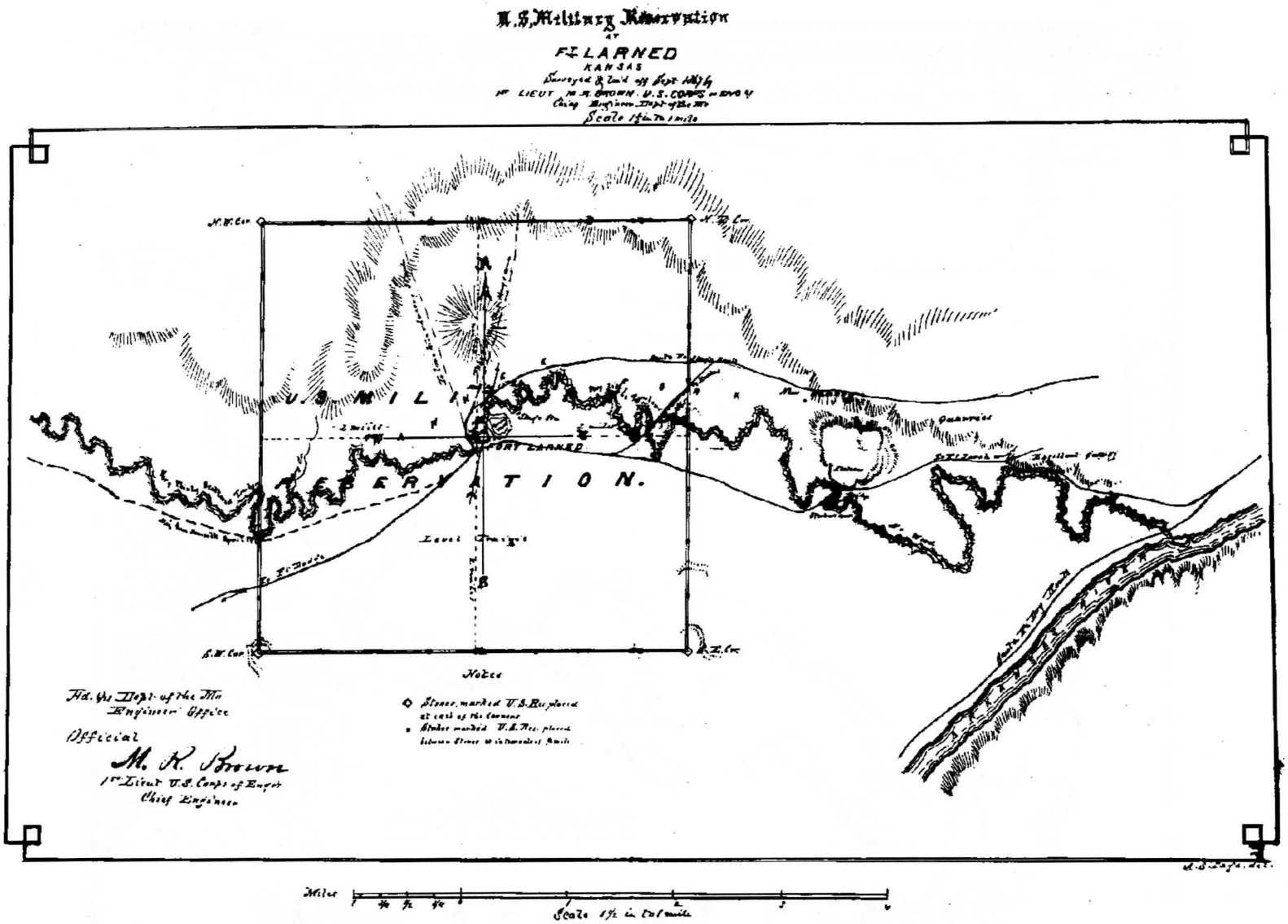
Map 1. 1863 or 1864 Map of Fort Larned. [National Archives]



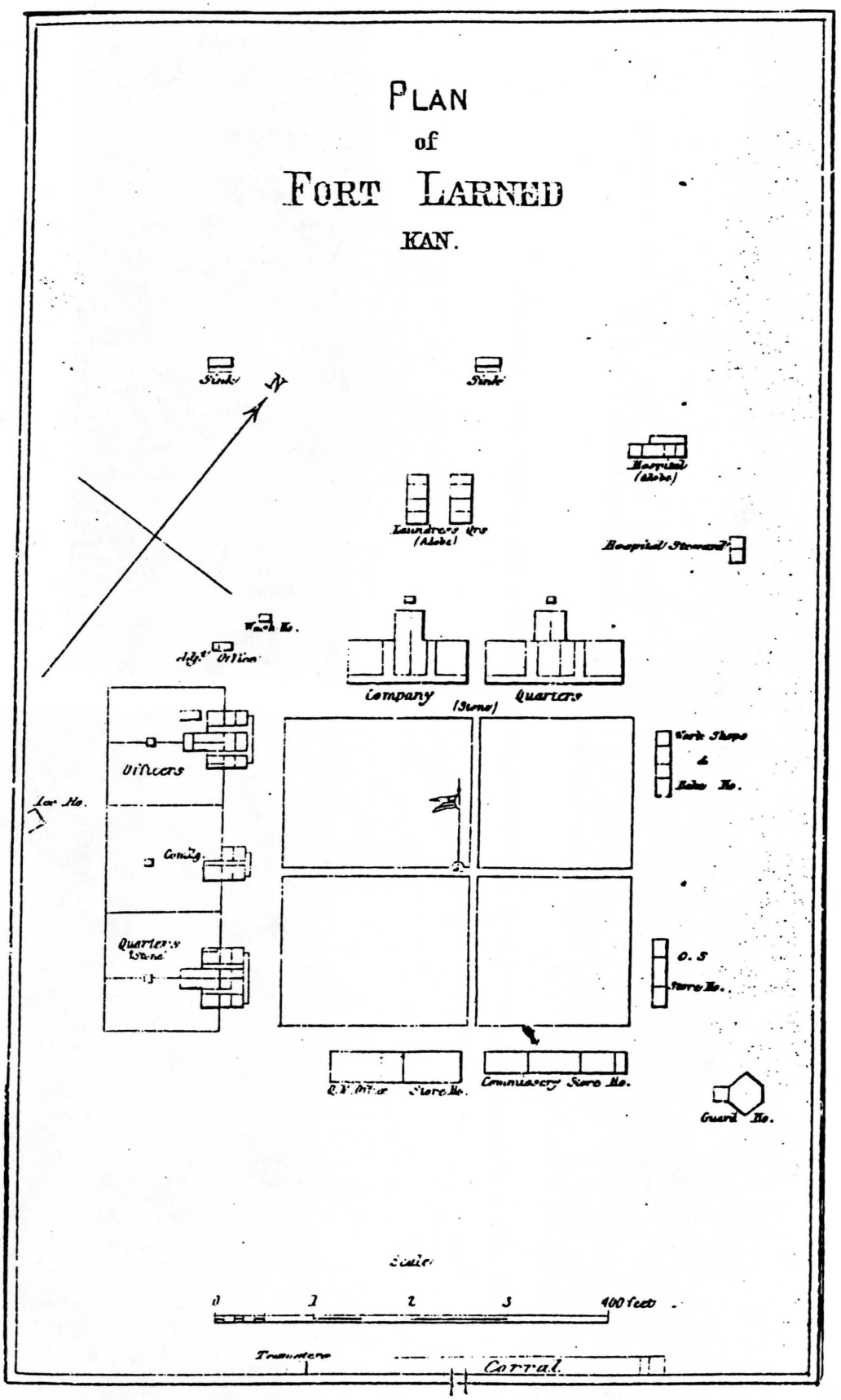
Map 2. 1866 Map of Fort Larned, Marion County, Kansas. [National Archives]



Map 3. 1866 Map of Fort Larned, Kansas, showing the sutler's complex. [Fort Larned National Historic Site]



Map 4. U.S. Military Reservation at Ft. Larned, Kansas, Surveyed and Laid off Sept. 1867 by 1st Lieut. M.R. Brown, U.S. Corps of Engrs. [Fort Larned National Historic Site]



Map 5. 1876 Map of Fort Larned. [from *Outline Description of the Posts in the Military Division of the Missouri*, Headquarters Military Division of the Missouri (Chicago, 1876)]

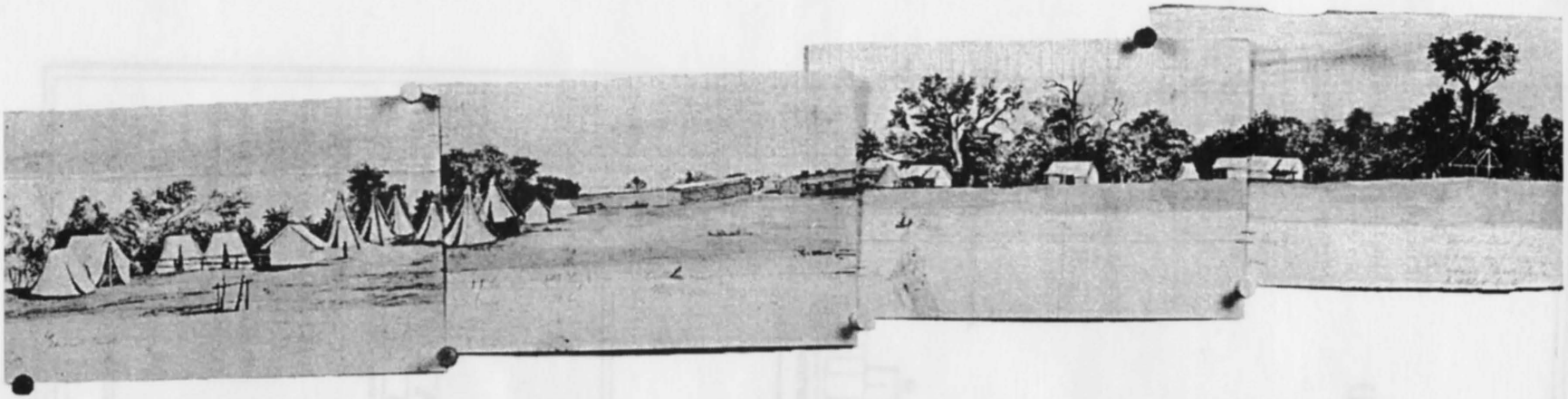


Figure 1. Four sketches giving a panoramic view of Fort Larned, drawn by Pvt. F. Roche, 1860. [Fort Larned National Historic Site]

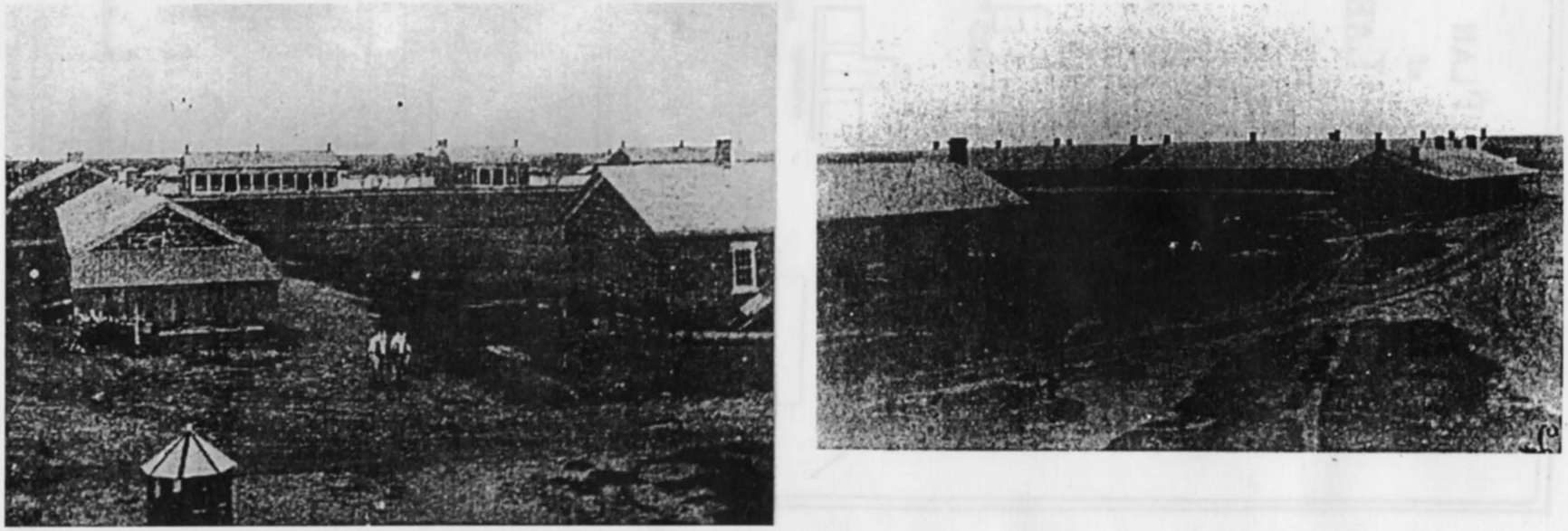


Figure 7. Overall view of Fort Larned from the southeast, late 1870s. [Fort Larned National Historic Site]

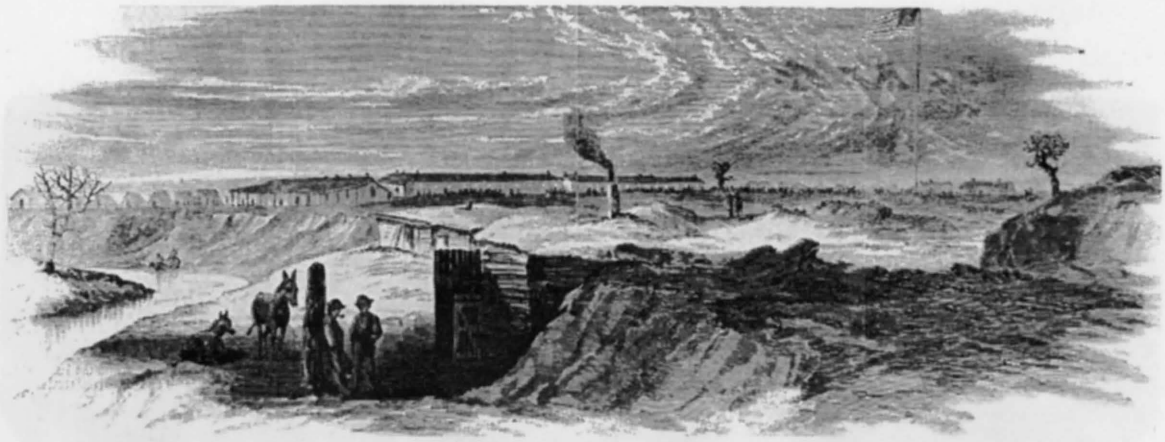


Figure 2. Engraving of Fort Larned by Theodore R. Davis, from *Harper's Weekly*, June 8, 1867. [Kansas State Historical Society]

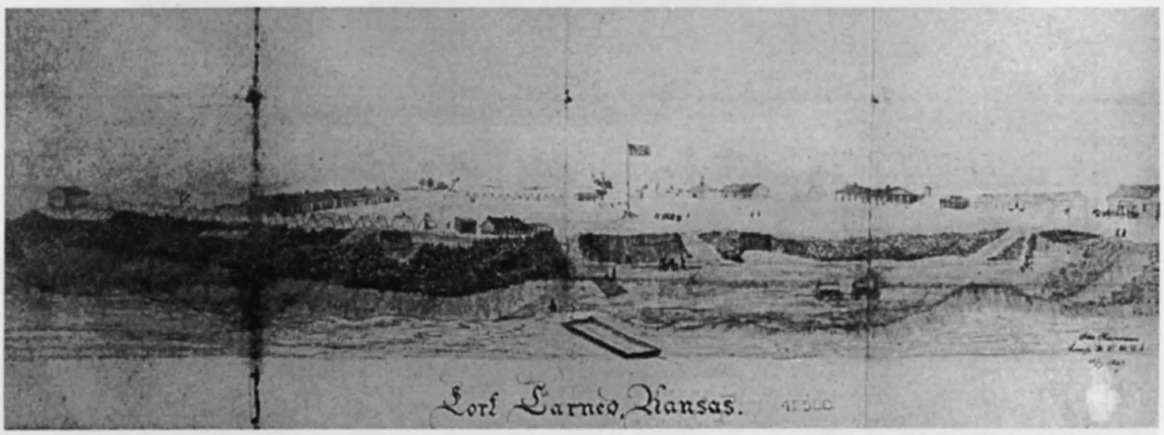


Figure 3. Sketch of Fort Larned in 1867 by A. Hunnius. [Kansas State Historical Society]

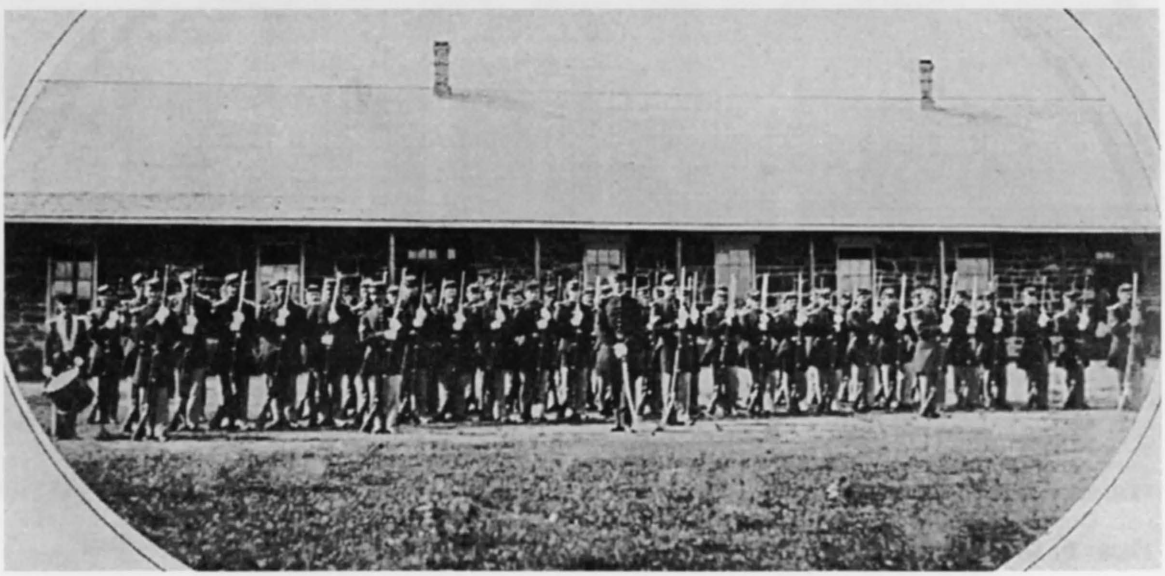


Figure 4. Company C, 3rd Infantry, in front of barracks (HS-1), fall 1867. [Kansas State Historical Society]



Figure 5. General view of Fort Larned from the east, winter 1867-68. [Kansas State Historical Society]

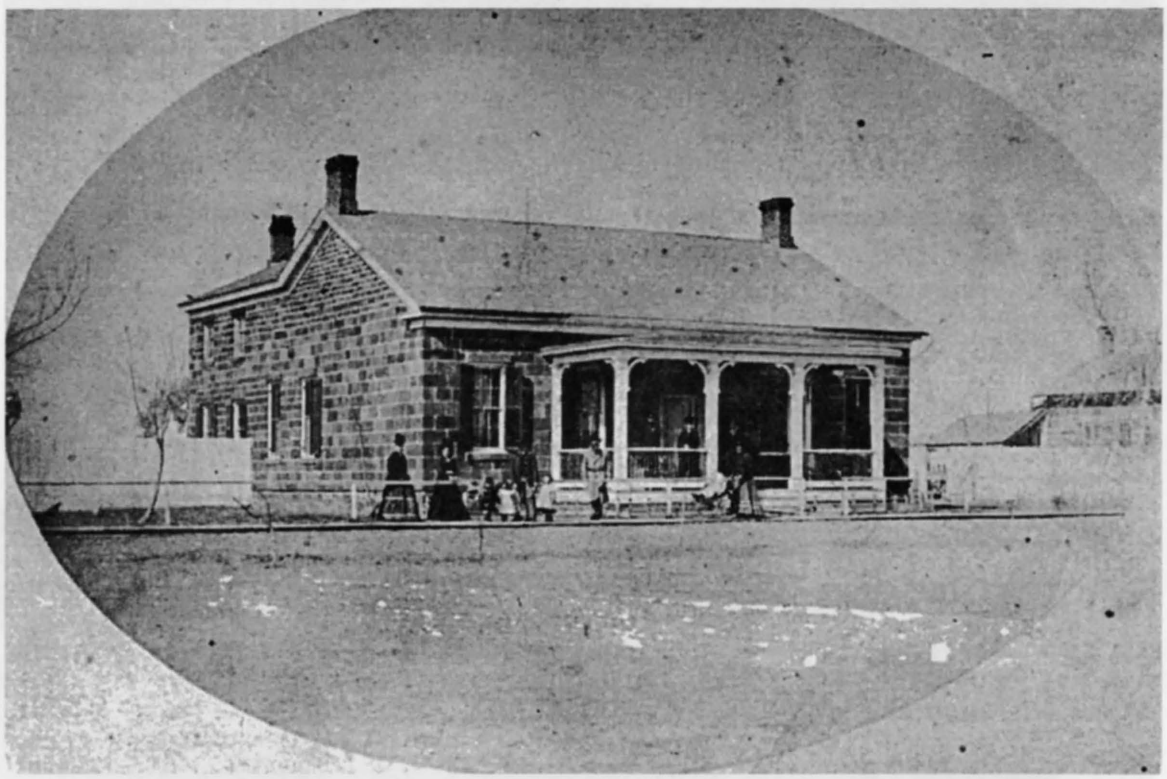


Figure 6. Commanding Officer's Quarters (HS-8), *circa* 1875. [Fort Larned National Historic Site]

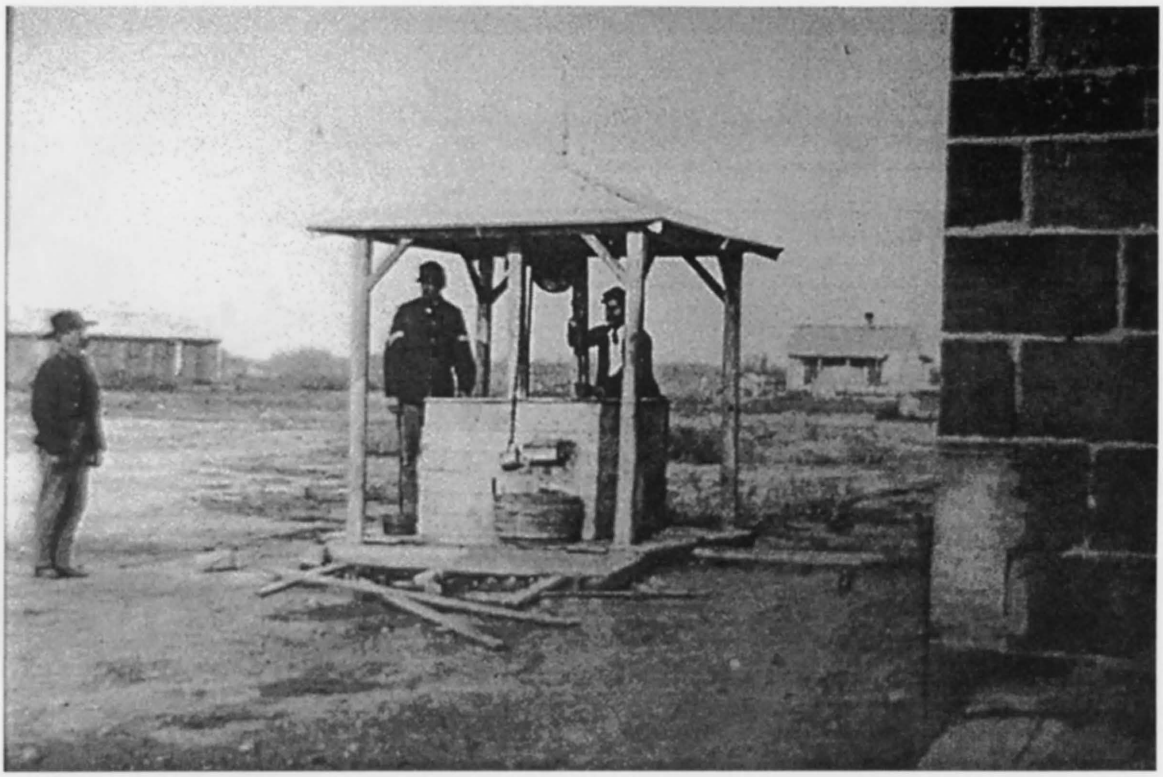


Figure 8. Well house behind infantry barracks (HS-1), with old adobe hospital, *left*, and hospital steward's quarters, *right*, in background, 1878. [Santa Fe Trail Center, Larned KS]

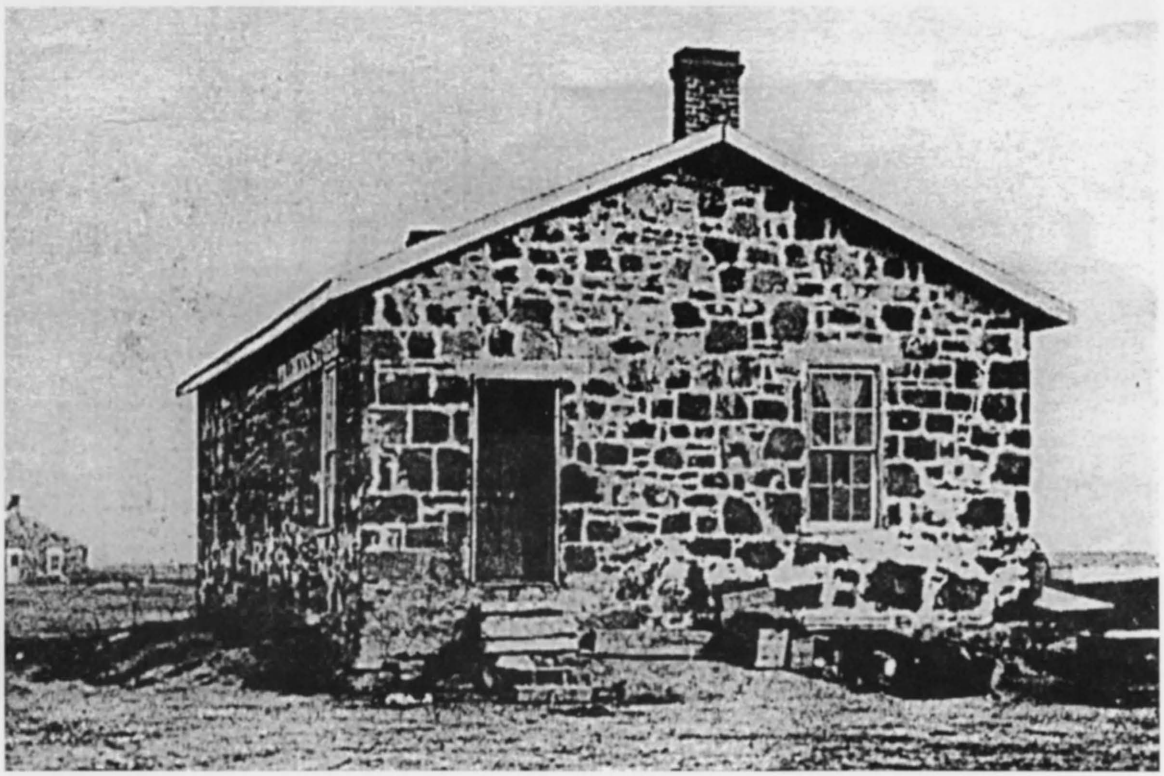


Figure 9. Sutler's store, with Quartermaster Storehouse in background, *circa* 1878. [Fort Larned National Historic Site]



Figure 10. Barracks (HS-1, HS-2), April 29, 1879. [Kansas State Historical Society]

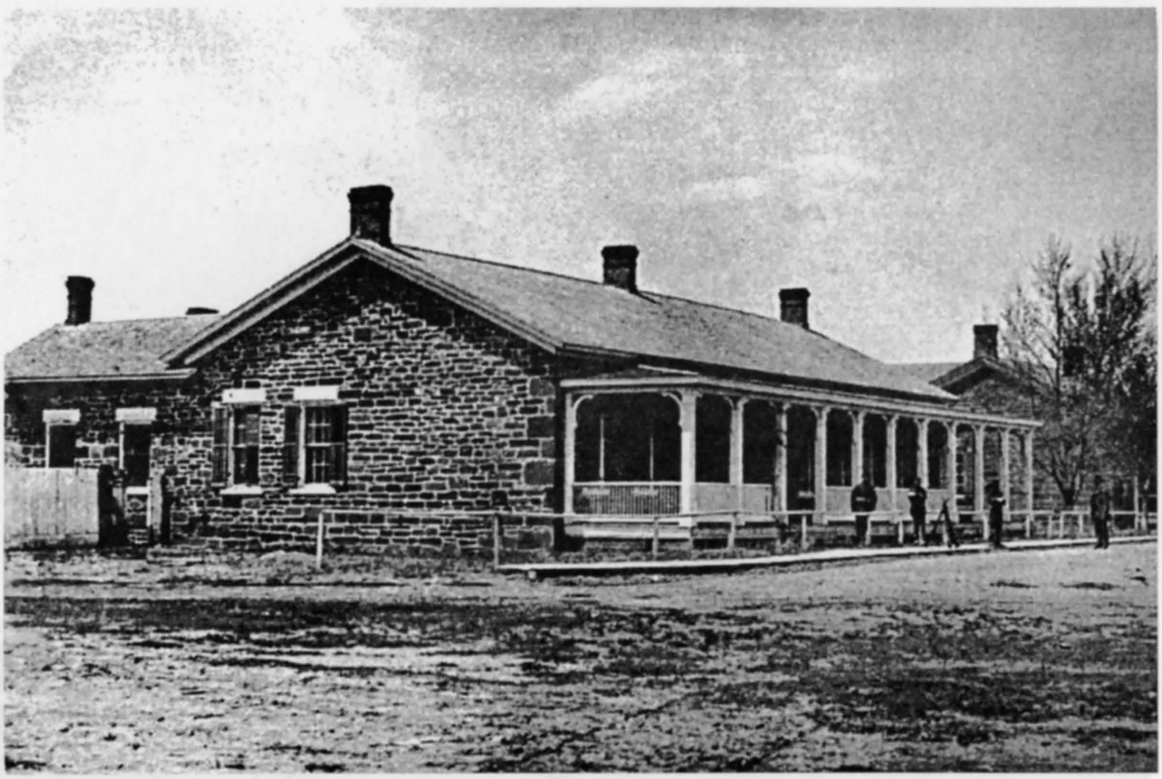


Figure 11. Officers' Quarters (HS-7), April 29, 1879. [Kansas State Historical Society]



Figure 12. General view of Fort Larned from the southeast, 1886. [Kansas State Historical Society]

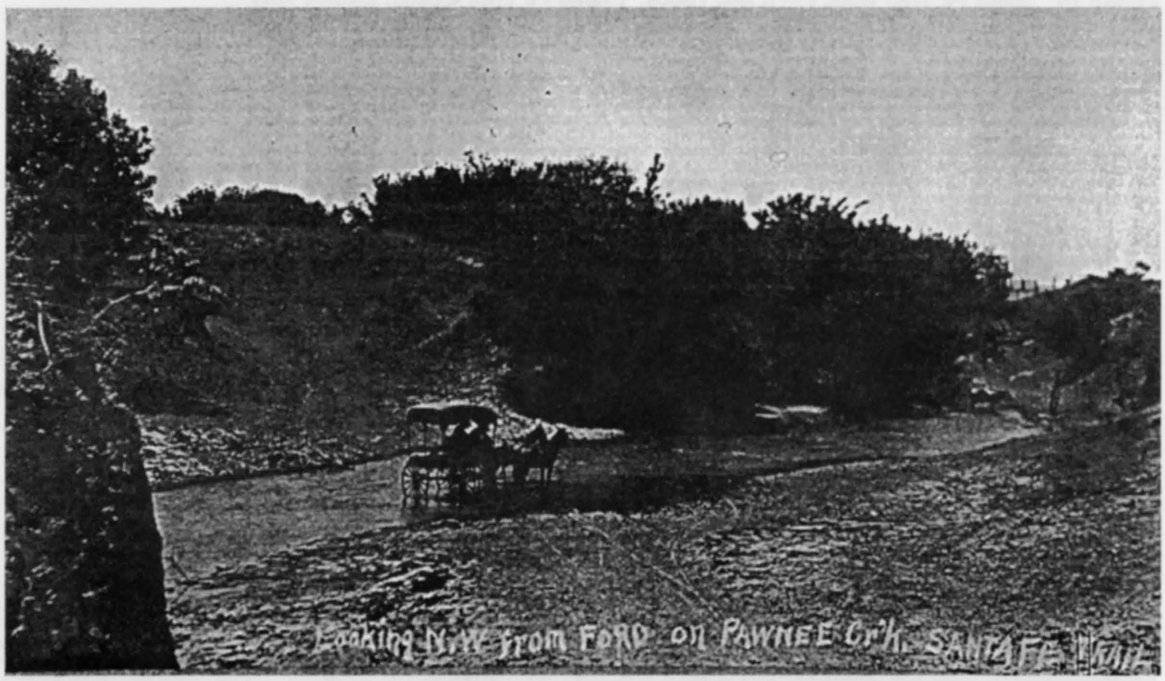


Figure 13. "Looking NW from Ford on Pawnee Cr'k, Santa Fe Trail," *circa* 1886. [Fort Larned National Historic Site]



Figure 14. Santa Fe Trail Ruts, *circa* late 1800s. [Santa Fe Trail Center, Larned KS]

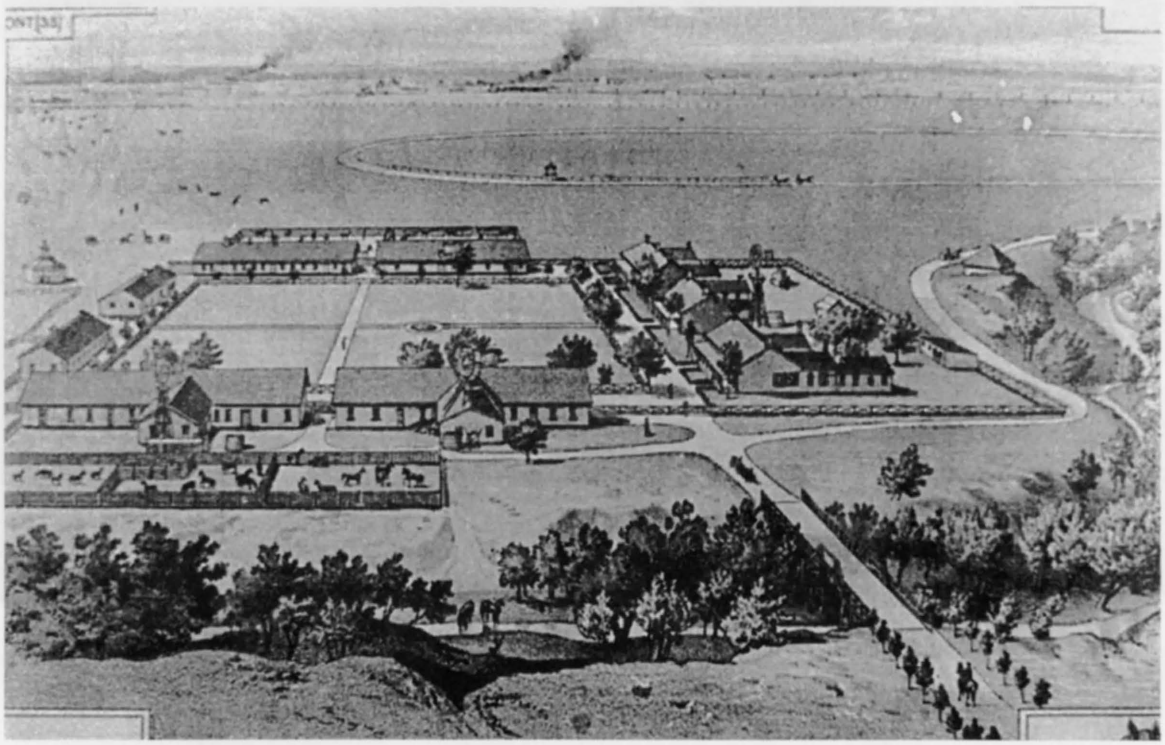


Figure 15. Detail of Pawnee Valley Stockbreeders Association, from *The Official Atlas of Kansas 1887*. [Santa Fe Trail Center, Larned KS]

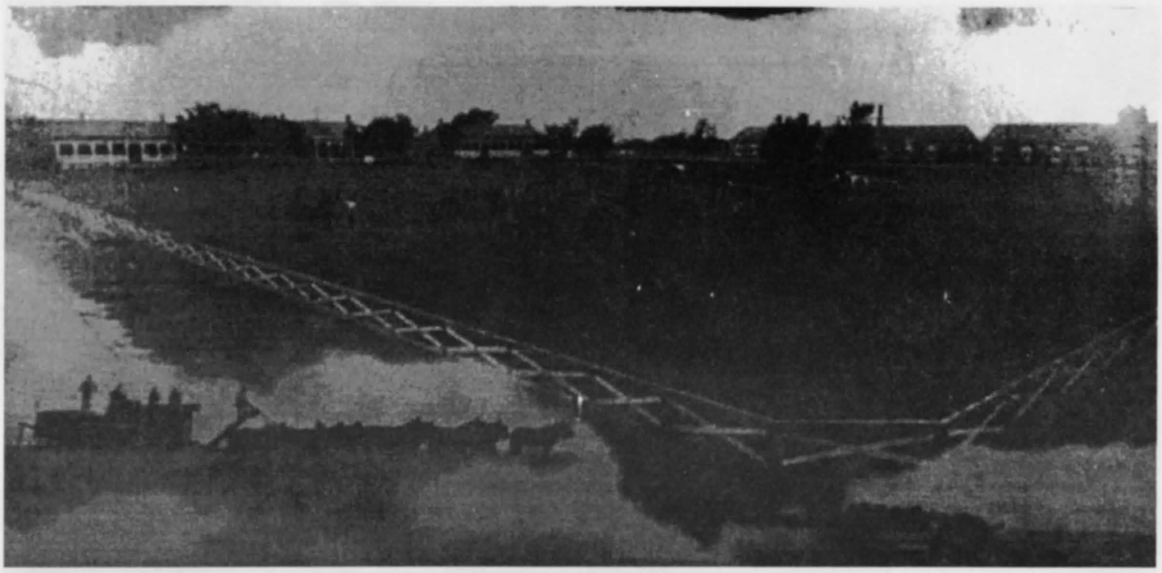


Figure 16. Detail of photomontage, Fort Larned Ranch, *circa* 1900. [Santa Fe Trail Center, Larned KS]

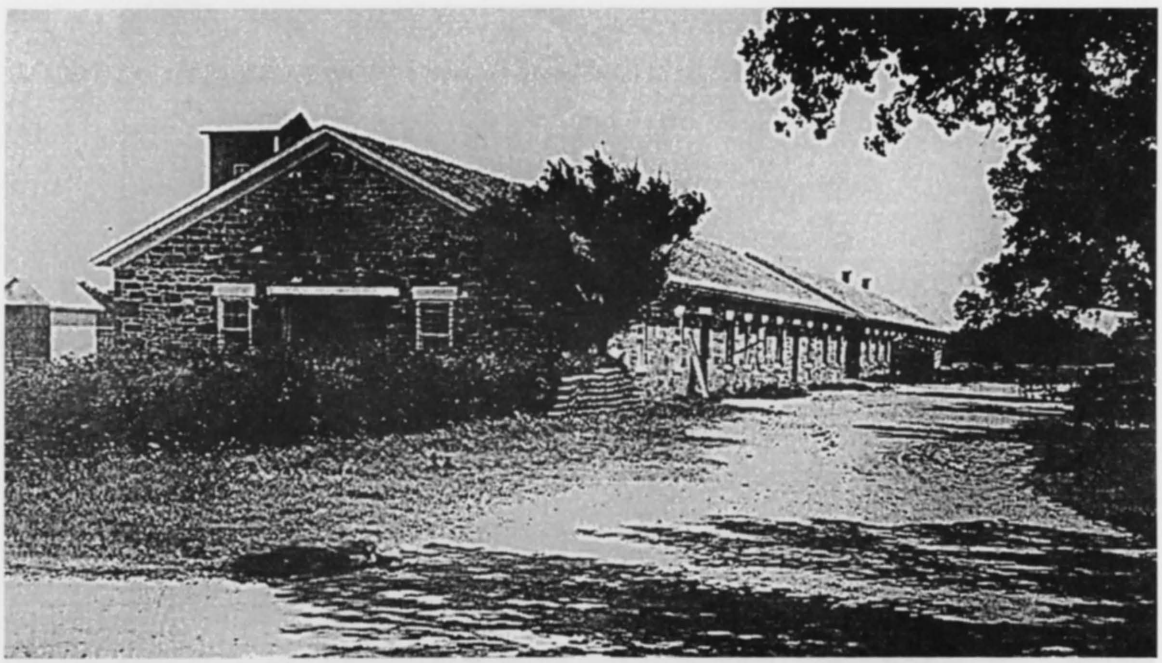


Figure 17. View of HS-1 and HS-2, *circa* 1910-18. [Fort Larned National Historic Site]

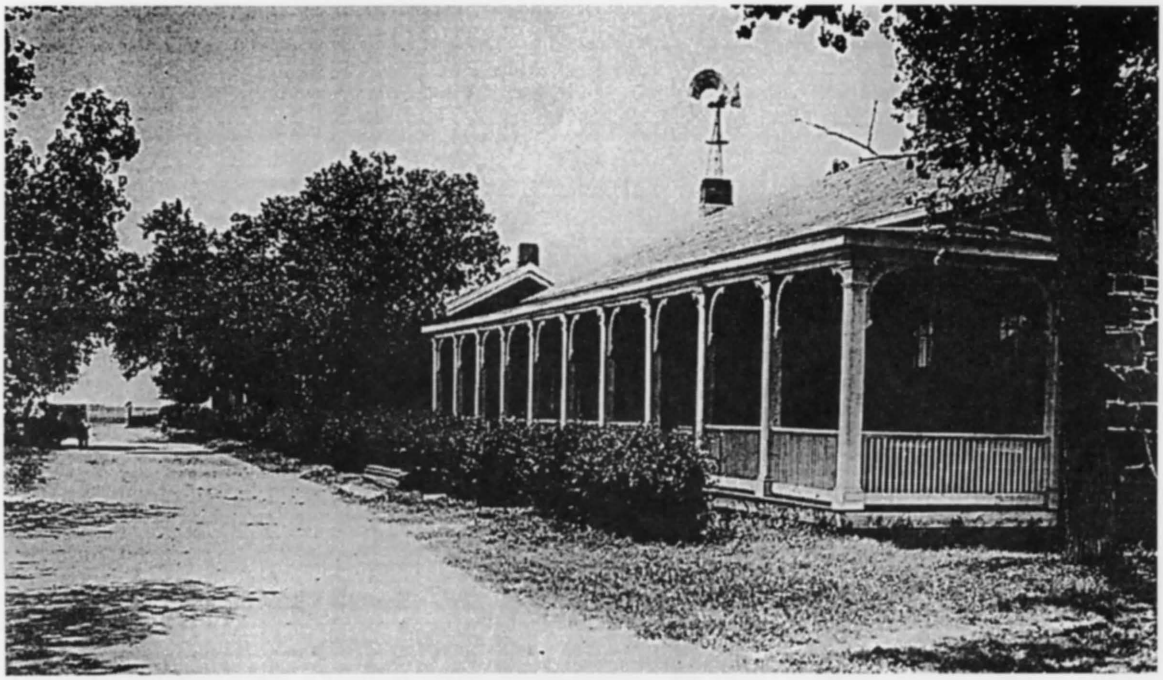


Figure 18. View of HS-9, *circa* 1910. [Fort Larned National Historic Site]

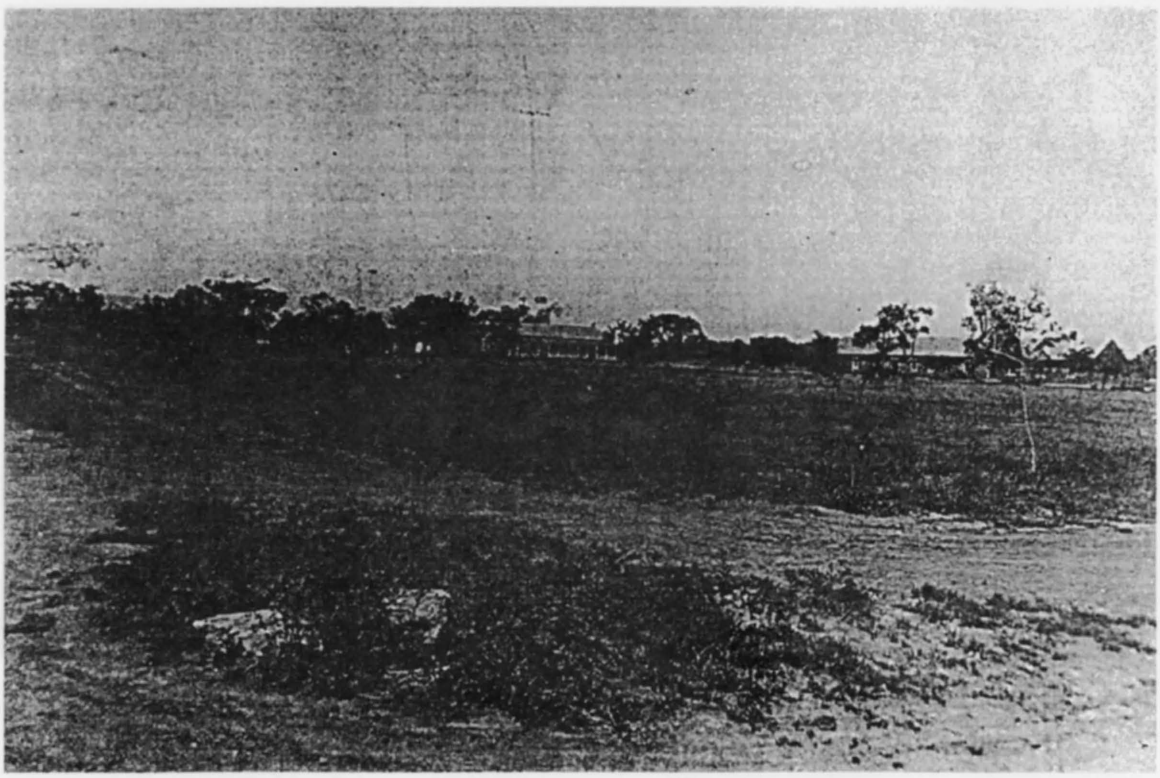


Figure 19. General view to the northwest, early 1920s. [Santa Fe Trail Center, Larned KS]



Figure 20. General view to the northwest, late 1920s. [Kansas State Historical Society]

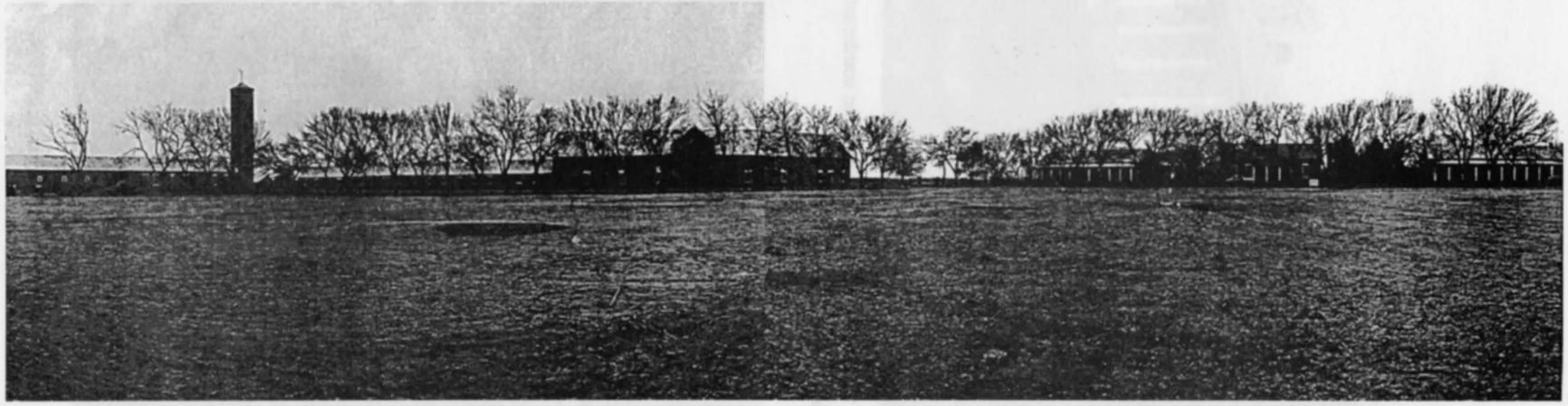


Figure 21. Panorama looking southeast to southwest, taken by R.R. Frizell, 1956. [Fort Larned National Historic Site]



Figure 22. View of Officers' Row from the southeast, taken by R.R. Frizell, 1956. [Fort Larned National Historic Site]



Figure 23. Aerial view of Fort Larned, mid-1950s. [Kansas State Historical Society]

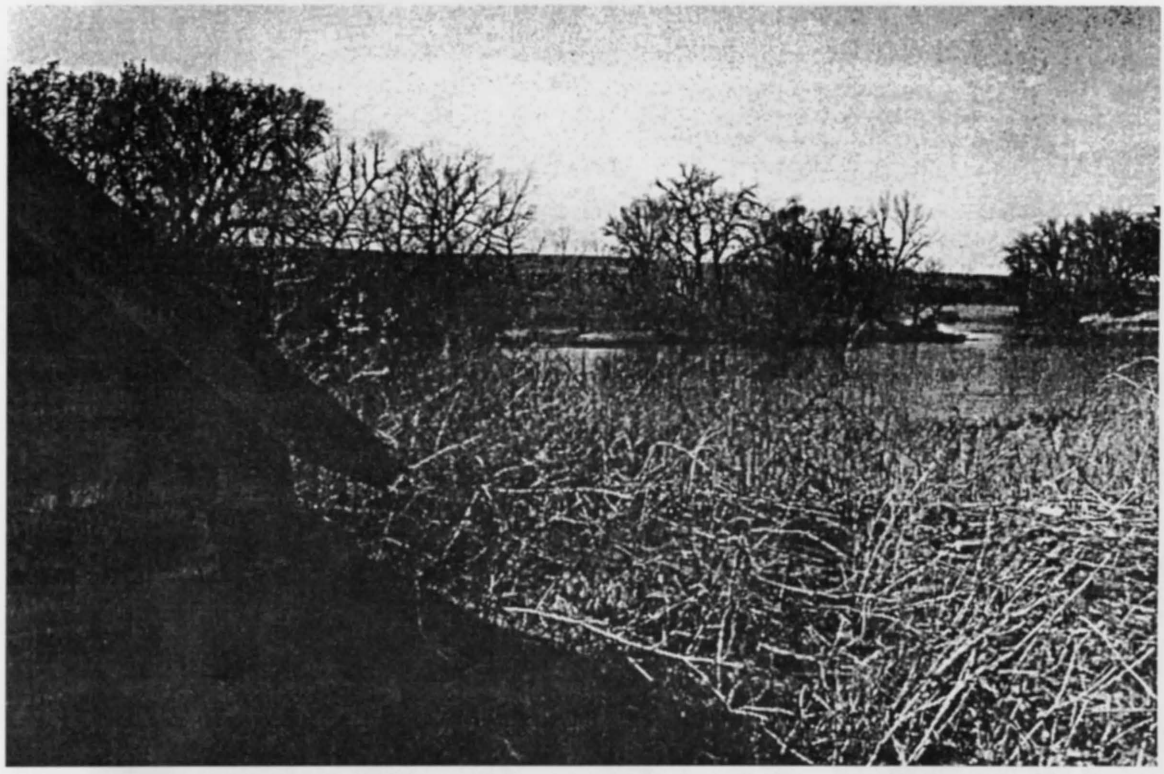


Figure 24. Icehouse and Pawnee River, April 1960. [Fort Larned National Historic Site]

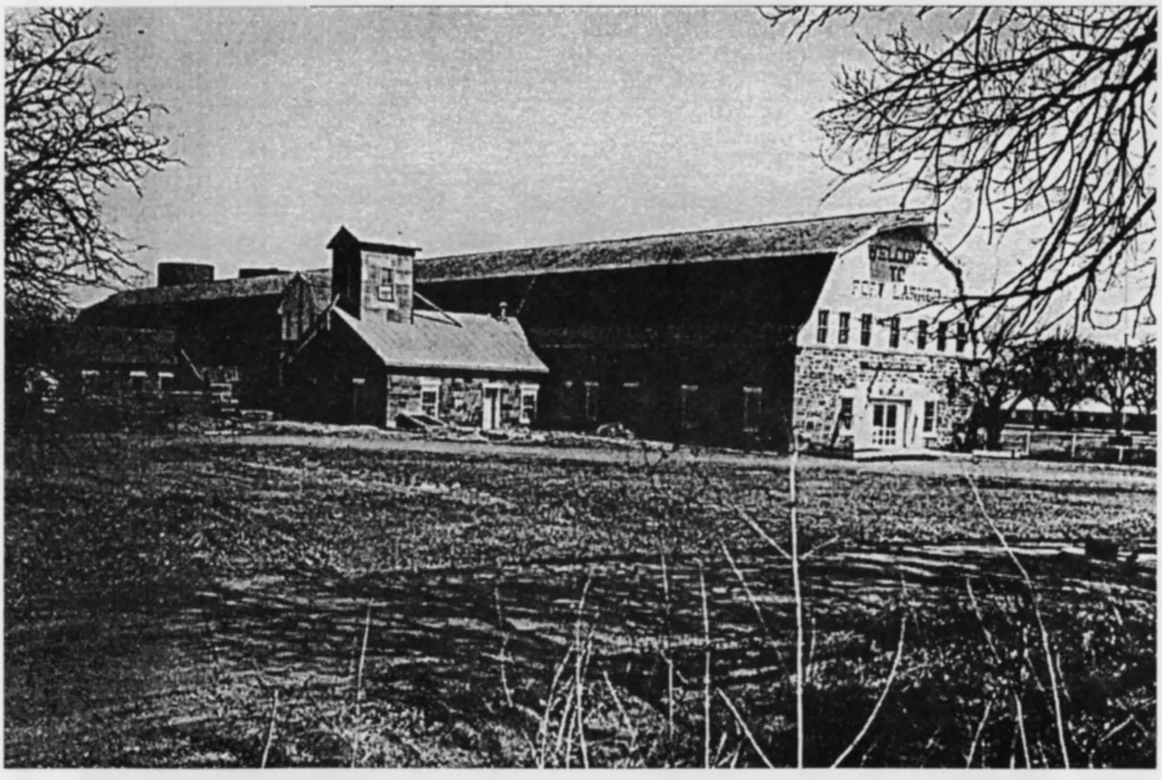


Figure 25. View of HS-1 and HS-2 from the northwest, April 1960. [Fort Larned National Historic Site]



Figure 26. Aerial survey photo, late 1960s. [Fort Larned National Historic Site]

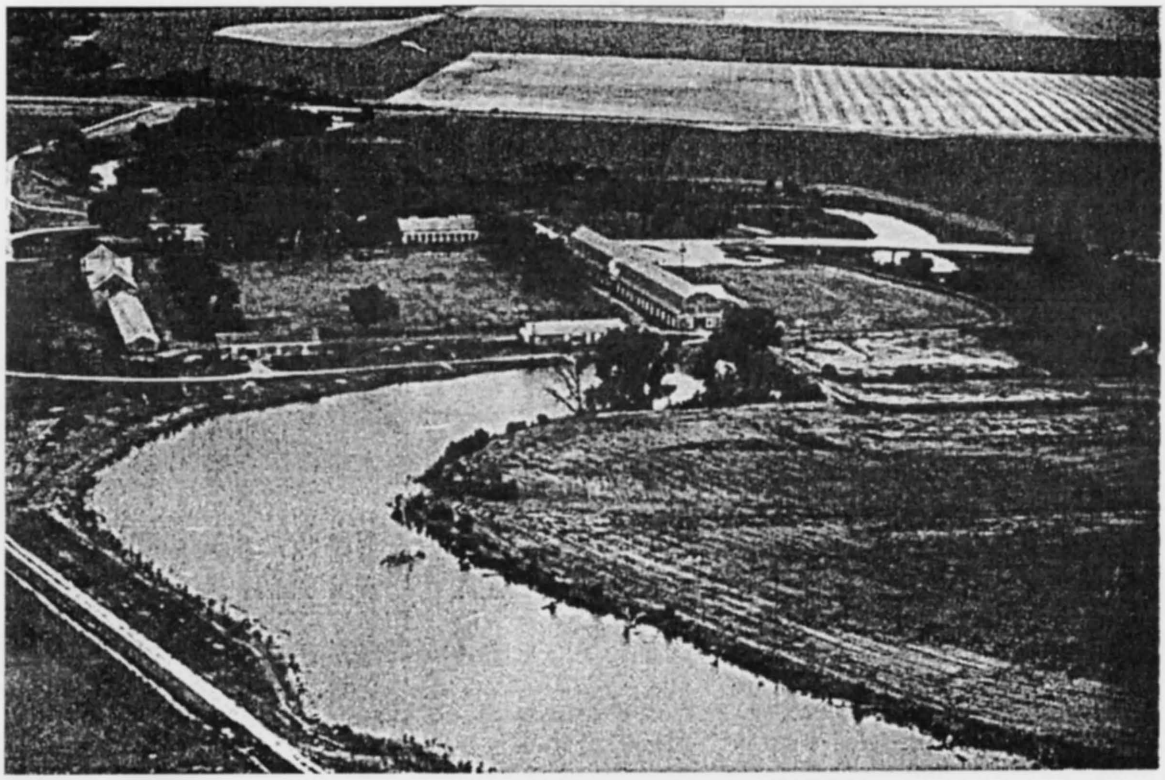


Figure 27. Aerial view of Fort Larned from the east, July 14, 1971. [National Park Service, Midwest Regional Office]

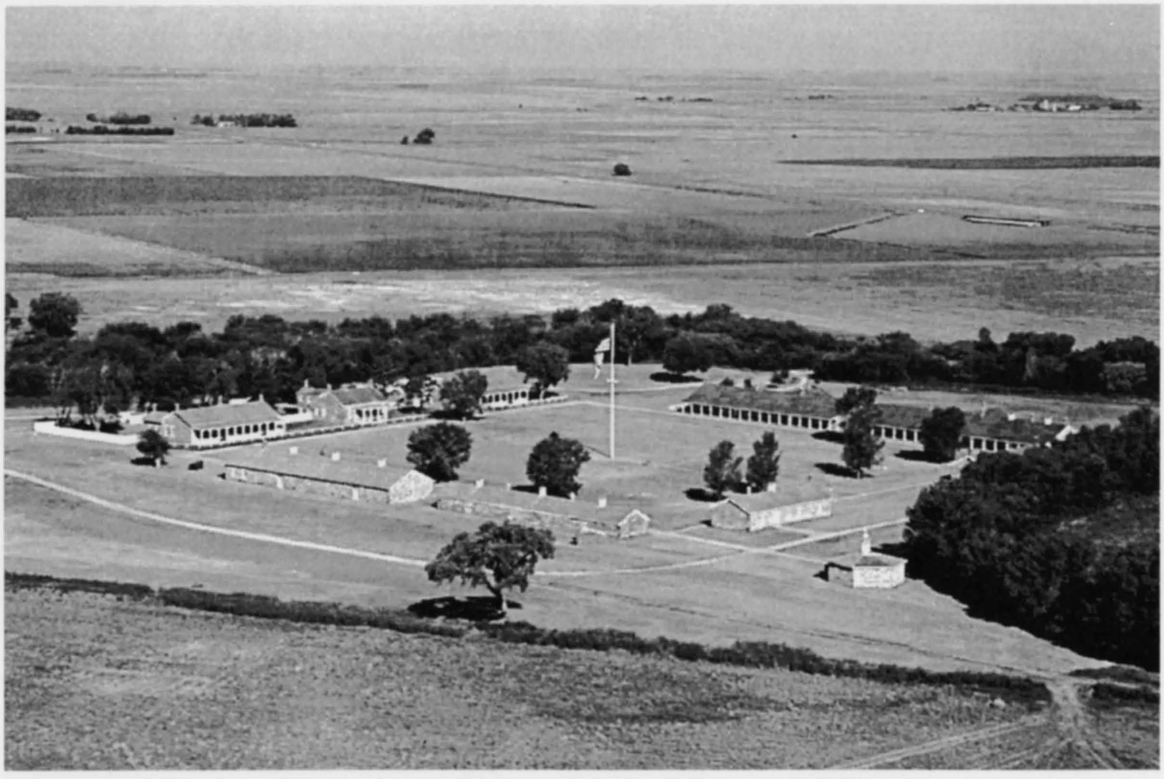


Figure 28. Aerial view of Fort Larned from the southeast, August 10, 1993. [© 1993, American Images, courtesy Fort Larned National Historic Site]



EXISTING CONDITIONS

Existing Conditions

Environmental Context and Setting

Fort Larned National Historic Site is located in west central Kansas, approximately 100 miles west-northwest of Wichita, 55 miles northeast of Dodge City, and 25 miles southwest of Great Bend. The fort is situated on Kansas Route 156, six miles (9.5 km) west of Larned, the seat of Pawnee County, and lies primarily within section 32 of township 21S, range 17W *(Figure 29)*. The non-contiguous Santa Fe Trail Ruts area lies near the southwest corner of section 19, township 22S, range 17W, approximately six miles to the southwest.[1] The 718.39-acre (290.72-hectare) NHS consists of three areas: the nineteenth-century fort site and its environs, the adjacent agricultural lands held in scenic easement and state-owned public rights-of-way, and the Santa Fe Trail Ruts area. County Road FAS 986 traverses the NHS on the west. Fort Larned was authorized as a national historic site in 1964 and was acquired as a unit of the National Park System in 1966.

The Fort Larned area is primarily underlaid by sandstone deposits of the Dakota Formation dating from the Cretaceous period, 65 to 135 million years ago.[2] It is located within the geologic structure known as the Central Kansas Uplift. Fort Larned also lies within the Arkansas River lowlands of the Upper Arkansas drainage basin. Soils in the area of the fort are of the Harney series and are moderately erodable.[3]

Although covered in many places by later deposits of river silt from the Tertiary or Quaternary periods, sandstone outcroppings are common throughout central Kansas. All of the sandstone for the extant historic buildings at the fort is of the Dakota Formation,[4] reportedly from a site several miles to the east. Notable sandstone outcroppings, such as those at Pawnee Rock 14 miles to the northeast, provided recognizable landmarks and strategic vantage points for travelers on the Santa Fe Trail.

Prior to European settlement, the Great Plains of present-day eastern and central Kansas were characterized by tallgrass prairie, with shortgrass prairie predominant in the western third of the state. Fort Larned is located in a transition area between these two grassland communities.[5] Within the tallgrass prairie, major river corridors such as the Missouri, Arkansas, and Neosho supported some woodland vegetation. In the vicinity of Fort Larned, the Arkansas did not support woodland vegetation, except on some islands and sections of the south bank. Smaller stream corridors such

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[1]U.S. Department of the Interior, National Park Service, *Land Status Map 01, Fort Larned National Historic Site, Pawnee County, Kansas*, Denver Service Center, Division of Land Acquisition (Denver, September 1973, revised 3/8/82).

[2]Rex C. Buchanan and James R. McCauley, *Roadside Kansas: A Traveler's Guide to Its Geology and Landmarks*, Kansas Geological Survey, University Press of Kansas (Lawrence, 1987), 7.

[3]Felix Revello, Black-Tailed Prairie Dog Workshop, Fort Larned, Kansas, July 1, 1997.

[4]Buchanan and McCauley, 293.

[5]Linda Scott Cummings and Kathryn Puseman, "Pollen, Phytolith, and Macrofloral Analysis of Sod From Ft. Larned National Historic Site, Central Kansas," Paleo Research Laboratories, February 1996, 3.

as that of the Pawnee, however, were wooded, and often supported large populations of wild turkey and quail.[6] As agricultural uses transformed the prairie environment in the last quarter of the nineteenth century, wheat became the predominant crop in central and western Kansas,[7] and remains important today. By the mid-twentieth century, however, petroleum production had become increasingly visible as a non-agricultural activity in this landscape.

Site Description *(Exhibit 8)*

The present 718.39-acre (290.72-hectare) Fort Larned NHS consists of 410.46 acres (166.11 hectares) in fee simple ownership (the historic fort unit and the trail ruts unit), 269.20 acres (108.94 hectares) of scenic easements, and 38.73 acres (15.67 hectares) owned by the State of Kansas.[8] See Exhibit 10, *Photographic Station Points*, for locations of photographs included in this chapter.

The overall topography of the historic fort unit and easement area is nearly level, with a fall of approximately 10' in 4000' from northwest to southeast. The major topographic feature in this portion of the NHS is the intermittently dry channel of the Pawnee River, which winds through the site from southwest to northeast, and its adjacent dry oxbow *(Figures 30, 31)*. Steep banks and terraces along the river mark the 8'–12' difference in grade between the river bottom and the adjacent uplands; gentler slopes characterize the 4' high banks of the oxbow. The field and prairie areas northwest and southeast of the river are generally flat, although the topography within the developed portion of the fort ("the fort precinct") has been modified to some extent to provide for site drainage.

The fort precinct consists of nine original sandstone buildings arranged around a central quadrangle, and a reconstructed sandstone blockhouse located outside the quadrangle to the southeast *(Figure 32)*. These buildings and their rectilinear arrangement provide the dominant architectural expression of the site. Several small outbuildings are associated with the historic residential buildings and the blockhouse, and are located outside the quadrangle. The fort also includes a boardwalk, a rectilinear grid of dirt and gravel paths, and several paved and unpaved curvilinear roads. Outside the fort precinct, a day-use picnic area with picnic shelters and a restroom building is located adjacent to the state highway *(Figure 33)*. Farther along the NHS entrance road, an admissions kiosk is located at the temporary visitor parking area north of the river *(Figure 34)*. A highway bridge over the Pawnee River provides pedestrian and limited vehicular access to the fort precinct. The maintenance building and yard for the NHS are located just south of the river on the west side of the county road *(Figure 35)*.

The topography of the Trail Ruts unit is gently sloping from northeast to southwest. The ruts run north and south across the area, giving the ground an undulating appearance. The only structure is an elevated, roofed wooden viewing platform, accessible by a dirt path from a small parking area adjacent to the county road *(Figures 36, 37)*.

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[6]Eugene D. Fleharty, *Wild Animals and Settlers on the Great Plains*, University of Oklahoma Press (Norman and London, 1995), 44.

[7]Wilbur E. Garrett, ed., *Central Plains*, The Making of America Series, no. 9, Cartographic Division, National Geographic Society (Washington, D.C., September 1985).

[8]U.S. Department of the Interior, National Park Service, *Fort Larned National Historic Site • Kansas, General Management Plan Amendment, Development Concept Plan, and Interpretive Prospectus*, Denver Service Center (Denver, November 1994), 1.

Section
30 | 29
31 | 32

KANSAS 156

FAS 986

HS# Structure or Feature / Present Use

1 Enlisted Men's Barracks / Visitor Center, Museum, Administrative Offices
Wellhouse (reconstructed) / Exhibit
2 Enlisted Men's Barracks and Post Hospital / Interpretive Exhibit
Wellhouse (reconstructed) / Exhibit
3 Shops Building / Interpretive Exhibit
4 New Commissary Storehouse / Interpretive Exhibit (north part only)
5 Old Commissary Storehouse / Interpretive Exhibit
6 Quartermaster Storehouse / Interpretive Exhibit
7 Officers' Quarters / Interpretive Exhibit
Wellhouse (reconstructed) / Exhibit
Privy (reconstructed) / Exhibit
8 Commanding Officer's Quarters / Administrative Use only
Carport (non-historic) / Administrative Use only
9 Officers' Quarters / Interpretive Exhibit
Wellhouse (reconstructed) / Exhibit
Privy (reconstructed) / Exhibit
10 Blockhouse and Sweat Box (reconstructed) / Interpretive Exhibit

Map Key

Water in river
Vegetation
Buildings
Fence
Drainage Ditch
Levee
Gravel/dirt roads, walks or paths
Asphalt roads, walks or paths

Picnic Shelters
Comfort Station
Picnic Area
Pump House
Fort Larned Entrance Sign
Pawnee River
Exhibit Shelter
DAR Santa Fe Trail Marker
Approximate Location of Santa Fe Trail
Entrance Road
Temporary Visitor Parking Lot
Tepee (seasonal)
Admissions Kiosk
Highway Bridge
Interpretive Nature Trail and Shelter
Approximate Location of Santa Fe Trail
A/C Equipment
Laundress Tent (seasonal)
Handicapped Parking Area
Interpretive Sign
Oxbow
Hospital Wagon
Escort Wagon
Cavalry Tent Camp (seasonal)
12-Pounder Mountain Howitzer
Parade Ground
Hitching Poles and Line
Flagstaff
Restored Drainage Ditch
Escort Wagon
Interpretive Sign
County Road Bridge
Maintenance Building
Santa Fe Trail Ruts Unit

Map prepared by Land and Community Associates, July 1997.
Revised June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996. Figures 27, 28.

Exhibit 8

EXISTING CONDITIONS SITE PLAN

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

Individual landscape features and characteristics are in generally fair-to-good condition. This assessment, however, is made without benefit of a structural engineering component and is based solely upon visual examinations.

Land Uses and Activities

Fort Larned has not served a military function since 1878, but its historic military use provides the basis for its current interpretative use. The site's present appearance reflects its historic landscape functions, such as the use of the open parade ground for the regular daily calls, inspections, drills, and ceremonial functions that were an important part of the fort's military history. Historic land use was related closely to military functions and support activities. The current character of the site is supportive of living history interpretations of military life. Park staff offer visitors interpretation of the role the fort played in the settlement of the West and of life at an isolated prairie post *(Figure 38)*. This interpretation focuses on the Santa Fe Trail as an important route of trade, travel, and commerce; the authority and control of the U.S. government that extended along the Santa Fe Trail due to the presence of Fort Larned; changes in the lifestyle of the Plains Indians caused by encroaching non-native cultures; and the variety of cultural influences that interacted at Fort Larned.[9] The Santa Fe Trail Ruts unit is an important component of this effort. Visitor interpretation activities include guided and self-guided tours of the fort and its buildings; museum and historic restoration exhibitions; living history demonstrations; preservation and restoration projects; and general maintenance, security, and life safety efforts.

Recreation is another important—albeit non-historic—contemporary use of the site. The picnic area adjacent to the state highway provides travelers and local residents with a recreational facility for individual, family, or group use. A history and nature trail which originates at the fort site provides an additional recreational and interpretive opportunity to visit outlying sites associated with the fort and to explore adjacent areas of restored prairie, with their indigenous flora and fauna *(Figure 39)*. The prairie restoration itself represents an additional land use of the site—ecosystem conservation. Finally, agricultural activities represent a significant use of land held in easement within the NHS *(Figure 40)*.

Patterns of Landscape Organization

The overall landscape organization of the historic fort unit and easement area consists of planar agricultural fields and prairie areas, bisected by the steep banks and meandering channel of the Pawnee River and its associated woodland vegetation. The curvilinear character of the river and its remnant oxbow is in sharp contrast to the predominantly rectilinear geometry of the state and county roads which traverse the site on the north and west respectively. The site's major development occurs within the flat, protected area bounded by the Pawnee River channel on the west and north and the oxbow on the east. Here the landscape organization is defined by the fort's nine historic sandstone buildings fronting on a central parade ground (HS-48) oriented to the south-southeast. The grass parade ground takes the form of a quadrangle, defined by a perimeter walk and perpendicular crosswalks, all of gravel. Although the intersection of the crosswalks creates four grass quadrants of unequal size, the true center of the quadrangle is marked by the fort's present 99' flagstaff (HS-32). A segment of the Santa Fe Trail alignment adjoins the developed area to the south-southeast.

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[9]*General Management Plan Amendment*, 67.

The north-northwest side of the quadrangle is reinforced by the fort's two largest buildings, the Barracks / Visitor Center (HS-1) and the Barracks / Post Hospital (HS-2) *(Figure 41)*. On the east-northeast are the Shops Building (HS-3) and New Commissary (HS-4), and on the south-southeast the Old Commissary (HS-5) and Quartermaster Storehouse (HS-6); all four buildings are located directly adjacent to the perimeter walk *(Figures 42, 43)*. On the west-southwest, two Officers' Quarters (HS-7, HS-9) flank the central Commanding Officer's Quarters (HS-8); all three buildings are set back from the perimeter gravel walk by an intervening linear boardwalk *(Figure 44)*. The spaces between HS-1 / HS-2 and HS-5 / HS-6 align with the ends of the north-northwest – south-southeast crosswalk, and direct views into the prairie and agricultural areas south of the fort *(Figure 45)*. HS-8 is sited on axis with the fort's flagstaff along the alignment of the west-southwest – east-northeast crosswalk *(Figure 46)*.

The blockhouse (HS-10) and the fort's present outbuildings are located in the zone between the quadrangle of historic buildings and the Pawnee River / oxbow. Historically, a number of earlier fort buildings and other support facilities were located in this vicinity. Most of the present outbuildings are associated with the fort's residential structures. Four reconstructed wells, each with a raised platform and post-supported roof, are located on axis with and at the rear of HS-1, HS-2, HS-7, and HS-9 *(Figure 47)*. Further to the west along their central axes, HS-7 and HS-9 also each have a reconstructed privy *(Figure 48)*. A modern carport is located in the rear yard of HS-8. The reconstructed blockhouse is located just east of the quadrangle's eastern corner; adjacent to it on the south is a reconstructed sweatbox *(Figure 49)*.

Public roads traversing the site provide direct access to two non-historic activity areas within the NHS. The entrance road from the state highway at the northern portion of the site provides access to the day-use picnic area; the road continues south to provide access to the historic portion of the NHS across a modern highway bridge. The picnic area's curvilinear roads mirror to some degree the bends of the adjacent Pawnee River. A restroom building and picnic shelters are sited in an informal arrangement throughout the area. At the southwest corner of the site, the county road provides access to the NHS maintenance building and yard. The yard is a rectangular, fenced compound oriented along a north–south axis.

The landscape organization of the Trail Ruts unit is defined primarily by the north–south orientation of the extant ruts themselves and the consequent proportions of the parcel in federal ownership. The elevated, wooden viewing platform is located adjacent to the ruts at the southern boundary of the tract.

Response to Natural Features

The siting of Fort Larned in a protected bend in the Pawnee River represents the most significant response to the natural features of the site. In this location near the steep banks of the river channel and the adjacent oxbow, the fort was protected from assault on the west, north, and east. The river also served as a source of water for the fort, and the associated woodland vegetation provided both building materials and firewood. The proximity of the new fort to sandstone deposits along the Pawnee River provided the opportunity to quarry durable building materials, an essential requirement in the Great Plains. Abundant grass for grazing horses and fertile soil for kitchen gardens also may have influenced the choice of a riverside location for the fort although wind, sun, and seasonally heavy rain often damaged the fort's gardens. Many of these same factors—source

of water, protection afforded by the river, firewood, and grazing opportunities—no doubt influenced the alignment of this portion of the Santa Fe Trail.

The arrangement, design, and construction of the fort buildings also represent an important response to natural site conditions. The fort's first structures were constructed of sod and adobe, with most of them located north of the present quadrangle. When the present buildings on the parade ground were constructed, starting in 1866, they were arranged around a smaller, but more defined, central open space. This arrangement not only provided a more formal and secure environment for military exercises and daily fort life, but may have afforded the parade ground some protection from prairie winds. Many of the fort's buildings—and all of its extant residential structures—incorporated porches to afford protection from sun, rain, and snow.

Site drainage was also an important concern at the fort. Drainage ditches were constructed throughout the fort precinct to conduct stormwater from the nearly level parade ground. A remnant of this system located at the eastern corner of the quadrangle empties into the oxbow near the reconstructed blockhouse *(Figure 50)*.

Efforts to improve the visibility both from and to the fort were influenced by the natural conditions of the site. In its protected riverside location, it was all the more important that the fort have good visibility to the Santa Fe Trail which it was charged to protect. The fort's wooded backdrop of trees provided screening on the west, north, and east; the open view to the south, however, focused attention on travelers approaching on the adjacent trail *(Figure 51)*. Likewise, surrounding riverine vegetation made it difficult initially to see the fort from a distance. Devegetation of the Pawnee River occurred during the 1861–1866 period, however, as a result of cutting trees for firewood. The original 100'-tall flagstaff in the center of the parade ground helped give the fort an unmistakable point of identity above the treetops that could be seen for miles across the prairie.

Subsequent owners and occupants of the fort property also have modified the site in response to its natural features and conditions. During the ranching period, the Frizell family constructed berms along the south bank of the Pawnee River to assist in flood control *(Figure 52)*. Berms along irrigation ditches south of the fort may also protect the fort from backwash flooding. The more recent construction to state highway standards of the entrance road bridge across the Pawnee River also is a reflection of concern about the potentially damaging effects of flooding. The river's presence and its periodic, albeit less frequent, flooding continue to influence the site and its surroundings today. The fertility of the soil, resulting at least in part from the river's history of siltation and flooding, continues to make agriculture a prime economic activity in Pawnee County.

Site features that originated in response to the fort's natural setting vary in their present condition. The fort's siting and physical arrangement of buildings still give it a commanding presence. The loss of native prairie to agricultural use, however, has altered the fort's historic context. Structures and vegetation that accompany residential and agricultural development have reduced the opportunity of sweeping vistas to and from the fort, although the flagstaff is still a recognizable element visible from a distance of several miles. Within the fort precinct, poor site drainage has made the gravel walks difficult to negotiate during wet weather. The Officers' Row boardwalk, however, appears to be in good condition and to function well. Drainage problems also have given rise to building deterioration in several areas. The berms along the Pawnee River are in generally

good condition, as documented by a 1995 Bureau of Reclamation condition survey.[10] Agriculture in the surrounding area remains strong, an indication of good soil fertility. During a period of flooding in 1993, a portion of the dike at the far east end of the NHS was topped. Water did not back up into the fort, however.

Views and Viewsheds

Views to and from Fort Larned are important characteristics of the site and its historic relation to its prairie setting. The view of the fort from the reconstructed prairie and agricultural lands to the south is still highly evocative of the fort's isolated setting, although the present-day backdrop of trees is not consistent with its appearance in the late 1860s. Views from the north, east, and west do not reflect historic views, again due to the woodland vegetation along the Pawnee River corridor. From greater distances in all directions, however, the fort's flagstaff remains an important identifying feature.

Views from the fort are more problematic. The expansive, nineteenth-century vistas of the prairie are no longer present, replaced by a landscape that includes not only signs of development such as agricultural fields and structures, utility lines, and industrial equipment, but also the growth of woodlands that mask the horizon. Several pole barns located southeast, south, and southwest of the fort intrude upon the fort's viewshed because of their size and color, if not proximity *(Figure 53)*. The NHS maintenance facility also is visible from the area between HS-6 and HS-7. A line of power poles marches along the farm road south of the fort. The line continues northeast of the quadrangle across the river to Route 156 *(Figure 54)*. Within the fort precinct, the view to the northwest includes intrusions such as the HVAC equipment northwest of HS-1, the handicapped parking area, and the entrance road bridge. Although not visible from the fort itself, the petroleum production equipment northwest of the NHS highway entrance intrudes upon the impression of the fort's setting as an isolated, pre-industrial environment.

Circulation Systems

Vehicular

The primary vehicular approach to Fort Larned NHS is via Kansas Route 156, a two-lane, asphalt highway connecting Larned and Garden City, Kansas. Route 156 passes through the northern portion of the NHS running east and west. Former Kansas Route 242—a two-lane, tar-and-gravel road acquired from the state in 1985—enters the site from Route 156, providing access to the picnic area with its dirt-and-gravel loop road and to the NHS temporary visitor parking area, also surfaced in tar and gravel. The 0.3-mile entrance road continues south across the Pawnee River on a 350' concrete-and-steel highway bridge, constructed in 1963, to its terminus in a similar but smaller parking area for handicapped visitors at the northwest corner of the fort precinct *(Figures 55, 56)*. From this point, a dirt service road for authorized vehicles only continues south, swinging to the west side of Officers' Row and providing access to fenced yards behind each of the officers' quarters *(Figures 57, 58)*.

West of the NHS entrance, Route 156 intersects with County Road FAS 986, a two-lane asphalt road which runs both north and south through the western portion of the NHS for a distance of 0.8

[10]U.S. Department of the Interior, Bureau of Reclamation, Technical Services Center, *Condition Survey Report for Pawnee River Dike and Noname Dam No. 2* (Denver, July 1996).

mile *(Figure 59)*. FAS 986 leads south over the Pawnee River on a concrete-and-steel highway bridge, completed in 1994, to the southern boundary of the NHS, where it continues as a dirt road. West of the county road just north of the river is a one-lane, dirt service road leading to a material storage area. South of the river, a controlled-access, one-lane, dirt-and-gravel service road leads east to intersect with the service road behind Officers' Row. Farther along FAS 986, a dirt-and-gravel entry drive leads west to the fenced, similarly-surfaced, NHS maintenance yard.

The two service roads that intersect southwest of Officers' Row continue eastward, south of HS-5 and HS-6 *(Figure 60)*. South of the blockhouse they split again, this time to form a loop which doubles as the pedestrian, history and nature trail. One arm continues north along the east side of HS-4 and HS-3 as a dirt-and-gravel service road, and the other arm continues east as a dirt track along the approximate alignment of the Santa Fe Trail. The former road segment crosses the drainage ditch on an at-grade, wood-plank bridge between the blockhouse and HS-4. Northeast of HS-2 it continues as a dirt track, crossing two embankments at the ends of the oxbow before turning east and south to join the Santa Fe Trail portion. Another dirt track runs south from the fort as a farm road, crossing the reconstructed prairie and agricultural lands toward the community of Frizell. At the Trail Ruts unit, vehicular circulation is limited to a dirt-and-gravel pull-in parking area for two vehicles adjacent to the county road.

Pedestrian

The predominant pedestrian circulation within the NHS is the broad, perimeter walk that surrounds the fort's central parade ground. The gravel walk varies in width from 16' in front of Officers' Row and 14' on the north-northwest and south-southeast sides to 5' in front of HS-3 and HS-4 *(Figure 61)*. The gravel path in front of HS-5 continues east beyond the quadrangle to provide access to the blockhouse. Gravel crosswalks, approximately 5' in width, connect opposite sides of the perimeter walk. A circular gravel area astride the west-southwestern crosswalk, 30' in diameter, marks the center of the parade ground and supports the fort's flagstaff. A reconstructed boardwalk, 4' in width and approximately 440' long, runs in front of the officers' quarters just west of the perimeter gravel walk *(Figure 62)*. The northern and southern ends of the boardwalk are angled to the west for an approximate distance of 25'. Short, entry walks of similar construction lead from the main boardwalk to each of the five sets of porch stairs serving the three residences *(Figure 63)*. An at-grade section of boardwalk also occurs near the eastern corner of the quadrangle where the perimeter gravel path crosses the drainage ditch.

Non-historic pedestrian circulation within the fort precinct takes the form of an asphalt path leading from the south end of the entrance bridge and the handicapped parking area to the porch of HS-1 *(Figure 64)*. This 6' wide walk provides an accessible route for visitors to the visitor center. Similar walks occur at the picnic area to serve the restroom building and the adjacent wayside exhibit and at the temporary visitor parking area providing a pedestrian route to the highway bridge over the Pawnee River. *(Figure 65)* A red brick patio with a concrete and a bluestone stepping stone are located at the rear of HS-8. East of the fort, a 1.5-mile history and nature trail conducts visitors past the first post cemetery, quartermaster stables and corral, and mail station. The trail also passes through areas of reconstructed prairie and riverbank ecology. A similar dirt trail at the Trail Ruts unit leads visitors from the small parking area to the elevated viewing platform.

The condition of vehicular and pedestrian circulation systems within the NHS is generally good. In times of wet weather, however, accessibility is a problem—particularly along the gravel paths. The gravel surface and sandy substrate take on a fluid-like character, making walking difficult and wheelchair access impossible. Dirt and dirt-and-gravel roads are also difficult at these times. The portion of the service road east of HS-3 is particularly so, due in part to its proximity to the less stable soils of the oxbow bank. Dirt tracks through the prairie are ill-defined or uneven in places, making identification of safe crossings at agricultural irrigation ditches difficult.

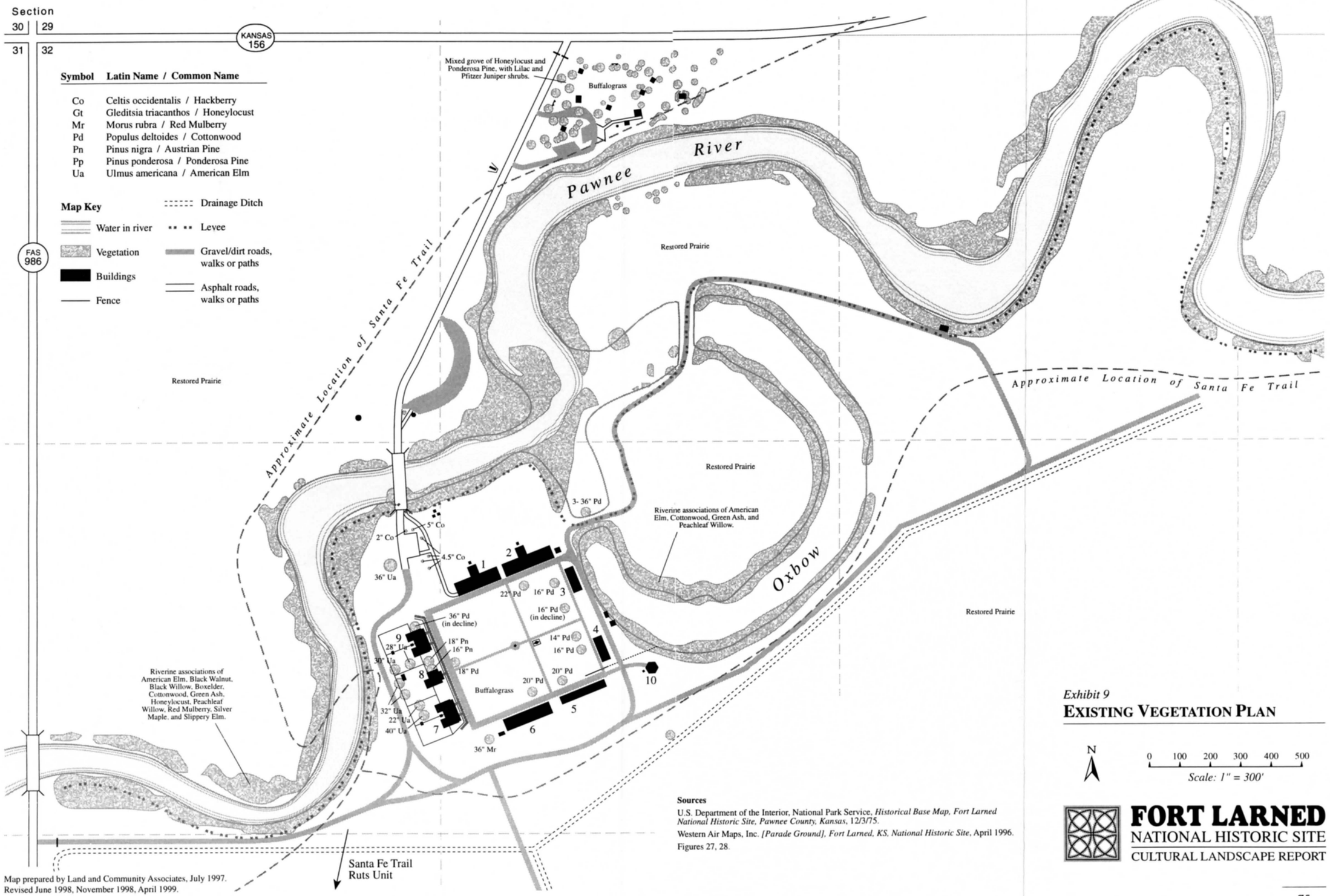
Boundary Demarcations

The boundary of the NHS extends eastward from a point 400' north of the intersection of Route 156 and FAS 986, running parallel with the centerline of the state highway to the northeast corner of the NHS at the boundary between sections 29 and 28. From the northeast corner, the NHS boundary extends south past the corner of sections 28, 29, 32, and 33 by 0.5 mile, then west 0.25 mile, and south approximately 2000' to the southeast corner of the NHS. From the southeast corner, the NHS boundary extends west 0.25 mile, then north approximately 700', then west approximately 3300' to the southwest corner of the NHS. From the southwest corner, the NHS boundary extends north approximately 2700', then west-northwest approximately 2100', then north approximately 1050' to the northwest corner of the NHS, and then eastward to the starting point. The non-contiguous portion of the NHS, the Trail Ruts unit, is a rectangular parcel approximately 2000' north-to-south by 1000' east-to-west, lying near the southwest corner of section 19, township 22S, range 17W. The boundaries of the NHS are not marked. Instead, only the federally-owned portions of the NHS—the historic fort unit and the Trail Ruts unit—are indicated with signs identifying them as NPS property. This area includes the majority of the NHS located southeast of the state highway / county road intersection, as well as a small parcel west of the county road both north and south of the Pawnee River.

Within the NHS, several areas are delineated by fencing for privacy, security, and site definition. At Officers' Row, a reconstructed, 4' wood post-and-rail fence defines the front yards of the three officers' residences just west of the boardwalk. Further west, a 6' board privacy fence, reconstructed in 1988, encloses the rear yards of the residences. It extends from the rear line of the central mass of each building approximately 100' to the west-southwest, and extends beyond the north and south ends of the row by approximately 35'. Yards between HS-8 and the two halves of HS-7 and HS-9 are separated from each other by additional fences of the same design. All five yards open onto the adjacent service road through pairs of 5'-wide, hinged wood panels. At the maintenance facility, a chainlink fence surrounds the maintenance yard. Similarly, a wire fence defines the perimeter of the Trail Ruts unit, allowing for a pull-in parking area at the southwest corner.

Vegetation *(Exhibit 9)*

Vegetation at Fort Larned NHS consists of a variety of native and exotic (non-native) trees, shrubs, herbaceous plants, grasses, and forbs. Both deciduous and evergreen plant materials are represented. These plant materials are found in five distinct culture areas: the Pawnee River and oxbow corridor, the fort precinct, the picnic area and maintenance area, the native and reconstructed prairie, and the agricultural fields. The overall vegetative character of the NHS is of planar wheat and hay fields and prairie bisected by the taller, sinuous band of canopy trees and understory vegetation along the Pawnee River channel and adjacent oxbow *(Figure 66)*.



Map prepared by Land and Community Associates, July 1997.
Revised June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Figures 27, 28.

Exhibit 9

EXISTING VEGETATION PLAN

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

Within this pattern are three developed areas—the historic fort precinct, the picnic area, and the maintenance area—that have a ground plane defined by mown turf and punctuated by individual trees and shrubs.

The predominant trees on the site are American elm, black willow, boxelder, cottonwood, green ash, and slippery elm, all of which occur in the riverine environment. American elms are also present in the grassy area southwest of the bridge abutment, and in the rear yards of Officers' Row. Southwest of HS-6, there is a red mulberry with conspicuous herbicide damage. Cottonwoods have been planted in various locations along the perimeter of the central parade ground; an older and larger cottonwood is immediately north of HS-9 *(Figures 67, 68)*. This tree was estimated in 1996 to be 161 years old.[11] Given the somewhat approximate process of dating by tree rings, it is likely that the tree was present during the military period of the fort and may date from the beautification efforts of 1870–71. Other trees within the fort precinct include two 50' Austrian pines between HS-8 and HS-9 and a group of young hackberries planted northwest of HS-1 *(Figure 69)*. Two cottonwoods in the riverine environment are notable for their height, girth, and presumed age: one is located at the southwest end of the oxbow just east of HS-2; the other is southwest of HS-7 along the river corridor adjacent to the service road.

Throughout the three developed areas within the NHS, the predominant ground cover is buffalograss, mown to a height of 3"–4". Adjacent agricultural areas are dominated by irrigated fields of alfalfa hay, county-wide production of which ranks fourth in the state.[12] Other crops grown locally include wheat, grain sorghum, and corn.[13] Since 1969, restoration of 240 acres to 1860s prairie conditions has been an important NPS management objective *(Figure 70)*.[14] Presently, ten management zones (see *Exhibit 12*, chapter 4) contain prairie vegetation with varying percentages of dominant species. These species include Indian grass, silver beardgrass, western wheatgrass, Japanese brome, smooth brome, blue grama, sideoats grama, kochia, big bluestem, little bluestem, switch grass, and field bindweed. In addition, several native prairie relics exist, the largest being the Trail Ruts unit. Other such areas occur on the west side of FAS 986 just north of the NHS maintenance facility and along the east side of the road between the service road and NHS boundary, along the north bank of the Pawnee River at the northeast corner of the historic fort unit, and at the dump site at the southern portion of the historic fort unit.

The condition of vegetation within the NHS varies. Several mature trees within and near the fort precinct have had major loss of limbs and are in decline, most notably the cottonwood north of HS-9, the red mulberry southwest of HS-6, and the cottonwood along the farm road south of the fort. Trees along the Pawnee River channel and oxbow may be showing signs that water has become less plentiful, owing to recent drought conditions and river siltation.

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[11]Memo from Chief Ranger, Fort Larned National Historic Site to Superintendent, August 15, 1966.
[12]Robert Frisbie, Pawnee County Extension Agent, telephone conversation with Frederick Schneider, AIA, May 22, 1996.
[13]U.S. Department of Agriculture, Kansas Department of Agriculture, Value *of Production, Pawnee County, Farm Facts 1994-95*, Kansas Agricultural Statistics (Topeka, 1995).
[14]Donald A. Becker, Ph.D., et al., *Prairie Management Plan, Fort Larned National Historic Site*, U.S. Department of the Interior, National Park Service (Elkhorn, NE, February 1986), 2.

Master Plant List

Plants identified and/or documented at the NHS include

Trees (N=native, n=native to Kansas but likely introduced to the fort environs, E=exotic)

American Elm (N)	*Ulmus americana*	oxbow and river banks, W fort precinct
Austrian Pine (E)	*Pinus nigra*	between HS-8 and HS-9
Black Walnut (N)	*Juglans nigra*	river bank
Black Willow (N)	*Salix nigra*	river bank
Boxelder (N)	*Acer negundo*	river bank
Cottonwood (N)	*Populus deltoides*	oxbow and river banks, parade ground
Eastern Redbud (E)	*Cercis canadensis*	north of river
Green Ash (N)	*Fraxinus pennsylvanica*	oxbow and river banks
Hackberry (N)	*Celtis occidentalis*	northwest of HS-1
Honeylocust (N)	*Gleditsia triacanthos*	river bank
Peachleaf Willow (N)	*Salix amygdaloides*	oxbow and river banks
Red Cedar (N)	*Juniperus virginiana*	north of river
Red Mulberry (n)	*Morus rubra*	river bank
Silver Maple (n)	*Acer saccharinum*	river bank
Slippery Elm (n)	*Ulmus fulva*	river bank

Trees previously identified but not observed
(N=native, n=native to Kansas but likely introduced to the fort environs, E=exotic)

Black Hickory (E)	*Carya texana*	
Bur Oak (n)	*Quercus macrocarpa*	(perhaps previously misidentified)
Chinese Elm (E)	*Ulmus parvifolia*	
Kentucky Coffeetree (n)	*Gymnocladus dioicus*	
Pear (E)	*Pyrus communis*	
Russian Olive (E)	*Elaeagnus angustifolia*	
White Ash (n)	*Fraxinus americana*	
White Mulberry (E)	*Morus alba*	
Wild Plum (E)	*Prunus angustifolia (?)*	

Shrubs and woody vines (N=native, E=exotic)

Coralberry (N)	*Symphoricarpos orbiculatus*	restored prairie
Lead Plant (N)	*Amorpha canescens*	restored prairie
Poison Ivy (N)	*Toxicodendron radicans*	restored prairie
Sandbar Willow (N)	*Salix exigua*	river bank
Smooth Sumac (N)	*Rhus glabra*	restored prairie

Herbaceous plants, grasses, and forbs

Alfalfa	*Medicago sativa*	restored prairie
Annual Sunflower	*Helianthus annuus*	restored prairie
Aster	*Aster ericoides*	restored prairie
Bermuda Grass	*Cynodon dactylon*	restored prairie
Big Bluestem	*Andropogon gerardii*	restored prairie
Blackseed Plantain	*Plantago rugelii*	restored prairie
Blue Grama	*Bouteloua gracilis*	restored prairie
Broadleaf Milkweed	*Asclepias syriaca*	restored prairie
Buffalo-bur	*Solanum rostratum*	restored prairie
Buffalograss	*Buchloe dactyloides*	restored prairie, parade ground
Canada Wildrye	*Elymus canadensis*	restored prairie
Dandelion	*Taraxacum officinale*	restored prairie
Devil's Claw	*Proboscidea louisianica*	restored prairie
Dock	*Rumex altissimus*	restored prairie
Downy Brome	*Bromus tectorum*	restored prairie
False Dandelion	*Tragopogon dubius*	restored prairie
Field Bindweed	*Convolvulus arvensis*	restored prairie
Green Foxtail	*Setaria viridis*	restored prairie
Ground Cherry	*Physalis heterophylla*	restored prairie
Hairy Grama	*Bouteloua hirsuta*	restored prairie
Hemp Dogbane	*Apocynum cannabinum*	restored prairie
Indian Grass	*Sorghastrum nutans*	restored prairie
Japanese Brome	*Bromus japonicus*	restored prairie
Kansas Sage	*Artemisia ludoviciana*	restored prairie
Knotweed	*Polygonum arenastrum*	restored prairie
Kochia	*Kochia scoparia*	restored prairie
Lamb's Quarter	*Chenopodium album*	restored prairie
Little Bluestem	*Andropogon scoparius*	restored prairie
Mare's Tail (Horseweed)	*Conyza canadensis*	restored prairie
Pigweed	*Amaranthus retroflexus*	restored prairie
Plains Milkweed	*Asclepias pumila*	restored prairie
Poison Hemlock	*Conium maculatum*	restored prairie
Prairie Coneflower	*Ratibida columnaris*	restored prairie
Prickly Lettuce	*Lactuca serriola*	restored prairie
Prickly Pear Cactus	*Opuntia macrorhiza*	restored prairie

Herbaceous plants, grasses, and forbs (continued)

Puncture Vine	*Tribulus terrestris*	restored prairie
Purple Poppy Mallow	*Callirhoe involucrata*	restored prairie
Salmon-colored Mallow	*Sphaeralcea coccinea*	restored prairie
Sedge	*Carex spp.*	restored prairie
Sheep Sorrel (Wood Sorrel)	*Oxalis stricta*	restored prairie
Sideoats Grama	*Bouteloua curtipendula*	restored prairie
Silver Beardgrass	*Bothriochloa saccharoides*	restored prairie
Smooth Brome	*Bromus inermis*	restored prairie
Switch Grass	*Panicum virgatum*	restored prairie
Tall Dropseed	*Sporobolus asper*	restored prairie
Threeawn	*Aristida longiseta*	restored prairie
Virginia Wildrye	*Elymus virginicus*	restored prairie
Western Ragweed	*Ambrosia psilostachya*	restored prairie
Western Salsify	*Tragopogon pratensis*	restored prairie
Western Wheatgrass	*Agropyron smithii*	restored prairie
Wild Alfalfa	*Psoralea tenuiflora*	restored prairie
Wild Four O'Clock	*Mirabilis nyctaginea*	restored prairie
Wild Lettuce	*Lactuca saligna*	restored prairie
Witch Grass	*Panicum capillare*	restored prairie
Woolly Verbena	*Verbena stricta*	restored prairie
Yellow Foxtail	*Setaria glauca*	restored prairie
Yellow Spine Thistle	*Cirsium ochrocentrum*	restored prairie
Yellow Sweetclover	*Melilotus alba*	restored prairie

In 1995, Paleo Research Laboratories conducted analysis of pollen, phytolith (silica by-products of plant growth), and macrofloral (seeds and other floral parts) remains from sod remnants preserved beneath HS-7 and HS-8. The objective was to identify vegetation in the general fort site at the time the structures were built. Analysis indicated that a variety of grasses and forbs of varying heights characterized the site at that time. There was no evidence that trees were present, although the pollen record suggested that trees probably grew along the Pawnee River corridor. A complete list of grasses, forbs, and trees identified by this analysis is included in *Pollen, Phytolith, and Macrofloral Analysis of Sod from Fort Larned National Historic Site, Central Kansas.*[15]

[15]See Appendix A.

While prairie restoration efforts appear to be progressing, turf management issues have arisen within the native prairie of the Trail Ruts unit. The prairie dog community in this area appears to be thriving, resulting in heavy grazing and limited growth of prairie grasses, and opening the possibility of damage to the historic trail ruts by the expansion of their burrows *(Figure 71)*. Similarly, pocket gophers present a turf management problem within the fort precinct. Networks of gopher holes are present in several areas of the fort, notably north and west of HS-1 and HS-2, between HS-3 and HS-4, in the rear yards of HS-7 and HS-8, northwest of HS-9, and in the south corner of the parade ground *(Figure 72)*. These holes damage mowing equipment, subjecting it to expensive repairs, and pose a safety hazard to pedestrians as well as to horses present for special occasions.

Cluster Arrangements of Buildings and Structures

Nine extant historic buildings form the core of the fort precinct, along with one major reconstructed building and several auxiliary structures such as privies and well houses. Non-historic buildings and structures also are located throughout the NHS. Current buildings and structures include the following:

- HS-1 Barracks / 1867-68 (exterior restored 1975) with well house (reconstructed 1988)
- HS-2 Barracks / 1867–68 (exterior restored 1975) with well house (reconstructed 1988)
- HS-3 Shops Building / 1867 (exterior restored 1980)
- HS-4 New Commissary Storehouse / 1867–68 (exterior restored 1987)
- HS-5 Old Commissary Storehouse / 1866 (exterior restored 1982)
- HS-6 Quartermaster Storehouse / 1867 (exterior restored 1980)
- HS-7 Officers' Quarters / 1867–68 (front and rear porches restored 1982) with well house (reconstructed 1988) and privy (reconstructed 1983)
- HS-8 Commanding Officer's Quarters / 1867 (exterior restored 1986)
- HS-9 Officers' Quarters / 1867–68 (front and rear porches restored 1983) with well house (reconstructed 1988) and privy (reconstructed 1983)
- HS-10 Blockhouse and Sweatbox (reconstructed 1988)
- HS-32 Flagstaff (reconstructed 1983)
- carport / *circa* 1980
- picnic shelters / *circa* 1960 and 1988
- well house in picnic area / 1982
- restroom in picnic area / 1987
- maintenance building / 1984

Temporary, seasonal structures associated with the site's interpretive activities include a canvas tepee, laundress's tent, and cavalry tent camp; the use of all these structures originated in 1995.

The historic buildings form the site's dominant cluster arrangement surrounding the fort's central quadrangle. Within this arrangement, several of the buildings and reconstructed structures have close physical, visual or functional relationships. Three one-story sandstone buildings, the Barracks / Visitor Center (HS-1), Barracks / Post Hospital (HS-2), both built 1867-68, and Shops Building (HS-3), built 1867, and the two wood-frame well houses, reconstructed in 1988, form a recognizable, if somewhat extended, cluster at the north side of the parade ground *(Figure 73)*. Opposite on the southeast side of the parade ground is a similar extended cluster consisting of the one-story sandstone New Commissary (HS-4) built 1867-68, Old Commissary (HS-5) built 1866, and Quartermaster Storehouse (HS-6) built 1867 *(Figure 74)*. At the west end of the parade

ground is the fort's most recognizable building cluster, the three residences and associated outbuildings known as Officers' Row *(Figure 75)*. The central element in the row is the sandstone Commanding Officer's Quarters (HS-8), a one-story main block with a two-story rear ell, built in 1867. Flanking this are the two, one-story sandstone Officers' Quarters (HS-7, HS-9) built 1867-68. Each residence has two rear ells that form a courtyard containing a well house, reconstructed in 1988. Farther to the west along a central axis at each residence is a privy, reconstructed in 1988. A non-historic timber and metal carport is located in the rear yard of HS-8. At the center of the parade ground is the fort's 99'-tall reconstructed flagstaff (HS-10). During the site's hours of operation, a 37-star U.S. flag in one of three sizes is flown from the flagstaff depending upon the occasion and weather conditions *(Figure 76)*.

Just beyond the quadrangle of buildings and outbuildings is the one-story sandstone blockhouse with its wood-frame cupola, reconstructed in 1988. The blockhouse, accessible from the quadrangle along the extension of the south gravel walk, is flanked by a one-story, wood-frame sweatbox reconstructed in 1988.

The contemporary picnic area also contains an informal cluster of non-historic structures, consisting of two timber and four steel-and-wood-frame picnic shelters, a steel-and-wood-frame exhibit shelter, and a one-story, split-face concrete block restroom building built in 1987 *(Figure 77)*.

The NHS also contains non-historic structures not associated with any identifiable cluster: the Fort Larned entrance sign, the one-story wood-frame entrance kiosk at the temporary visitor parking area, the one-story split-face concrete block maintenance building southwest of the fort (built in 1984), the timber shelter along the history and nature trail, and the elevated timber viewing platform at the Trail Ruts unit.

In general, most of the historic sandstone buildings appear to be in good condition. Many, however, have extensive areas of carved graffiti, some examples of which date from the fort's historic period. Several buildings also exhibit cracks in the exterior walls due to differential settlement of building foundations and/or moisture penetration and freeze/thaw action. These cracks and other wall openings also provide opportunity for nests of boxelder bugs, wasps, mud-daubers, and sparrows *(Figure 78)*. The reconstructed buildings and structures are of recent construction and are in good condition, as are the two concrete block buildings. The remaining structures appear to be in fair condition owing to their age or exposed locations. None of the buildings currently meets the Uniform Federal Accessibility Standards (UFAS) for facility accessibility. Quinn Evans / Architects, the prime consultant for the Midwest Indefinite Quantity Contract, is undertaking concurrent historic structure reports (HSRs) for the NHS.

Archeological Resources

Approximately fifty known archeological sites dating from the active period of the fort's operation exist at Fort Larned *(Figure 79)*. The exact or approximate locations of the non-extant resources were identified starting in 1968 and during the period 1973-1975 by an NPS archeological team led by Douglas D. Scott of the University of Colorado. A listing of the archeological resources follows.

LCS #	*Structure Name*	*Date Built*	*Certainty of Location*
HS-1	Barracks	1867-68	Extant
HS-2	Barracks	1867-68	Extant
HS-3	Shops Building	1867	Extant
HS-4	New Commissary Storehouse	1867-68	Extant
HS-5	Old Commissary Storehouse	1866	Extant
HS-6	Quartermaster Storehouse	1867	Extant
HS-7	Officers' Quarters	1867-68	Extant
HS-8	Commanding Officer's Quarters	1867	Extant
HS-9	Officers' Quarters	1867-68	Extant
HS-10	Blockhouse and Sweatbox	1864-65	Reconstructed 1988
HS-32	Flagstaff	1860	Reconstructed 1983
HS-48	Parade Ground	early 1860s?	Reconstructed 1983

LCS #	*Site Name*	*Date Built*	*Certainty of Location*
HS-11	Commissary Storehouse and Barracks	1860	Located archeologically
HS-12	Quartermaster Storehouse and Barracks	1860	Located archeologically
HS-13	Laundress Quarters	1860	Located archeologically
HS-14	Laundress Quarters	1860	Located archeologically
HS-15	Hospital (Ordnance Sergeant's Quarters)	1860	Located archeologically
HS-16	Sink (Privy)	1860?	Approximate location
HS-17	Sink (Privy)	1860?	Approximate location
HS-18	Meathouse	1860	Approximate location
HS-19	Storehouse	1860	Approximate location
HS-20	Carpenter and Blacksmith Shop	1860	Approximate location
HS-21	Icehouse	1867	Located archeologically
HS-22	Sutler's Corral and Stables	early 1860s	Approximate location
HS-23	Sutler's Store	ca. 1863	Located archeologically
HS-24	Sutler's Mess Room	1863	Approximate location
HS-25	Sutler's Residence	1865	Located archeologically
HS-26	Bridge	early 1860s	Approximate location
HS-27	New Sutler's Store	1867	Approximate location
HS-28	Officers' Quarters	1860	Located archeologically
HS-29	Field Entrenchments	1864 or 1865	Located archeologically
HS-30	Teamster Quarters	1867	Approximate location
HS-31	Corral	early 1870s?	Located archeologically
HS-33	Guardhouse	1860	Approximate location
HS-34	Hospital Steward's Quarters	1874	Approximate location
HS-35	Stable	1867	Approximate location
HS-36	Bake Shop	1860	Approximate location

LCS #	*Site Name*	*Date Built*	*Certainty of Location*
HS-37	Old Cemetery	1860	Approximate location
HS-38	New Cemetery	1869	Approximate location
HS-39	Corral	1860?	Located archeologically
HS-40	Mail Station	1863	Approximate location
HS-41	Beef Corral	early 1860s?	Approximate location
HS-42	Adobe Shanties (3)	early 1860s?	1 known; 2 approx.
HS-43	Adjutant's Office	1867	Approximate location
HS-44	Wash House	late 1860s?	Approximate location
HS-45	Guardhouse Foundation	1867	Located archeologically
HS-46	Drainage System	1860s, 1870s	Located archeologically
HS-47	Dumps	early 1860s?	Located archeologically
HS-49	Dugouts	early 1860s	Approximate location
HS-50	Gardens	1860, 1870	Approximate location

Small-scale Features

A variety of small-scale features is present at Fort Larned, including those associated with the fort's period of operation, present-day visitor interpretive or recreational use, and service- and maintenance-related activities. The condition of each feature is noted in brackets. Condition was assessed on the basis of visual inspections and without benefit of structural studies. Condition was assessed only in regard to cultural resource preservation and not with regard to structural stability or human safety factors.

Historic fort-related features

- 12-pounder mountain howitzer at parade ground crosswalk intersection [Good]
- drainage channel at east corner of parade ground [Fair]
- bootscrapers (plain at HS-7 and HS-9, fancy at HS-8) [Good]
- timber tent platforms: 1) east of HS-2; 2) northeast of HS-4 [Good]
- escort wagons: 1) at oxbow between HS-3 and HS-4; 2) west of HS-6 [Fair]
- hospital wagon at HS-3 [Good]
- hitching poles northeast of HS-4 [Fair]
- DAR Santa Fe Trail marker at picnic area *(Figure 80)* [Good]

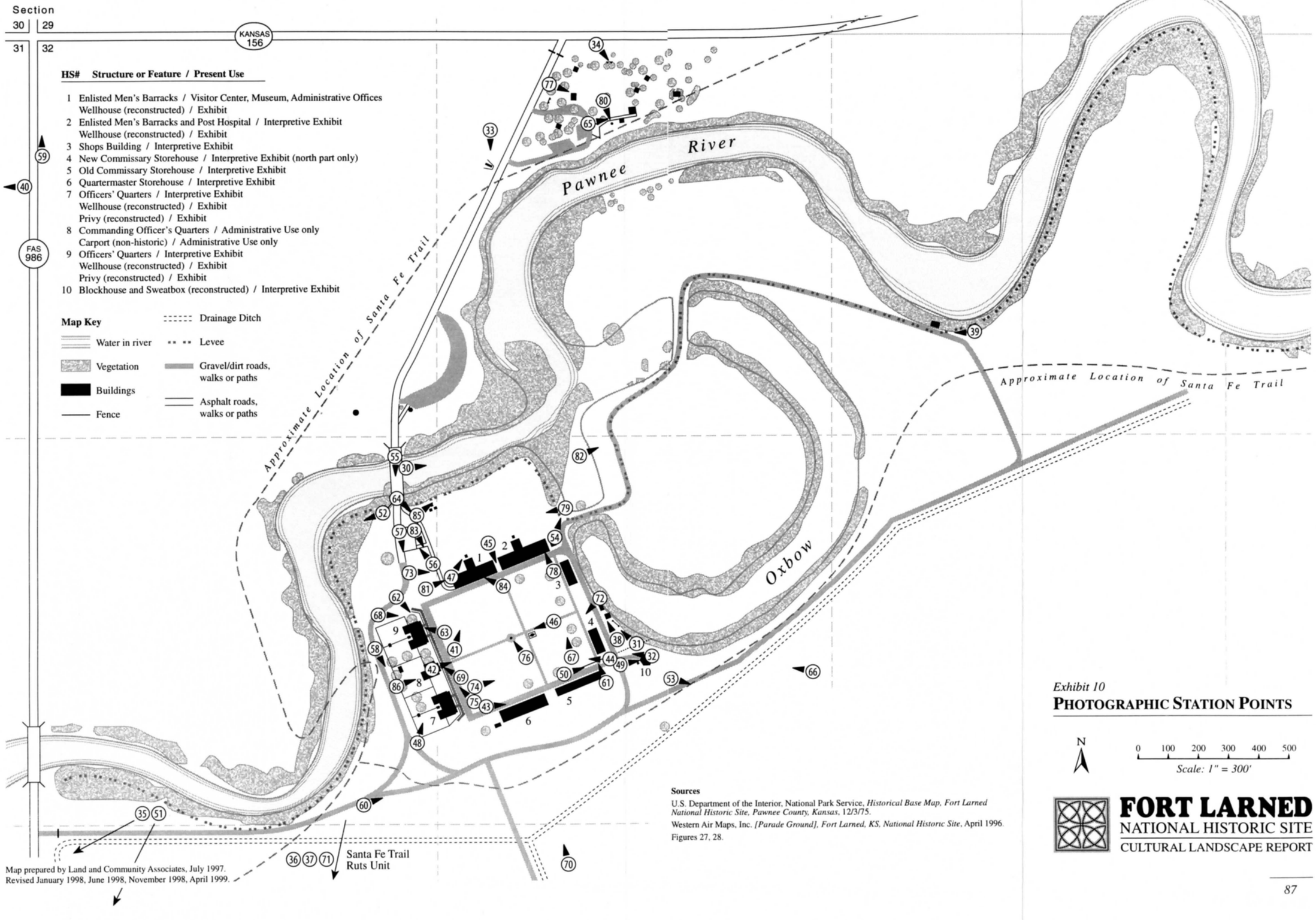
Visitor-related features

- Fort Larned sign southeast of entrance road bridge abutment [Good]
- interpretive signs for 1) well, adobe hospital; 2) Officers' Row *(Figure 81)* [Fair]
- numbered interpretive posts (throughout) [Good]
- movable history and nature trail interpretive markers (seasonal) *(Figure 82)* [Excellent]
- bicycle rack at entrance road bridge abutment [Good]
- barrel trash receptacles (throughout) *(Figure 83)* [Good to Fair]
- benches (7) at HS-1, HS-2, and HS-7 [Good]
- cabinet benches (3) containing fire hoses at HS-1, HS-2, and HS-7 *(Figure 84)* [Good]

- rope-and-stanchions at HS-3 (temporary)
- Fort Larned picnic area sign [Good]
- picnic tables at picnic area [Good]

Service- and maintenance-related features
- stormwater drains and grates at entrance road bridge [Fair]
- drop inlets and grates southeast of entrance road bridge abutment [S-Good; N-Fair]
- residential drop inlets and grates in rear yards of Officers' Row [Fair; Poor at HS-8]
- concrete pads and HVAC equipment northwest of HS-1 *(Figure 85)* [Good]
- below grade fire hydrant and water shut-off boxes (8) at perimeter of parade ground [Good]
- sand filter drainage hatch next to HS-5 [Good]
- water valve manhole behind HS-5 [Fair]
- hatch to below-grade 100,000-gallon concrete fire protection reservoir behind HS-5 [Fair]
- wood vent cover housing behind HS-5 [Fair]
- water faucets and gravel drains (2) at rear yards of HS-7 and HS-8 [Good]
- residential gas meter at rear of HS-8 [Fair]
- concrete pad and HVAC condensing unit at rear yard of HS-8 [Good]
- raised concrete slab well cover at rear yard of HS-8 [Good]
- "Colonial"-style lamp-post at rear yard of HS-8 *(Figure 86)* [Fair]
- volunteers' trailer pads at maintenance facility [Good]

Miscellaneous features
- Pawnee River sign at south end of entrance road bridge [Good]
- authorized vehicle signs (2) at north and southwest service roads [Good]
- rain gauge on fence behind HS-9 [Good]
- mail box on fence behind HS-8 [Fair]
- concrete pad for trash cans at rear yard of HS-8 [Good]



Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Figures 27, 28.

Exhibit 10

PHOTOGRAPHIC STATION POINTS

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT



Figure 29. Aerial view to the northeast of Fort Larned. [© 1993, American Images, courtesy Fort Larned National Historic Site]



Figure 30. Pawnee River looking east from entrance bridge. [LCA, 7/97]



Figure 31. Oxbow and bank at east side of quadrangle. [LCA, 7/97]



Figure 32. Parade ground seen from the roof of the blockhouse. [LCA, 4/96]



Figure 33. Picnic area adjacent to Kansas Route 156. [LCA, 4/96]



Figure 34. Entrance road, Fort Larned NHS sign, and admissions kiosk. [LCA, 4/96]



Figure 35. NHS maintenance facility. [LCA, 4/96]



Figure 36. Santa Fe Trail Ruts sign, entry path, and viewing platform. [LCA, 4/96]

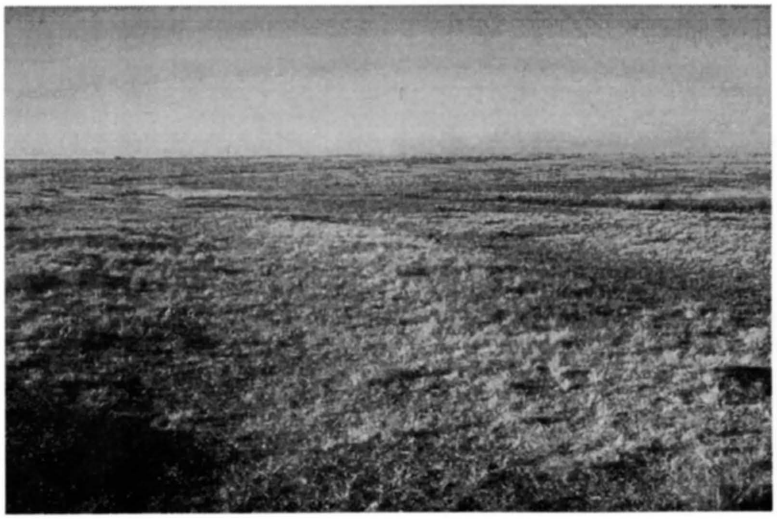


Figure 37. Trail ruts looking northeast. [LCA, 4/96]



Figure 38. Tent platform and escort wagon adjacent to oxbow. [LCA, 4/96]



Figure 39. History and nature trail, interpretive post, and bench shelter. [LCA, 4/96]



Figure 40. Agricultural fields in the easement area. [LCA, 4/96]



Figure 41. HS-1 and HS-2. [LCA, 4/96]



Figure 42. HS-3, flagstaff, and HS-4. [LCA, 4/96]

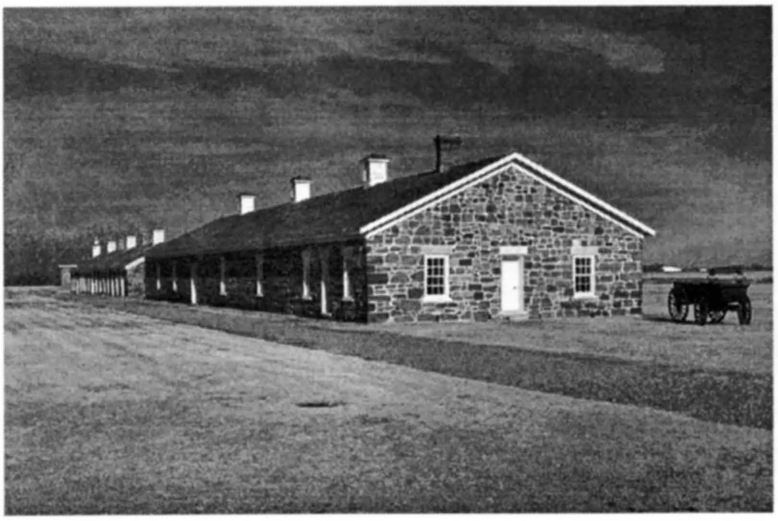


Figure 43. HS-5 and HS-6. [LCA, 4/96]



Figure 44. Officers' Row (HS-7, HS-8, and HS-9). [LCA, 4/96]



Figure 45. View along crosswalk to HS-5 and HS-6. [LCA, 4/96]



Figure 46. Howitzer and flagstaff, with HS-8 in background. [LCA, 4/96]

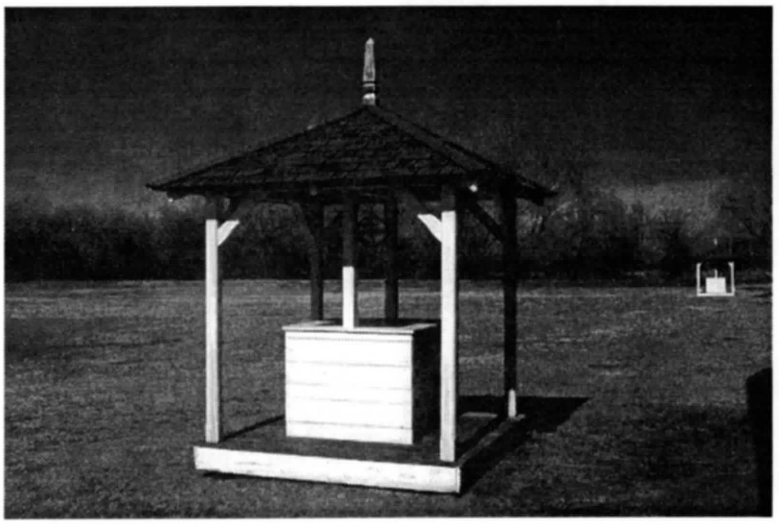


Figure 47. Wells behind HS-1 and HS-2 in distance. [LCA, 4/96]

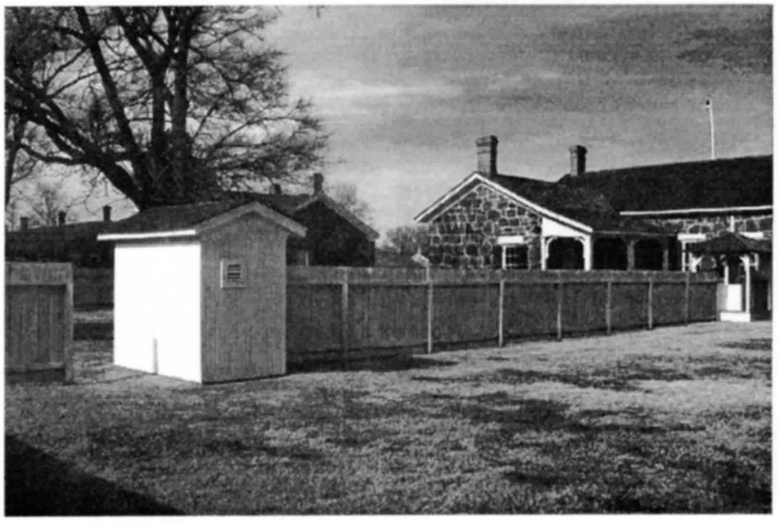


Figure 48. Well, fence, and privy behind HS-7. [LCA, 4/96]

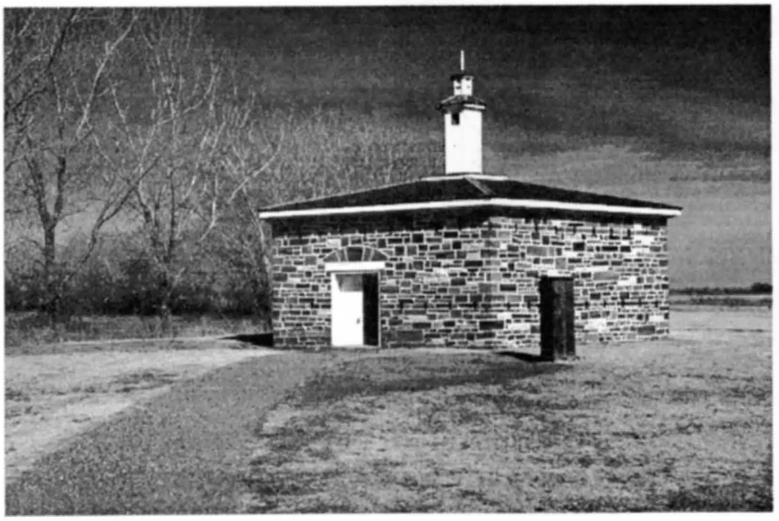


Figure 49. Blockhouse and sweatbox. [LCA, 4/96]



Figure 50. Drainage ditch at east end of parade ground. [LCA, 4/96]

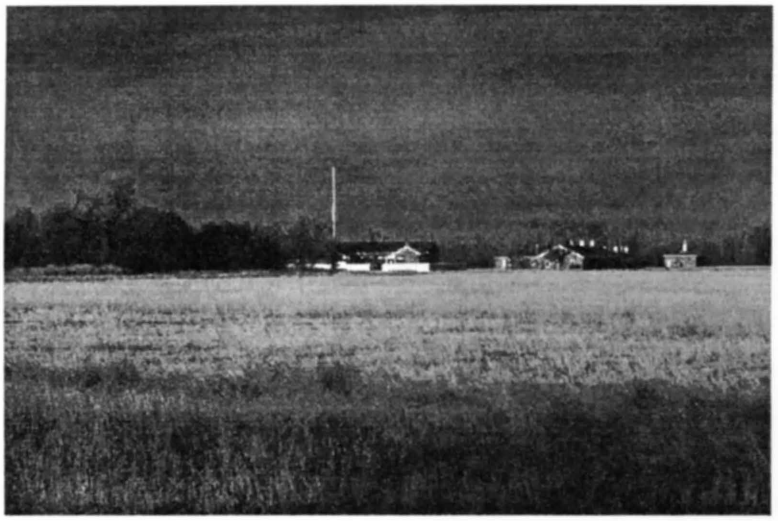


Figure 51. Fort Larned seen from reconstructed prairie southwest of quadrangle. [LCA, 4/96]



Figure 52. Berm along south bank of the Pawnee River. [LCA, 7/97]

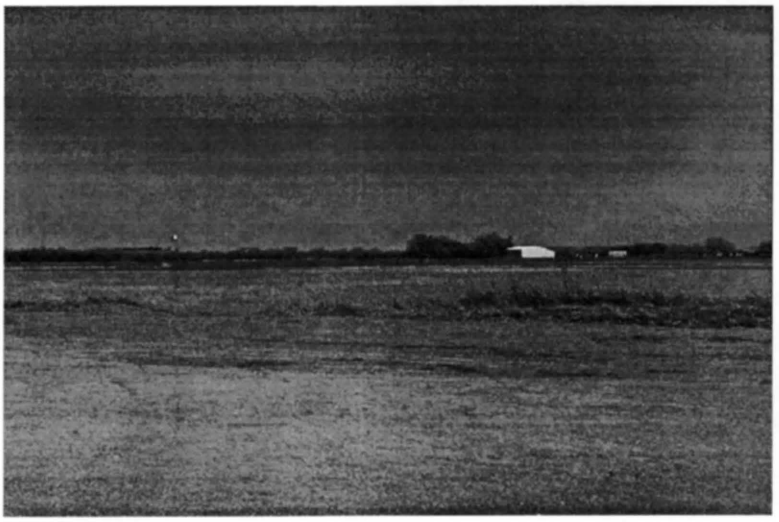


Figure 53. View from the fort to the southeast, showing water tower at state hospital, pole barn, and trees on the horizon. [LCA, 4/96]



Figure 54. Power poles northeast of HS-2. [LCA, 4/96]

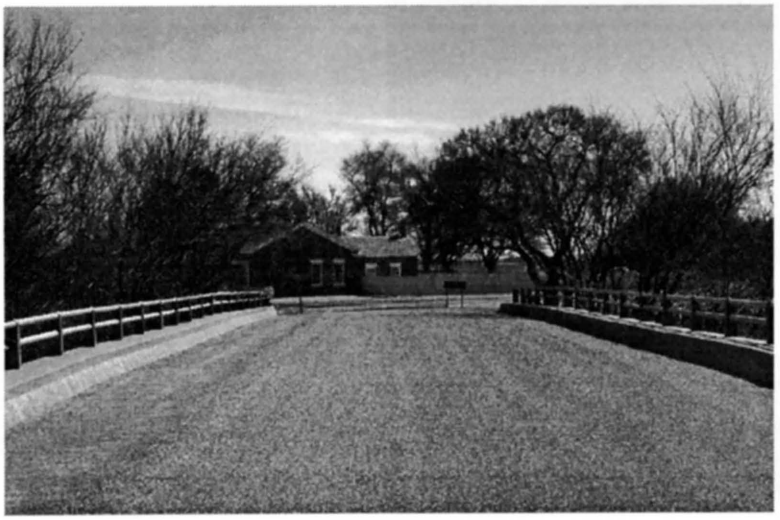


Figure 55. View to fort from entrance bridge. [LCA, 4/96]



Figure 56. Handicapped parking area. [LCA, 4/96]



Figure 57. Service road south of entrance bridge. [LCA, 4/96]

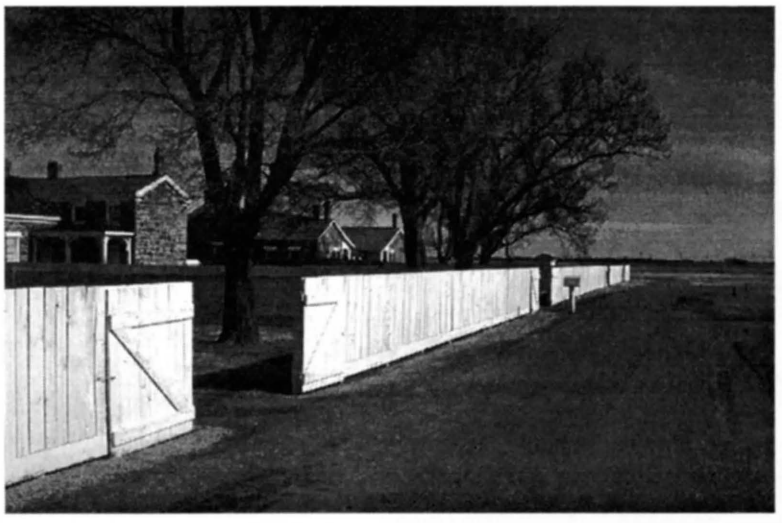


Figure 58. Service road west of Officers' Row. [LCA, 4/96]



Figure 59. County Road FAS 986, looking north to intersection with Kansas Route 156. [LCA, 4/96]



Figure 60. Service road south of quadrangle. [LCA, 4/96]

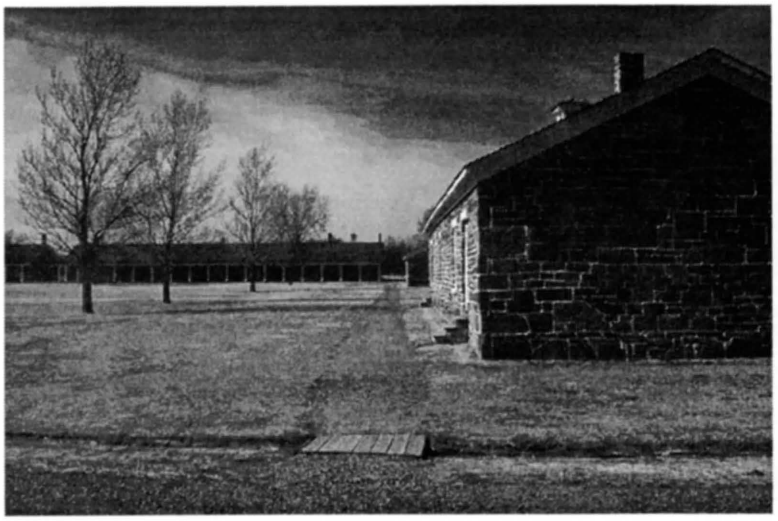


Figure 61. Gravel path and boardwalk in front of HS-4. [LCA, 4/96]

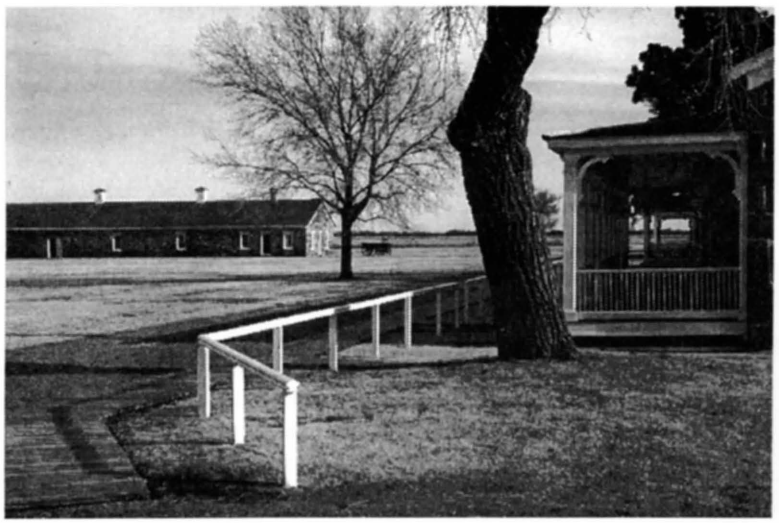


Figure 62. Boardwalk and post-and-rail fence at front of Officers' Row. [LCA, 4/96]

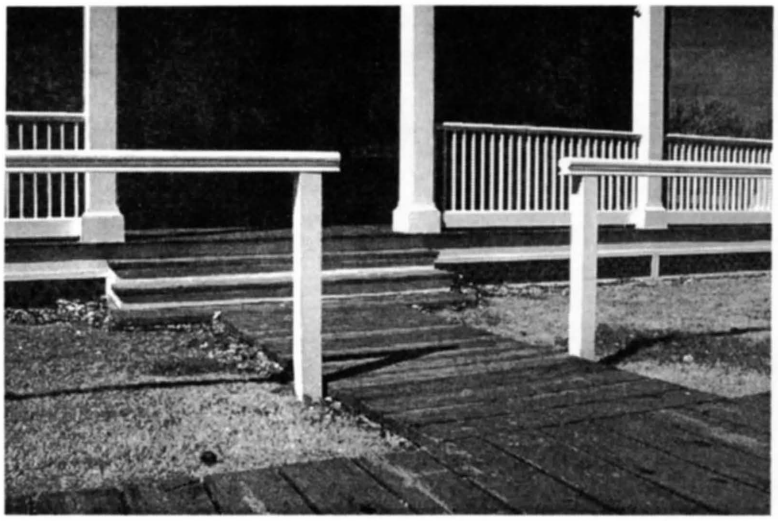


Figure 63. Entry walk to HS-9. [LCA, 4/96]



Figure 64. Asphalt path to visitor center. [LCA, 4/96]



Figure 65. Restroom building and exhibit shelter at picnic area. [LCA, 4/96]

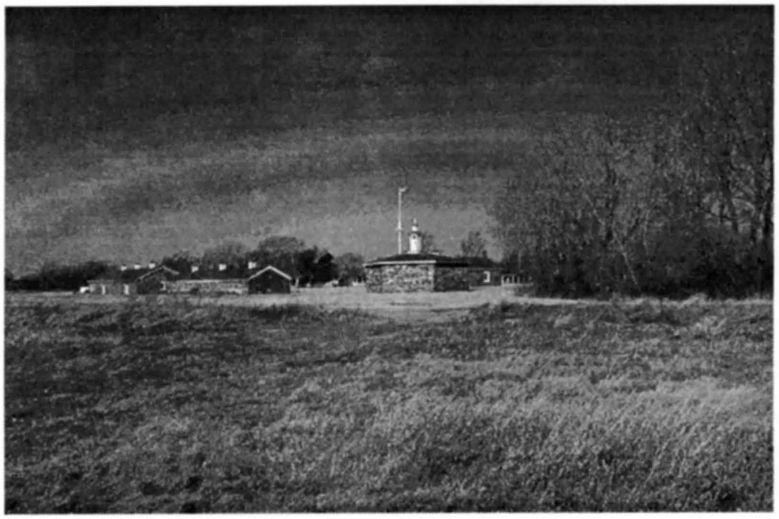


Figure 66. Fort Larned and oxbow vegetation seen from reconstructed prairie southeast of the quadrangle. [LCA, 4/96]

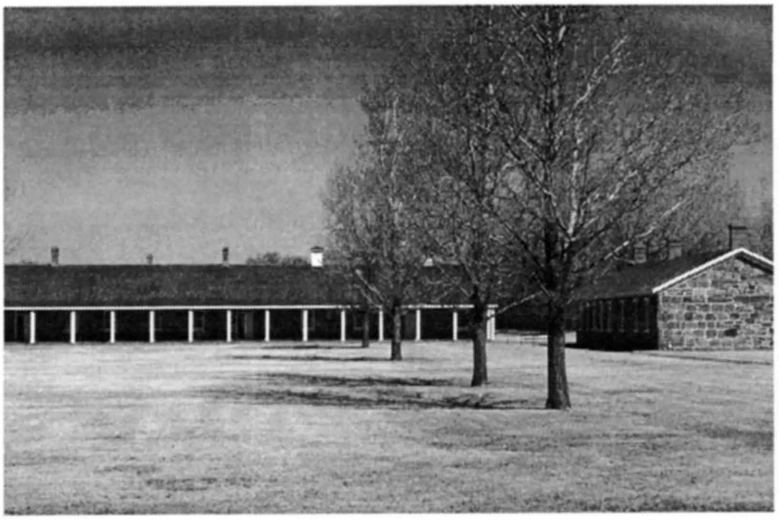


Figure 67. Cottonwood trees along east side of parade ground. [LCA, 4/96]



Figure 68. Cottonwood tree adjacent to HS-9. [LCA, 4/96]

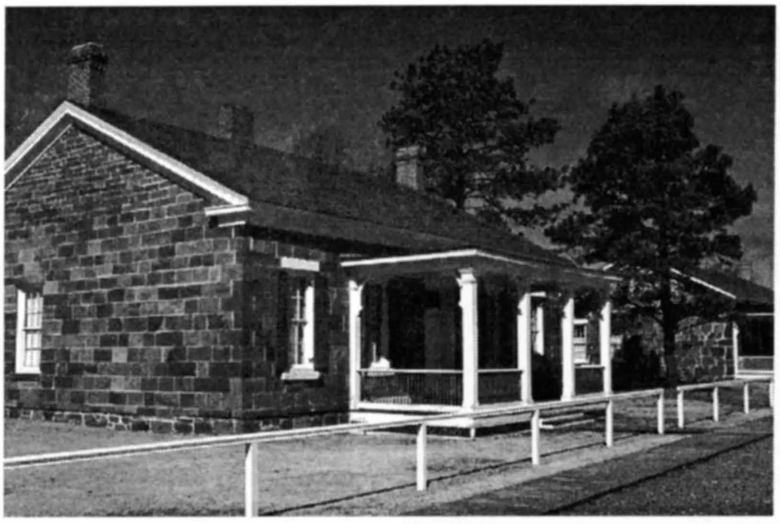


Figure 69. Austrian pines between HS-8 and HS-9. [LCA, 4/96]



Figure 70. Reconstructed prairie south of the fort. [LCA, 4/96]



Figure 71. Prairie dog holes at the Trail Ruts unit. [LCA, 4/96]



Figure 72. Pocket gopher holes between HS-3 and HS-4. [LCA, 4/96]

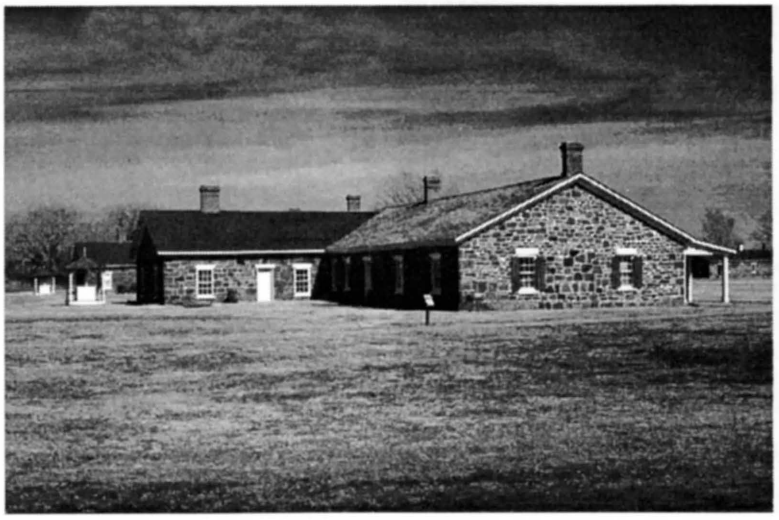


Figure 73. HS-1, HS-2, and wells seen from the west. [LCA, 4/96]



Figure 74. HS-4, HS-10, HS-5, and HS-6. [LCA, 4/96]

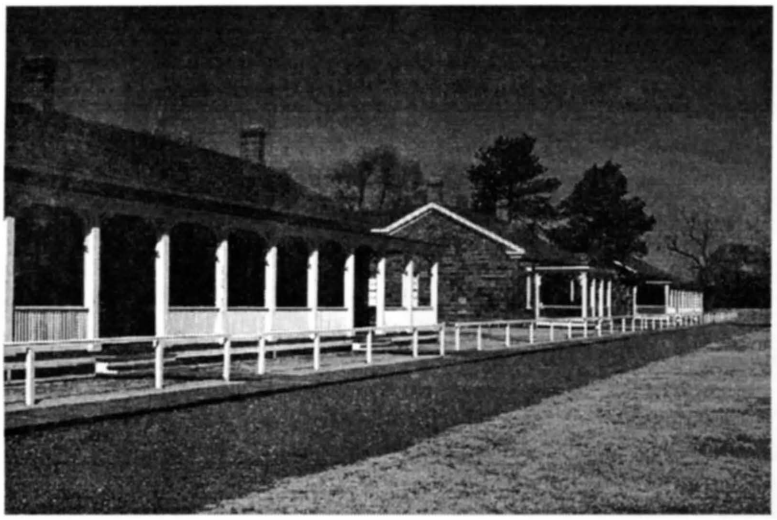


Figure 75. Officers' Row. [LCA, 4/96]

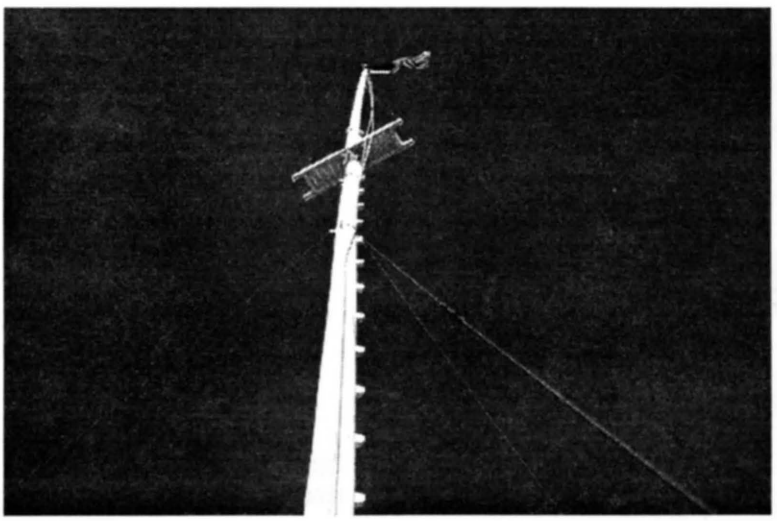


Figure 76. The fort's 99' flagstaff. [LCA, 4/96]



Figure 77. Timber and wood-and-steel shelters at the picnic area. [LCA, 4/96]

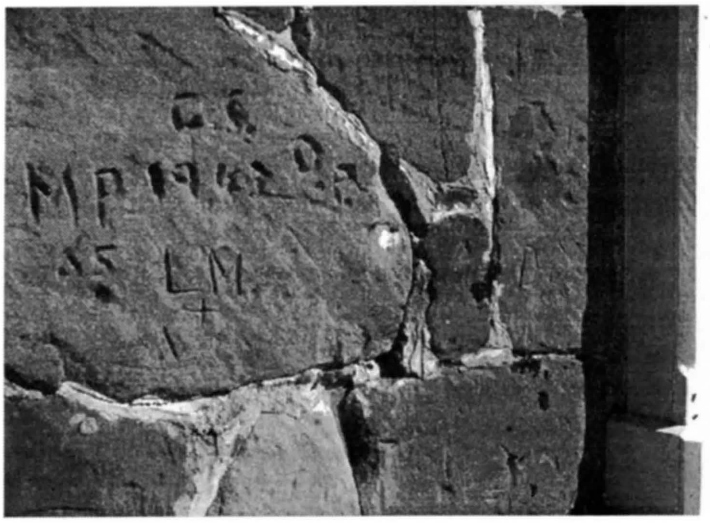


Figure 78. Carved graffiti and boxelder bugs at HS-2. [LCA, 4/96]



Figure 79. Open area north of HS-1 and HS-2, archeological site of fort's early adobe buildings. [LCA, 4/96]





Figure 80, *left*. Santa Fe Trail and Fort Larned commemorative marker at picnic area. [LCA, 4/96]

Figure 81, *right*. Interpretive sign adjacent to HS-1. [LCA, 4/96]



Figure 82. Movable history and nature trail interpretive marker. [LCA, 7/97]

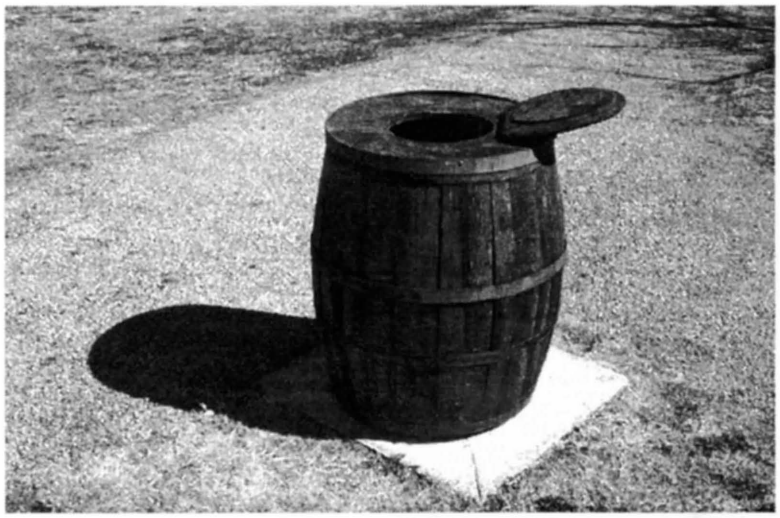


Figure 83. Barrel trash receptacle adjacent to entry walk. [LCA, 4/96]



Figure 84. Cabinet bench at HS-1. [LCA, 4/96]



Figure 85. HVAC equipment adjacent to entry walk. [LCA, 4/96]



Figure 86. Non-historic small-scale features behind HS-8. [LCA, 4/96]



ANALYSIS

Analysis

Significance

Fort Larned is significant in American history and the design of nineteenth-century frontier military forts, and relates to the historic context of American westward expansion. The Fort Larned National Historic Site possesses significance for the period 1868–1878 as one of a network of forts that played a major role in protecting the Santa Fe Trail and in expanding westward commerce. Fort Larned was associated with the development of the Plains region when first wagon trains, and then railroads, opened the American West to commerce and settlement. Fort Larned occupied a strategic location on the Pawnee River near an important trail junction. For a period of time during the nineteenth century, no wagon trains could travel west of Fort Larned without an armed military escort. This directive made the fort extremely important in westward travel and commerce. The period of active military operation for the fort also coincides with the major period of initial settlement and agricultural development of the Kansas prairie. The landscape that exists at Fort Larned today is inextricably linked with the history and development of the site between 1868–1878 and the frontier history of Kansas.

The period of significance for this landscape extends from 1868 to 1878, representing a major period of the fort's operation. This period commences in 1868 when the majority of Fort Larned's second period of development was complete, and extends through 1878 when the military period ended and the fort was left in the care of a guard force. Although Fort Larned was first developed on this site in 1860, no major above-ground buildings or structures from the early fort survive today. There are some archeological resources associated with the earliest occupation of this site, but their presence is not sufficient to support an earlier period of significance.

Both the fort's most intense period of occupation and activities associated with its historical significance and its major period of physical development related to extant resources (1868–1878) are contained with this period of significance. The NHS period of interpretation of 1868–1878 coincides with this period of significance.

The National Register of Historic Places lists properties that possess "quality of significance in American history, architecture, archeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
B. that are associated with the lives of persons significant in our past; or

C. that 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. that have yielded or may be likely to yield information important in prehistory or history."

Fort Larned meets the criteria A, C, and D.

Criterion A

Fort Larned is associated with events that have made a significant contribution to the broad patterns of American history. The fort played a significant role in the history of American westward expansion during the 1860s and 1870s. Although Fort Larned was never the focus of a famous or dramatic event, it existed as part of a system of forts that contributed to American westward movement, settlement, and commerce. It was also the most significant military post on the eastern portion of the Santa Fe Trail. The fort was used as a place for Native American encampments when it served as an annuity distribution point for members of the Cheyenne, Arapaho, and Plains Apache tribes during the 1860s. The fort also was associated with major conflicts between U.S. troops and Native Americans, such as the Plains War of 1864, as well as peacekeeping initiatives. The fort also is significant for its associations—not with famous or individually significant individuals—but with the numerous but largely anonymous soldiers, emigrant travelers, merchants, Native Americans, and others whose lives were affected by the establishment and operation of the fort.

Criterion B

Many famous and significant Native American and U. S. military leaders visited Fort Larned but none had a major association with the fort that affected either the fort or their military careers. These individuals include Satank, Black Kettle, George Custer, Kit Carson, J. E. B. Stuart, Philip Sheridan, Winfield Scott Hancock, and many others. These associations are minor and do not appear to make a case for eligibility according to Criterion B.

Criterion C

Fort Larned possesses a significant collection of well-preserved and restored sandstone buildings that embodies the distinctive characteristics of nineteenth-century, military frontier architecture; as such, it is an excellent example of its type. The collection represents a significant and distinguishable grouping of masonry buildings arranged as a quadrangle that defines the fort's central parade ground. It is the assemblage and arrangement of these buildings in a military landscape, rather than any one individual building or other feature, that makes the historic fort complex significant as a cultural landscape.

Criterion D

The Fort Larned landscape has yielded and is likely to yield information important in prehistory and history. The site retains both structures and sites of archeological value. These structures and sites reveal information concerning the design and function of the fort during the period of significance; they also provide some evidence of the pre-1868 period for which there is no above ground evidence surviving. Future archeological investigations and studies would be expected to reveal additional information about the landscape. Such information could be expected to continue to inform an understanding of the site's cultural landscape and its evolution.

Integrity Evaluation and Character-defining Features

The Fort Larned landscape retains integrity because its existing landscape possesses the general character and much of the feeling that existed during the period 1868–1878; some of its integrity is attributable to NPS restoration and reconstruction efforts. It no longer retains integrity for the 1860–1868 period, however, since very little of the fort's initial development is evident today. Although some features from the 1868–1878 period either are no longer extant, have been modified, or have evolved over time, the major characteristics and essential character-defining features of that landscape are present today. Nevertheless, the site possesses some integrity deficiencies. It is anticipated that many of these can be addressed through preservation treatments, including restoration and reconstruction, and that others can be addressed through cultural landscape interpretation. Implementation of the overall rehabilitation treatment recommended in this CLR can be expected to enhance the fort's integrity of feeling.

Evaluation of Aspects of Integrity

The National Register of Historic Places has identified seven aspects of integrity that may be present in an eligible property. These include integrity of association, location, design, materials, workmanship, feeling, and setting. An overall evaluation of integrity based on the National Register's seven aspects of integrity follows.

Association

The Fort Larned landscape possesses integrity of association. It is closely associated with the Santa Fe Trail and the events and activities that occurred on and adjacent to the site during the period of significance. The fort also has adequately represents the frontier military themes associated with its 1868–1878 use as an active fort.

Location

Fort Larned occupies its historic site and possesses integrity of location. This integrity is diminished somewhat by the absence of many above-ground buildings, structures, and landscape features that have been lost from the site since the period of significance. The fact that some of these features have been identified as archeological resources enhances integrity, as does the fact that in most cases these features are simply missing above ground and no replacement features occupy their original locations. In addition, the fort's relationship to the Pawnee River has not changed. The location of the trail between the river and the Santa Fe Trail remains identifiable and enhances integrity of location.

Design

Integrity of design is essential for the fort to represent its significance as a nineteenth-century fort intended to provide protection for the growing commercial interests of the nation. The Fort Larned site reflects many aspects of its historic military design, particularly the character-defining layout and arrangement of the sandstone buildings and parade which give the fort its distinct identity. The fort layout is characteristic of nineteenth-century fort designs with the majority of its buildings arranged and oriented towards the parade ground with the symbolic American flag at its center. These buildings form and define the quadrangle of the parade. The parade was the focus of formal military life and is evident still as the dominant characteristic of Fort Larned today. The defining spatial organization of the parade's perimeter buildings still exhibits its original hierarchical

arrangement characteristic of military installations with its row of officers' quarters at the west end of the quadrangle, the barracks at the north, and service buildings at the east and south ends. The fort's shops, commissary, and storage buildings located as they were at the south end of the quadrangle were conveniently located nearer the Santa Fe Trail while the barracks and officers' quarters were nearer the Pawnee River. Other less important and auxiliary structures were sited outside the quadrangle in keeping with traditional military design traditions. Although auxiliary buildings and structures are not well represented today, the fort still represents its highly formal organization within the traditional quadrangle of the parade.

Materials

Integrity of material is derived largely from the survival and restoration of the character-defining stone buildings that form the historic quadrangle. The fort's original adobe buildings have vanished; major buildings of this temporary construction material used for the fort's early structures were replaced with more substantial structures built of locally available sandstone. Auxiliary buildings of adobe did not survive into the twentieth century and none have been reconstructed. The use of stone for the fort's major buildings symbolized the strength of the United States military presence in this region. The fort was identifiable to all, and perhaps—particularly to Native Americans—as a substantial military installation. There is less integrity of material for vegetative features. The riverbank today is wooded as it was at the time of fort establishment, but has little of the nearly bare character it possessed during 1868–1878. Integrity, however, is more apparent within the traditional fort core and parade. While not historic material, the restoration of the prairie with appropriate vegetation and the parade with buffalo grass and gravel walks enhances integrity of material for this site.

Workmanship

Restoration of the sandstone buildings does not appear to have diminished the character of historic workmanship associated with the site. The survival even of the historic graffiti on the sandstone walls is an indication of integrity of workmanship. Apart from the workmanship associated with architecture, however, integrity of workmanship is not especially strong for this site. In addition, most auxiliary structures are not extant; the survival and reconstruction of major fort buildings and structures probably represents a higher degree of quality in workmanship than would have been present for auxiliary structures. Landscape maintenance with current management practices and technologies also result in a landscape that is more highly maintained and manicured than that apparent in nineteenth-century photographs. Although the historic intention was most certainly to maintain the fort to military standards, the reality was that prairie conditions and constant use resulted in a parade that was sparsely vegetated and that alternated between dusty worn patches of bare earth and muddy puddles, depending on weather conditions. Today's evenly mowed, green parade contrasts with that nineteenth-century pattern.

Feeling

Fort Larned retains much of the historic feeling within the enclosure of the quadrangle. There is also strong integrity of feeling when viewed from a distance as a defined complex of buildings punctuated by a high-flying flag. Integrity of feeling, however, is diminished most by the absence of the many auxiliary support structures of frame and adobe construction that were essential to the operation of the fort. Similarly the absence of activity associated with operation of the fort and the sights, sounds, smells, and other qualities of fort life diminishes integrity of feeling.

Setting
Fort Larned's environs have changed and evolved since the period of significance. Today, twentieth-century agricultural operations are visible in middle-ground and background views from the NHS. Similarly, the river—which was watered historically—is sometimes dry. During the decade 1982–1992, the number of days during which the Pawnee River flowed never exceeded 25%. In the years 1993–1996, however, the river has been recorded as flowing between 50% and 85% of the year.[1] These fluctuations in the river environment have altered vegetation in this vicinity as well as wildlife habits and habitat. The increase in river flow in more recent years contributes to integrity of setting for at least part of the year; should flow rates again fall to the previously recorded lows, integrity of setting would be diminished to a substantial degree. The NHS, however, still retains an overall integrity of setting with its rural—rather than urban or suburban—site.

Character-defining Features *(Exhibits 11a and 11b)*
The landscape is an important aspect of the fort's design and character; it provides its physical setting as well as the geographic context for its location. The fort experienced many changes following its deactivation; it was adapted first to a stockbreeding operation and then to a large, family-owned ranch. The changes associated with both post-military uses have been removed by NPS so that the site could represent its historical fort function. The fort landscape as it exists today possesses character-defining features and qualities associated with its period of significance. These include

- the unmistakable organization of a frontier fort responding to a prairie and riverine environment;
- the historic linear, hierarchical and utilitarian arrangement of buildings comprising the quadrangle;
- the clearly defined parade ground, with its gravel perimeter and cross walks and buffalograss turf;
- a major visible point of identity—the central flagpole with its 37-star American flag; and
- restored representations of a number of historic uses, although many specific land uses are no longer represented;
- a number of known archeological resources that enhance an understanding of the development and layout of the fort;
- historically appropriate prairie vegetation adjacent to the fort's historic core;
- rural landscape context with few structural intrusions;
- expansive views both into and out of the fort.

Features documented in the existing conditions portion of this work as well as historic features identified through historic research have been assessed as contributing, reconstructed, missing, or non-contributing.

[1] U.S. Geological Survey data from Gauge location T21S - 21W - S21, provided by Fort Larned NHS staff.

Contributing Features

Barracks (HS-1)
Barracks (HS-2)
Shops Building (HS-3)
New Commissary Storehouse (HS-4)
Old Commissary Storehouse (HS-5)
Quartermaster Storehouse (HS-6)
Officers' Quarters (HS-7)
Commanding Officer's Quarters (HS-8)
Officers' Quarters (HS-9)
Parade Ground (LCS #48)
hospital wagon at HS-3
12-pounder mountain howitzer at parade ground

Reconstructed Features

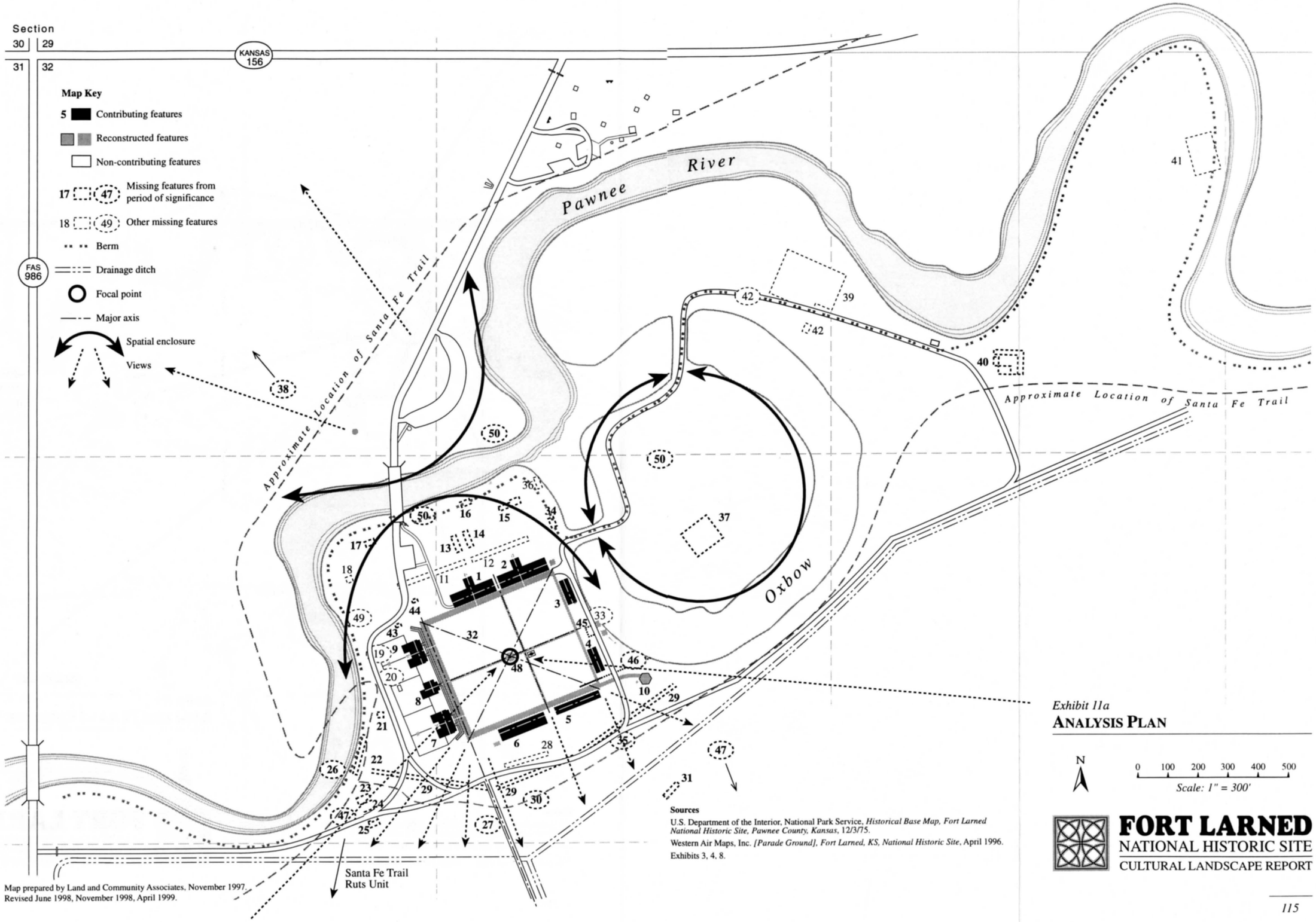
tepee at entrance road
well houses behind HS-1, HS-2, HS-7, and HS-9
privies behind HS-7 and HS-9
Blockhouse (HS-10)
Flagpole (LCS #32)
sweatbox adjacent to HS-10
gravel walks at parade
timber tent platforms and tents: 1) east of HS-2; 2) northeast of HS-4
hitching poles and line northeast of HS-4
benches (7) at HS-1, HS-2, and HS-7
cabinet benches (3) containing fire hoses at HS-1, HS-2, and HS-7
drainage channel at east corner of parade ground
bootscrapers (plain at HS-7 and HS-9, fancy at HS-8)
escort wagons: 1) at oxbow between HS-3 and HS-4; 2) west of HS-6
post-and-rail fencing at Officers' Row
boardwalk at Officers' Row
privacy fencing at Officers' Row

Missing Features from the Period of Significance

Laundress Quarters (#13)
Laundress Quarters (#14)
Hospital (Ordnance Sergeant's Quarters) (#15)
Sink (Privy) (#16)
Sink (Privy) (#17)
Icehouse (#21)
Sutler's Corral and Stables (#22)
Sutler's Store (#23)
Sutler's Mess Room (#24)
Sutler's Residence (#25)
Bridge (#26)
New Sutler's Store (#27)
Field Entrenchments (#29)
Teamster Quarters (#30)
Corral (#31)
Hospital Steward's Quarters (#34)
Stable (#35)
Old Cemetery (#37)
New Cemetery (#38)
Mail Station (#40)
Adjutant's Office (#43)
Wash House (#44)
Guardhouse Foundation (#45)
Drainage Systems (#46)
Dumps (#47)
Gardens (#50)

Other Missing Features

Commissary Storehouse and Barracks (LCS #11)
Quartermaster Storehouse and Barracks (#12)
Meathouse (#18)
Storehouse (#19)
Carpenter and Blacksmith Shop (#20)
Officers' Quarters (#28)
Guardhouse (#33)
Bake Shop (#36)
Corral (#39)



Map prepared by Land and Community Associates, November 1997.
Revised June 1998, November 1998, April 1999.

Sources

U.S. Department of the Interior, National Park Service, *Historical Base Map, Fort Larned National Historic Site, Pawnee County, Kansas*, 12/3/75.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Exhibits 3, 4, 8.

Exhibit 11a

ANALYSIS PLAN

N

0 100 200 300 400 500

Scale: 1" = 300'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

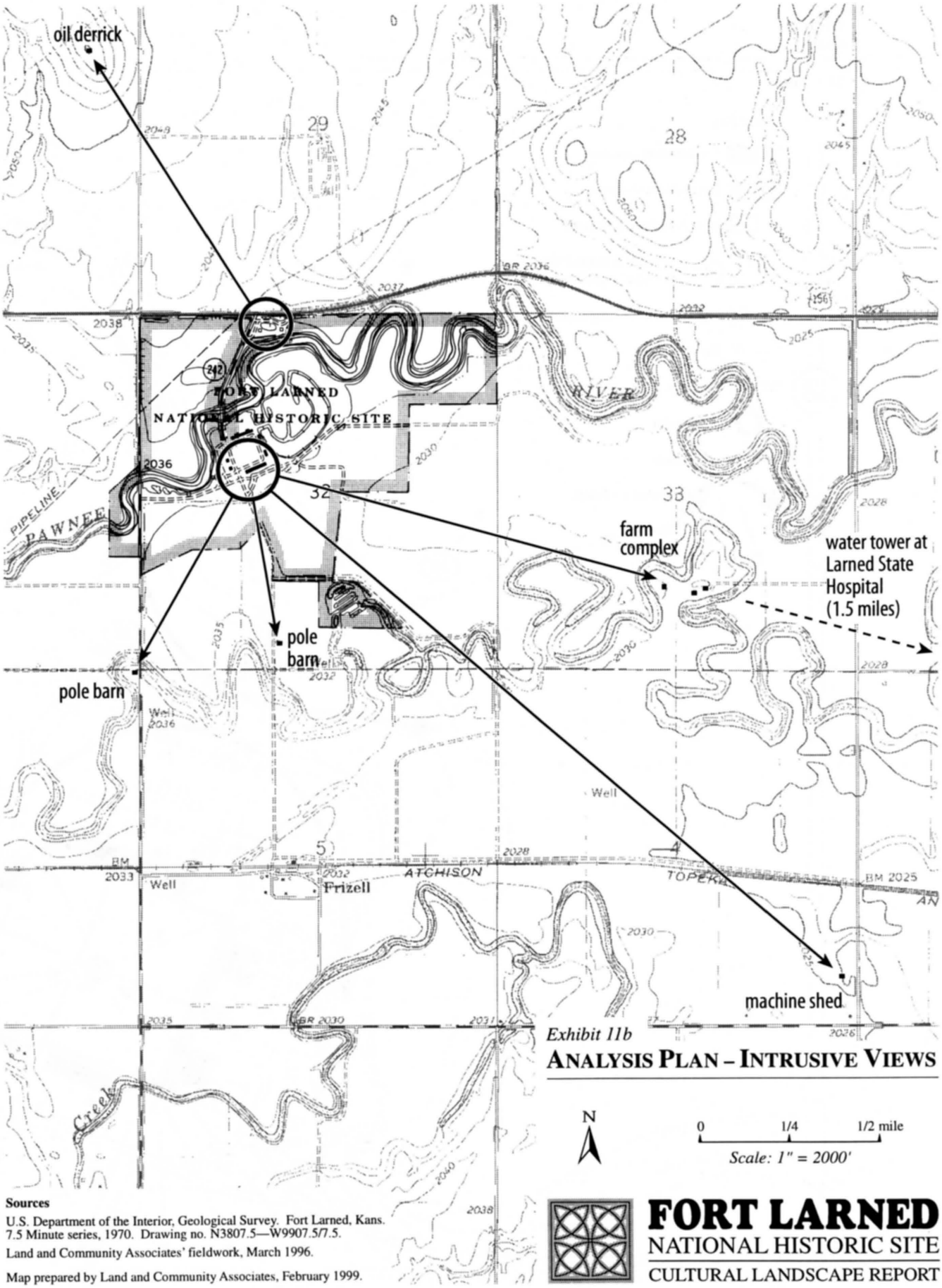


Exhibit 11b

ANALYSIS PLAN – INTRUSIVE VIEWS

N

0 1/4 1/2 mile

Scale: 1" = 2000'

Sources

U.S. Department of the Interior, Geological Survey. Fort Larned, Kans. 7.5 Minute series, 1970. Drawing no. N3807.5—W9907.5/7.5.

Land and Community Associates' fieldwork, March 1996.

Map prepared by Land and Community Associates, February 1999.

FORT LARNED
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Beef Corral (#41)
Adobe Shanties (3) (#42)
Dugouts (#49)

Non-contributing Features

Fort Larned picnic area sign
roads, paths and parking area at picnic area
restroom building at picnic area
exhibit shelter at picnic area
picnic shelters and tables at picnic area
historic marker at picnic area
Fort Larned NHS sign at entrance road
park entrance road*
temporary visitor parking area and pedestrian walk*
admissions kiosk*
highway bridge north of fort*
bridge on County Road FAS 986
maintenance building, yard and entry road*
volunteers' trailer pads at maintenance facility*
Santa Fe Trail Ruts sign
fencing, path and parking area at trail ruts
viewing platform at trail ruts*
Fort Larned sign southeast of entrance road bridge abutment*
interpretive signs for 1) well, adobe hospital; 2) Officers' Row
interpretive trail
shelter at interpretive trail
numbered interpretive posts
bicycle rack at entrance road bridge abutment*
barrel trash receptacles (throughout)
rope-and-stanchions at HS-3 (temporary)
stormwater drains and grates at entrance road bridge*
drop inlets and grates southeast of entrance road bridge abutment*
residential drop inlets and grates in rear yards of Officers' Row*
concrete pads and HVAC equipment northwest of HS-1*
below grade fire hydrant and water shut-off boxes (8) at perimeter of parade ground*
sand filter drainage hatch next to HS-5*
water valve manhole behind HS-5*
hatch to below-grade 100,000-gallon concrete fire protection reservoir behind HS-5*
wood vent cover housing behind HS-5*
water pumps and gravel drains (2) at rear yards of HS-7 and HS-8*
residential gas meter at rear of HS-8*
concrete pad and HVAC condensing unit at rear yard of HS-8*
raised concrete slab well cover at rear yard of HS-8*
"Colonial"-style lamp-post at rear yard of HS-8*
Pawnee River sign at south end of entrance road bridge*
authorized vehicle signs (2) at north and southwest service roads
rain gauge on fence behind HS-9
mail box on fence behind HS-8*
concrete slab at rear yard of HS-8*
view to pole barn on FAS 986*
view to pole barn at south farm road*
view to machine shed southeast of fort*
view to farm complex and water tower east-southeast of fort*
view to oil derrick northwest of NHS entrance*

* These features not only post-date the period of significance, but also diminish historic character.



TREATMENT RECOMMENDATIONS

Treatment Recommendations

Rehabilitation as a Treatment Approach

Research and assessments undertaken for this CLR support rehabilitation as the recommended landscape treatment approach. Rehabilitation can reinforce and facilitate interpretive efforts to evoke—but not re-create—the landscape of the fort's period of significance, 1868–1878, provide an accessible site for visitors, and use and interpret the site's extant cultural landscape resources. Past treatments of both the buildings and landscape of the Fort Larned National Historic Site have included the full range of preservation treatments currently recognized by NPS as appropriate for historic resources. These approaches include preservation, rehabilitation, restoration, and reconstruction. Although a number of extant cultural landscape features and qualities exist at the NHS, the number, distribution, and locations of identified non-extant cultural landscape features would make an overall treatment approach of restoration or reconstruction inappropriate. In addition, there is a need to provide universal accessibility and to improve circulation and parking. As a result, rehabilitation appears to be the most appropriate cultural landscape treatment approach to meet these needs and to avoid restoration or reconstruction that would be based on conjecture or incomplete information.

Plans for a New Visitor Center

Rehabilitation is consistent with current NPS plans to develop a new visitor center. In addition once a new visitor center is in place, there are enhanced opportunities within the overall NHS and, specifically, within the historic core for meeting cultural landscape goals, achieving universal accessibility, and improving the existing circulation and parking.

Treatment Issues

A number of specific issues relating to the management and treatment of the Fort Larned cultural landscape emerged during the pre-planning and planning meetings with NHS staff and as an outgrowth of the CLR process. The following discussions present a broad statement of some of these specific issues and establish the philosophical basis for related specific treatment recommendations.

Visual Intrusions

Significant changes have occurred within the historic viewshed of the fort since the period of significance. Owing to the fort's general orientation to the south, changes in this area are particularly apparent from the historic core. For the most part, however, the evolution has been within a rural context, and the present land uses largely represent those of family-scale agricultural practices. Nevertheless, views of agricultural structures visually intrude and interrupt what was historically a prairie scene *(Exhibit 11b)*.

One of the most conspicuous differences in the present landscape from its historic environmental conditions is the dominance and proliferation of trees. Historically, the only large-scale vegetation would have been associated with river corridors. With the Arkansas River some eight miles to the south of the fort, the viewshed from the fort historically would have been one of far more open prairie. Since it is unlikely that there will be widespread clearing of windbreaks and other significant vegetation in the fort vicinity, it is reasonable to acknowledge and accept the existing vegetative character of the surroundings. Instead, treatment efforts can focus on removal or mitigation of the visual effects of more specific intrusions such as large-scale buildings and utility structures.

In fact, adding additional coniferous trees in characteristic windbreak groupings may actually be effective in screening the most visually prominent agricultural structures. Although modern vegetative screening of distant structures could be misinterpreted as part of an accurate historic setting, it can also provide the fort and its environs with a greater degree of separation from contemporary agricultural land uses. Vegetation may be more easily ignored at a distance whereas structures are more likely to interrupt and obviously intrude into what would have been a prairie landscape during the period of significance. There are limits, however, to the appropriate use of vegetative screening. Tall pines and large clumps of deciduous trees are no more historic than the barns and other structures they would be used to block. Vegetative screening will be most appropriate and appear least intrusive when it is an extension of established riparian corridor vegetation. Other non-vegetative means of screening undesirable views from the historic core may occur in the foreground through the use of interpretive objects and other historic or reconstructed features.

Since there are currently only five objectionable views from the NHS, four of which are visible from the historic core, it is appropriate to consider individual approaches and strategies in dealing with each intrusion. Management, however, needs flexibility in developing and implementing adjacent land strategies. Some techniques other than screening should be explored to manage the fort's viewshed. These strategies may cover a broad range of techniques and could include but not necessarily be limited to easement acquisition and working cooperatively with property owners to limit or prevent the construction of new features that may be visually intrusive. Cooperative arrangements with neighboring property owners may provide viable solutions through the use of less conspicuous building form, massing, and color schemes. In addition, NPS could consider offering limited design assistance to nearby property owners.

Major Archeological Concerns

Although this CLR has been developed without benefit of a concurrent archeological component, a number of archeological concerns have been identified during the CLR process. In some instances these concerns have influenced or limited the range of landscape treatment options that could be considered. Additional archeological research and investigations would inform decisions regarding the proposed treatment recommendations. Archeological research and investigations will be necessary before implementing some recommendations. For example, the present grade of the parade is now several inches higher than it was during the period of significance. Consequently the historic road surface of the company streets—still extant below the present road surface—has been overlain by several inches of soil and paving materials that have built up during the intervening years. Information from NPS personnel indicates that this deposition is inconsistent:

the extent of additional material appears to be higher on the north side of the parade than on the south side. This condition limits treatment options and complicates implementation of accessibility improvements for company streets since extensive excavation could threaten the integrity of subsurface resources.

Circulation Improvements and Alterations

In keeping with the recommended treatment approach of rehabilitation to better represent the fort's period of significance, only essential non-historic circulation to and within the historic core is appropriate. A number of the changes related to vehicular circulation are dependent upon development of the new visitor center on the north side of the Pawnee River and associated road alterations. Removal of the highway bridge, in particular, will represent a significant improvement in the historic appearance of the fort.

Much of the circulation associated with the period of significance, although having an appropriate historic appearance, does not function well during or following precipitation or for visitors using wheelchairs. Emergency vehicular access to and within the historic core will have to rely on such circulation routes without compromising their historic appearance. Other non-historic pedestrian circulation is either incompatible in appearance with that of the historic period or does not promote universal accessibility. The use of a paving material such as asphalt or chip and seal bituminous paving makes it possible to provide stability and accessibility while drawing a distinction between historic and non-historic circulation through the use of surface aggregates of different colors and textures. The use of soil consolidants or stabilizers may present an additional opportunity to provide improved accessibility for the history and nature trail and as an alternative surface treatment for secondary circulation throughout the NHS.

Universal Accessibility

The Uniform Federal Accessibility Standards (UFAS) set guidelines for facility accessibility by physically handicapped persons for Federal and federally funded facilities. None of the buildings at the NHS currently meet the UFAS for facility accessibility by physically handicapped persons for Federal and federally funded facilities. The standards call for at least one accessible entrance to each accessible building, facility, element, and space that is on the site. The standards are to be applied during the design, construction, and alteration of buildings and facilities. Provisions may be made to accommodate special circumstances encountered in historic structures, as provided in UFAS Section 4.1.7 "Accessible Buildings: Historic Preservation."[1] The buildings and grounds of Fort Larned National Historic Site qualify (i.e., are eligible for listing in the National Register of Historic Places) for such treatment, and may be granted variances with regard to the requirements of the UFAS.

The goal of the preliminary design recommendations for accessibility contained herein is to provide universal accessibility to the NHS historic buildings and interpretive areas. The Fort Larned

[1]Under this section, comments regarding any alteration to a *qualified* historic building must be obtained from the UFAS Advisory Council on Historic Preservation when required by Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800). This is to ensure that qualified buildings and facilities (those that are eligible for listing in the National Register of Historic Places) would not be threatened, or their historic significance destroyed, by compliance with requirements for accessible ramps, entrances, toilets, parking, displays, and signage. Special, alternate solutions or exceptions to the requirements may only be utilized following a written determination by the Advisory Council that a particular requirement would threaten the historic integrity of the qualified building or facility.

General Management Plan, Development Concept Plan, and Interpretive Prospectus outlines a portion of the National Park Service Management Policies as follows:

- Modifications to historic structures will be made to provide the highest feasible level of physical access to historic properties for disabled persons.
- Modifications must be consistent with the preservation of the properties' significant historical attributes.
- Modifications for access will be designed and installed to least affect the features of a property that contribute to its significance.
- Some impairment of some features will be accepted in providing access.
- If access modifications to particular features will destroy a property's significance, such modifications will not be made.[2]

It should be acknowledged that implementation of the UFAS will have a significant impact not only on the appearance of the historic buildings at the fort but also on the cultural landscape. Once these alterations are implemented, the view of the fort's historic buildings from the parade will differ from that present during the period of significance. These proposed alterations are designed to be reversible and clearly will be evident as products of their own time installed in response to the contemporary desire to make the site more accessible.

The development of the new visitor center will integrate handicapped parking within the overall visitor parking area. All visitor center facilities and circulation to the historic core will be universally accessible for all visitors. Many of the circulation improvements described in the previous section will address issues of universal accessibility.

Improving Site Drainage

Inadequate site drainage within the historic core of the NHS poses numerous problems, both for pedestrian circulation and for the structural integrity of buildings. The ground plane of the fort, and particularly of the central parade ground, is essentially flat and does not drain well during periods of heavy rain. This results in the surface water percolating into the earth rather than draining to areas of lower elevation, and serves to maintain a relatively high water table in the surrounding area.

The high water table, porous stone, and the lack of foundation waterproofing or drainage systems at and in the vicinity of the original sandstone buildings cause potential for significant damage. Persistent conditions include damaged interior plaster due to moisture penetration, undermined foundation walls in the basements of the Officers' Quarters, and damp conditions in crawl spaces leading to deterioration of wood structural framing members.

Measures are to be taken to reduce further damage to the historic structures by retarding the water penetration into the stone and alleviating the presence of water around the foundations. Installation of a foundation drainage network should be part of a more comprehensive drainage approach providing for adequate site drainage at key locations within the fort.

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[2]U.S. Department of the Interior, National Park Service, Denver Service Center, *General Management Plan Amendment, Development Concept Plan, Interpretive Prospectus* (Denver, Colorado, 1994), 23.

Historic Vegetation and Prairie Management

Site vegetation was much less dense during the period of significance than it is today since the utilitarian need for firewood resulted in an almost total loss of trees from the site—including its riparian areas. Photographs dating from the years immediately following the period of significance indicate that the parade ground was devoid of trees. Although current visitors have become familiar with the fort's "greener" landscape character developed during the NPS era, restoring the parade ground to its historic, treeless appearance is more consistent with other rehabilitation and interpretive efforts. While emphasizing historic values in the character of the landscape, however, is generally more important than the practical benefits afforded by vegetation, retaining the present vegetation along the Pawnee River corridor seems warranted. The dense tree and understory growth not only provides the historic core with important screening from more recent landscape development—including that of the new visitor center—but its retention also is in keeping with sustainable landscape practices being adopted throughout NPS.

As with any cultural landscape, plant materials are expected to grow and change over time. This is particularly applicable to vegetation in the individual yards of Officers' Row, where the photographic record indicates that trees had been planted during the period of significance. At least one extant cottonwood—now over-mature and in decline—may have been planted as part of such beautification efforts. As a result, recommendations have been developed that acknowledge this dynamic character while attempting to reestablish missing but known historic vegetation.

The process of reestablishing prairie grasses and forbs in areas adjacent to the historic core has been informed by the results of a recent sod analysis identifying additional plant species that would have been present during the period of significance. These efforts have been successful, resulting in vegetation that is both sustainable and evocative of historic conditions. Concerns now shift to implementing effective prairie management policies such as periodic burning or haying.

Control of Pocket Gophers and Prairie Dogs

Within the historic core, the plains pocket gopher *(Geomys bursarius)* and its burrows—and to a lesser degree, the thirteen-stripe ground squirrel *(Citellus tridecemlineatus)*—present a significant maintenance and safety problem. The mounds (12"–18" in width and up to 6" in height) associated with pocket gophers and the holes associated with both are apparent on the parade ground and in other turf areas within the fort. The earth mounds pose an impediment to visitor circulation and a hazard to mowing equipment and operators. Pocket gopher and ground squirrel burrows may also threaten the structural integrity of berms, levees, and other flood control earthworks. The animals themselves have been known to chew through underground electrical lines and other subsurface utilities. Burrowing by gophers also has been responsible for the excavation and displacement of archeological artifacts, particularly in the rear yards of the officers' quarters. While pocket gophers may prove beneficial in some environments by increasing soil fertility and aeration, promoting better water infiltration, and reducing soil compaction, their detrimental effects are certainly more pronounced within the setting of the fort. Although ground squirrels were native and common in western Kansas during Fort Larned's period of significance, there is no known historic reference to them or pocket gophers having been present at the fort. In keeping with the recommended overall landscape treatment approach of rehabilitation, relocation or eradication of pocket gophers and ground squirrels in areas of historic significance and archeological sensitivity is therefore warranted.

A similar problem exists at the Santa Fe Trail Ruts unit of the NHS, where the black-tailed prairie dog *(Cynomys ludovicianus)* has established an extensive colony. Although the CLR process has addressed the issue of prairie dogs, this issue warrants continued and more focused attention than the multifaceted CLR can provide. More study by animal ecologists, biological resource specialists, and others is needed not only to determine the extent of potential effects of prairie dogs on the trail ruts but also concerning the potential designation of prairie dogs as an endangered specie. Should the prairie dogs be reclassified as endangered, treatment options will be more limited.

The current concern with the prairie dogs is that the animals' continued foraging and burrowing activities and that resultant erosion will damage the extant trail ruts. The prairie dogs' presence may have historical associations with the Santa Fe Trail. The extent of their populations during the period of significance is not known. Regardless of their presence historically, the current situation is that the actual trail ruts represent the primary historic resource of that portion of the NHS. As a result, protection of the trail ruts is a priority. In this instance wildlife and cultural resource protection goals may be in conflict. Innovative strategies for prairie dog removal may need to be developed to afford both resources the protection they require.

Past efforts to control the prairie dogs have included poisoning, shooting, and suction capture. Except for poisoning, none of these approaches has proved effective, and the costs associated with the latter were deemed too expensive for a colony of this size, estimated at about 260 dogs.[3] More recent concerns about the historic decline of the prairie dog ecosystem regionally and the animals' role in supporting biodiversity have focused attention on efforts to stem additional loss of habitat resulting from agricultural practices, urbanization, and disease.

Fort Larned represents one of only two prairie dog populations at NPS sites within the historic range of the black-tailed prairie dog that is not threatened by sarcoptic (bubonic) plague.[4] Consequently, there is currently greater interest in relocation rather than eradication as a means of controlling the effects of prairie dogs. At the same time, there is an awareness that not only erosion but also deposition—particularly from adjacent agricultural lands—may threaten the ruts as much as the prairie dogs, and that additional monitoring is necessary to develop comprehensive protection strategies for these historic resources.

Cultural Landscape Management Zones

NPS personnel have established and currently use a system of twelve management sub-units of the NHS. Two of these units correspond to the historic core and the Trail Ruts unit; the majority, however, identify areas of reconstructed prairie. These sub-units have provided the basis for a more comprehensive division of the NHS into seven cultural landscape management zones that have similar characteristics and management needs *(Exhibit 12)*. The boundaries of some of the original sub-units have been combined, sub-divided, or adjusted somewhat to reflect historic land uses, physical evidence of significant features, or other site characteristics. The following cultural landscape management zones provide an organizational framework for the specific treatment recommendations that are presented later in this chapter:

[3]Glenn Plumb, Ph.D. and Gary Willson, Ph.D., "Black-Tailed Prairie Dog Inventory and Monitoring in the National Park Service," draft report, 2/28/97, table 3.
[4]Glenn Plumb, Ph.D., presentation at Black-Tailed Prairie Dog Workshop, Fort Larned, Kansas, July 1, 1997.

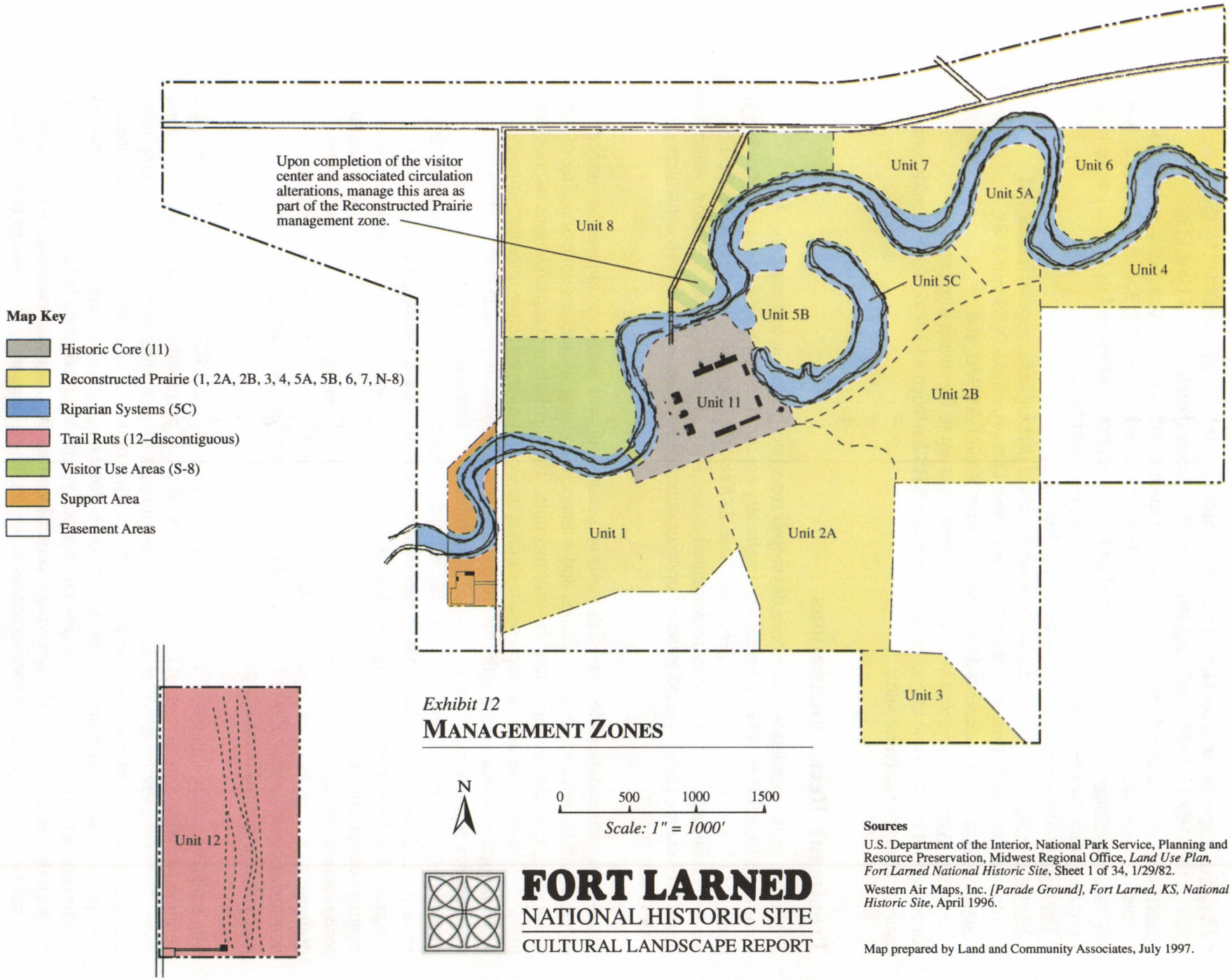


Exhibit 12

MANAGEMENT ZONES

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

Sources

U.S. Department of the Interior, National Park Service, Planning and Resource Preservation, Midwest Regional Office, *Land Use Plan, Fort Larned National Historic Site*, Sheet 1 of 34, 1/29/82.

Western Air Maps, Inc. *[Parade Ground], Fort Larned, KS, National Historic Site*, April 1996.

Map prepared by Land and Community Associates, July 1997.

- Historic Core – the area containing the extant historic fort buildings, bounded by the Pawnee River, the Oxbow, and the existing irrigation ditch (corresponds to NPS Unit 11);
- Reconstructed Prairie – those areas planted and maintained as reconstructed prairie, some of which include archeological resources (includes NPS units 1, 2A, 2B, 3, 4, 5A, 5B, 6, 7, N-8)
- Riparian Systems – the Pawnee riverbed and banks, and the Oxbow and its banks, owing to its origins rather than its present character (includes NPS unit 5C);
- Trail Ruts – the discontiguous, 44-acre Trail Ruts unit;
- Visitor Use Areas – the picnic area, temporary visitor parking area, approach road and embankments, and future visitor center development area (includes NPS unit S-8);
- Support Area – non-easement area west of County Road FAS 986; and
- Easement Areas – lands held in scenic easement adjacent to fee ownership property.

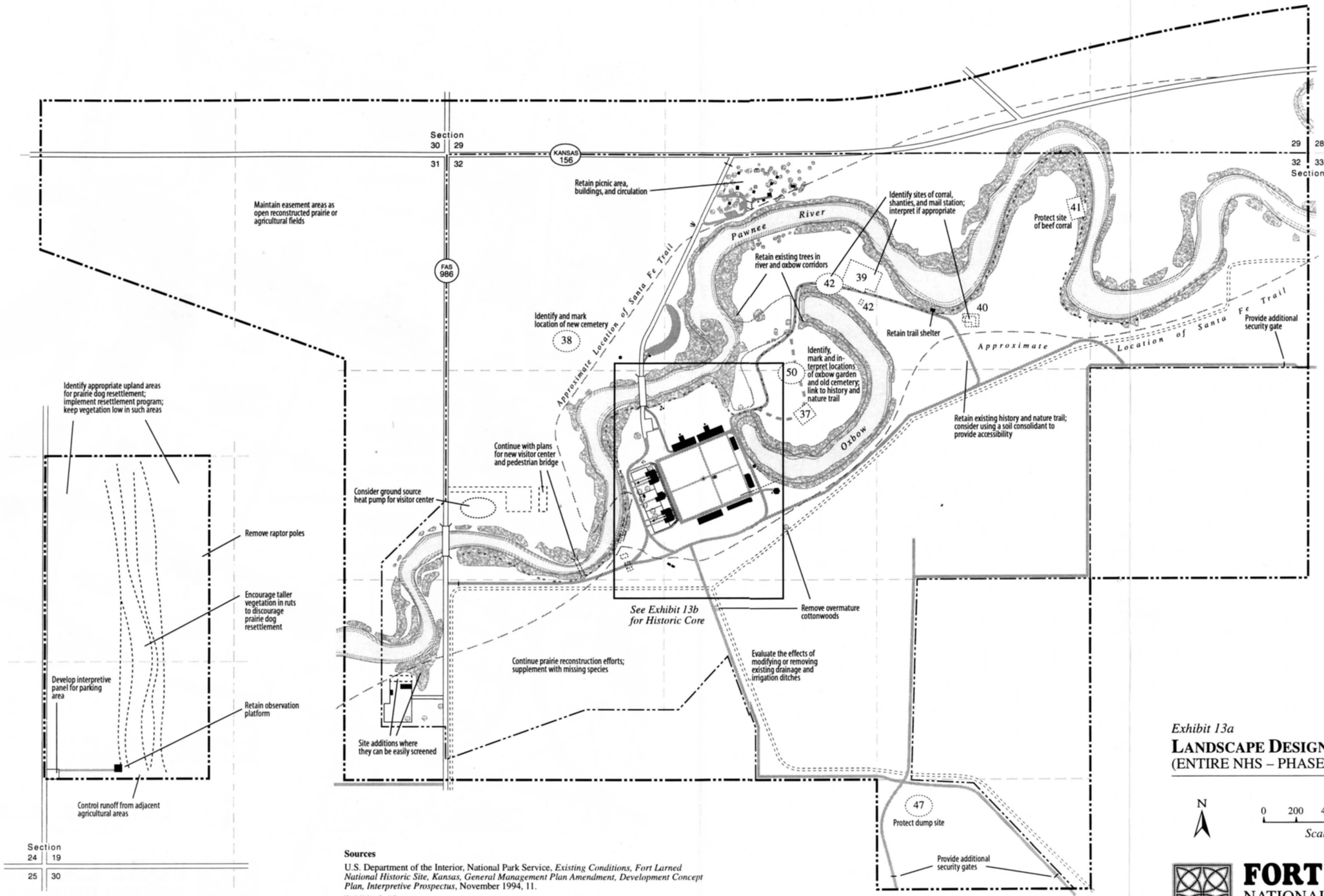
An additional overall zone encompassing the entire NHS has been added to facilitate addressing issues relating to the entire site.

Treatment Recommendations

Treatment recommendations have been developed for a two-phase implementation. All recommendations that can be represented graphically are indicated on a series of landscape design plans for Phase 1 *(Exhibits 13a, 13b)* and Phase 2 *(Exhibits 14a, 14b).* In general, Phase 1 recommendations can begin to be implemented as soon as budgets and schedules allow while most Phase 2 recommendations are dependent upon or intended to be coordinated with construction of a new visitor center.

Phase 1 recommendations for the NHS focus on general cultural landscape approaches intended to enhance and improve existing conditions and enhance the visitor awareness understanding of the entire cultural landscape, including the trail ruts unit. They include recommendations to consider historic reconstruction as an interpretive technique as well as more effective interpretation of archeological resources outside the visitor center setting. Proposals include such landscape maintenance recommendations as removal of non-historic vegetation, planting of new plant material—primarily to screen objectionable internal and external views, and continuation of the present prairie reconstruction. Phase 1 recommendations also favor landscape management practices that discourage prairie dog settlement and address the need for appropriate strategies to control both prairie dog and pocket gopher populations. Within the historic core, Phase 1 treatment recommendations incorporate proposals to protect building fabric by improving underground drainage as well as establishing a hierarchy of paving materials to distinguish between historic and non-historic circulation. Phase 1 circulation proposals generally are limited to improving universal accessibility to historic buildings.

The landscape design plan for Phase 2 focuses on changes to the NHS that can be implemented in conjunction with construction of the visitor center NPS has proposed to locate outside the historic core. The new location provides increased opportunities for removing or relocating existing non-historic circulation, utilities, and vegetation. Relocation of the visitor center to a location outside the core provides an opportunity for removal of non-historic circulation systems that currently provide visitor access to the fort. Similarly new circulation systems are recommended for pedestrian access between the historic core and a new visitor center location; there are also proposals for expanding the trail system to provide pedestrian access to the existing picnic area. Removal of non-historic



Sources

U.S. Department of the Interior, National Park Service, *Existing Conditions, Fort Larned National Historic Site, Kansas, General Management Plan Amendment, Development Concept Plan, Interpretive Prospectus*, November 1994, 11.

Exhibits 8, 12.

Map prepared by Land and Community Associates, December 1997.
Revised June 1998, December 1998, April 1999.

Exhibit 13a

LANDSCAPE DESIGN PLAN
(ENTIRE NHS – PHASE 1)

N

0 200 400 600 800 1000

Scale: 1" = 600'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

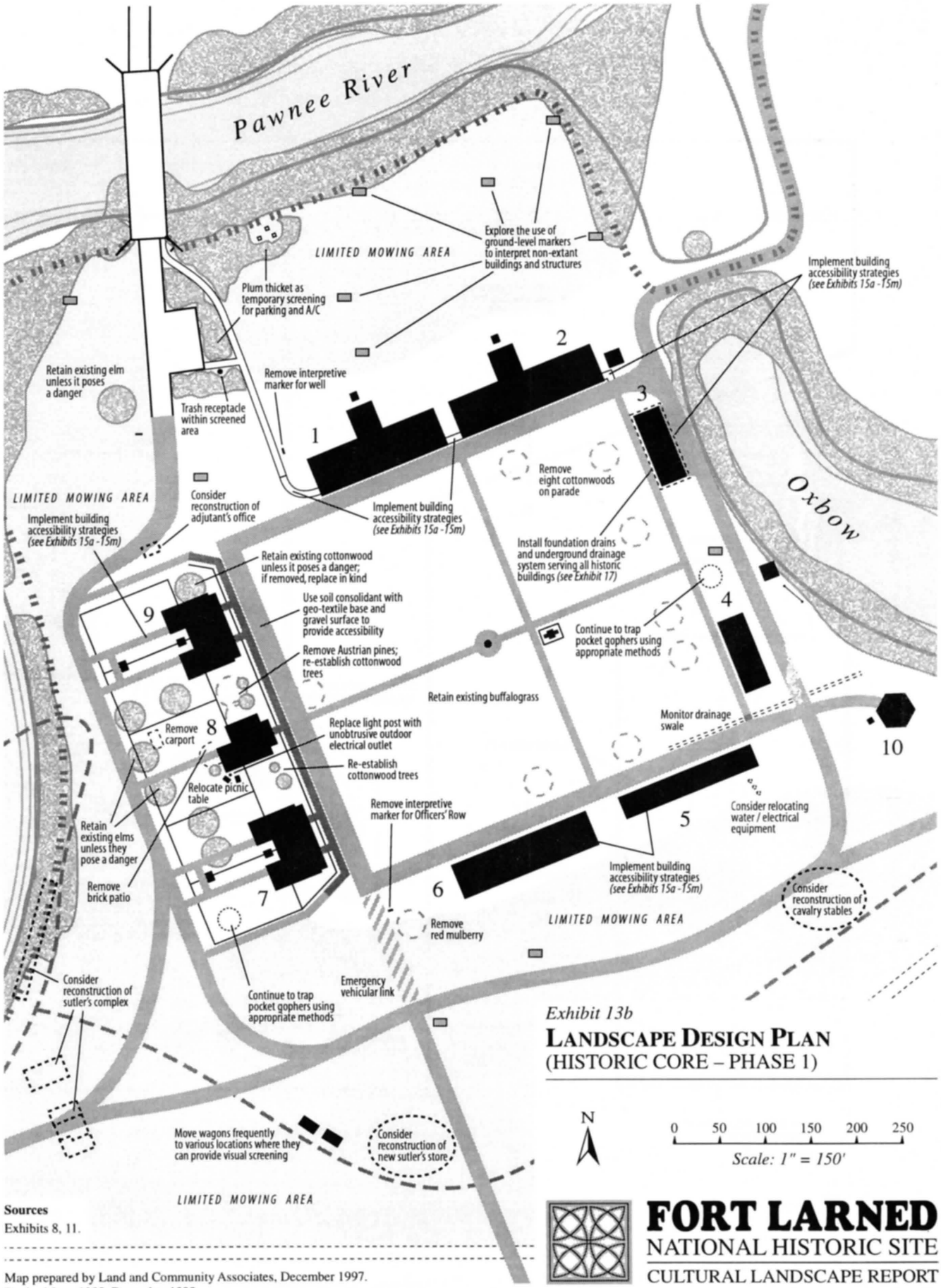


Exhibit 13b

LANDSCAPE DESIGN PLAN
(HISTORIC CORE – PHASE 1)

N

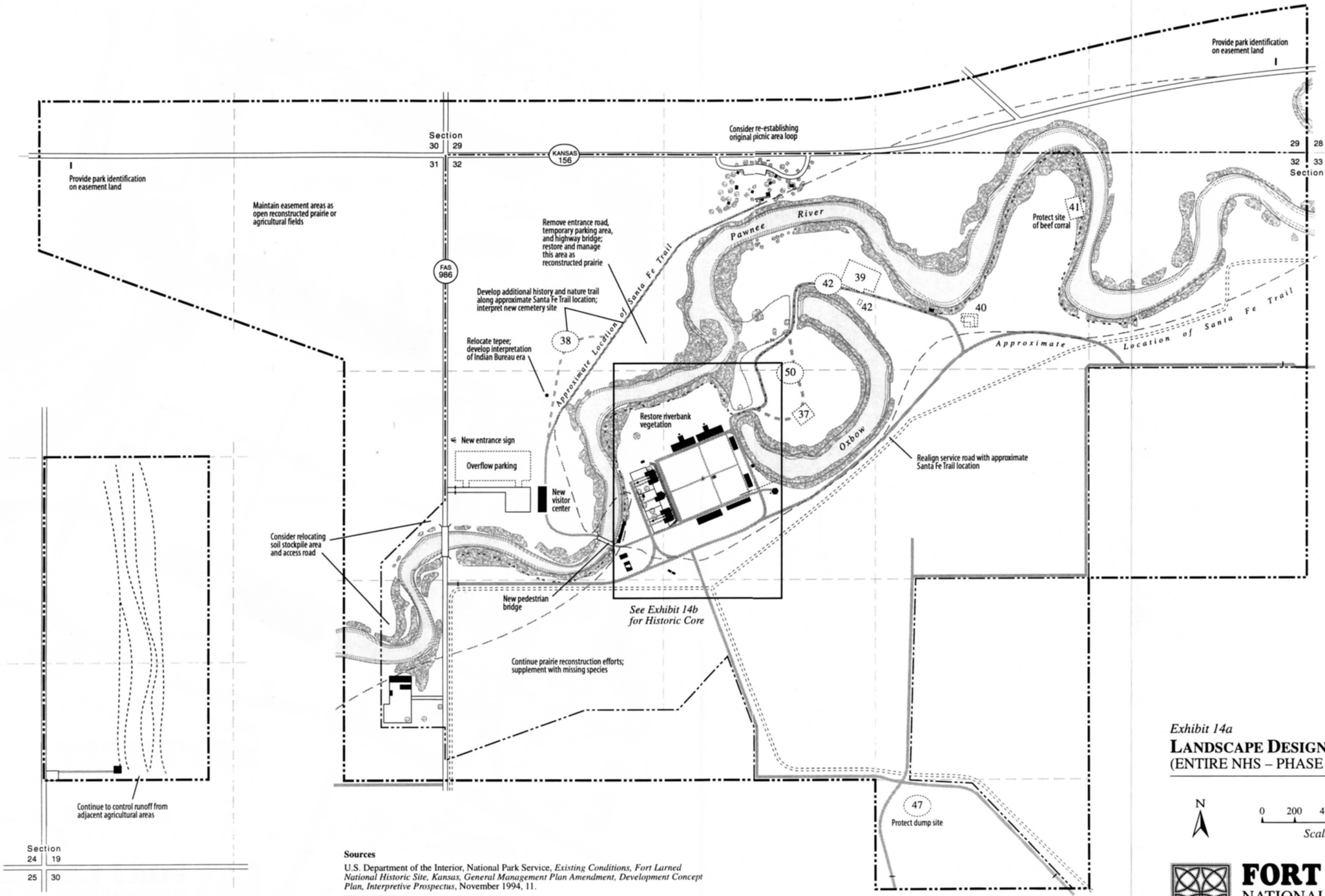
0 50 100 150 200 250

Scale: 1" = 150'

Sources
Exhibits 8, 11.

Map prepared by Land and Community Associates, December 1997.
Revised June 1998, December 1998.

FORT LARNED
NATIONAL HISTORIC SITE
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Sources

U.S. Department of the Interior, National Park Service, *Existing Conditions, Fort Larned National Historic Site, Kansas, General Management Plan Amendment, Development Concept Plan, Interpretive Prospectus*, November 1994, 11.

Exhibits 8, 12.

Map prepared by Land and Community Associates, December 1997.
Revised June 1998, December 1998, April 1999.

Exhibit 14a

LANDSCAPE DESIGN PLAN
(ENTIRE NHS – PHASE 2)

N

0 200 400 600 800 1000

Scale: 1" = 600'

FORT LARNED
NATIONAL HISTORIC SITE
CULTURAL LANDSCAPE REPORT

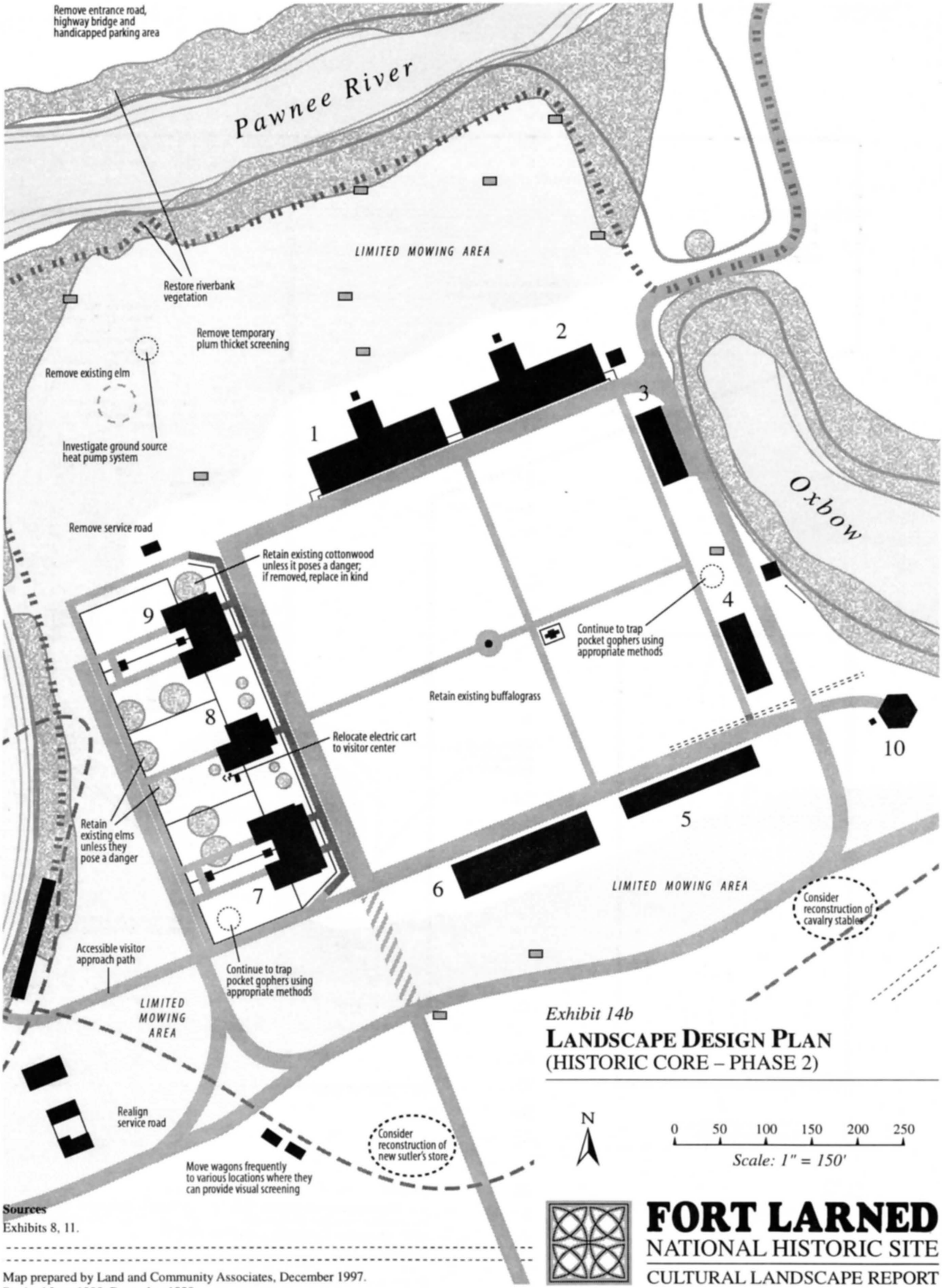


Exhibit 14b

LANDSCAPE DESIGN PLAN
(HISTORIC CORE – PHASE 2)

Sources
Exhibits 8, 11.

Map prepared by Land and Community Associates, December 1997.
Revised June 1998, December 1998.

FORT LARNED
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vegetation and relocation of the visitor center provide the potential for a more historic approach to the landscape of the historic core and can facilitate removal of non-historic circulation and opportunities for providing meeting the utility requirements of historic buildings in more appropriate ways. Relocation of the visitor center outside the historic core also provides opportunities for clarifying NHS identification signage.

Phase 1 and Phase 2 recommendations have been organized for each landscape management zone using the following categories: Buildings and Structures, Circulation and Parking, Vegetation, Site Furnishings and Objects, Signage and Interpretation, Views and Vistas, Utilities and Site Management, Special Events, and Future Research and Documentation. Recommendations are intended for implementation in Phase 1 unless they are followed in the text by an asterisk (*) which indicates Phase 2 recommendations.

ENTIRE NHS

Buildings and Structures

- Protect and interpret known archeological resources from the period of significance.
- Reconstruct non-extant buildings and structures for interpretive purposes only when there is sufficient documentation and/or physical evidence to inform an authentic reconstruction that avoids conjectural recreations.
- Consult a hydrologist or civil engineer to evaluate the effects of modifying or removing existing drainage and irrigation ditches and berms to determine if there are less visually intrusive methods of providing flood protection.

Circulation and Parking

- Comply with the Uniform Federal Accessibility Standards (UFAS) when developing new or altering existing circulation systems within the NHS.
- Realign pedestrian and vehicular circulation where appropriate, such as service and farm roads within the NHS and the history and nature trail, with the approximate known location of the Santa Fe Trail. Use opportunities to delineate the Santa Fe Trail when developing extensions to the history and nature trail.
- Vary color and surface texture to distinguish between historically significant access routes and modern, non-historic routes throughout the NHS.

Vegetation

- Acknowledge that vegetation occurred in different locations and in different concentrations during the period of significance than it does currently for some areas; interpret why this difference is tolerated or supported.
- Adopt and implement the vegetative management policies appropriate for each landscape management zone; in each, address the most appropriate tree maintenance, planting, and removal policies as well as turf maintenance and mowing policies.
- Inform neighboring farmers of NPS policies and actions to control invasive exotic species that threaten adjacent farm productivity.
- Retain and diversify vegetation along the riverbank despite documentary evidence that this area was cleared of tree cover during the period of significance. In this instance, informed ecological management as well as the desire to provide visual screening for more distant views that detract from the historic setting of the NHS take precedence over historical accuracy.

Signage and Interpretation

- Develop interpretive signage for non-extant resources throughout the NHS that are informative yet visually unobtrusive. Within the historic core, consider using ground-level interpretation that is visible only at the site of the resource; in other areas, use low-scale sign panels that will not be visible above the height of adjacent prairie or other vegetation.
- Consider the needs of all handicapped visitors, including the visually and hearing impaired, when planning cultural landscape interpretation. Address the unique sensory qualities of the NHS and its expansive prairie setting, including but not necessarily limited to the sights and sounds of the wind-blown prairie grasses, the light quality of the prairie sky, and the presence of native birds and insects.
- Work with state historic resource personnel, the Santa Fe Trail Center, and other public and private groups to incorporate information about Fort Larned at the Pawnee Rock and Fort Zarah waysides. Interpreting the NHS at these locations will enhance the visitor's sense of the Santa Fe Trail experience and the role of Fort Larned as one of several frontier Kansas forts. Similarly, work to incorporate directional and visual orientation to Fort Larned from the Pawnee Rock overlook.

Viewshed Enhancement within the NHS

- Use the CLR analysis (see Chapter 4) to plan and implement appropriate viewshed treatments for intrusive views.
- Screen undesirable views of the maintenance facility where plant materials can be established as a natural extension of existing riparian vegetation.
- Use native plant materials indigenous to these riparian areas and identified in the sod analysis study. Avoid the use of single conifers or other single plant specimens to screen or block views of adjacent properties or remote features.
- Explore strategic placements of wagons, Indian encampments, or other interpretive objects to screen undesirable views from key vantage points within the historic core.

Viewshed Enhancement and Protection for Adjacent and Nearby Properties

- Use the CLR analysis (See Chapter 4) to plan and implement appropriate viewshed treatments for intrusive views.
- Monitor conditions on adjacent properties to identify changes that occur over time and recommend appropriate treatments to preserve the viewshed from the fort.
- Monitor and become involved in any necessary approval and/or permitting processes for the addition of any proposed telecommunications towers or installations within the NHS viewshed.
- Explore creative and innovative agreements with adjacent property owners to reduce the visual and acoustic effects of undesirable buildings, structures, and equipment outside the NHS. These may include
  - working with adjacent property owners who may be willing to establish plantings that will screen intrusive buildings or structures on their property. Encourage such plantings only when they will appear as part of a larger existing mass of similar vegetation when viewed from the fort. Discourage property owners from establishing groupings of trees and other screening that are isolated elements in the Fort Larned viewshed. Any vegetative screening attempts also should be in keeping with the landscape character of the subject property.

- encourage the use of vegetative buffers to mitigate the effects of audible intrusions only when they are consistent with the use of plant materials for visual screening (see above). Otherwise, work with adjacent property owners or public jurisdictions to seek reduction of audible intrusions at their source.
- exploring the possibility of developing cooperative agreements with adjacent property owners to reach consensus on new construction and alterations of existing buildings and structures.
- considering cash payments to adjacent property owners for modifications, such as repainting or relocating structures, that will make the existing views less obtrusive.
- considering financial incentives and free technical advice and design services to adjacent property owners who will agree to give NPS design review authority within the viewshed. NPS historical architects and historical landscape architects may be able to offer helpful advice on the design and siting of new structures or other changes within the viewshed.
- exploring possible acquisition scenarios, such as purchase options, lease-backs, rights of first refusal, life tenancies, bargain sales, installment sales, and land swaps. Acquired land could be added to the NHS and the objectionable structures removed or relocated. Such properties could be leased and remain in agricultural uses or could be sold with restrictive covenants. Explore also the possibility of acquiring additional scenic easements—through either donation or purchase—to manage the viewshed from the NHS. Any easements and other land acquisitions would need to be phased so that the NHS size remains within its 750-acre authorization.
- exploring agreements with adjacent landowners for phased transformation of land uses within the viewshed from agricultural cultivation to grazing.

• Encourage informal dialogue between NPS and adjacent property owners to keep each informed of planned changes. Work cooperatively to reduce NPS effects on adjacent private properties as well as the effects of private development on the NHS. Establish a working group to meet periodically to discuss issues of mutual interest and concern.

• Work with local government to ensure that any changes in land development regulations serve to maintain or increase the protection of views and other sensory qualities associated with the NHS.

• Explore the possibility of establishing a non-profit land trust to acquire adjacent land or easements with the intent of removing or relocating objectionable structures and reselling the land with restrictive covenants. Consult with existing groups such as the Santa Fe Trail Center and others involved in promoting and protecting cultural and natural resources. Perhaps an existing group could lead or coordinate land trust activity.

Utilities and Site Management

• In accordance with the stated policy of the GMP, Remove, relocate, or bury all overhead utility lines within the NHS boundaries, as called for in the GMPA.[5]

Special Events

• Plan adequately for Memorial Day weekend, which is the peak time of visitation, and for special interpretive events. Acknowledge that on these occasions temporary measures may be necessary to accommodate large numbers of visitors. Avoid permanent site changes to

[5]*General Management Plan Amendment*, 21.

accommodate the temporary needs of peak visitation. Use temporary site furnishings to provide for visitor comfort, and remove such furnishings following special events.

- Continue to accommodate temporary overflow parking in the present manner, taking care that soil compaction from vehicles parked in such areas will not damage extant or archeological cultural landscape resources. Repair any surface site damage other than that on the parade immediately following an event by reseeding or undertaking other necessary maintenance measures. [Upon completion of the new visitor center, develop overflow parking immediately adjacent to the visitor center parking area.]* See also *Historic Core, Special Events*, below.

Future Research and Documentation

- Continue research and archeological investigations to identify the types of vegetation, non-extant resources, and subsurface site features that were extant during the period of significance.
- Update existing site documentation, including aerial photography, digital topographic mapping, and color and infrared photography for the entire NHS, including the easement area.
- Undertake a combined viewshed and vegetative screening study to identify and evaluate intrusive views from within the NHS and to identify specific appropriate vegetative screening techniques, both within the NHS and on adjacent lands.
- Consult a hydrologist or civil engineer to evaluate the effects of modifying or removing existing drainage and irrigation ditches and berms to determine if there are less visually intrusive methods of providing flood protection.

HISTORIC CORE

Buildings and Structures

General Recommendations

- Continue to protect and use the ten historic buildings and related outbuildings in the historic core for interpretive and educational uses following the technical guidance offered in applicable HSRs.
- In conjunction with implementation of drainage improvements at the perimeter of the ten historic buildings (see *Utilities and Site Management*, below), consider installation of a waterproofing membrane at the exposed foundation walls of these buildings as a means of retarding water penetration into the exterior stone walls.
- Accept and acknowledge—through interpretation—that changes have occurred within the historic core landscape over time. Use photographs and other interpretive approaches to illustrate the historic appearance of the NHS where there have been significant changes. For example, there is a discrepancy between the historic elevation of the parade ground in relation to adjacent structures. A treatment option may be implemented that allows preservation of the historic subsurface walks as archeological resources and yet still facilitates universal accessibility.

Accessibility Recommendations *(Exhibits 15a-k* and *16a-m)*

- Provide universal access to the ten historic buildings within the historic core consistent with the UFAS, particularly with regard to width of openings, means of egress, ground and floor surfaces, protruding objects, ramps, and stairs. Refer to Appendix B for the Exhibits 15 and 16 series, a summary of the general accessibility requirements, and a complete discussion of the recommended and alternative accessibility treatment options for the ten historic buildings. The recommended treatment option only for these buildings is summarized below.

- To the greatest extent possible, design accessibility improvements to be compatible with existing buildings, structures, and site. Ensure that building approaches and entrances provide a sequential experience similar to that which existed during the period of significance. Comply with the requirements for Section 106 review by the UFAS Advisory Council on Historic Preservation for all proposed universal accessibility treatments.
- *HS-1 and HS-2.* Subject to UFAS Advisory Council review, provide universal access to the visitor entrances at each building by raising the existing porch floor surface to within 1/2" of the existing stone thresholds at each door, and by other interior modifications as described in Appendix B. Provide a raised pathway with a chip-and-seal bituminous surface (non-historic surface treatment, see below) between HS-1 and HS-2 *(Exhibits 15b-c).*
- *HS-3.* Subject to UFAS Advisory Council review, provide universal access to HS-3 through the use of a sloped approach area with a chip-and-seal bituminous surface (non-historic surface treatment, see below) along the east elevation of the building *(Exhibit 15d).*
- *HS-4.* (An accessibility plan will be developed to be implemented after the artifact storage facility is removed from HS-4 and the building is restored. Following restoration, it is anticipated that the main entrances to the building will be from the east.)
- *HS-5 and HS-6.* Subject to UFAS Advisory Council review, provide universal access to HS-5 and HS-6 by sloping the grade at each door adjacent to the company street (historic surface treatment, see below) and at other doors (non-historic surface treatment, see below) to within 1/2" of the existing stone thresholds *(Exhibits 15f-g).*
- *Officers' Row.* Subject to UFAS Advisory Council review, provide universal access to HS-7, HS-8 and HS-9 by constructing a sloped grade approach with a chip-and-seal bituminous surface (non-historic surface treatment, see below) between the rear yard entrances and the floor level of each rear porch, which in turn is elevated to within 1/2" of the existing stone thresholds at each door opening onto the porch *(Exhibits 15h-j).*
- *HS-10.* Subject to UFAS Advisory Council review, provide universal access to HS-10 by regrading the approach path to slope gradually to the building entrance, using a chip-and-seal bituminous surface (historic surface treatment, see below), and by other interior modifications as described in Appendix B *(Exhibit 15k).*

Demolition and Reconstruction

- Remove the timber carport and the concrete trash can pad at the rear yard of HS-8.
- Remove the brick patio from the rear yard of HS-8 and restore the ground to a level condition consistent with the adjacent area.
- Consider reconstruction of the sutler's complex (sutler's store [HS-23], mess room [HS-24], residence [HS-25], and corral and stables [HS-22]). Continue to research and evaluate the role and appearance of the sutler's complex. Reconstruction of the complex would enhance the interpretive program by illustrating this important on-site entrepreneurial enterprise and its role in the social and commercial life of the fort and the Santa Fe Trail. The store was an important aspect of the fort's character during the period of significance. Reconstruction of the sutler's complex would help screen views to twentieth-century farm structures in the viewshed. Good documentation exists for the sutler's store (ca. 1863), mess room (1863), and residence (1865) which would support a reconstruction treatment. There is some documentation for the sutler's corral and stables, and little documentation for the new sutler's store (1867 [HS-27]). These issues need to be resolved through more detailed research and analysis prior to any reconstruction effort.

- Evaluate the feasibility of reconstructing the adjutant's office [HS-43] given the limited known documentation available. Reconstruction of this building would give the visitor a sense of the historic extent of the fort landscape beyond the major buildings enclosing the parade.
- Evaluate the feasibility of reconstructing the cavalry stables [HS-35] given the limited known documentation available. Reconstruction of these stables would help screen views to twentieth-century farm structures in the viewshed.

Circulation and Parking

- Make existing circulation systems—including all parade ground circulation and access routes to historic buildings—universally accessible consistent with the UFAS. When making necessary modifications to parade ground circulation in particular, provide such circulation systems with positive drainage by crowning all walks and elevating the grade slightly above that of the adjacent parade.
- Use materials that are characteristic of the period of significance when making universal accessibility or other alterations to historic streets and paths.
- Distinguish between historic and non-historic circulation routes by contrasting the color and surface appearance of the paving when making universal accessibility modifications within the historic core. A summary of the recommended treatment option for such modifications is given below. Refer to Appendix B for a complete discussion of this treatment option and three alternative options for achieving universal accessibility along historic and non-historic circulation routes.
  - Historic routes. Provide accessible routes located along historic circulation with a stable, crushed stone surface using a bituminous chip and seal treatment. This pavement should signify the original company street and pathways. By using aggregate which matches the existing parade street and pathways in color and aggregate size, the chip and seal bituminous paving will closely resemble the existing system. Application of the chip and seal paving would involve laying down a geotextile fabric and then placing the bituminous paving over it, ultimately resulting in approximately 4 inches of new material. Limited archeological investigations should be conducted to determine the depth of the historic road materials prior to construction. Once the depth of the original material is determined, the new surface should be constructed in a manner that avoids disturbing archeological materials while striving to result in a new surface at elevations that are as close as possible to the existing grade. It is recommended that an archeologist be on-site during excavation to oversee and provide guidance should any archeological resources be disturbed. This treatment approach will require applying the new surface over the existing surface in some areas. In other areas it will be possible to excavate before placing the new materials. The final result should be a route that is level with existing grade whenever possible, and above existing grade only when this condition is necessary to protect the underground resources. In all cases, the change in treatments should be undetectable in the final surface appearance. Required changes in grade should be extremely gradual and should avoid exceeding the slope on the existing surface. Where the paving is placed over existing grade and results in a raised surface, apply earth fill at the edges of this pavement tapering to existing grade at a slope no greater than 1:10. These side slopes should be returned to native grass.
  - Non-historic routes. Provide accessible routes located along non-historic circulation with a stable, crushed stone surface using a bituminous chip and seal treatment with aggregate of a color and size that is clearly distinguishable from the company street historic surface.

Where there is no potential for disturbing archeological materials the existing surface should be excavated to a depth of six to eight inches, a compacted aggregate base put down, and the chip and seal bituminous wearing course laid over it. Side slopes, where no traffic is desired, should be returned to native grass. Where there is potential for disturbing archeological materials the chip and seal treatment should be applied over the existing surface as described in the previous paragraph.

- Retain in Phase 1 the existing configuration of the non-historic, dirt service road leading from County Road FAS 986 to and surrounding the fort for authorized vehicular access only. Stabilize the service road with coarse gravel for year-round emergency access.
- Consider establishing an emergency vehicular link between the dirt service road south of the historic core (described above) and the chip and seal roads at the perimeter of the parade. Design, develop, and designate this link for emergency and service vehicular access only. Reinforce the vehicular path with a subsurface plastic grid or appropriate soil stabilizer. Keep the area visually unobtrusive by reestablishing it in turf consistent with adjacent areas. Do not pave or otherwise improve this linkage. Safeguard the locations of known archeological resources in this vicinity.
- Following completion of the visitor center and in conjunction with other circulation modifications, remove the highway bridge, handicapped parking area, and service road approach to the rear of Officers' Row. Also remove the asphalt pedestrian path from the highway bridge to HS-1. Restore these areas to a level appearance and condition consistent with the adjacent areas.*
- Realign the portion of the non-historic, dirt service road located south of Officers' Row to accommodate potential reconstruction of the sutler's complex. Stabilize all realigned portions with coarse gravel for year-round emergency access. Restore the former road alignment to a level appearance and condition consistent with the adjacent areas.*
- Provide a new pedestrian visitor access route to the parade quadrangle from the end of the new pedestrian bridge following completion of the visitor center.*

Vegetation

- Adopt a vegetative rehabilitation approach that evokes to the greatest extent possible the historic visual character of the period of significance while also acknowledging current NPS initiatives such as sustainability, local and regional expectations concerning landscape maintenance, and visitor safety and comfort.
- Restore the parade to the open appearance it possessed during the period of significance.
- Remove the eight cottonwood trees from the perimeter of the parade ground; restore the ground to a level appearance and condition consistent with the adjacent area.
- Although a portion of a deciduous tree is visible in the northwest corner of the parade in an 1879 view of HS-1 and HS-2, insufficient information exists at this time for an informed recommendation for an appropriate planting in this location. Should adequate information become available in the future concerning this and/or other trees on the parade perimeter in the Officers' Row vicinity, consider reestablishing appropriate tree species in those locations only.
- Remove the two Austrian pines north of HS-8; restore the ground to a level appearance and condition consistent with the adjacent area.

*Phase 2 recommendation.

- Remove the red mulberry tree west of HS-6 and restore the ground to a level appearance and condition consistent with the adjacent area.
- Retain the cottonwood tree north of HS-9; it may date from the period of significance. Consider propagating new specimens from the existing tree as recommended by state foresters in August 1996. When the existing tree begins to pose a danger to human safety or building condition, prune and/or reinforce it consistent with a certified arborist's recommendations for tree preservation. If such measures prove insufficient or if the resulting appearance is unsightly, remove the tree and replace it in-kind or with a propagated specimen.
- Reestablish two small deciduous trees in each of the side yards between HS-7 and HS-8 and between HS-8 and HS-9 as shown in the April 29, 1879 view of HS-7. Later photographs show similar sized deciduous trees that are likely to be cottonwoods given their general shape and the fact that a surviving tree along Officers' Row is a cottonwood. Use of this or another specie with similar characteristics would be appropriate.
- Retain existing elms in the rear yards of Officers' Row. The estimated remaining life span is in the 15–20 year range. Only scant historic photographic documentation exists for vegetation in these yards during the period of significance but there is an indication of at least one deciduous tree in the backyard of HS-8 in the late 1870s. Should trees become diseased or a danger to human safety or building condition, prune and/or reinforce them consistent with a certified arborist's recommendations for tree preservation. If such measures prove insufficient or if the resulting appearance is unsightly, remove them but do not replace them unless additional information becomes available concerning the number and species present during the period of significance.
- Retain the existing elm west of the existing handicapped parking area during Phase 1 as long as it remains healthy and does not pose a danger to human safety; it helps screen views to the service road behind Officers' Row and provides welcome shade for visitors in summer. However, since the tree appears to be within the footprint of the non-extant Enlisted Men's Barracks (LCS #11), it does not date from the period of significance. Should the tree become diseased or unsafe, remove it and do not replace it. [In any event, remove the tree during Phase 2 and restore the ground to a level appearance and condition consistent with the adjacent area.]*
- Conduct annual inspections of all trees. Also conduct inspections following storms and other extreme weather conditions. Remove any damaged branches and remove debris. Prune broken branches back to a healthy branch or the trunk, just distal to the crown of the branch. Monitor all trees for disease and insect infestations and consult with certified arborists for appropriate treatment for any adverse conditions.
- As a short-term screening measure, plant a low shrub thicket of native plant materials such as plum or sumac to reduce the visual effect of the existing handicapped parking area. Retain the existing hackberry trees that have been planted recently. [Following completion of the new visitor center, remove the shrub plantings and hackberry trees in conjunction with the long-term removal of the handicapped parking area. Restore the ground to a level appearance and condition consistent with the adjacent area.]*
- As a related, short-term screening measure, consider extending the low shrub thicket of native plant materials recommended above to provide visual and acoustic screening of the existing air conditioning equipment north of HS-1. [If a ground source heat pump system is installed in conjunction with the long-term removal of the handicapped parking area and service road approach to Officers' Row, remove the shrub plantings and restore the ground to a level appearance and condition consistent with the adjacent area (see *Utilities and Site Management* below).]*

- If mower and edger damage to the existing hackberry trees in the handicapped parking area is a concern, use wood chips at bases of these trees to eliminate the need for mowing since the area is clearly a twentieth-century feature.
- Mow as close to other trees in the historic core as feasible without vegetative damage. Accept uneven growth near tree bases as more representative of the historic appearance of the core when there was uneven growth in many areas. Hand-clipping of grass near tree bases would be appropriate if there is substantial public complaint concerning NHS appearance.
- Use interpretation to explain vegetated views to the visitor. Interpret that the original fort environs near the river were forested, but were devegetated quickly as a result of the need for firewood. Interpret also current environmental philosophies and practices support the retention of vegetation along the river corridor to control erosion and provide habitat opportunities for wildlife.
- Retain buffalograss *(Buchloe dactyloides)* in the historic core as the preferred grass species for all turf areas. This species, and in particular the long-standing preferred variety Texoka, has a mature height of 4"–6". Accept that this species, which has a historic basis, is not as dense as new varieties of buffalograss. The use of new varieties, such as Bison, Tatanka, and Cody, is not desirable because these varieties typically present a darker green color and more lush appearance than the historic variety. Texoca is the old forage-type buffalograss. It is considered an economical, low-maintenance ground cover. It is known to be long-lived and hardy under adverse conditions.
- Develop mowing schedules for the parade and the immediate environs of the buildings adjacent to it based on maintaining a desired turf height of 4". Mowing occurred historically and is necessary today to maintain the degree of turf height control which is desirable for visitor comfort and the control of exotic species. Base mowing schedules on observed growing patterns and seasonal weather variations to maintain the desired height.
- In the northern, western, and southern perimeters of the historic core, where visitor circulation is not as predominant, initiate an experimental reduced mowing policy allowing the grass to grow to the upper limit of the growth range of buffalograss. Observe and record the growing patterns and the incidence of exotics in these areas. Modify the mowing schedule accordingly to control invasive exotic species.
- Avoid the use of grass retardants to control overall turf height.
- Accept an uneven turf height at building edges as consistent with the historic appearance of the fort. Hand clipping of grass near building edges would be appropriate if there is substantial public complaint concerning NHS appearance. Avoid the use of power trimmers near building surfaces.
- Use historic photographs, historic narratives, and other available information to interpret the historic appearance and turf management practices associated with the period of significance. Acknowledge that the historic core today is not subject to the intense daily use that occurred when it was an active fort, and that it is neither practical nor desirable to recreate the actual conditions observable in photographs that depict worn or muddy sections of the parade and its environs.
- Adopt an experimental non-seeding policy for bare areas to more closely approximate the historic appearance. Observe and record the growing patterns and the incidence of exotics in these areas. As necessary, reseed with buffalograss variety Texoka mixed with Blue Grama to limit the growth of exotic species.

- Continue to use approved herbicides, such as Roundup, to control invasive and exotic species only at the bases of buildings and along gravel walks. It is anticipated, however, that the reconstruction of the gravel walks to provide for universal accessibility will significantly reduce the opportunity for the establishment of these species.

Site Furnishings and Objects

- Continue to use and even increase the use of interpretive objects within the historic core. Objects may be either authentic reproductions or historic artifacts. When actual historic artifacts are used, proper conservation measures should be employed. The historic fort landscape was an active, animated landscape. Interpretive objects help to portray that sense of outdoor activity.
- Movable objects exhibited in the landscape, such as wagons, should not be left in one place long enough for grass to grow up at the base but should be moved frequently. Altering the location slightly should be sufficient to allow regular turf maintenance and avoid establishing a permanent appearance. More stationary objects, such as tent platforms, teepees, and hitching posts, can occupy more permanent locations but can be moved as the need arises.
- Consider the use of interpretive objects in the landscape for their potential to block or obscure distant views to present day agricultural structures and other elements that detract from the historic appearance of the landscape (See *Views and Vistas* below).
- Continue to restrict the use of wooden benches to the porch areas of historic buildings. Locate all benches adjacent to the front wall of the building. Select the number of these benches based on observable demand and frequency of use. Avoid locating benches as free-standing landscape furnishings in the historic core. Avoid introducing any other additional outdoor seating—either historic or contemporary in character—in the historic core.
- Relocate the existing staff picnic table in the yard of HS-8 to the southwest corner of the building where it will be less visible.
- Limit the use of water barrels as interpretive objects to their known historic locations: behind kitchens and in association with the wagons that were used to haul water from the river. Use wooden barrels during living history events as a logical and appropriate extension of interpretive programs. Otherwise, use sparingly within the historic core.
- Continue to avoid the use of exterior site lighting.
- Replace the light post in the rear yard of HS-8—which provides an electrical outlet for the electric cart—with a low, all-weather receptacle that is less visually obtrusive.

Signage and Interpretation

- Continue to make minimal use of freestanding waysides and markers within the historic core.
- Remove the two existing interpretive markers for the well and the adobe hospital and for Officers' Row. Reproduce and incorporate the historic photographs of these features or areas into other interpretive materials, such as a revised brochure.
- Develop a cultural landscape interpretation that addresses the differences between the character of the landscape today and during the period of significance, in particular, contrasting the vegetative character of the prairie and the present agricultural surroundings. Also use the landscape interpretation to address changes in the character, orientation, and width of the Santa Fe Trail in the environs of the fort over time. Take advantage of interior exhibit space or other opportunities for interpretation to avoid creating a cluttered, non-historic appearance in the landscape.

- Explore the use of ground-level interpretation for non-extant buildings and structures. Ensure that the installation avoids creating mowing or tripping hazards. Consider other more innovative interpretive techniques for non-extant features. See also *Reconstructed Prairie: Signs and Interpretation,* below.
- Avoid the use of additional informational or directional signs.
- Following construction of the visitor center and in conjunction with circulation modifications, remove all informational or directional signs associated with former circulation systems.*
- Develop an interpretive exhibit at the new visitor center that deals with the fort's historic building materials and discourages their defacement.*

Views and Vistas *(Exhibit 11b)*

- Acknowledge the potential of reconstructed features such as the sutler's complex to provide some degree of screening from key locations within the NHS and divert the eye from modern intrusive elements.
- Investigate and evaluate opportunities for using interpretive objects such as hay bales, water wagons, hay wagons, wagon trains, and Indian encampments to provide partial screening of distant intrusive elements within and at the perimeter of the historic core. Such objects may provide a distracting visual focus that will divert the eye away from modern elements.
- Explore the possibility of removal of the existing pole barn adjacent to FAS 986 south of the NHS maintenance facility. The structure is highly conspicuous from the historic core. Consider developing an agreement with the owner of the property for relocating the structure to a location that would not be visible from the core. If relocation or removal is not possible, explore the potential for establishing a vegetative windbreak that would serve as a visual screen.
- Explore the possibility of removal of the existing pole barn along the south farm road. The structure is highly conspicuous from the historic core. Consider developing an agreement with the owner of the property for relocating the structure to a location that would not be visible from the core. If relocation or removal is not possible, explore the potential for establishing a vegetative windbreak that would serve as a visual screen.
- Explore opportunities to reduce or eliminate the visual effect of views of the white machine shed southeast of the NHS. Potential alternatives include removal or relocation to a less conspicuous site, repainting the structure in a dark but neutral color that will help it to blend in visually with distant vegetation, as well as the planting of a vegetative screen.
- Explore opportunities to reduce or eliminate the visual effect of views of the farm complex east-southeast of the NHS. The existing silos which are dark-colored are less visually apparent than the white farm structures in the same complex despite their height and verticality. Potential alternatives include removal or relocation of the structures to a less conspicuous site or repainting them in a dark but neutral color that will make them less conspicuous, as well as the planting of a vegetative screen.
- Accept the long-range views to distant water towers at Larned State Hospital and within the city limits of Larned. They provide visual points of identity and orientation; attempts to screen them would have a greater visual impact. Work with the appropriate officials of both the City of Larned and the State of Kansas to ensure that NPS will be informed and able to comment on any proposed changes or additions to the existing structures.

Utilities and Site Management

- Consider installation of a drainage system within the historic core to provide a means of reducing damage to buildings caused by inadequate site drainage and high water table. A summary of the recommended treatment option for such a system is given below. Refer to Appendix C for a complete discussion of this treatment option, Exhibit 17, and two alternative options for reducing the adverse impacts of water on historic buildings.
  - Install an underground drainage system within the historic core, consisting of a perimeter drainage loop around each of the ten historic buildings surrounding the parade. Also install a network of collection lines, which discharges into the Pawnee River just west of the fort as indicated on Drawing C.1 / Mechanical Site Plan *(Exhibit 17)*. At the point of discharge, a flared end section or headwall should be installed to reduce the velocity of discharge and minimize soil erosion. The system should employ perforated drain tiles located at a depth of approximately 3'6" below grade looped around the perimeter of each building. Porous material should be provided around the entire length of each tile to facilitate the removal of ground water adjacent to the building foundations. The purpose of this procedure is to provide a valid drainage path for all ground water above the level of the tile.
  - During the time when the foundation wall is exposed for installation of the foundation drainage system, apply a bituminous dampproofing or waterproofing material to the exposed foundation to retard moisture penetration into the stone.
  - Since the majority of the grounds at the Fort contain original fabric and potential archeological resources that have not been investigated, construction of the system would pose a threat to any archeological resources located in the area disturbed by implementation. In order to minimize the threats to these resources, an archeologist should be on-site during excavation. This on-site archeologist should document any artifacts or information uncovered during excavation. In the event that a potentially significant collection of artifacts is uncovered, the archeologist should provide guidance for proceeding with the project.
- Retain and interpret the stone-lined portion of the drainage ditch at the southeastern corner of the parade, keeping it functional to the greatest degree practical. If soil erosion at the point of discharge becomes a significant problem, consider widening or flaring the drainage channel terminus to reduce the velocity of drainage discharge.
- Take a straightforward approach to screening mechanical systems from view. Avoid the use of woodpiles or fences to screen utilities. Such devices generally are not entirely effective and only partially obscure the objectionable view. See also *Vegetation*, above.
- Consider the potential of relocating the existing water treatment and electrical transformer equipment presently located near HS-5 as part of the site development for the new visitor center. If coordination with that project is not possible, explore opportunities for relocating the objectionable equipment to underground utility vaults, to interior locations, or to more remote locations outside the central historic core.
- Relocate all stored materials to the expanded maintenance building proposed for development to reduce the need for vehicular access to the historic core.
- Continue to trap pocket gophers and thirteen-stripe ground squirrels within the historic core, and perhaps even increase such efforts to reduce the damage their holes inflict on the parade ground, to archeological resources, and to subsurface utilities as well as the hazards they pose to pedestrian circulation and maintenance operations.

- On the parade and other areas of high pedestrian circulation, employ the lateral tunnel trapping method.[6] Consider using historically accurate reproduction barrels, wagons, and other movable site furnishings and objects as temporary covers for the holes where traps have been set. Open holes with operative traps present visitor safety issues, but identifying them to the public with warning signs will create additional obtrusive elements and may present public relations issues associated with trapping.
- In areas with less pedestrian circulation and where no damage would be caused to archeological resources, consider using a technique that involves digging a hole to intersect with a main gopher tunnel and setting two traps in opposite directions to increase the likelihood of successful trapping.[7] This method is too conspicuous for high-traffic and highly visible areas, and it requires a larger hole that would present greater danger and be unsightly. Dug holes should be clearly identified with temporary warning signs.
- Monitor the effectiveness of all gopher-trapping operations and adapt as necessary; determine the need for alternative strategies. Continue to fill holes and level mounds once the trapping is completed in a specific location.
- Continue to stay current with the literature and technical advice available for reducing gopher populations within the historic core.
- As a long-term measure, consider the use of a ground source heat pump system to replace the existing visually and acoustically intrusive air conditioning equipment north of HS-1. Such a system would eliminate the need for any external above-ground equipment and would have the other benefits of conventional water-source heat pump systems. Although such a system would present the need for subsurface drilling, the construction of the water loop may be coordinated with the removal of the existing handicapped parking lot and entry road. Using this approach would confine the subsurface disturbance to areas that are already disturbed.*
- Provide for parking and storage of the rangers' electric cart within the new visitor center, and remove all related equipment and activities from the rear yard of HS-8.*

Special Events

- Prepare for special events such as the Memorial Day living history demonstrations by providing temporary site furnishings for visitor comfort. Locate wooden benches for additional seating and wooden barrels for trash disposal at the perimeter of the parade or other locations where they would be useful and appropriate.
- Take advantage of the impact of foot traffic and living history activities on the parade and other turf areas; avoid repairing damage unless it is inconsistent with the historic character of the parade (*e.g.*, modern tire ruts) or is necessary for human safety. These events will be the major opportunities for the site to be used and to portray the evidence of human use that was characteristic of the site during the period of significance.

Future Research and Documentation

- Continue research and archeological investigations of non-extant resources and subsurface features to inform decisions concerning circulation and interpretation. In particular, concentrate efforts to establish the historic road elevation of the company streets as they existed during the period of significance.

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[6]See Appendix D for a description of this technique.
[7]See Appendix D for a description of this technique

- Continue research and archeological investigations (particularly for Officers' Row) to identify the types of vegetation and small-scale site features that were extant during the period of significance.
- Continue research to identify additional information that would be used in the potential reconstruction of the sutler's complex, adjutant's office, and cavalry stables. Particular attention should be given to the appearance, siting, role, and relationship of the original sutler's store (ca. 1863 [HS-23]) and the new sutler's store (1867 [HS-27]) prior to planning and implementing any reconstruction efforts.

RECONSTRUCTED PRAIRIE

Buildings and Structures

- Protect the area's known archeological resources from the period of significance, which include the old cemetery (1860–1869 [HS-37]), the new cemetery (1869–1878 [HS-38]), gardens, two corrals [HS-39, HS-41], three adobe shanties [HS-42], and the mail station [HS-40]. Interpret sites where there is good potential to facilitate visitor access.
- Using available documentary and physical evidence, identify the sites of both cemeteries: the old cemetery in the center of the oxbow and the new cemetery northwest of the historic core. Use metal NPS markers to identify the corners; set the markers flush with the ground. Delineate the extent of the cemeteries through mowing, extending the mowed area five feet beyond the cemetery boundaries. Establish a mowed path to both sites from the nearest pedestrian circulation. Construction of the proposed new visitor center may provide opportunities for access to the new cemetery archeological site.
- Protect and identify the archeological sites of the corral and adjacent adobe shanties, and the mail station. Consider providing access and interpretation from the adjacent history and nature trail if additional research reveals that they were active during the period of significance.
- Protect the dump southeast of the historic core [HS-47] and the beef corral site [HS-41] as archeological sites; access to each would be difficult to achieve without introducing additional circulation through the prairie.
- Retain and maintain existing history and nature trail shelter as long as it meets NPS interpretive needs. The location is appropriate since it is sited at the farthest extent of the trail.
- Avoid new construction in this area.

Circulation and Parking

- Improve access to this area and its archeological sites. Take advantage of all existing nearby and adjacent circulation to provide through extensions of or linkages with existing roads and trails. Avoid introducing new circulation into the prairie. Do not introduce parking into this area.
- Retain and maintain the existing earth-surfaced history and nature trail for interpretive purposes.
- In conjunction with the current vehicular access and service road from FAS 986 to the historic core, rely upon this and other existing county roads to provide access within the reconstructed prairie for fire-fighting equipment and other vehicles.
- Explore the feasibility and consider purchase of a specially equipped, motorized wheelchair or other vehicle with features that will permit improved accessibility to the history and nature trail. Alternatively, consider use of a soil consolidant for the entire length of the trail to provide conventional wheelchairs with a more accessible, all-weather surface.

- Take advantage of the potential for linkages between the existing history and nature trail and archeological features in this area and explore opportunities for access in conjunction with planning for the new visitor center.
- Provide additional security gates, as necessary, where existing farm roads enter the site from the south and east.
- Upon completion of the visitor center and in conjunction with other circulation modifications, realign the non-historic, dirt service road east of the historic core with the approximate alignment of the Santa Fe Trail. Stabilize the service road with coarse gravel to provide year-round emergency access. Avoid additional modifications that would alter the road's existing unobtrusive, rural character. Restore the former road alignment to a level appearance and condition consistent with the adjacent area.* See also *Historic Core: Circulation and Parking,* above.
- Upon completion of the visitor center, develop an additional history and nature trail as called for in the GMPA along the approximate alignment of the Santa Fe Trail connecting the visitor center and the picnic area.*[8] See also *Signage and Interpretation,* below.

Vegetation

- Continue to strive to recreate a prairie environment evocative of the landscape during the period of significance. Acknowledge that this appearance is not historically accurate.
- Based on the findings of the pollen, phytolith, and macrofloral analysis and the 1989 and 1996 prairie plant surveys, consider supplementing the current prairie flora with species known to have been present during the period of significance.[9] These include grasses such as fescue *(Festuca),* Calmolvilfa, and Muhlenbergia, as well as other plants such as milkvetch *(Astragalus),* wild buckwheat *(Eriogonum),* prairie clover *(Petalostemon),* phlox *(Phlox),* and weedy purslane *(Portulaca).* In addition, consider including appropriate members of several plant families also known to have been present, including mustard (Brassicaceae), mint (Lamiaceae), primrose (Onagraceae), and milkwort (Polygalaceae).
- Remove the two overmature cottonwood trees south of the historic core in conjunction with other efforts towards reestablishing prairie vegetation in the area.
- Manage reconstructed prairie areas to control the incidence of woody vegetation and undesirable annuals.
- Explore the feasibility of acquiring the requisite approvals to conduct periodic, controlled burns of reconstructed prairie areas.
- Work towards establishing a policy of conducting controlled burns every three to five years in selected areas of the reconstructed prairie consistent with the recommendations of the 1989 and 1996 plant survey reports prepared by Natural Science Research Associates.[10] If it is not possible to establish controlled prairie burns, rely instead on annual haying to maintain the prairie and control undesirable species.
- Conduct annual haying in unburned areas and where prairie conditions make haying feasible. Process the hay into square bales for use in the Trail Ruts unit and for possible resale. Allocate

*Phase 2 recommendation.

[8]*General Management Plan Amendment,* 19.

[9]See Appendix A for the complete pollen, phytolith and macrofloral analysis report; see Appendices E and F for the 1989 and 1996 plant survey reports.

[10]Natural Science Research Associates, *Plant Survey of the Restored Prairie at Fort Larned National Historic Site.* Hays, Kansas, 1989, 1-2 (Appendix E).

a portion of the yield for bales produced by historical methods and having an appropriate appearance for use as interpretive objects within the historic core and adjacent prairie areas.
- Avoid using the reconstructed prairie for grazing. Grazing has the potential to introduce the seeds of undesirable species and would require fencing.
- Control the incidence and spread of undesirable species through controlled spraying of herbicides as recommended by Natural Science Research Associates.
- Upon completion of the visitor center and in conjunction with the removal and restoration to prairie of the southern portion of the existing entrance road, manage this area as part of the reconstructed prairie management zone.* See also *Visitor Use Areas: Circulation and Parking,* below.

Site Furnishings and Objects

- Consider placing historically appropriate hay stacks near the old cemetery since historic accounts mention that there were haystacks on the island.
- Avoid the use of fencing to delineate the NHS boundary or to subdivide the area with fencing, in order to convey as much as possible the appearance of an open, prairie landscape.
- Avoid the use of site furnishings, such as benches and trash receptacles, except in association with the history and nature trail shelter.

Signage and Interpretation

- Interpret prairie management practices as part of the overall interpretation of the NHS. Address the roles of haying and of seasonal fires in this area both historically and today. Provide interpretation of the historic character of the prairie and interpret the philosophies and techniques associated with prairie reconstruction in the twentieth century. Relate the interpretation to the ecology of place.
- Acknowledge through interpretation that the prairie was grazed during the period of significance, but that grazing today is inconsistent with current prairie management practices.
- Take advantage of the existing history and nature trail to provide access to archeological sites and provide on-site interpretation of non-extant associated resources (stable, corrals, cemeteries, gardens, and outbuildings).
- Continue the use of portable freestanding signs to provide interpretation of seasonal plant species.
- Using archeological investigations, identify and interpret the site of the garden [HS-50] on the oxbow "island". Consider planting an interpretive reconstructed garden that would be typical of the kind documented in Surgeon Forwood's reports and other primary source materials. Such a garden could include corn, lettuce, radishes, beets, spinach, peas, beans, onions, cabbage, cucumbers, and squash. Employ nineteenth-century gardening practices, allowing the garden to prosper during summers with favorable growing conditions and to decline during dry, windy summers. Avoid the use of pesticides. Also interpret at this site the garden established by Company C on the north side (left bank) of the Pawnee River opposite the hospital site and the garden or gardens established by Companies D and K on the right bank of the river. These gardens are described in the 1870 and 1875 annual reports.[11]

[11]Although information is available concerning the company gardens, the location of the garden north of the river would make access difficult for visitors. Reconstruction of its sod wall and irrigation pump would be expensive and require ongoing maintenance by NHS staff. While gardens could be reconstructed on the south bank of the river, that action would be inconsistent with the proposed treatment of other non-extant resources in this vicinity.

- Following completion of the visitor center, relocate the tepee to a site adjacent to the history and nature trail connecting the visitor center and the picnic area. Use this feature to provide interpretation of the Indian Bureau era. Reconstruction of a larger Indian encampment and associated features could be developed as part of the interpretive program.*

Views and Vistas

- Monitor views from the new cemetery archeological site and from the history and nature trail with a goal of protecting the viewshed from these areas. See *Entire NHS: Viewshed Enhancement and Protection*, above, for adjacent land protection strategies.
- Use interpretive exhibits and objects, such as wagons and encampments, to provide opportunities to screen undesirable views.

Future Research and Documentation

- Continue documentary research and archeological investigations to supplement existing information available concerning the archeological sites in this area.
- Conduct additional research to determine the extent to which the corrals, adobe shanties, and mail station were active during the period of significance.
- Undertake a sign study to develop a series of interpretive and informational signs that will be compatible with controlled burns, haying and mowing, or whatever prairie management practices are adopted. Signs need to be low in scale and unobtrusive to be compatible with the visual character of the prairie; they also need to be sufficiently evident to be protected during periods of prairie management. The present portable, freestanding signs that provide interpretation of seasonal plant species provide an appropriate model for interpretive signs. No signs should exceed the height of unmowed prairie vegetation.

RIPARIAN SYSTEMS

Buildings and Structures

- Retain the existing berm along the south bank of the Pawnee River because of its role in preventing site damage from periodic flooding. Consult a hydrologist or civil engineer to evaluate any effects of modifying or removing existing berms and drainage or irrigation ditches to determine if there are less visually intrusive methods of providing flood protection.

Circulation and Parking

- Upon completion of the visitor center and in conjunction with other circulation modifications, remove the highway bridge north of the historic core.*
- In siting and constructing the new pedestrian access bridge to the historic core across the Pawnee River, which replicates the historic approach, consider opportunities for protecting existing vegetation in the river corridor* See also *Visitor Use Areas: Circulation and Parking,* below.

Vegetation

- Retain existing trees along the Pawnee River and oxbow corridors—primarily a hardwood mix of maples, elms, walnuts, oaks, and willows—to provide screening for the historic core from undesirable modern intrusions within the NHS viewshed. Acknowledge and accept that the existing vegetation and tree cover are more dense than they were during the period of

*Phase 2 recommendation.

significance. Retention of vegetation in this area more closely approximates the conditions at the time the fort was established (rather than during the period of significance), but is desirable as part of overall NPS sustainability policies.

- Adopt one of two approaches to the oxbow bottomland: either continue to mow it so that its form is identifiable, or allow successional ingrowth of trees to more closely approximate the historic appearance described by Forwood as "a dry, shallow ravine that once supported a large growth of trees." The presence of trees may be desirable to screen incompatible views to the southeast.
- Continue to control hemlock and other undesirable species along the Pawnee River and oxbow corridors.

Site Furnishings and Objects

- Avoid installing site furnishings, such as picnic tables, benches and trash receptacles, near the Pawnee River and the oxbow, to protect the natural setting and character of the riparian area .

Signage and Interpretation

- Interpret the role of the river in fort life, river ecology—both historically and today—and uses of the oxbow and the island during the period of significance as well as later modifications that are evident today, such as the embankment separating it from the Pawnee River.
- Provide all interpretation for the Pawnee River and the oxbow in other areas of the NHS, such as the historic core, visitor center, or along the history and nature trail, to protect the natural setting and character of the riparian area.

Views and Vistas

- Use appropriate riparian vegetation to screen objectionable modern views from the historic core.

Utilities and Site Management

- Work with adjacent and other riparian land owners, especially at the dam site, to ensure appropriate seasonal flow of the Pawnee River.
- Monitor and evaluate the need for riverbank stabilization (fieldwork did not indicate bank stabilization to be a pressing concern).
- Monitor the activity of pocket gophers and thirteen-stripe ground squirrels at all flood control earthworks, and evaluate the need for trapping or other management techniques. See also *Historic Core: Utilities and Site Management* for appropriate trapping approaches.
- In conjunction with removal of the existing highway bridge over the Pawnee River, restore the affected areas to a condition consistent with that of adjacent riverbank areas.*

Future Research and Documentation

- Consult a hydrologist or civil engineer to evaluate the effects of modifying or removing existing drainage and irrigation ditches and berms to determine if there are less visually intrusive methods of providing flood protection.

TRAIL RUTS

Buildings and Structures

- Retain and maintain the existing observation platform. Avoid introducing any additional structures in the Trail Ruts unit.
- Remove the raptor poles since they have not been effective in attracting prairie dog predators. Restore the ground to a level condition consistent with the adjacent area.

Circulation and Parking

- Maintain the existing parking area with its current size and configuration.
- Continue to provide a mowed path as access to the observation platform.

Vegetation

- Control exotic and invasive vegetation using techniques suited to each of the objectionable species. Use approved herbicidal sprays to control field bindweed (which is invasive from the adjacent fields). Consider the use of selected hand mowing to control smooth brome (which is invasive from the adjacent road), taking care to avoid damage to the historic ruts (below). Use selective and controlled burns: in early spring for kochia (which is invasive from adjacent fields); in the early fall for threeawn, as needed. Limit treatment to the specific areas where the objectionable species are located. Do not treat the entire area. Consult the 1989 Natural Science Research Associates plant survey for additional information.[12]
- Keep vegetation low in height in the areas designated for the relocation of the prairie dog community by hand-mowing, burning in the early spring, or other appropriate methods. See also *Utilities and Site Management,* below.
- Explore the short-term use of fertilizers or interseeding within the trail ruts portion of the site to produce taller or more dense vegetation less suitable as a prairie dog habitat. Acknowledge and interpret the fact that such practices may make the ruts less visible for a time to visitors. See also *Signage and Interpretation,* below. Monitor vegetation in this unit to identify any overgrazing on the part of prairie dogs and the subsequent increase in threeawn presence.

Site Furnishings and Objects

- To preserve the remote character of the site, avoid siting benches, trash receptacles, and other site furnishings within the Trail Ruts unit.

Signage and Interpretation

- Continue to use the observation platform as an interpretive site.
- Develop an interpretive panel to be located on the fence at the parking area. This panel should identify the Trail Ruts unit and provide general interpretation for visitors. Remove the existing Trail Ruts identification sign at the parking area. This panel will also provide alternative interpretation for those who do not view the site from the platform. Currently the only on-site interpretation is from the platform.
- Promote public awareness of the prairie dog resettlement program by providing interpretation of these activities at the designated interpretation areas within the Trail Ruts unit. See also *Utilities and Site Management* below and *Vegetation,* above.

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[12]Natural Science Research Associates, *Plant Survey of the Restored Prairie at Fort Larned National Historic Site.* Hays, Kansas, 1989, 3 (Appendix E).

- Continue to use warning signs sparingly as needed.

Views and Vistas

- Identify important viewsheds from and within the Trail Ruts unit, especially those to the north from the observation platform. Utilize as necessary the appropriate viewshed protection strategies described above for the entire NHS.
- See *Buildings and Structures* above for the removal of the raptor poles.

Utilities and Site Management

- Develop a short-time approach to controlling runoff and soil deposition from adjacent agricultural fields, such as using siltation fences along the affected boundaries of the site. If deposition continues to be a problem, work with adjacent landowners and farmers to find and implement longer-term solutions such as perimeter drainage structures.
- Continue to use post and wire fencing at the boundaries of the site to protect the site's integrity.
- Continue to monitor the effects of prairie dog settlement in and near the Trail Ruts unit. Implement controls in a manner that is consistent with the level of cultural resource threat to the trail ruts and the protection status of the prairie dogs. Resolve any conflicts between wildlife protection and cultural resource protection goals. Appropriate landscape-related control and treatment measures may include
  - identifying appropriate upland portions of the Trail Ruts unit—away from the historic trail ruts—for the relocation and resettlement of the existing prairie dog community. Provide a suitable habitat by keeping vegetation in such areas low in height. See also *Vegetation,* above.
  - erecting straw bale barriers (approximately 2' high) between the designated resettlement areas and the existing prairie dog settlement to discourage re-migration to the ruts portion of the site. See also *Reconstructed Prairie: Vegetation,* above. Ensure that the bales do not contain seed heads of undesirable species. It is anticipated that the bales will be used for an extended period of time but that they will not be permanent. Place the bales between the rut and the prairie dog settlement since the bales would interfere with the dogs' abilities to visually detect predators. This interference is intended to encourage the dogs to more away from the rut area.
  - using non-injurious trapping methods and equipment (box traps) to capture and relocate prairie dogs from the trail ruts portion of the site to the designated resettlement areas. Trapping is generally most effective in the fall. Monitor these activities to assess their effectiveness.
  - leveling prairie dog mounds and fill holes within the ruts portion of the site to discourage reoccupation of the former prairie dog town.
  - monitoring the efficacy of management practices that maintain prairie vegetation at different heights for the purpose of controlling prairie dog settlement patterns.

Future Research and Documentation

- Undertake a detailed study of the appropriate methods to control the prairie dog population. Involve nearby and adjacent property owners as appropriate.
- Explore the use of sensing and mapping techniques, such as magnetometry, aerial photography, and global positioning satellite technology, to establish baseline site conditions and monitor over time important site characteristics such as erosion / deposition rates and the

settlement patterns of the local prairie dog community. Determine the effects on the NHS over time of adjacent land uses. Such information may be useful in future planning for the NHS and in developing agreements with private property owners and in the state and local planning process.

VISITOR USE AREAS

Buildings and Structures

- Retain and maintain the existing restroom, well house, interpretive exhibit shelter, and picnic shelters at the picnic area.
- Continue with present plans to design and construct a new visitor center west of the Pawnee River and the historic core accessible from FAS 986. Consider developing a contemporary building design that makes use of sandstone and other materials characteristic of the fort's historic architecture while striving to incorporate sustainable design principles for daylighting, energy conservation, and renewable, recyclable, and/or non-toxic building materials. Use of similar exterior construction materials to those used historically will provide an opportunity for implementation and evaluation of future preservation techniques applicable to historic buildings and structures, as necessary, without the risk of experimentation on the historic resources themselves.
- Upon completion of the visitor center and in conjunction with circulation modifications, remove the entrance kiosk at the temporary visitor parking area.*
- Upon completion of the visitor center, relocate the seasonal tepee exhibit to a site adjacent to the history and nature trail connecting the visitor center and the picnic area or to an appropriate alternate site within the reconstructed prairie adjacent to the historic core.*

Circulation and Parking

- In the short term, retain and maintain the existing picnic area vehicular and pedestrian circulation.
- Continue with present plans to design and construct a pedestrian bridge across the Pawnee River just west of the historic core in conjunction with construction of the new visitor center. Consider siting the bridge to take advantage of views between the proposed visitor center and reconstructed sutler's complex. See also *Riparian Systems: Circulation and Parking,* above.
- Upon completion of the visitor center, remove the southern portion of the existing entrance road and the associated temporary visitor parking area. Regrade and restore the affected areas to a level condition and with appropriate plant species consistent with the adjacent reconstructed prairie. It is anticipated that, at such time, this area will be managed as part of the reconstructed prairie management zone. See also *Reconstructed Prairie: Vegetation,* above.
- Consider reestablishing the original vehicular circulation loop at the existing picnic area to orient the area more to in-transit highway visitors and reinforce separation between the picnic area and the other NHS facilities and interpretive areas, as called for in the GMPA.[13] Such circulation changes, in conjunction with development of a new vehicular access to the fort and visitor center to the west along FAS 986, would avoid confusion with the present NHS visitor entrance.*

*Phase 2 recommendation.

[13] *General Management Plan Amendment*, 19.

- In conjunction with construction of the new visitor center, develop new entrance roads, permanent and overflow parking areas, and pedestrian circulation systems. Ensure that these systems are appropriate in scale with the visitor center building and site design, that they utilize materials characteristic of the historic fort to the greatest degree practical, and that meet current UFAS and fire access requirements.*

Vegetation

- Explore the use of low maintenance varieties of buffalograss *(Buchloe dactyloides)* for groundcover within the picnic area and throughout the new visitor center site development. Varieties such as Tatanka and Cody produce a denser and darker-green turf than traditional varieties, are winter hardy, heat tolerant, and drought resistant, and have reduced mowing requirements. These characteristics will help distinguish the picnic area and visitor center site from the historic core, where a lighter green, traditional variety of buffalograss is present. In the picnic area, one of these varieties may be interseeded with the existing turf. The visitor center development presents the opportunity to use one of the new varieties exclusively, benefiting from their ability to provide faster first-year cover.
- Avoid the use of tree plantings as part of the general site development of the visitor center or its parking area unless designed and implemented as an naturalistic extension of existing vegetation of the adjacent Pawnee River corridor. Select native species of trees or other plant materials present in the river corridor for any developed planting areas. Avoid the use of predominantly ornamental plantings as part of the visitor center site development.
- Continue to monitor and control as necessary the growth of poison hemlock in the temporary visitor parking area until such time as this area is redeveloped as part of the reconstructed prairie.

Site Furnishings and Objects

- Continue to maintain the existing picnic area as a public amenity, in addition to the proposed picnic area to be developed as part of the new visitor center.
- Retain the DAR Santa Fe Trail marker as part of the existing picnic area. In its present location, the marker relates well to the approximate northern route of the Santa Fe Trail. If the marker must be relocated, it should be moved to another site along the known trail alignment and in conjunction with one of the existing or proposed interpretive history and nature trails.

Signage and Interpretation

- Continue to provide interpretive information concerning Fort Larned, Pawnee Rock and the Santa Fe Trail at the existing picnic area. It is anticipated that this area will continue to serve local residents, visitors and other travelers who are not visiting the NHS but who may desire information about the fort.
- Upon completion of the visitor center, remove the existing NHS entrance sign structure.
- Design and construct a new NHS entrance sign structure adjacent to the new entrance drive from FAS 986, using sandstone and other materials characteristic of either the fort's historic buildings or the new visitor center. Consider the use of raised or incised lettering on a durable wall panel rather than painted lettering on a metal sign. The overall appearance of the sign should be of a wall or monolith, not a building. In no case should the sign have a roof.* See also *Easement Areas: Signs and Interpretation,* below.

- Develop a new interpretive exhibit to inform visitors in an educational manner to avoid engraving on fort walls. Locate this exhibit on the pedestrian approach to the historic core.

Views and Vistas *(Exhibit 11b)*
- Continue to provide and maintain vegetative screening at the existing picnic area.
- Explore opportunities to reduce or eliminate the visual and acoustic effects of the oil derrick northwest of the NHS. Potential alternatives include removal or relocation to a less intrusive site or the addition of vegetative screening. Should use of the existing site be discontinued, encourage removal of all aboveground installations.
- Evaluate and revise screening efforts in the picnic area following completion of the new visitor center and the proposed extension of the history and nature trail in the northwest corner of the NHS.*
- Maintain an open vista to the new visitor center from Route 156 compatible with historic accounts of views to Fort Larned from the Santa Fe Trail.*

Utilities and Site Management
- Consider the use of a ground source heat pump system to meet the heating and cooling needs of the visitor center and associated facilities without reliance on visually and acoustically obtrusive external mechanical equipment.

Special Events
- Encourage visitor groups and other visitors during periods of peak attendance to use the existing picnic area adjacent to Route 156 rather than picnic facilities at the visitor center, to minimize noise and other disturbances within the historic core.

SUPPORT AREA

Buildings and Structures
- Site the proposed addition to the maintenance building and the freestanding storage building with their longest dimensions running east-west in the northern portion of the maintenance yard so they are less conspicuous from the historic core and can be more easily screened from view by vegetation. Use the same brown, split-faced concrete block or similar unobtrusive exterior building material as the existing structure. Limit all construction to one story in height.

Circulation and Parking
- To the greatest degree possible, keep service vehicles parked within the maintenance building when not in use.
- Avoid expanding the existing paved areas outside the maintenance yard fence.

Vegetation
- Retain the existing specimen trees at the maintenance facility, and find opportunities to incorporate them into the overall vegetative screening of the area. See *Views and Vistas,* below.

Signage and Interpretation
- Keep all signs associated with the maintenance facility, including directional signs on Route 156, minimal in number and inconspicuous in appearance.

View and Vistas

- Extend the adjacent Pawnee River corridor vegetation to screen views of the maintenance facility and volunteer trailer site from the historic core. Select native species of trees or other plant materials present in the river corridor for any developed planting areas. Strive for an appearance that is a natural extension of the existing river corridor vegetation. Vegetation along the Pawnee would have been present prior to and at the beginning of the period of significance. New vegetation should build on this character and not appear as an unrelated attempt at screening the maintenance facility.

Utilities and Site Management

- Upon completion of the visitor center, consider relocating the soil stockpile area to a less conspicuous portion of the NHS. If relocation is feasible, remove the dirt road and curb cut serving the existing site and restore the area to a level condition and with appropriate plant species consistent with the adjacent reconstructed prairie. If relocation is not feasible, extend the adjacent Pawnee River corridor vegetation to provide screening on the north side of the access road and stockpile area.*

EASEMENT AREAS

Buildings and Structures

- Monitor landowner activities concerning buildings and structures on easement properties with respect to legal provisions of easement agreements.

Circulation and Parking

- Avoid developing new roads or parking areas through easement areas. Rely on existing farm roads and adjacent vehicular circulation for fire access to these areas.

Vegetation

- Explore opportunities with landowners to establish reconstructed prairie vegetation on easement lands. Provide seed, site management, and technical assistance as necessary. Lacking such agreements, encourage landowners to maintain easement areas in open agricultural fields. Avoid tree plantings or other tall woody vegetation that would obscure long-range views to and from the NHS.
- Where it is beneficial to adjacent landowners, explore possibilities of growing crops not requiring irrigation equipment or structures in the easement areas.

Signage and Interpretation

- Explore opportunities to provide identification and directional signage on easement properties adjacent to Kansas highway 156 for both east and west approaches to the NHS. Such signs should be designed and erected following completion of the visitor center. They should be smaller in scale than but consistent in design with the NHS entrance sign structure, and should distinguish between the new NHS entrance and the existing picnic area.* See also *Visitor Use Areas: Signs and Interpretation,* above.

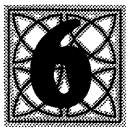
*Phase 2 recommendation.

Views and Vistas

- Concentrate present efforts to acquire additional easement lands on areas south of the Pawnee River. Areas north of the river are not as visible from the historic core, and potential changes and intrusions in these areas would involve far more land than is covered by the present limits of enabling legislation for the NHS. See also *Historic Core: Views and Vistas,* above.
- Keep easement lands open and free of buildings, structures, trees and other tall woody vegetation that would obscure long-range views to and from the NHS.
- Avoid screen plantings, particularly north of Kansas highway 156, to address visual intrusions such as oil wells on properties north of the NHS. Although such features may be visible during portions of the year from the visitor center site and the NHS approach, they do not impinge on specific views from the historic core. Extensive vegetative screening would be necessary to mitigate such views, but would result itself in a more substantial intrusion on the characteristically open prairie landscape. Instead, explore with landowners alternative land protection strategies to retire and remove such structures over time. See also *Entire NHS: Viewshed Enhancement and Protection*, above.

Utilities and Site Management

- Monitor landowner activities concerning the siting of any aboveground utilities on easement properties with respect to legal provisions of easement agreements.
- Work cooperatively with landowners of easement properties to share information and experience about relevant site management practices.



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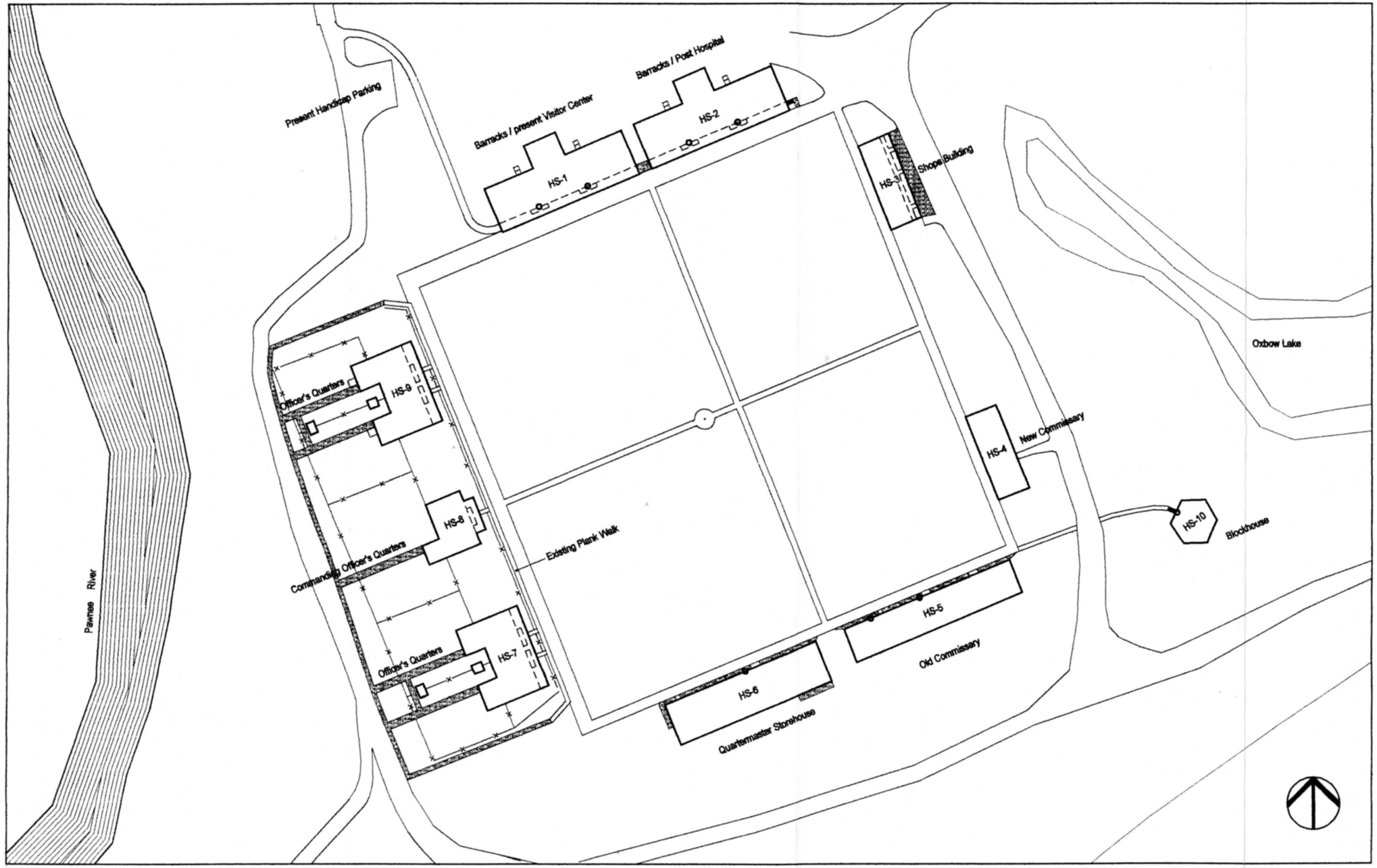
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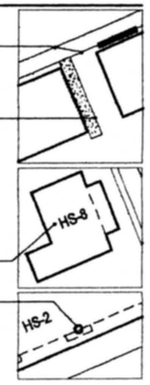
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This Key Map

shows the general location of proposed additions for universal access and is not to scale

Key to Drawing



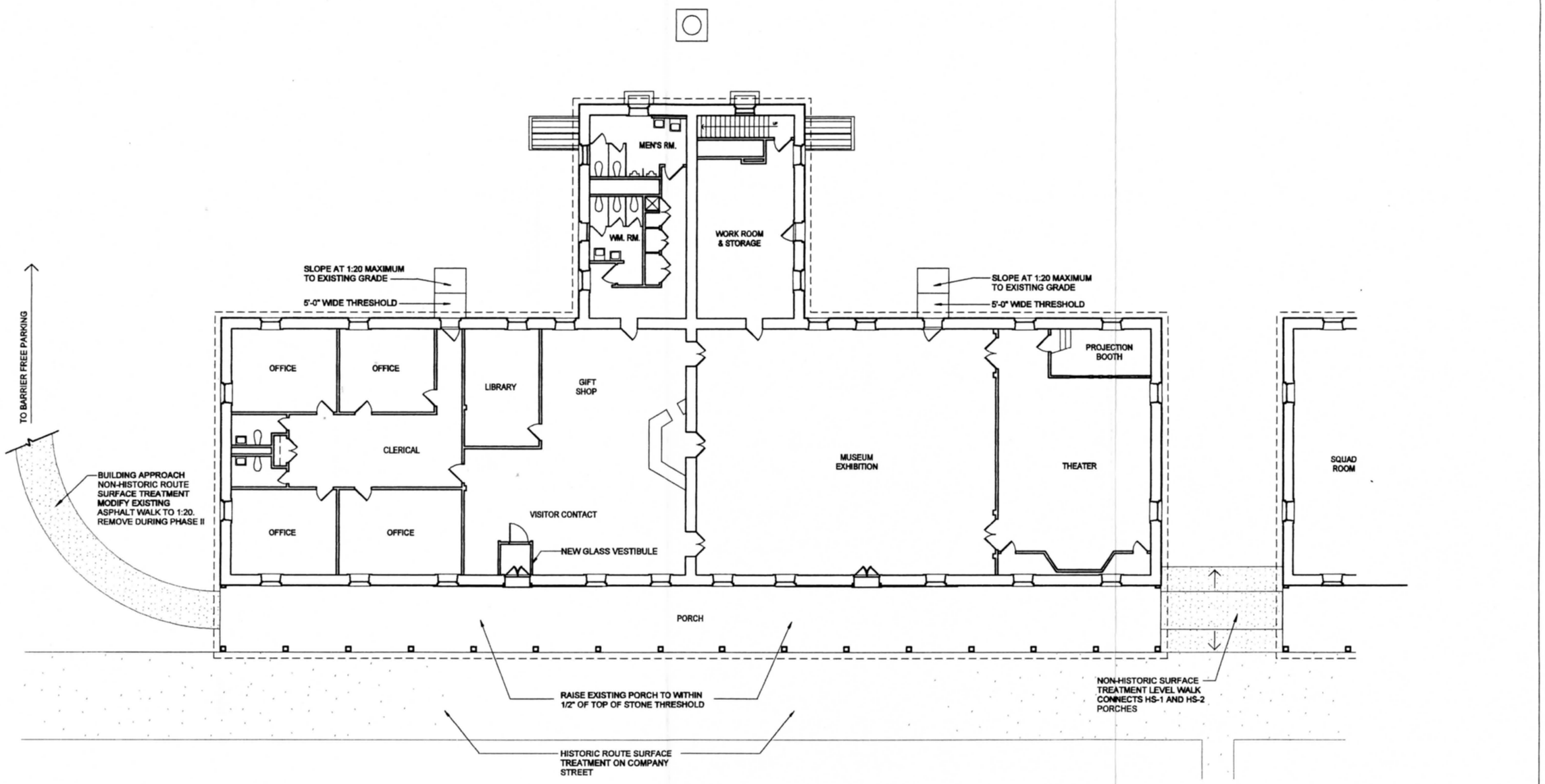
Proposed Ramps
are constructed with dimension lumber. Appearance shall clearly differ from historic plank walks

Lifts
will have a plank surface to match ramps and retractable guard rails

Noncomplying double-leaf doors
can be made accessible. Proposed options are as follows: 1) ranger assisted egress at noncomplying double-leaf doors. 2) automatic door openers or 3) rebuilding double-leaf doors that are not constructed of historic material so that they conform for the 32" clear egress requirement (see A.14)

Exhibit 15a/ Accessibility Recommendations Key Plan

DESIGNED: C. H., T. F.	SUB-SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: T. F.	A.1	KEY PLAN	PKG. NO. — — —
TECH REVIEW: S. J.		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	SHEET 1 OF 14
DATE: 5/30/97 REV. 12/2/98			



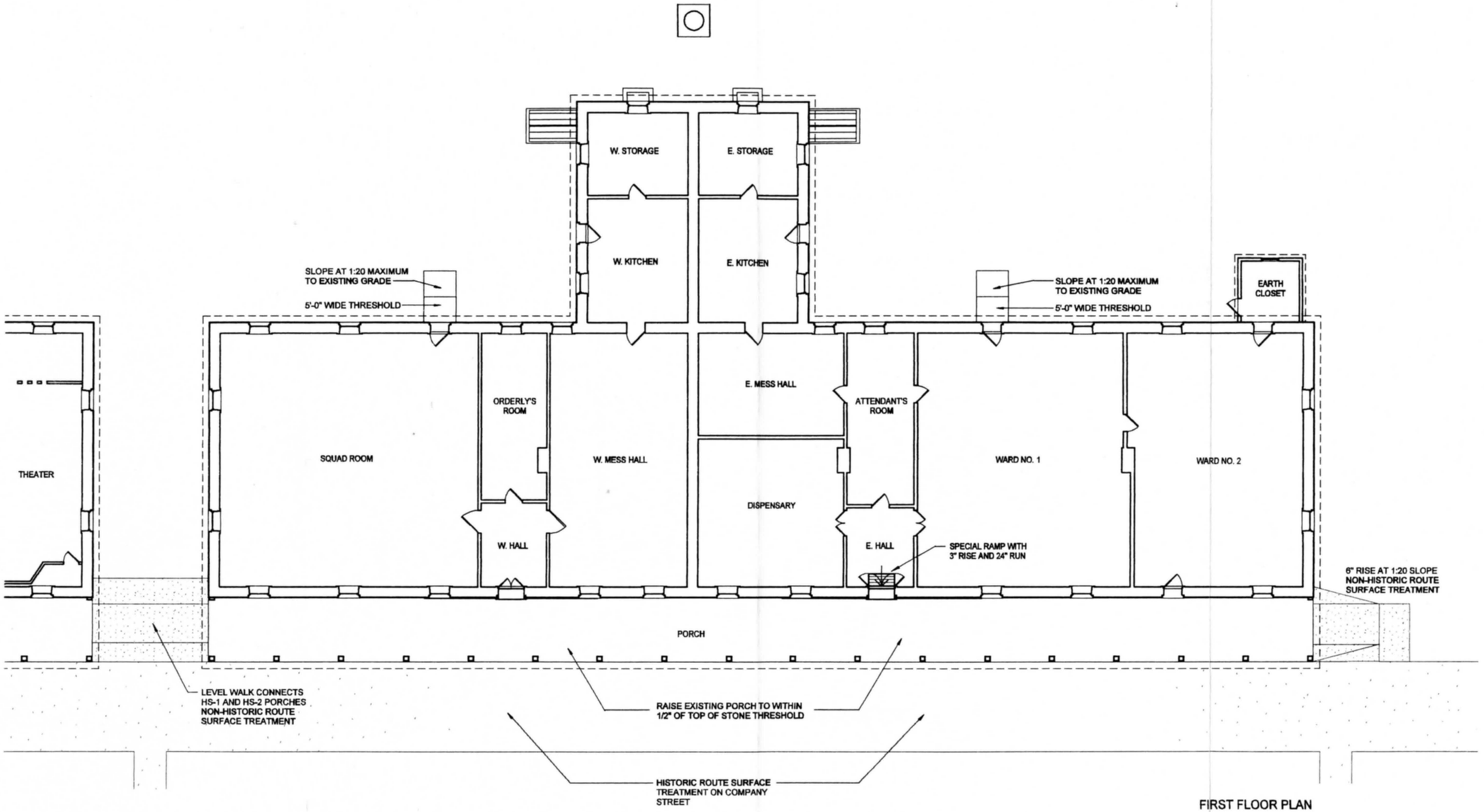
FIRST FLOOR PLAN

Exhibit 15b / Recommended Treatment

8 0 8 16

SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97 REV. 12/2/98	SUB SHEET NO. A.2	TITLE OF SHEET FIRST FLOOR PLAN BARRACKS / VISITOR CENTER HS-1 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. — PKG. NO. — SHEET 2 OF 14



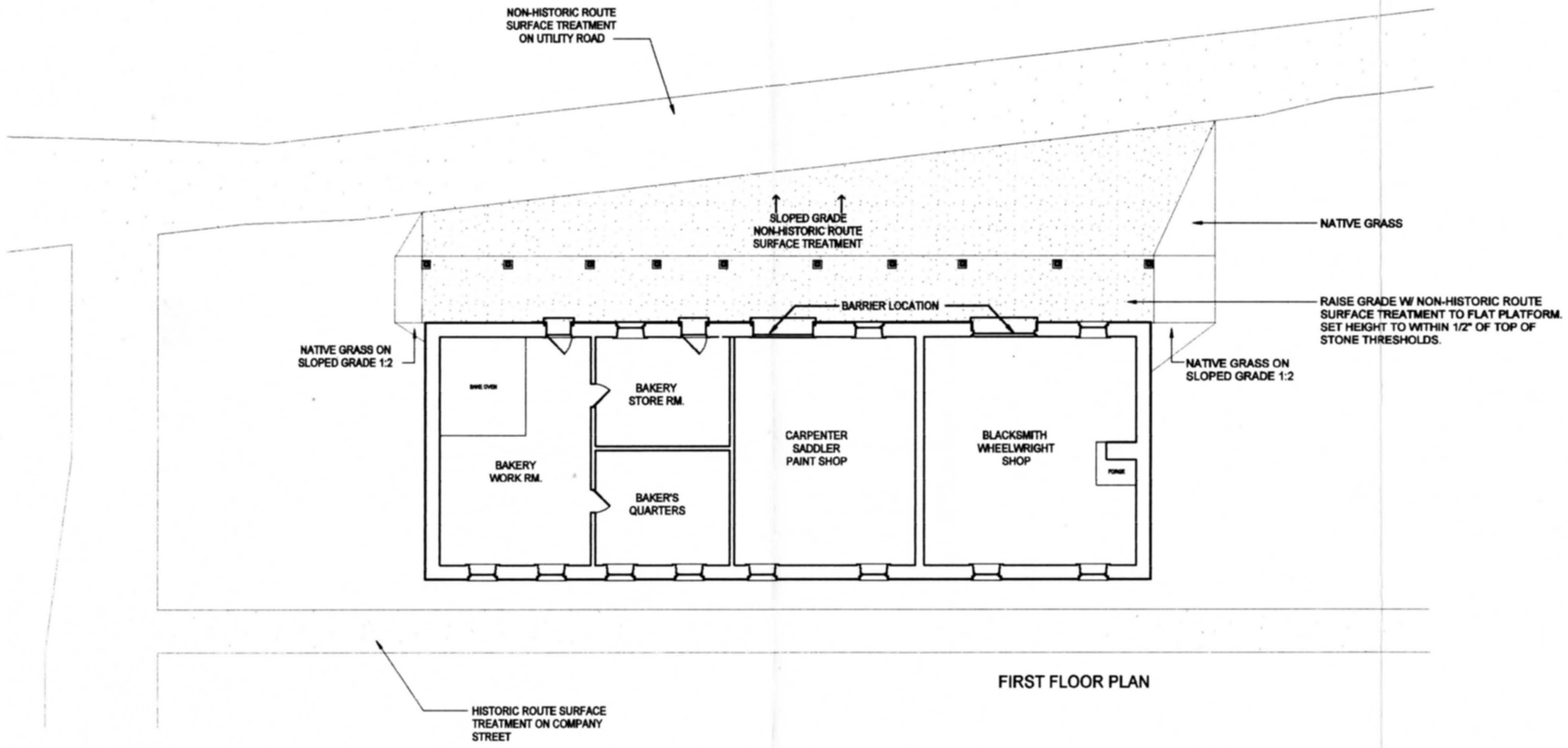
FIRST FLOOR PLAN

Exhibit 15c / Recommended Treatment

8 0 8 16

SCALE OF FEET

DESIGNED: C. H., T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: C. H., T. F.	A.3	FIRST FLOOR PLAN BARRACKS / POST HOSPITAL HS-2	PKG. NO. — — —
TECH REVIEW: S. J.			SHEET 3 OF 14
DATE: 5/30/97 REV. 12/2/98		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	

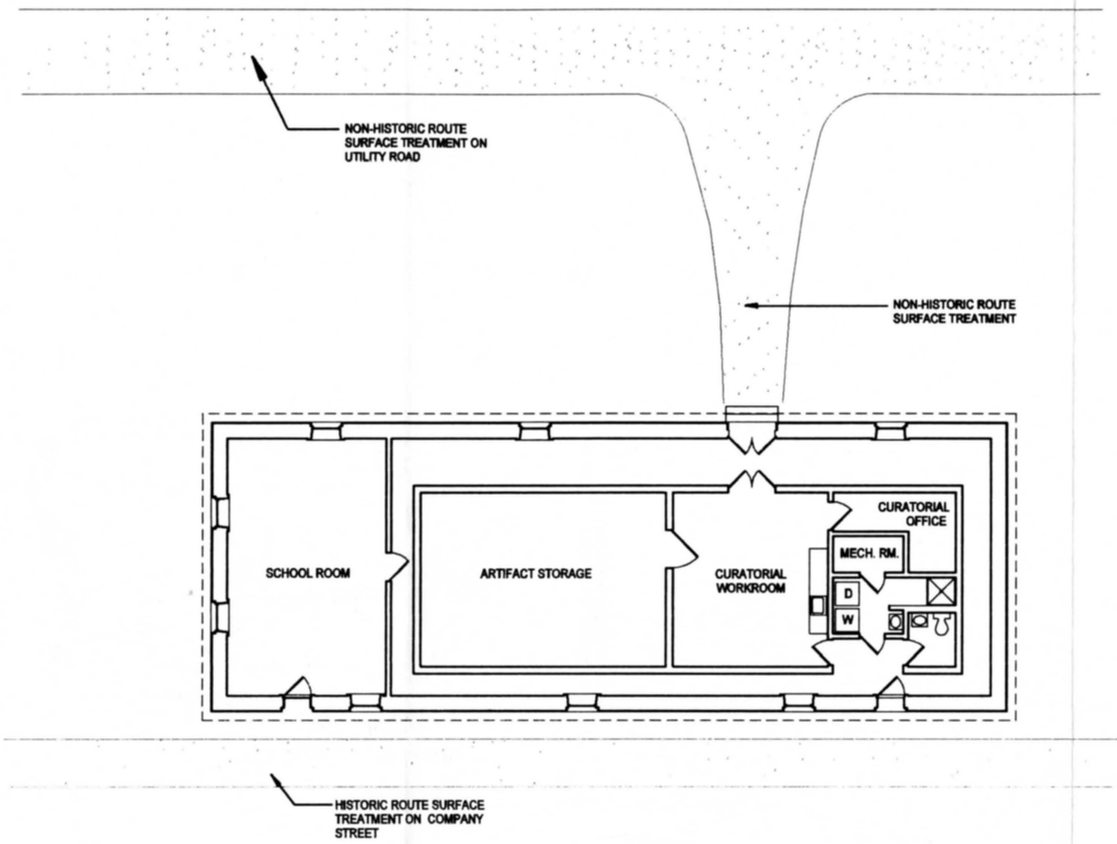


FIRST FLOOR PLAN

Exhibit 15d / Recommended Treatment

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: C. H., T. F.	A.4	FIRST FLOOR PLAN SHOPS BUILDING HS-3	PKG. NO. — — —
TECH REVIEW: S. J.			SHEET 4 OF 14
DATE: 5/30/97 REV. 12/2/98		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	

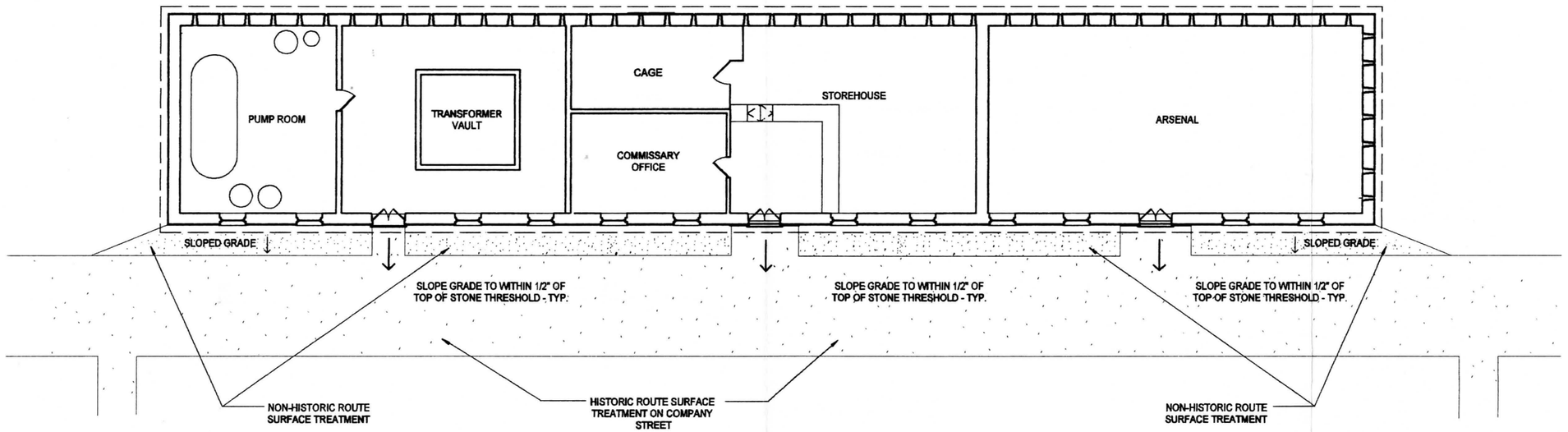


FIRST FLOOR PLAN

Exhibit 15e / Recommended Treatment

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: C. H., T. F.	A.5	FIRST FLOOR PLAN NEW COMMISSARY HS-4	PKG. NO. — — —
TECH REVIEW: S. J.			SHEET 5 OF 14
DATE: 5/30/97 REV. 12/2/98		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	



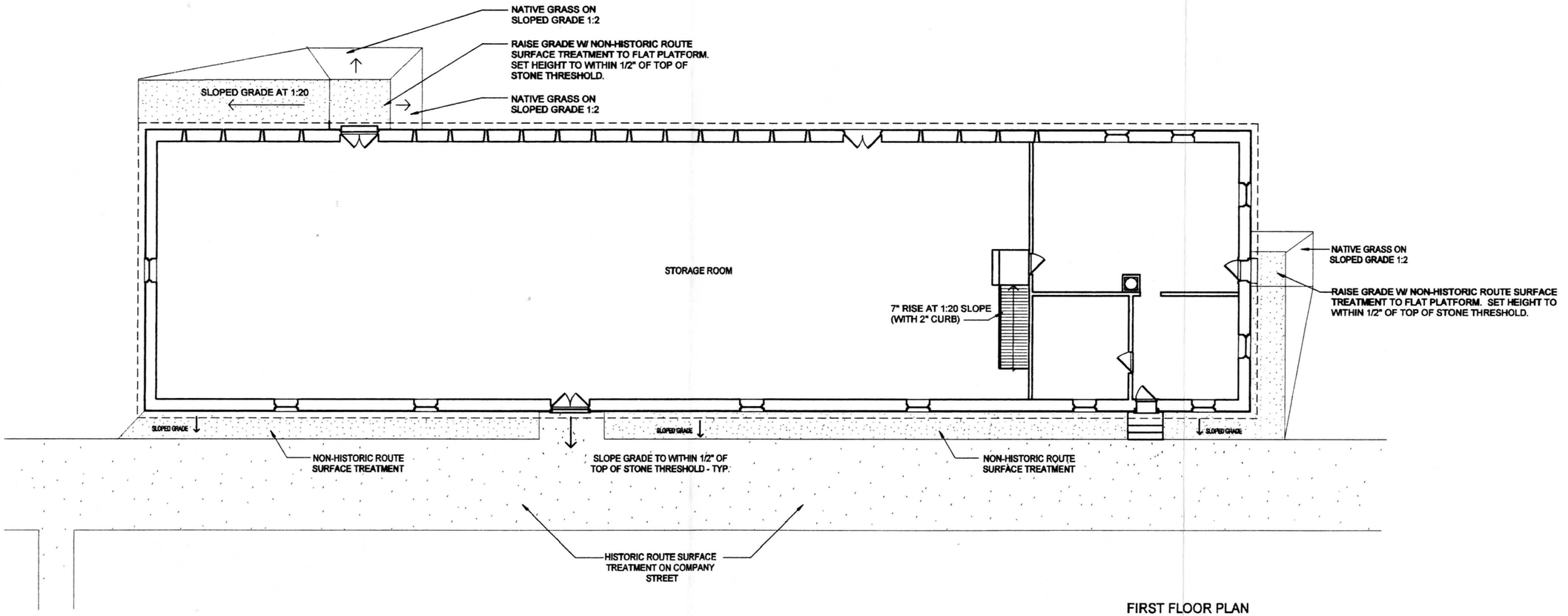
FIRST FLOOR PLAN

Exhibit 15f / Recommended Treatment

8 0 8 16

SCALE OF FEET

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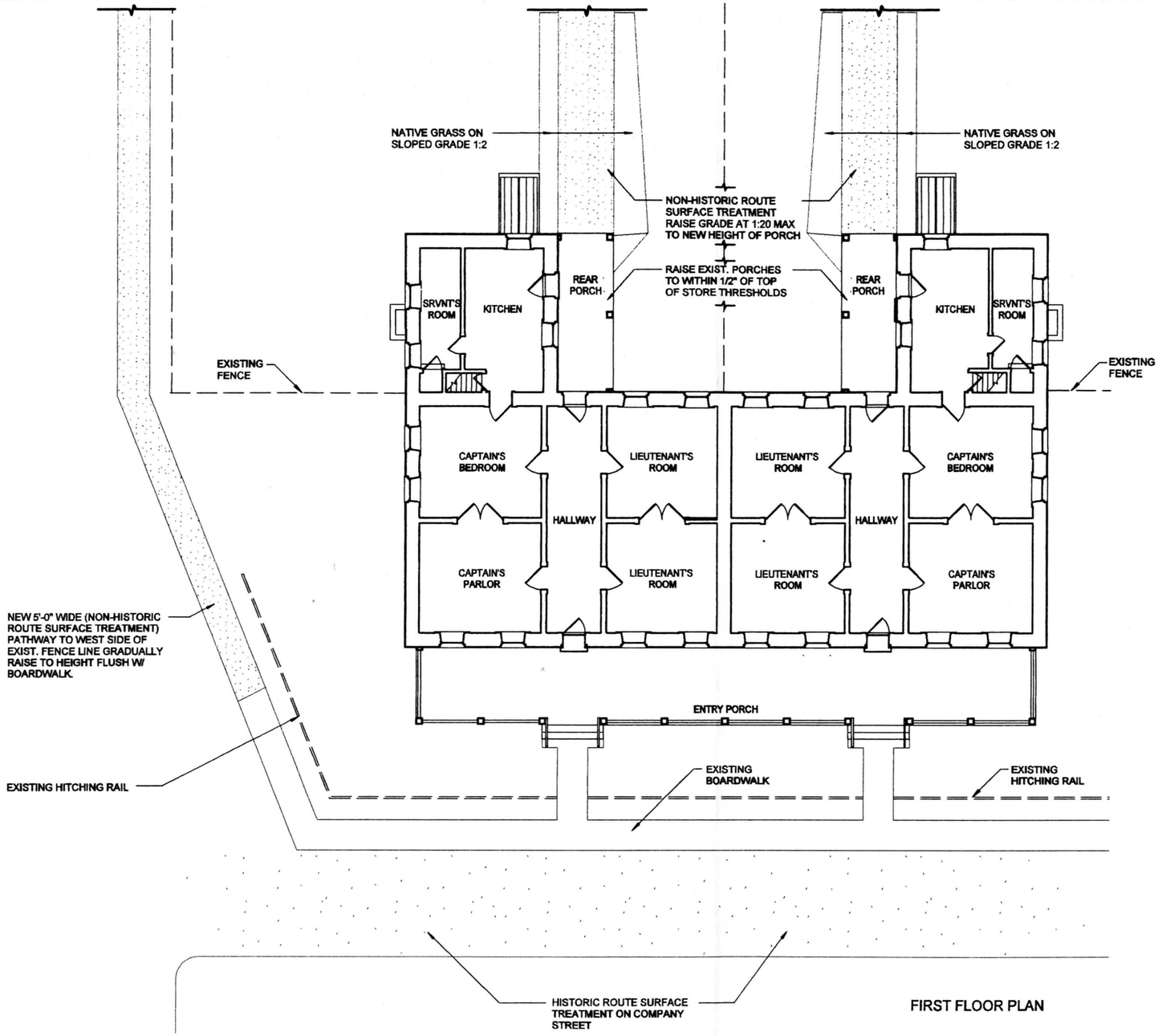
FIRST FLOOR PLAN

Exhibit 15g / Recommended Treatment

8 0 8 16

SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97 REV. 12/2/98	SUB SHEET NO. A.7	TITLE OF SHEET FIRST FLOOR PLAN QUARTERMASTER WAREHOUSE HS-6 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 7 OF 14



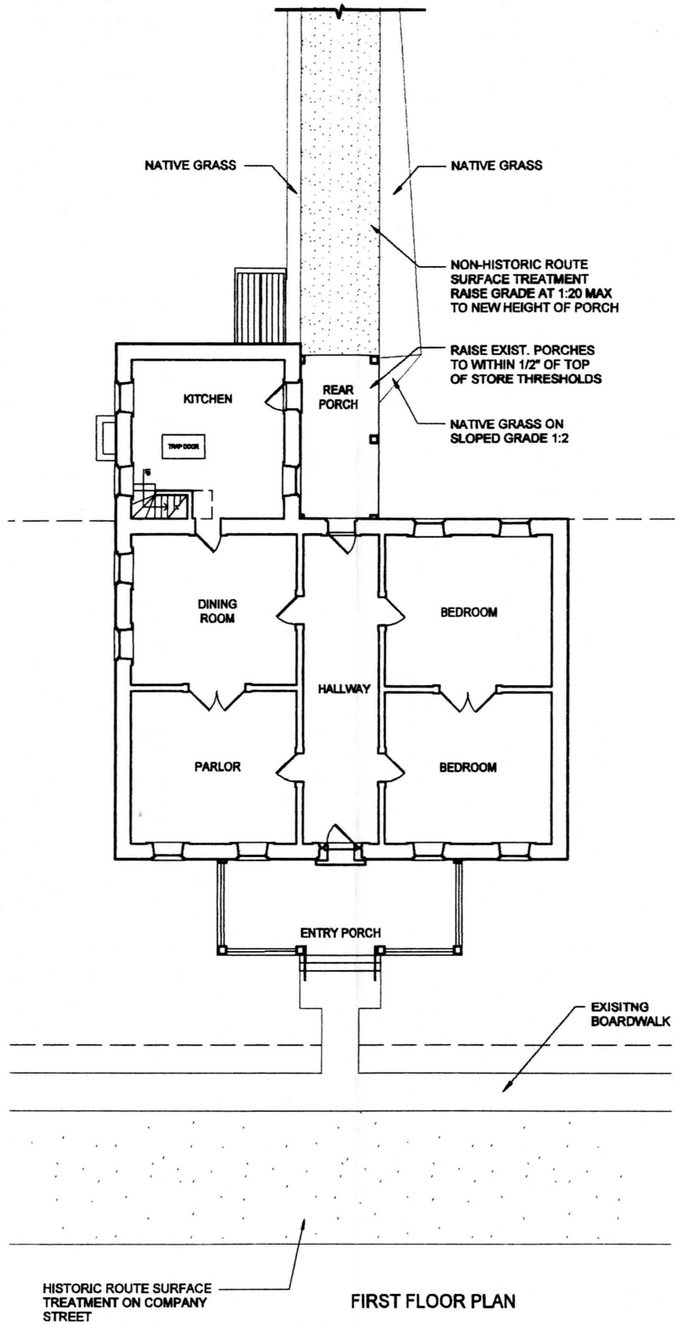
FIRST FLOOR PLAN

Exhibit 15h / Recommended Treatment

8 0 8 16

SCALE OF FEET

DESIGNED: C. H., T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: C. H., T. F.	A.8	FIRST FLOOR PLAN OFFICERS' QUARTERS HS-7	PKG. NO. — — —
TECH REVIEW: S. J.		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	SHEET 8 OF 14
DATE: 5/30/97 REV. 12/2/98			



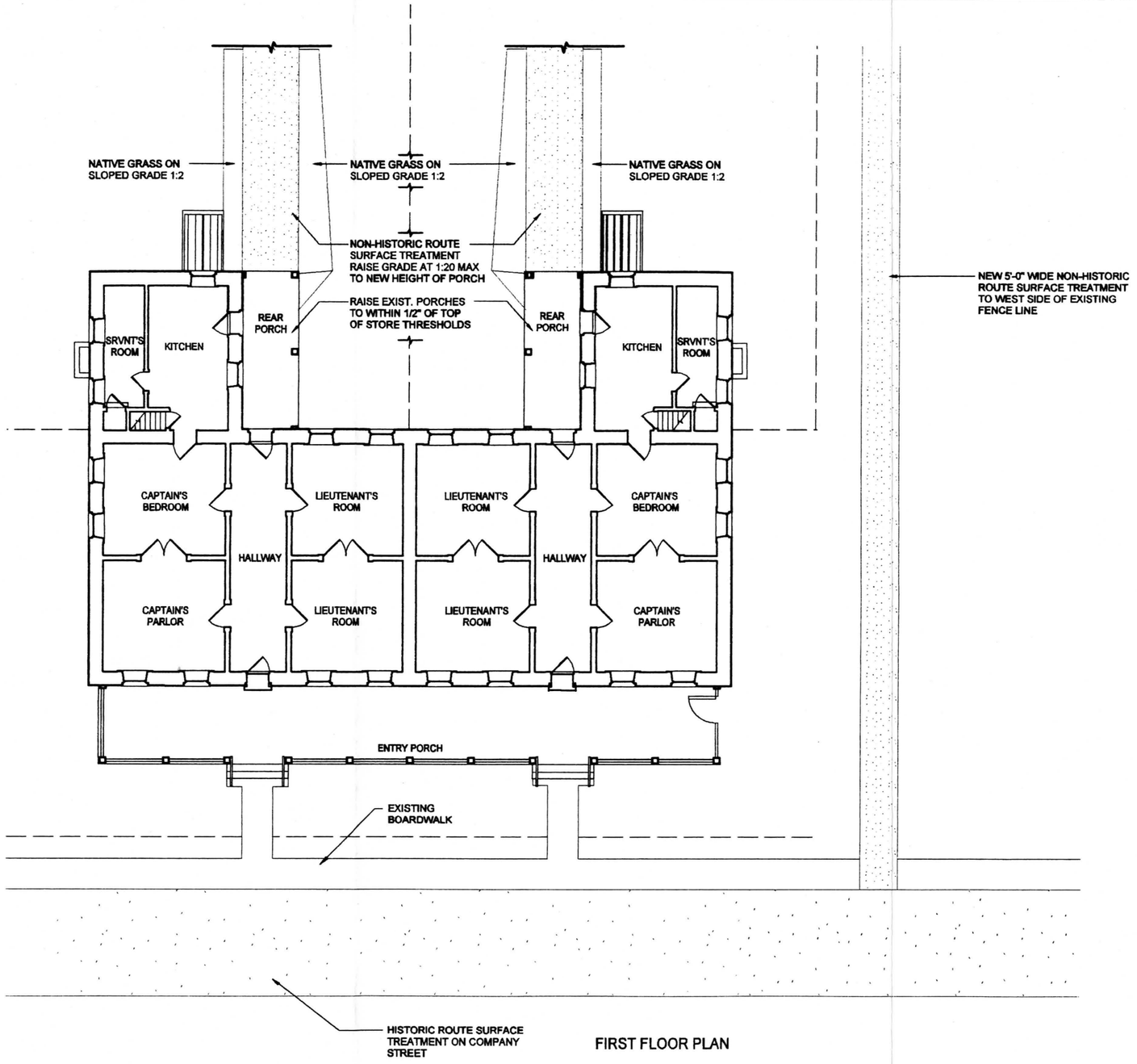
FIRST FLOOR PLAN

Exhibit 15i / Recommended Treatment

8 0 8 16

SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97 REV. 12/2/98	SUB SHEET NO. A.9	TITLE OF SHEET FIRST and SECOND FLOOR PLANS COMMANDING OFFICER'S QUARTERS HS-8 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 9 OF 14

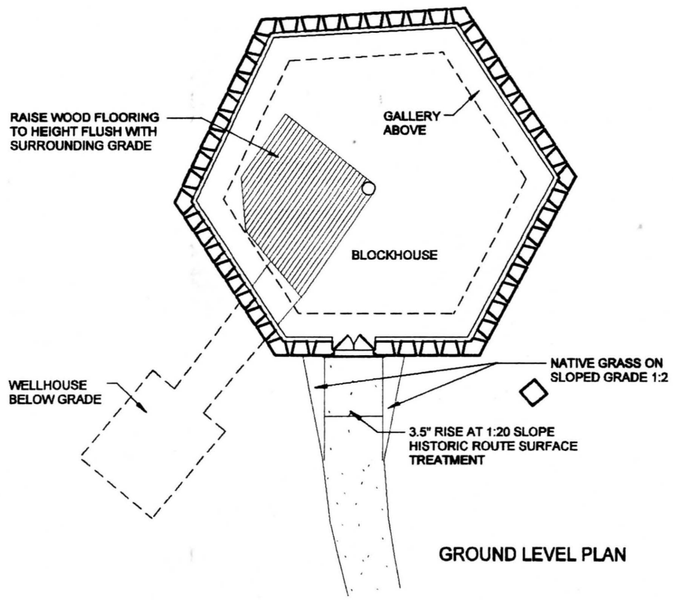


FIRST FLOOR PLAN

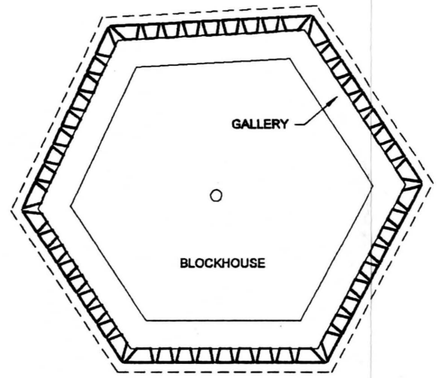
Exhibit 15j / Recommended Treatment

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97 REV. 12/2/98	SUB SHEET NO. A.10	TITLE OF SHEET FIRST FLOOR PLAN OFFICERS' QUARTERS HS-9 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. — PKG. NO. — SHEET 10 OF 14



GROUND LEVEL PLAN

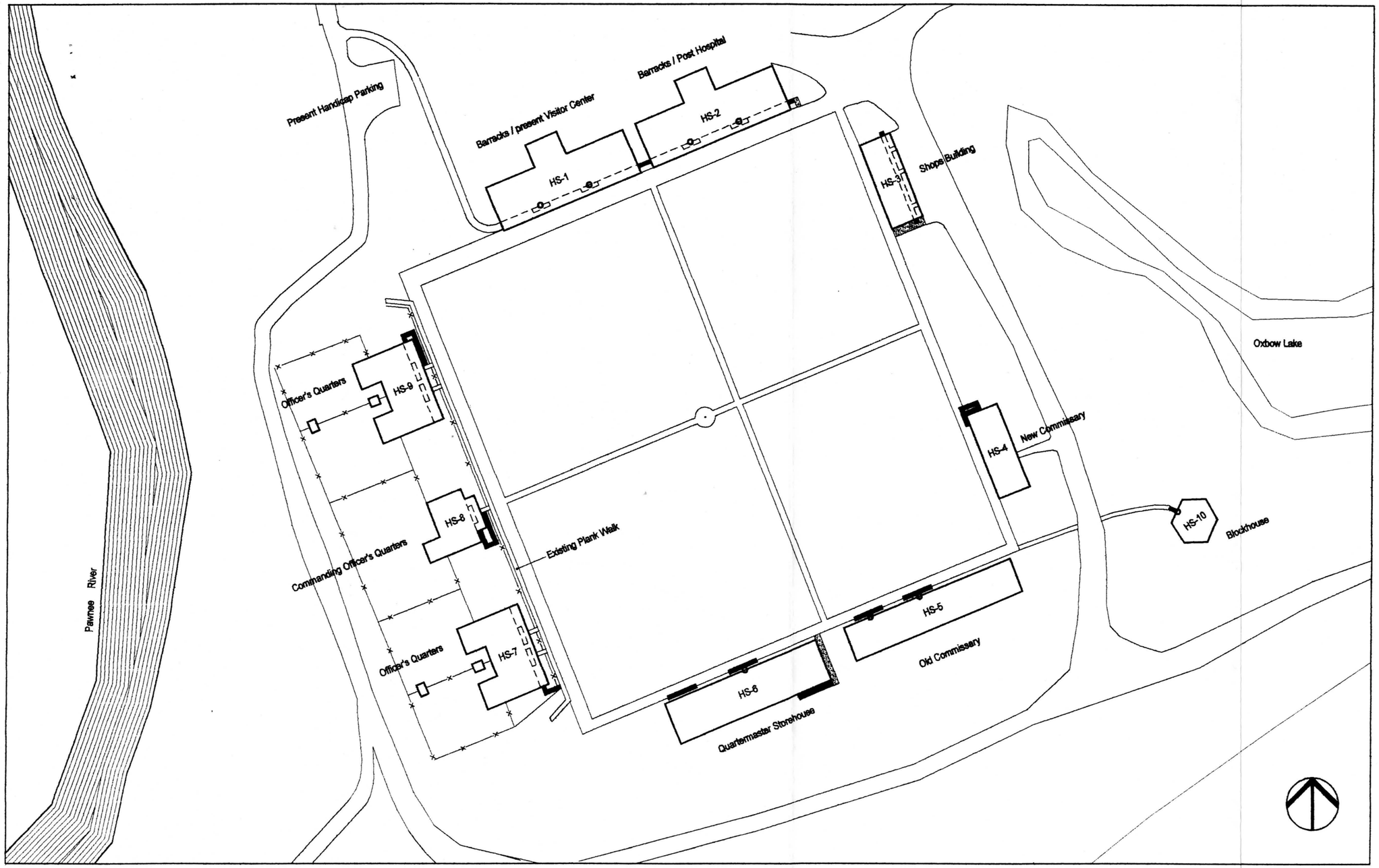


GALLERY LEVEL PLAN

Exhibit 15k / Recommended Treatment

8 0 8 16
SCALE OF FEET

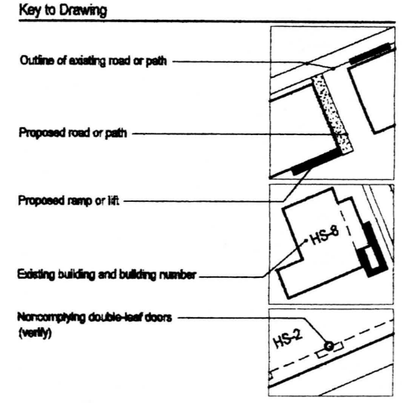
DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97 REV. 12/2/98	SUB SHEET NO. A.11	TITLE OF SHEET GROUND and GALLERY LEVEL PLANS BLOCKHOUSE HS-10 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 11 OF 14



This Key Map

shows the general location of proposed additions for universal access and is not to scale

Key to Drawing



Proposed Ramps

are constructed with dimension lumber. Appearance shall clearly differ from historic plank walks

Lifts

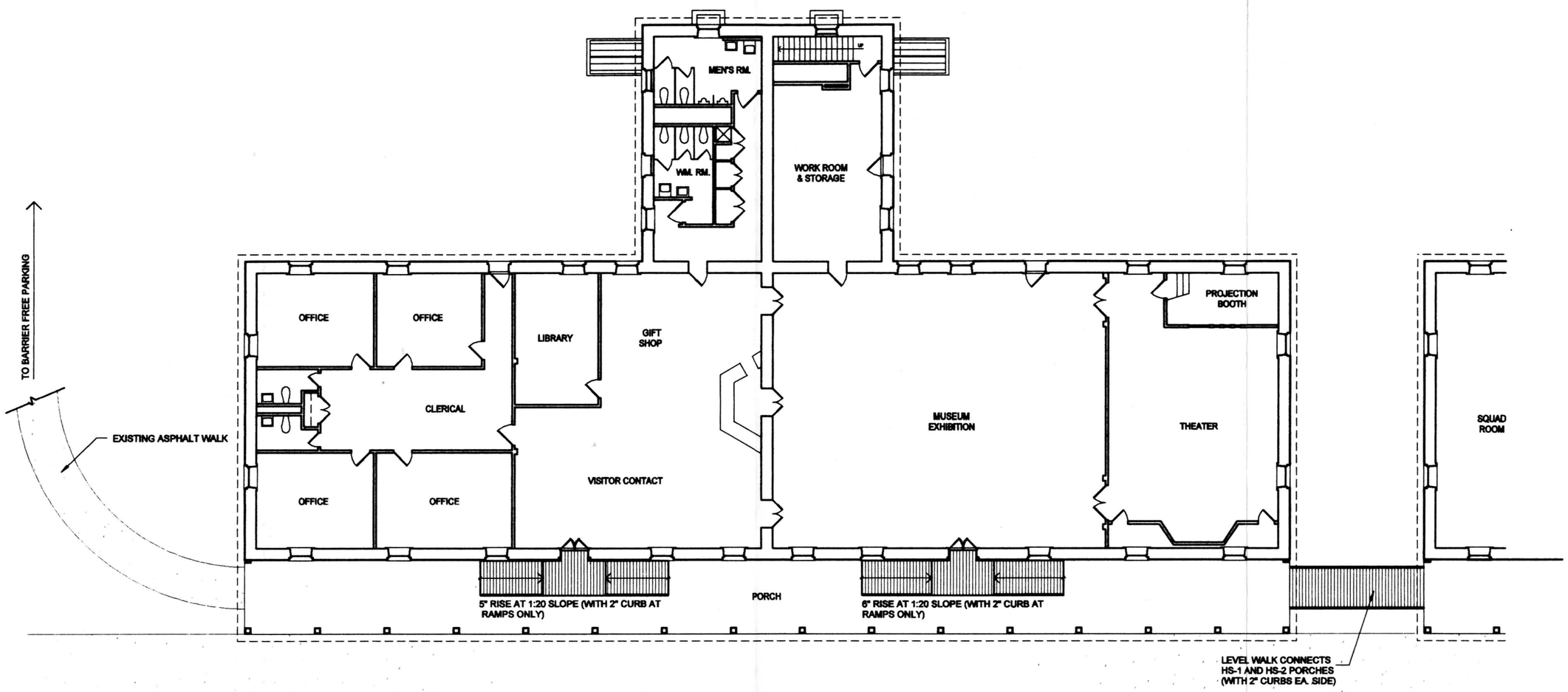
will have a plank surface to match ramps and retractable guard rails

Noncomplying double-leaf doors

can be made accessible. Proposed options are as follows: 1) ranger assisted egress at noncomplying double-leaf doors. 2) automatic door openers or 3) rebuilding double-leaf doors that are not constructed of historic material so that they conform for the 32" clear egress requirement (see A.14)

Exhibit 16a/ Treatment Option 2

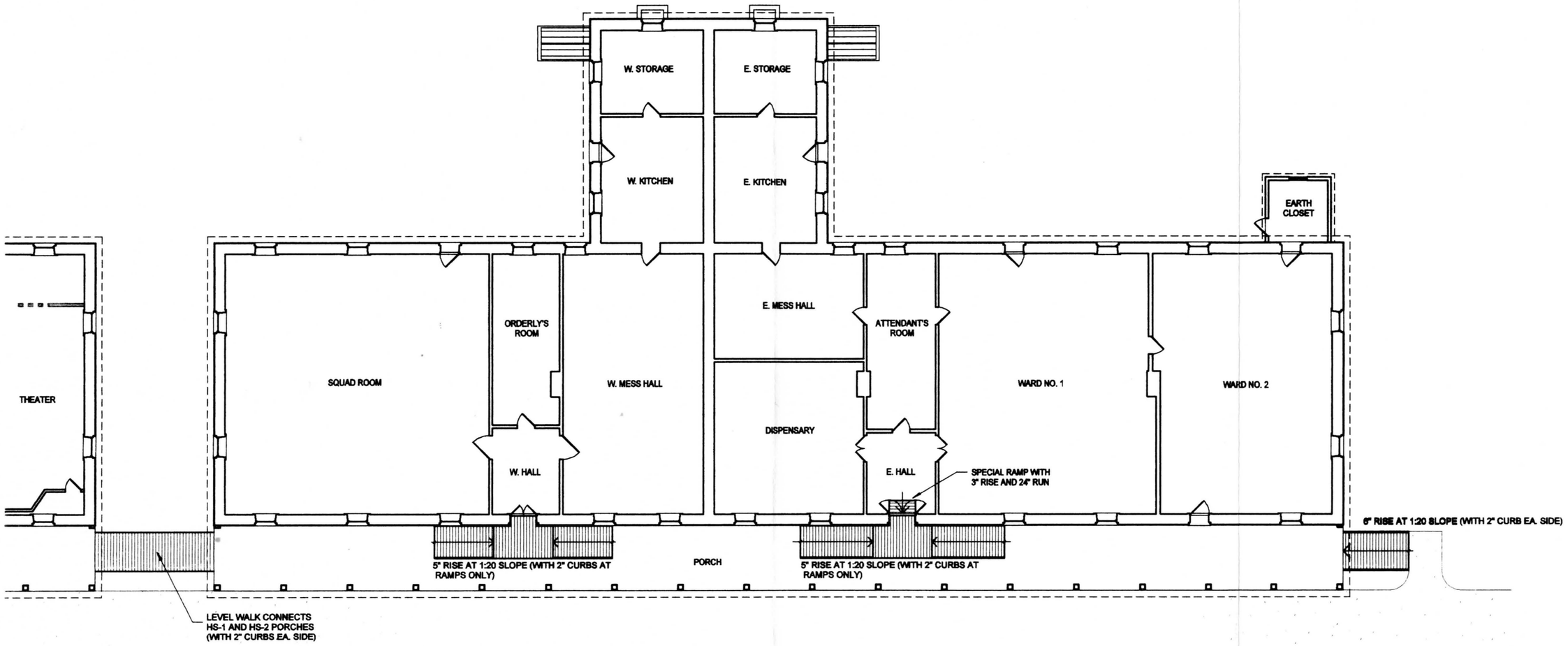
DESIGNED: C. H. T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: T. F.	A.1	KEY PLAN	
TECH REVIEW: S. J.			PKG NO. — — — SHEET 1 OF 14
DATE: 5/30/97 REV. 12/2/98		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	



FIRST FLOOR PLAN *Exhibit 16b / Treatment Option 2*

8 0 8 16
SCALE OF FEET

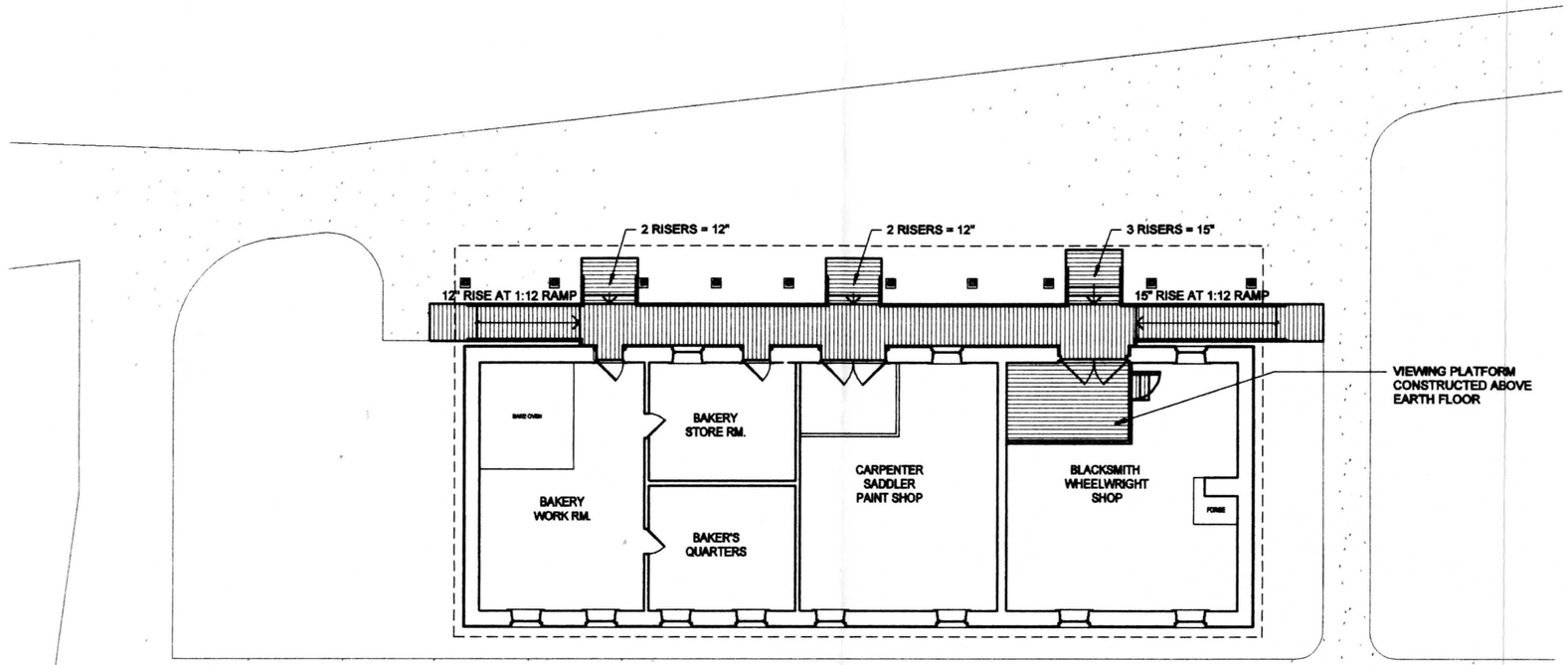
DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.2	TITLE OF SHEET FIRST FLOOR PLAN BARRACKS / VISITOR CENTER HS-1 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 2 OF 14



FIRST FLOOR PLAN *Exhibit 16c / Treatment Option 2*

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.3	TITLE OF SHEET FIRST FLOOR PLAN BARRACKS / POST HOSPITAL HS-2 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 3 OF 14

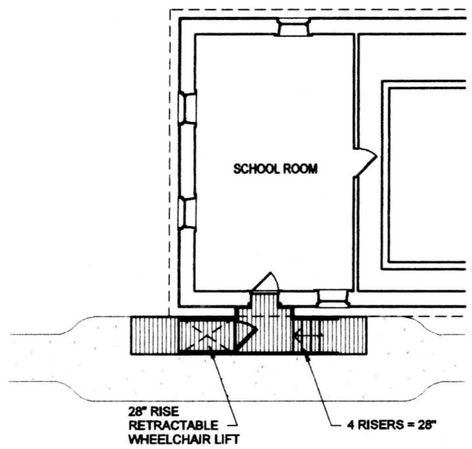


FIRST FLOOR PLAN

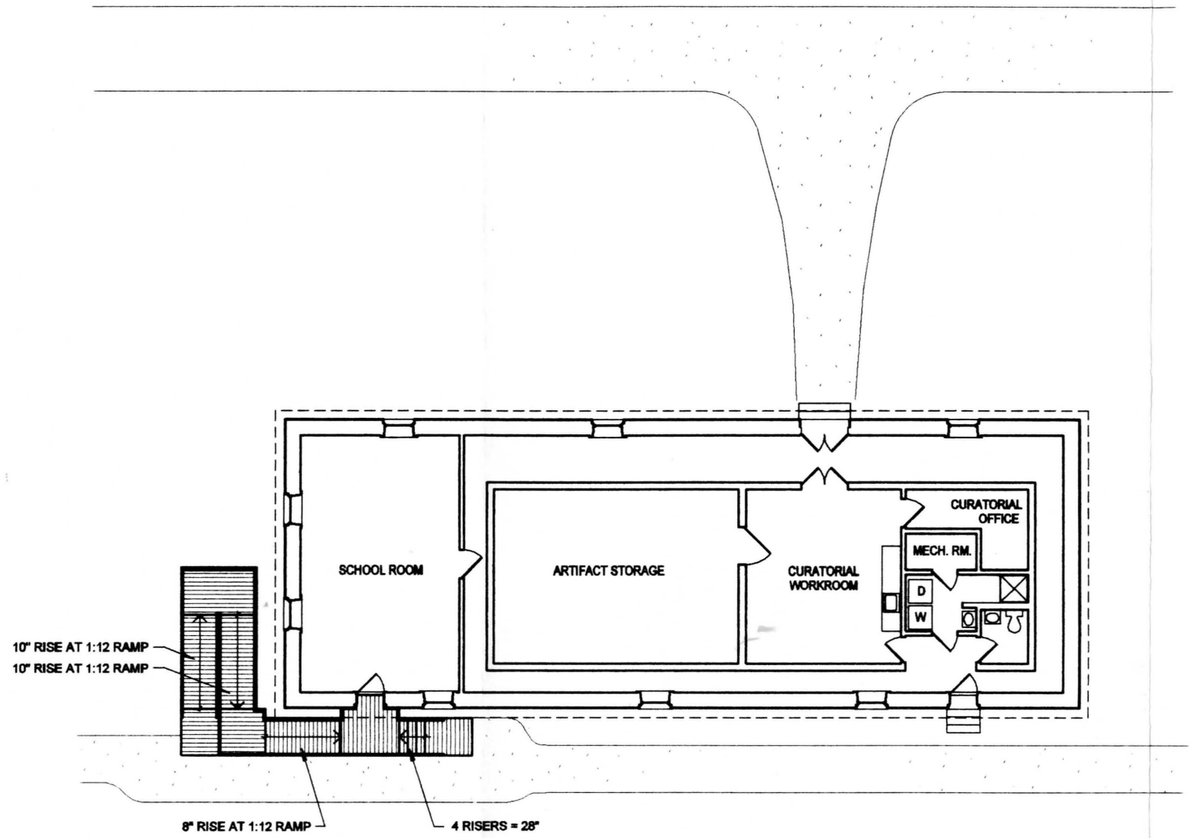
Exhibit 16d / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.4	TITLE OF SHEET FIRST FLOOR PLAN SHOPS BUILDING HS-3 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 4 OF 14



OPTION 3a - **FIRST FLOOR PLAN**

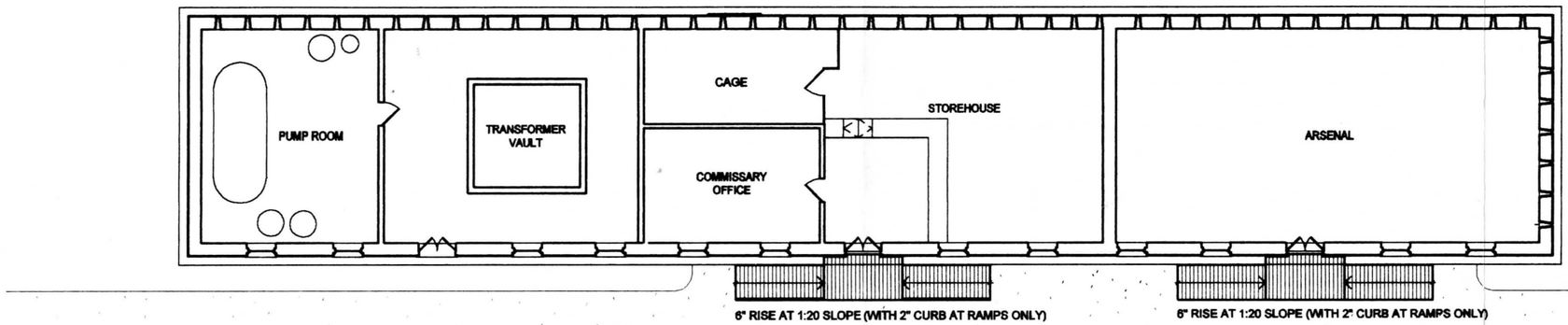


OPTION 3b - **FIRST FLOOR PLAN**

Exhibit 16e / Treatment Option 3

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J DATE: 5/30/97	SUB SHEET NO. A.5	TITLE OF SHEET FIRST FLOOR PLAN NEW COMMISSARY HS-4 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 5 OF 14

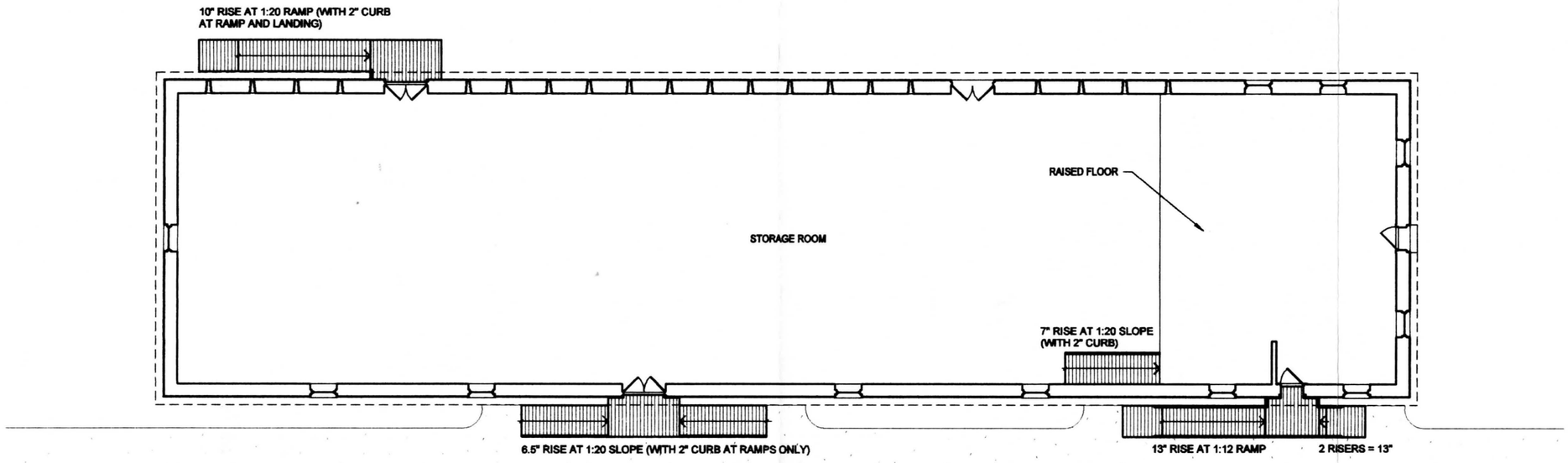


FIRST FLOOR PLAN

Exhibit 16f / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F.	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
DRAWN: C. H., T. F.	A.6	FIRST FLOOR PLAN OLD COMMISSARY HS-5	PKG. NO. — — —
TECH REVIEW: S. J.		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	SHEET 6 OF 14
DATE: 5/30/97			

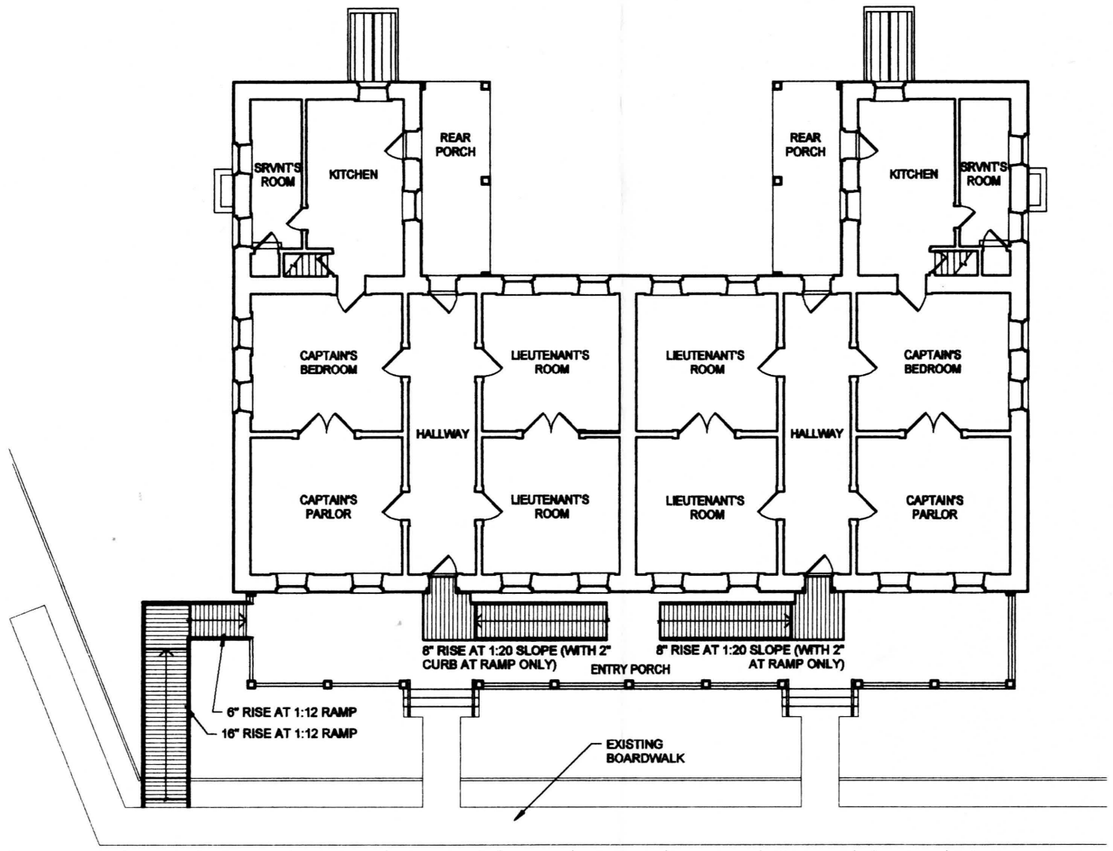


FIRST FLOOR PLAN

Exhibit 16g / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.7	TITLE OF SHEET FIRST FLOOR PLAN QUARTERMASTER WAREHOUSE HS-6 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 7 OF 14

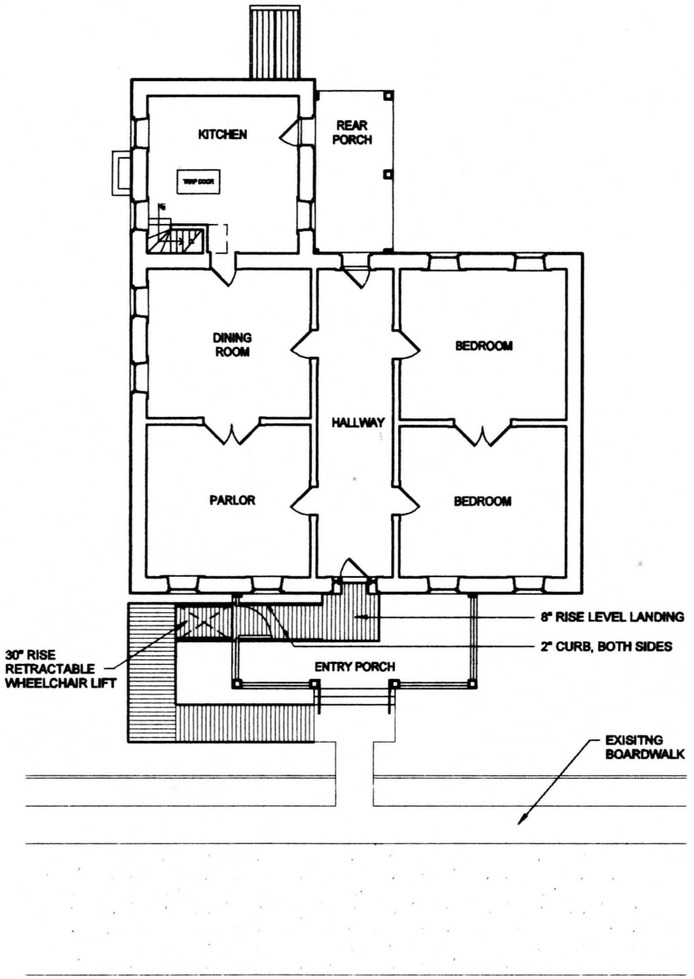


FIRST FLOOR PLAN

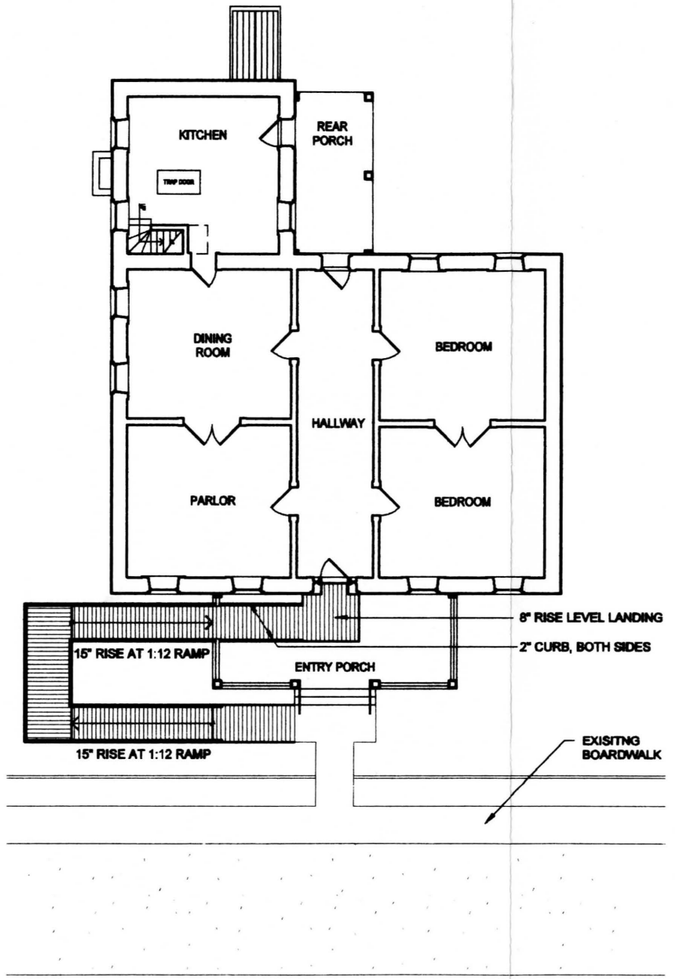
Exhibit 16h / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.8	TITLE OF SHEET FIRST FLOOR PLAN OFFICERS' QUARTERS HS-7 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 8 OF 14



OPTION 'A' - FIRST FLOOR PLAN

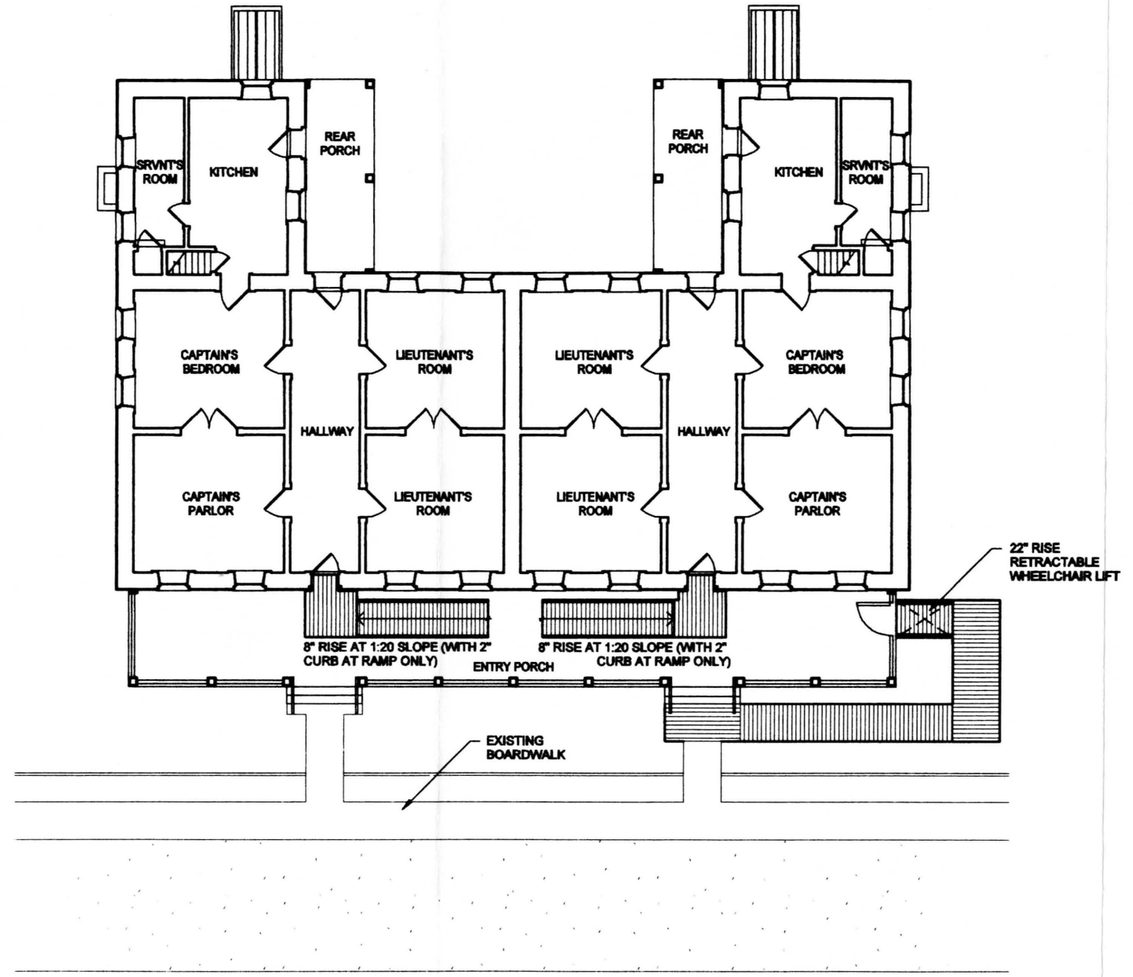


OPTION 'B' - FIRST FLOOR PLAN

Exhibit 16i / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.9	TITLE OF SHEET FIRST and SECOND FLOOR PLANS COMMANDING OFFICER'S QUARTERS HS-8 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 9 OF 14

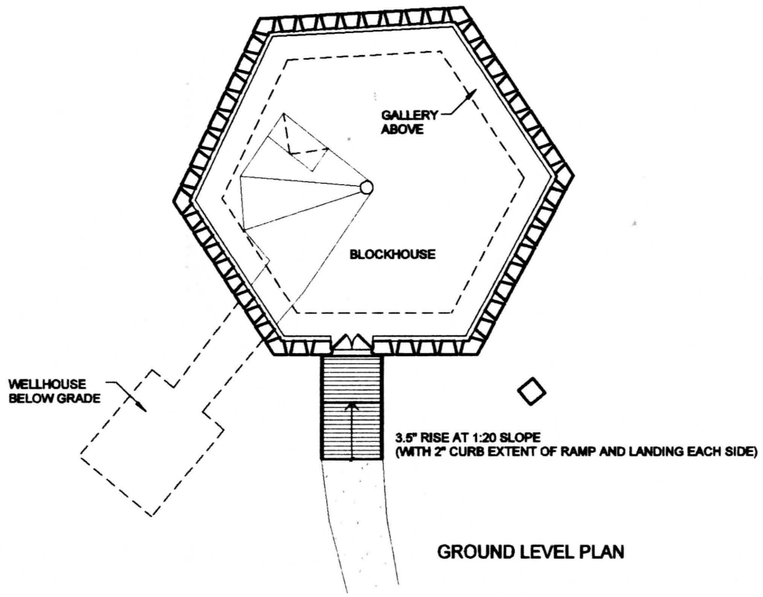


FIRST FLOOR PLAN

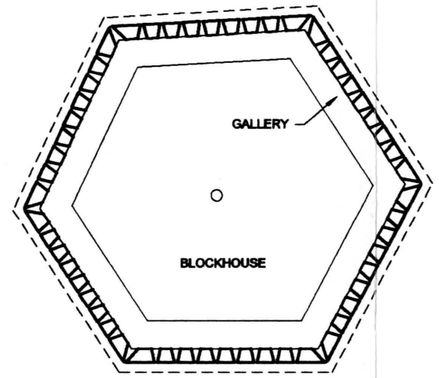
Exhibit 16j / Treatment Option 2

8 0 8 16
SCALE OF FEET

DESIGNED: C. H., T. F. DRAWN: C. H., T. F. TECH REVIEW: S. J. DATE: 5/30/07	SUB SHEET NO. A.10	TITLE OF SHEET FIRST FLOOR PLAN OFFICERS' QUARTERS HS-9 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. PKG. NO. — SHEET 10 OF 14



GROUND LEVEL PLAN

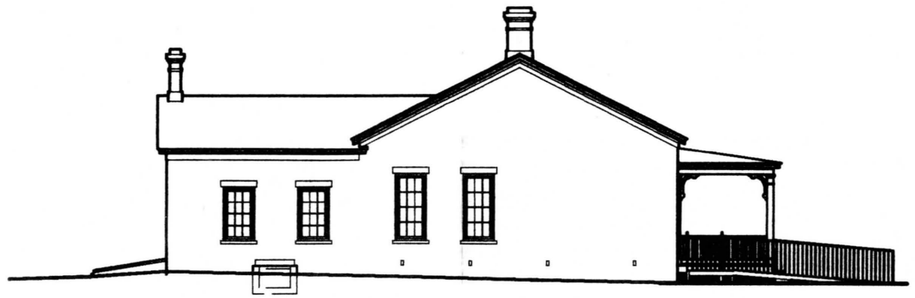


GALLERY LEVEL PLAN

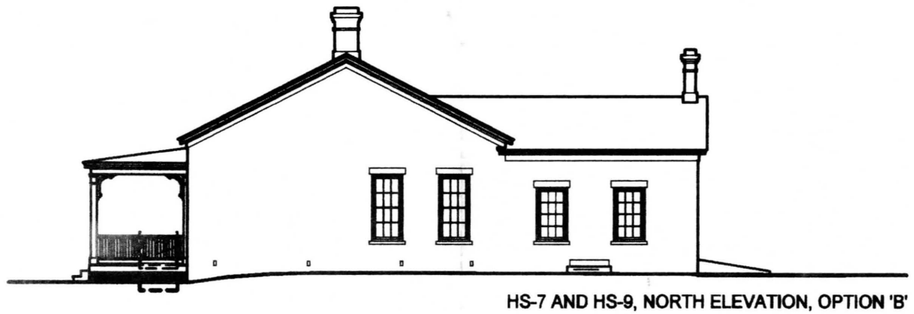
Exhibit 16k / Treatment Option 2

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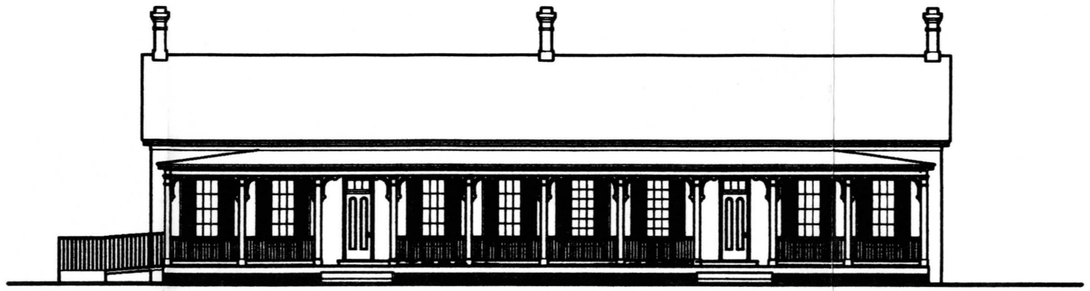
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DRAWN: C. H., T. F.	A.11	GROUND and GALLERY LEVEL PLANS BLOCKHOUSE HS-10	—
TECH REVIEW: S. J.			PKG. NO. — — —
DATE: 5/30/97		FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	SHEET 11 OF 14



HS-7 AND HS-9, SOUTH ELEVATION, OPTION 'A'

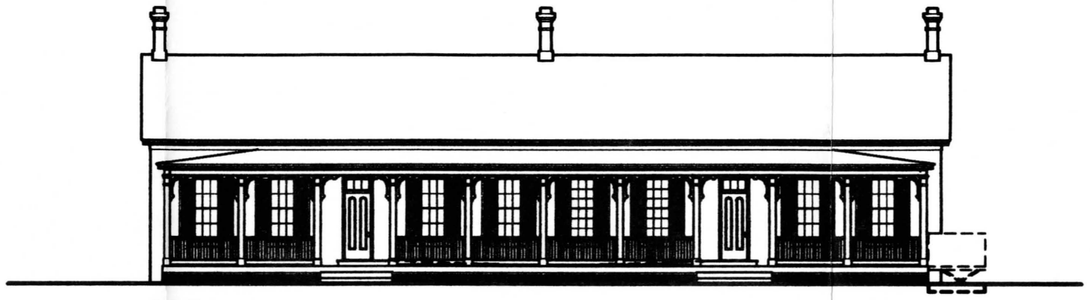


HS-7 AND HS-9, NORTH ELEVATION, OPTION 'B'



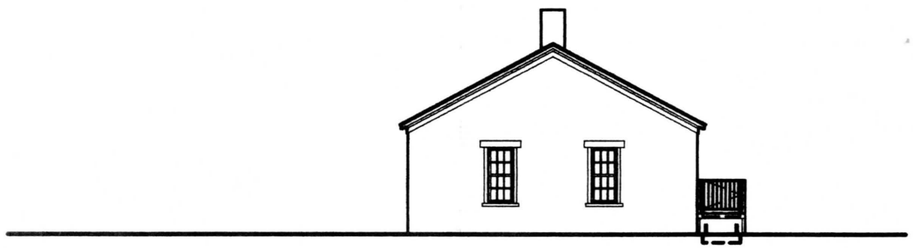
WITH RAMP

HS-7 AND HS-9, EAST ELEVATION, OPTION 'A'

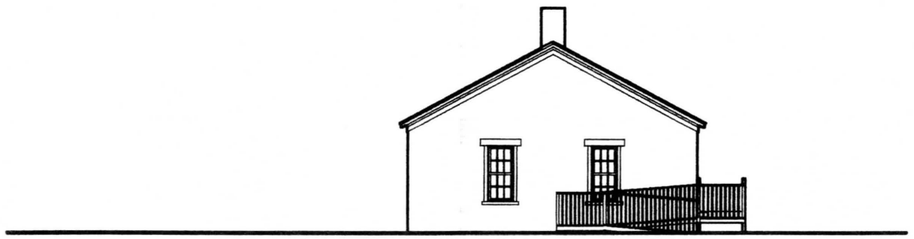


WITH LIFT

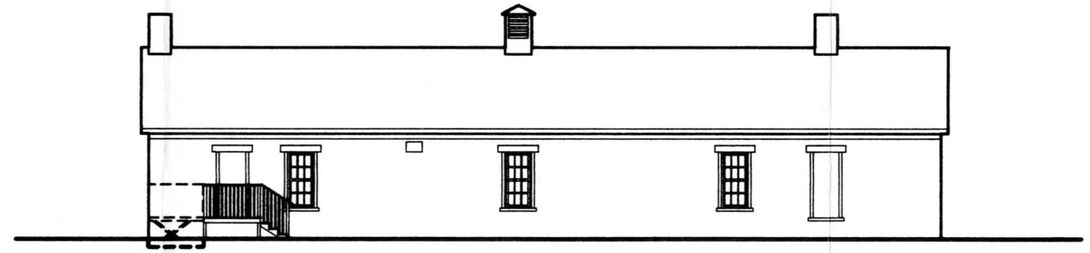
HS-7 AND HS-9, EAST ELEVATION, OPTION 'B'



HS-4, NORTH ELEVATION, OPTION 'A'

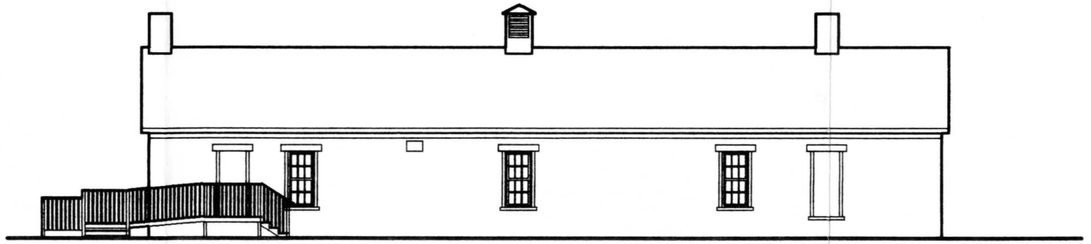


HS-4, NORTH ELEVATION, OPTION 'B'



WITH LIFT AND STAIR

HS-4, WEST ELEVATION, OPTION 'A'

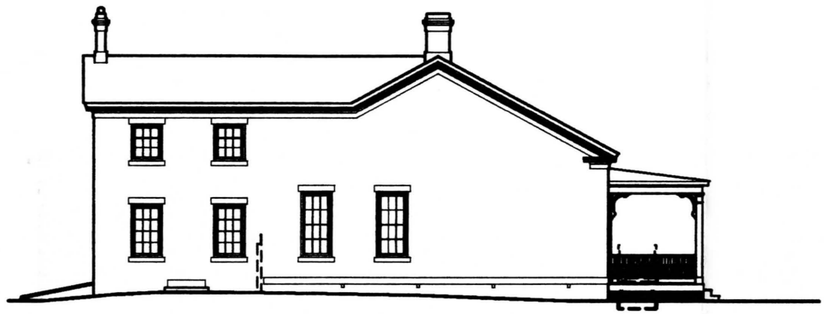


WITH RAMP AND STAIR

HS-4, WEST ELEVATION, OPTION 'B'

Exhibit 16l / Treatment Option 2

DESIGNED: C. H., T. F. DRAWN: T.F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.12	TITLE OF SHEET ELEVATIONS HS-4, HS-7 AND HS-9 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. xxx / xxxxx PKG. NO. — SHEET 12 OF 14

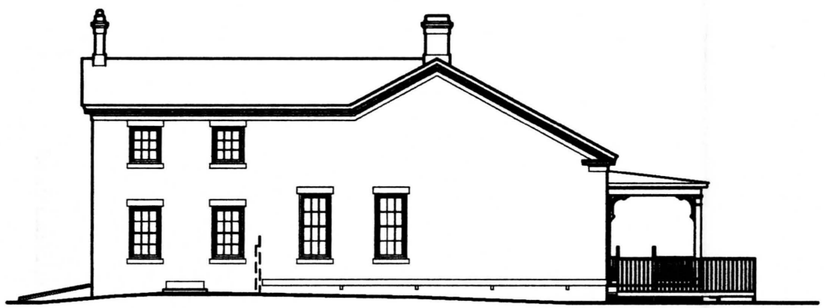


HS-8, SOUTH ELEVATION, OPTION 'A'

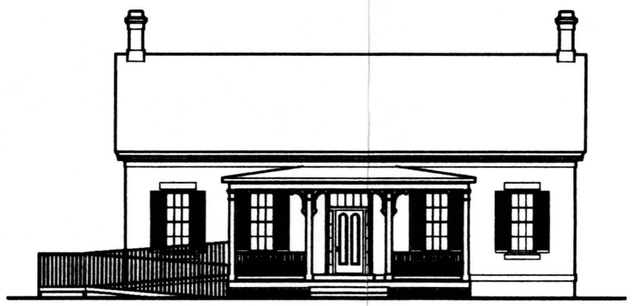


WITH LIFT

HS-8, EAST ELEVATION, OPTION 'A'



HS-8, SOUTH ELEVATION, OPTION 'B'

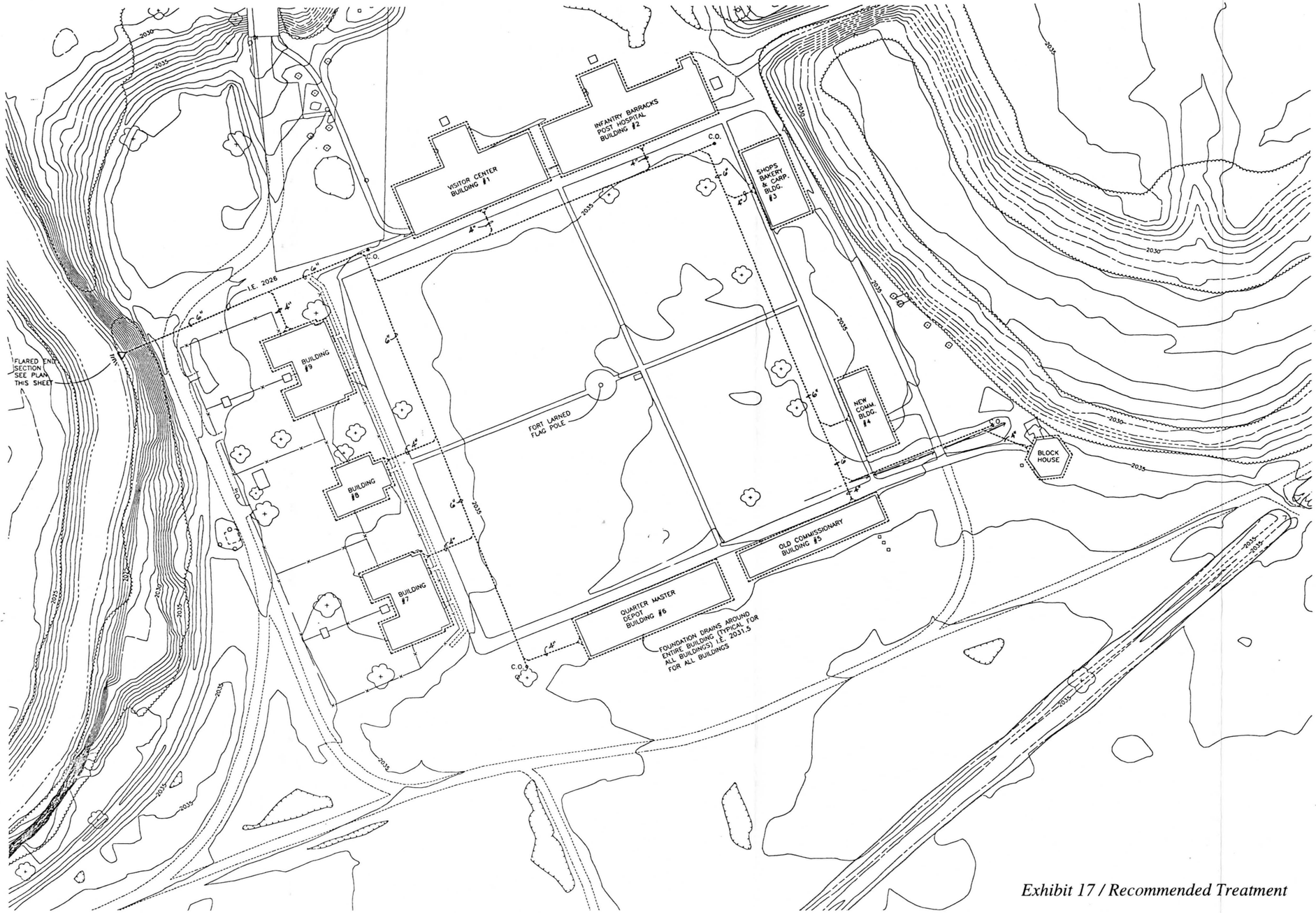


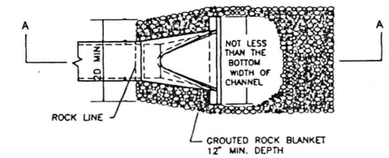
WITH RAMP

HS-8, EAST ELEVATION, OPTION 'B'

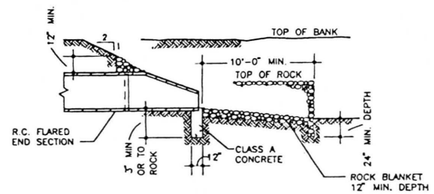
Exhibit 16m / Treatment Option 2

DESIGNED: C. H., T. F. DRAWN: T.F. TECH REVIEW: S. J. DATE: 5/30/97	SUB SHEET NO. A.13	TITLE OF SHEET ELEVATIONS HS-8 FORT LARNED NATIONAL HISTORIC SITE LARNED, KANSAS	DRAWING NO. — PKG. NO. — — — SHEET 13 OF 14

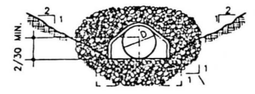




PLAN VIEW



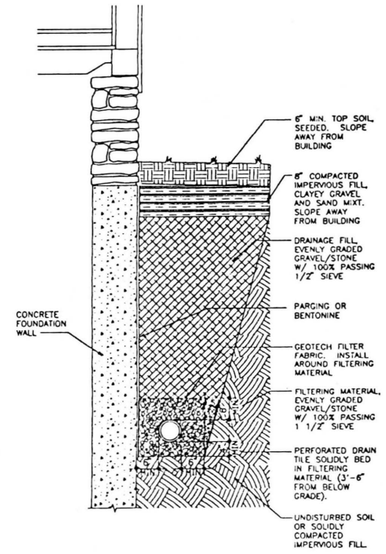
SECTION A-A



END VIEW

FLARED END SECTION

NO SCALE



FOUNDATION DRAIN DETAIL
@ CONCRETE WALLS

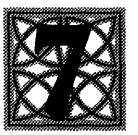
NO SCALE

Exhibit 17 / Recommended Treatment

SAS ENGINEERING
Mechanical & Electrical Engineers
29201 Telegraph Road, Suite 550
Southfield, Michigan 48034
(810) 355-5080
Fax: (810) 355-3998

QUINN EVANS ARCHITECTS
219 1/2 N. Main St.
Ann Arbor, MI 48104
313 663 5888

DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
PRW		MECHANICAL SITE PLAN	
DRAWN: NCS	C.1		PKG. NO. — — —
TECH REVIEW: RHS		FORT LARNED, KA	SHEET OF
DATE:			



APPENDICES

Appendix A

POLLEN, PHYTOLITH, AND MACROFLORAL ANALYSIS OF SOD FROM FT. LARNED NATIONAL HISTORIC SITE, CENTRAL KANSAS

By

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and
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Paleo Research Laboratories
Denver, Colorado

Paleo Research Labs Technical Report 95-60

Prepared For

Midwest Regional Office
National Park Service
Omaha, Nebraska

February, 1996

INTRODUCTION

Six paired pollen and phytolith samples and two macrofloral samples were examined from sod preserved beneath Historic Structures 7 and 8 at Ft. Larned National Historic Site, Kansas. Microscopic evaluation of botanic remains (pollen, phytolith, and macrofloral remains) from this sod was undertaken to identify plants that grew as part of the local prairie vegetation at the time these structures were built. The pollen, phytolith, and macrofloral studies were expected to contribute different but complementary data towards this interpretation.

METHODS

Pollen

A chemical extraction technique based on flotation is the standard preparation technique used in this laboratory for the removal of the pollen from the large volume of sand, silt, and clay with which they are mixed. This particular process was developed for extraction of pollen from soils where preservation has been less than ideal and pollen density is low.

Hydrochloric acid (10%) was used to remove calcium carbonates present in the soil, after which the samples were screened through 150 micron mesh. The samples were rinsed until neutral by adding water, letting the samples stand for 3 hours, then pouring off the supernatant. A small quantity of sodium hexametaphosphate was added to each sample once it reached neutrality, then the beaker was again filled with water and allowed to stand for 3 hours. The samples were again rinsed until neutral, filling the beakers only with water. This step was added to remove clay prior to heavy liquid separation. After the clay was removed the samples were dried and powdered. The dry samples were mixed with zinc bromide (density 2.1) for the flotation process. The heavy liquid separation was repeated at least once. All samples received a short (20 minute) treatment in hot hydrofluoric acid to remove any remaining inorganic particles. The samples were then acetolated for 3 minutes to remove any extraneous organic matter. This method also recovers starch granules present in the samples.

A light microscope was used to count the pollen to a total of 200 pollen grains at a magnification of 500x. Starch granules, when present, are tabulated along with pollen. Pollen preservation in these samples varied from good to fair. Comparative reference material collected at the Intermountain Herbarium at Utah State University and the University of Colorado Herbarium was used to identify the pollen to the family, genus, and species level, where possible.

Pollen aggregates were recorded during identification of the pollen. Aggregates are clumps of a single type of pollen and may be interpreted to represent pollen dispersal over short distances, or the actual introduction of portions of the plant represented into an archaeological setting. Aggregates were included in the pollen counts as single grains, as is customary. The presence of aggregates is noted by an "A" next to the pollen frequency on the pollen diagram.

Indeterminate pollen includes pollen grains that are folded, mutilated, and otherwise distorted beyond recognition. These grains are included in the total pollen count, as they are part of the pollen record.

Phytoliths

Extraction of phytoliths from these sediments also was based on heavy liquid floatation. Approximately 50 ml of sediment was added to 50 ml of sodium hexametaphosphate (0.1 molar solution) to suspend the clays. The sample was then sieved through 150 micron mesh. The sample was allowed to settle for two hours, then the supernatant was poured off, which contained clay. This settling time allowed the phytoliths to settle to the base of the beaker. The samples were mixed with water, allowed to settle for two hours, and the supernatant discarded several times, until the supernatant was clear. Liquid bleach was added to the sample and allowed to sit overnight to destroy the organic fraction in the sample. Rinses were continued to remove the bleach, then the remaining clays. The last two times the sample is allowed to settle the time is reduced to one hour. This procedure removes most of the clays. Once most of the clays were removed, the silt and sand size fraction was dried. The dried silts and sands were then mixed with zinc bromide (density 2.3) and centrifuged to separate the phytoliths, which will float, from the other silica, which will not. Phytoliths, in the broader sense, may include opal phytoliths and calcium oxylate crystals. Calcium oxylate crystals are formed by Opuntia (prickly pear cactus), and are separated, rather than destroyed, using this extraction technique, since it employs no acids. If calcium carbonates are present, use of glacial acetic may be employed to dissolve the calcium carbonates without destroying any calcium oxylates present. Any remaining clay is floated with the phytoliths, and is further removed by mixing with sodium pyrophosphate and distilled water. The samples are then rinsed with distilled water, then alcohols to remove the water. After several alcohol rinses, the samples are mounted in Cinnamaldehyde for counting with a light microscope at a magnification of 500x.

Macrofloral Remains

The macrofloral samples were obtained by screening and retaining all material from the uppermost sediment samples beneath each historic structure. The samples were water screened through a 150 micron mesh sieve to remove most of the dirt, then allowed to dry. The dried samples were passed through a series of graduated screens (US Standard Sieves with 2 mm, 1 mm, 0.5 mm and 0.25 mm openings) to separate charcoal debris and to initially sort the seeds. The contents of each screen were then examined. Charcoal pieces larger than 2 mm in diameter were broken to expose a fresh cross-section and examined under a binocular microscope at magnifications up to 140x. The material which remained in the 2 mm, 1 mm, 0.5 mm, and 0.25 mm sieves was scanned under a binocular stereo microscope at a magnification of 10x, with some identifications requiring magnifications of up to 70x. The material which passed through the 0.25 mm screen was not examined. Macrofloral remains were identified using manuals (Martin and Barkley 1973; Musil 1978; Schopmeyer 1974) and by comparison with modern and archaeological references. Estimates of seed and seed fragment frequencies were calculated from the sort of a portion of the total volume

floated and are noted in the macrofloral table with an asterisk (*). The term "seed" is used to represent seeds, achenes, caryopses, and other disseminules. Remains were combined and recorded as charred and/or uncharred, whole and/or fragments.

DISCUSSION

Pollen, phytolith, and macrofloral studies were undertaken to support a cultural landscape study in progress at Ft. Larned National Historic Site. The site is situated in a transition area between the tall grass and short grass prairies. Disturbance to the ground surface at Ft. Larned National Historic Site since its abandonment by the Army rendered most of the area unsuitable for botanic study in determining historic vegetation. A listing of vegetation observed by the senior author in 1974 is presented in D. Scott (1977:53-55). The officer's quarters, including structures 7 and 8, are located on the west side of the parade ground near the meandering Pawnee River. Sod has been preserved beneath the restored Surgeon's Quarters (HS 7) and the Commanding Officer's quarters (HS 8). The protected nature of this area was deemed sufficient to provide a good record of historic vegetation at the time the structures were built.

A fine dust was noted beneath the floors at HS 7. This dust was interpreted as common household dust that had filtered through the floors, as well as dirt and dust that had blown in through weep or ventilation holes in the foundation. Samples collected beneath HS 7 were removed 7.7 feet from the central support foundation wall and 13 feet east of the west exterior foundation wall beneath the restored Surgeon's Quarters (Table 1). Visible patches of native prairie surfaces also were noted through holes in the floor at HS 7. The macrofloral sample (Vegetation 1) was collected from this visible vegetation and the upper approximately 1 cm of soil. Once this sample was removed, three pollen/phytolith samples (1A, 1B, and 1C) were collected immediately beneath the vegetation sample location (Douglas Scott, personal communication, July 1995).

This collection process was repeated under the Commanding Officer's Quarters (HS 8). This structure was noted to have been more disturbed due to a longer period of use; however, the area near the center of the structure contained a fairly large block of native prairie surface. Vegetation sample 2 and pollen/phytolith samples 2A, 2B, and 2C were recovered from this block of native surface (Douglas Scott, personal communication, July 1995).

Modern reference samples from several trees were submitted in the hope that some non-grass phytoliths would be noted in these samples. The reference materials that contained phytoliths all exhibited calcium oxylate forms and none exhibited silica bodies. No calcium oxylate forms were noted in the archaeological samples, which consisted primarily of silica-based forms in the phytolith record.

Macrofloral Remains

The macrofloral sample collected from sod beneath HS 7 (Vegetation 1) contained numerous uncharred Poaceae remains, including Buchloë and probable Festuca (Tables 2 and 3). These remains indicate that buffalograss, probable fescue, and other grasses were found growing in the local prairie in the area of the restored Surgeon's Quarters. Uncharred Amaranthus, Brassicaceae, Chenopodium, and Euphorbia seeds indicate that pigweed, a member of the mustard family, goosefoot, and spurge also were present. Uncharred conifer wood may represent timbers used in construction of the building, while pieces of Fraxinus charcoal suggest that ash wood was burned. A few insect remains and snails also were recovered.

Vegetation sample 2 from beneath HS 8 contained a greater quantity of uncharred Buchloë remains, suggesting that buffalograss was more common in this area. Other uncharred Poaceae remains and an uncharred Sporobolus seed attest to the presence of other grasses including dropseed grass. Uncharred Amaranthus, Astragalus, Chenopodium, and Solanaceae seeds indicate the presence of pigweed, milkvetch, goosefoot, and a member of the nightshade family in the prairie vegetation. A piece of Fraxinus charcoal again suggests that ash wood was burned in a stove or fireplace. A few insect fragments also were recovered.

Pollen

The pollen record from all six soil samples was typical of a prairie, in that a wide variety of herbaceous plants were represented by varying quantities of pollen. Grasses, which dominate the vegetation in many prairie areas, were represented in the pollen record by moderate quantities of Poaceae pollen (Figure 1, Table 4). Moderate to moderately-large quantities of High- and Low-spine Asteraceae pollen record the presence of various members of the sunflower family within the prairie. Members of the Asteraceae family typically produce far more pollen than do grasses, so their pollen often is observed in larger frequencies.

The other notable element of the pollen record is Pinus, which occurs in moderate to moderately large quantities. Pinus pollen is produced in abundance and travels long distances in the wind; therefore, its presence in moderately large quantities in prairie samples often is due to long distance transport, rather than the presence of pine in the immediate surroundings. Small quantities of Picea and Ephedra pollen recovered also are present through long distance transport. Small quantities of a variety of pollen that may represent local trees were noted in these samples. These trees include Acer, Alnus, Betulaceae, Castanea, Juglans, Juniperus, Quercus, Salix, and Ulmus. A small quantity of Anacardiaceae pollen probably represents sumac growing in this area, possibly along the Pawnee River.

A variety of non-arboreal pollen represents several plants found in the local prairie. The small quantity of Apiaceae pollen represents a member of the umbell family. Liguliflorae-type pollen may represent dandelion-type plants growing in the prairie. Nyctaginaceae pollen represents a weedy prairie plant such as four-o'clock. A small quantity of Cheno-am pollen may represent any of the inconspicuous herbaceous members of this group of plants that may be members

of the prairie vegetation community. Cyperaceae pollen was observed in small quantity and probably represents either the growth of sedges that prefer dry conditions with the grasses of the prairie, or possibly transport of pollen from sedges growing along Pawnee River. A single probable Equisetum pollen represents wind transport from horsetail in a riparian area along the river. Small quantities of Eriogonum pollen were noted in the lowest sediment samples beneath each structure. This pollen type records the presence of wild buckwheat in the prairie vegetation. Small quantities of Euphorbia pollen indicate the presence of spurge in the local prairie vegetation. Small quantities of Fabaceae pollen and Petalostemon pollen indicate the presence of members of the legume family, specifically prairie-clover, in the local prairie.

Lamiaceae pollen was noted in sample 1B collected beneath HS 7, and represents the presence of a member of the mint family in the local prairie. Onagraceae pollen was recovered in the upper two samples beneath HS 8. Members of this family are common in the prairie and often are present in disturbed areas. Phlox-type pollen represents the presence of this spring-blooming plant in the local vegetation. Polygalaceae pollen was noted and represents the presence of a member of this family in the local prairie vegetation. Polygonum pollen was observed only in the lowest sample beneath HS 7, indicating the presence of smartweed/knotweed. Portulaca pollen was noted only in the uppermost sample from beneath HS 8, documenting the presence of weedy purslane that often grows in disturbed areas. Small quantities of Rosaceae pollen noted in most of the samples indicate the presence of a member of the rose family that may have grown along the Pawnee River. Solanaceae pollen was noted in these sod samples and probably represents local growth of a member of this family in the prairie. Sphaeralcea pollen was present in small quantities in several of the samples, indicating local presence of globemallow in the prairie vegetation. Selaginella densa spores were recovered only from the lowest samples beneath each structure, indicating the presence of this moss.

Total pollen concentration was noted to decline from the uppermost to the lowermost samples beneath HS 7, as is expected due to the normal deterioration of pollen in sediments. This pattern of deterioration was not as obvious in samples collected beneath HS 8. Pollen types recovered in this study were similar to those noted by the senior author in a study of a stratigraphic column of the prairie (L. Scott 1977) near Fort Larned. This similarity in pollen content suggests only slight fluctuations in local plant distribution through time.

Phytoliths

Phytoliths are silica bodies produced by plants when soluble silica in the ground water is absorbed by the roots and carried up to the plant via the vascular system. Evaporation and metabolism of this water result in precipitation of the silica in and around the cellular walls. The general term phytoliths, while strictly applied to opal phytoliths, also may be used to refer to calcium oxylate crystals produced by a variety of plants, including Opuntia (prickly pear cactus). Opal phytoliths, which are distinct and decay-resistant plant remains, are deposited in the soil as the plant or plant parts die and break down. They are, however, subject to mechanical breakage and erosion and

deterioration in high Ph soils. Phytoliths are usually introduced directly into the soils in which the plants decay. Transportation of phytoliths occurs primarily by animal consumption, man's gathering of plants, or by erosion or transportation of the soil by wind, water, or ice.

Types of grass short-cell phytoliths recovered from this site include festucoid, chloridoid, and panicoid. Elongate phytoliths are of no aid in interpreting either paleoenvironmental conditions or the subsistence record because they are produced by all grasses. Phytoliths tabulated to represent "total phytoliths" include the grass short-cells, elongates, buliform, pillow, root druse, spiny irregular, trichome, straight hair, and Cyperaceae. Frequencies for all other bodies recovered are calculated by dividing the number of each type recovered by the "total phytoliths".

The festucoid class of phytoliths is ascribed primarily to the subfamily Pooideae and occur most abundantly in cool, moist climates. However, Brown (1984) notes that festucoid phytoliths are produced in small quantity by nearly all grasses. Therefore, while they are typical phytoliths produced by the subfamily Pooideae, they are not exclusive to this subfamily. Chloridoid phytoliths are found primarily in the subfamily Chloridoideae, a warm-season grass that grows in arid to semi-arid areas and require less available soil moisture. Chloridoid grasses are the most abundant in the American Southwest (Gould and Shaw 1983:120). They also are an important component of the short grass prairie. Panicoid phytoliths occur in warm-season or tall grasses that frequently thrive in humid conditions. Twiss (1987:181) also notes that some members of the subfamily Chloridoideae produce both bilobate (panicoid) and festucoid phytoliths. "According to Gould and Shaw (1983, p. 110) more than 97% of the native US grass species (1,026 or 1,053) are divided equally among three subfamilies Pooideae, Chloridoideae, and Panicoideae" (Twiss 1987:181).

Buliform phytoliths are produced by grasses in response to wet conditions (Irwin Rovner, personal communication, January 1991), and are to be expected in wet habitats of floodplains and other places. Phytoliths referred to as "pillows" are the same as those reported by Rovner (1971). While these phytoliths are described, no taxonomic nor environmental significance has been assigned. They most probably represent grasses.

Other phytoliths recovered in this study include trichomes -- produced by a variety of grasses, root druse occasionally seen in grass roots, straight hairs probably representing a non-grass plant, and Cyperaceae cones representing sedges.

Diatoms and sponge spicules also were noted. Diatoms indicate wet conditions. Sponge spicules probably represent fresh water sponges that live in rivers. Their presence in these samples probably indicates wind transport of riverine deposits. Their recovery in upland soils in Illinois is noted to accompany loess deposits derived from floodplains (Jones and Beavers 1963).

The phytolith record at Ft. Larned was dominated by chloridoid saddle short cells (Figure 2). These forms typically are produced by short grasses such as buffalograss and blue grama. Other shapes attributable to the chlordoid group include thin chloridoid forms and chloridoid forms with an indentation on one of

the convex sides. Phytoliths typically produced by festucoid grasses are next most abundant, followed by phytoliths typically produced by panicoid grasses.

Crescent-shaped phytoliths are circular phytoliths with a straight to crescent-shaped ridge. These are the most abundant forms noted that are typically produced by festucoid grasses. Circular forms and circular forms with circular platforms also were common in these samples. Other types typically produced by festucoid-type grasses were noted occasionally in these samples and include circular forms with various shaped platforms, crenate and crenate platform types, square, rectangular, oblong with oblong platform, irregular decorated with irregular platform, and towers.

Only a few grasses have been examined for the purpose of identifying the frequency of phytoliths of different shapes within individual grasses. For the grasses examined, crescent forms are most abundant in Agropyron, Oryzopsis, Sitanion, and Stipa. Muhlenbergia, Calmolvilfa, and Bouteloua produced few or no crescent-shaped phytoliths. No other festucoid-type phytoliths were noted in the samples from Ft. Larned in sufficient quantity to be diagnostic for any particular grass species. The macrofloral samples contain evidence of probable Festuca in the festucoid group.

Phytolith types typically produced by panicoid grasses and observed in the Ft. Larned examples include bilobate, bilobate thin, bilobate squat, fat bilobate, bilobates with various shaped platforms, polylobates, and crosses, including those with platforms. The most diagnostic of these phytoliths include bilobate squat forms, which have been noted in both Muhlenbergia (a C-4 grass), and Aristida (a C-3 grass). The fat bilobate types also are noted both in Muhlenbergia and Aristida, as are crosses.

The presence of buliform and pillow-shaped phytoliths suggest adequate moisture for silicification of the cells that control rolling of the leaves during draught. A druse typical of those produced by grass roots, was noted in one of the samples. Trichomes are produced by a variety of grasses and are not considered diagnostic. The straight hair noted in sample 1A is from a non-grass plant. The small quantity of Cyperaceae phytoliths recovered from sample 2B indicates the presence of sedges in the prairie prior to construction of the officers' quarters. The presence of a few diatoms and a single sponge spicule probably represent ponding of water on the prairie after rains. The occasional presence of volcanic ash in these samples is not interpreted to represent any specific event. Rather, it is likely that it represents the presence of small amounts of volcanic ash in the atmosphere for long periods of time following an eruption.

SUMMARY AND CONCLUSIONS

Pollen, phytolith, and macrofloral analysis of prairie sod beneath historic structures 7 and 8 at Ft. Larned National Historic Site, Kansas, was successful in identifying important elements of the local prairie prior to construction of these buildings. The pollen record indicated the prairie was composed not only of grasses, buy a variety of forbs, as well. This mixture of grasses and

herbaceous plants was observed in samples of greater age (L.Scott 1977) and appear to have been a long established vegetation pattern. The presence of small quantities of pollen from trees, including the moderate quantities of pine pollen, indicate transport from the riparian community along the Pawnee river and from areas much farther away. For instance, the pine pollen may originate hundreds of miles to the west. The spruce pollen undoubtedly represents transport from the Rocky Mountains to the west. There is no evidence from either the pollen or the phytolith records that trees grew in this portion of the prairie prior to construction of these buildings. The pollen record indicates that the local prairie likely was a mixture of grasses, sedges, member of the sunflower family (Asteraceae) including a few dandelion-type plants, cheno-ams, wild buckwheat (Eriogonum), spurge (Euphorbia), members of the legume family (Fabaceae) including prairie clover (Petalostemon), a member of mint family (Lamiaceae), a member of the evening primrose family (Onagraceae), Phlox (Phlox), a member of the milkwort family (Polygalaceae), smartweed or knotweed (Polygonum), purslane (Portulaca), a member of the wild potato/tomato family (Solanaceae), and globemallow (Sphaeralcea). The phytolith record points to the presence of short grasses such as buffalo grass and/or blue grama as dominate elements of the grass in the local prairie. There were, however, festucoid-type grasses, which would grow primarily through the spring and fall, but lie dormant through the hot summers. The short grasses Calmolvilfa and Muhlenbergia might have been present also in the local prairie. The festucoid-type or cool season grasses such as Aristida and Agropyron also might have been present based on the phytolith record. The phytolith record echoes the presence of sedges (Cyperaceae) in the local prairie.

The macrofloral record indicates the presence of buffalo grass (Buchloë), dropseed grass (Sporobolus), and probable fescue (Festuca) in the prairie at the time HS 7 and HS 8 were constructed. In addition to noting the presence of specific grasses, the macrofloral record documents the presence of other herbaceous plants including pigweed (Amaranthus), goosefoot (Chenopodium), milkvetch (Astragalus), a member of the nightshade family (Solanaceae), a member of the mustard family (Brassicaceae), and spurge (Euphorbia). Recovery of uncharred conifer wood probably represents remnants of construction, while presence of charred ash (Fraxinus) probably represents burning ash wood in a stove or fireplace.

The combined pollen, phytolith, and macrofloral records indicate that the prairie, at the time of construction of HS 7 and HS 8, was a composite of grasses and forbs. The herbaceous forbs were of varying heights and probably introduced a patchwork of color when flowering. The grasses noted in the macrofloral and phytolith records are of varying heights, as well. Certainly the prairie upon which these officer's quarters were constructed changed in appearance with the seasons. There is no evidence of trees in the prairie itself, although evidence of trees that probably grew along the Pawnee River was noted in the pollen record.

TABLE 1
PROVENIENCE DATA FOR SAMPLES FROM FORT LARNED NHS, KANSAS

HS #	Sample No.	Depth (cm)	Provenience	Analysis	Pollen/Phyto Counted
7	Veg. 1	0	Soil from a visible surface 7.7 feet from the central support foundation wall and 13 feet east of the west exterior foundation wall, under the restored Surgeon's Quarters	Float	
	1A	0-2	Soil from a visible surface 7.7 feet from the central support foundation wall and 13 feet east of the west exterior foundation wall, under the restored Surgeon's Quarters	Pollen Phyto	200
	1B	2-4	Soil from a visible surface 7.7 feet from the central support foundation wall and 13 feet east of the west exterior foundation wall, under the restored Surgeon's Quarters	Pollen Phyto	200
	1C	4-6	Soil from a visible surface 7.7 feet from the central support foundation wall and 13 feet east of the west exterior foundation wall, under the restored Surgeon's Quarters	Pollen Phyto	200

HS #	Sample No.	Depth (cm)	Provenience	Analysis	Pollen/Phyto Counted
8	Veg. 2	0	Soil from a native surface with vegetation found near the center of the area under the Commanding Officers Quarters	Float	
	2A	0-2	Soil from a native surface with vegetation found near the center of the area under the Commanding Officers Quarters	Pollen Phyto	200
	2B	2-4	Soil from a native surface with vegetation found near the center of the area under the Commanding Officers Quarters	Pollen Phyto	200
	2C	4-6	Soil from a native surface with vegetation found near the center of the area under the Commanding Officers Quarters	Pollen Phyto	200

TABLE 2
MACROFLORAL REMAINS FROM SITE FORT LARNED NHS, KANSAS

Sample No.	Identification	Part	Charred		Uncharred		Comments
			W	F	W	F	
Veg 1	Liters Floated						0.7
	FLORAL REMAINS:						
	Amaranthus	Seed			2		
	Brassicaceae	Seed			1		
	Chenopodium	Seed			1		
	Euphorbia	Seed			1		
	Poaceae	Leaf/Stem				X	Moderate
	Poaceae	Stem base				710*	
	Poaceae	Stem/Root				105	
	Poaceae	Floret			1		
	Buchloë	Stem/Root				2	
	Buchloë	Seed			2		
	cf. Festuca	Seed			2		
	Unidentified	Seed			3		
	Rootlets					X	
	CHARCOAL/WOOD:						
	Conifer					2	
	Fraxinus			2			
	NON-FLORAL REMAINS:						
	Insect					12	
	Insect	Puparia			3	1	
	Snail				2	1	

Sample No.	Identification	Part	Charred		Uncharred		Comments
			W	F	W	F	
Veg 2	Liters Floated						0.2
	FLORAL REMAINS:						
	Amaranthus	Seed			2	4	
	Astragalus	Seed			1		
	Chenopodium	Seed			2		
	Poaceae	Leaf/Stem				X	Moderate
	Poaceae	Stem base				402*	
	Poaceae	Seed			2		
	Buchloë	Stem/Root				47	
	Buchloë	Seed			3	4	
	Sporobolus	Seed			1		
	Solanaceae	Seed				1	
	Unidentified	Seed			3		
	CHARCOAL/WOOD:						
	Fraxinus	Present		1			
	NON-FLORAL REMAINS:						
	Insect					21	

W = Whole
F = Fragment
X = Presence noted in sample
LF = Light Fraction
g = grams

* Indicates an estimated frequency based on the sort of a portion of the total volume floated

TABLE 3
INDEX OF MACROFLORAL REMAINS RECOVERED IN FORT LARNED NHS, KANSAS

Scientific Name	Common Name
FLORAL REMAINS:	
Brassicaceae	Mustard family
Chenopodium	Goosefoot
Euphorbia	Spurge
Poaceae	Grass family
Buchloë	Buffalograss
Festuca	Fescue
Sporobolus	Dropseed
Solanaceae	Nightshade family
CHARCOAL/WOOD:	
Conifer	Cone-bearing, gymnospermous trees
Fraxinus	Ash

TABLE 4
POLLEN TYPES OBSERVED IN SAMPLES FROM FORT LARNED NHS, KANSAS

Scientific Name	Common Name
ARBOREAL POLLEN:	
Acer	Maple
Alnus	Alder
Betulaceae	Birch family
Castanea	Chestnut
Juglans	Walnut
Juniperus	Juniper
Picea	Spruce
Pinus	Pine
Quercus	Oak
Salix	Willow
Ulmus	Elm
NON-ARBOREAL POLLEN:	
Anacardiaceae	Sumac family
Apiaceae	Parsley/carrot family
Asteraceae:	Sunflower family
Artemisia	Sagebrush
Low-spine	Includes ragweed, cocklebur, etc.
High-spine	Includes aster, rabbitbrush, snakeweed, sunflower, etc.
Liguliflorae	Includes dandelion and chicory
Cheno-am	Includes amaranth and pigweed family
Cyperaceae	Sedge family
Ephedra nevadensis-type	Mormon tea
Ephedra torreyena-type	Mormon tea
Equisetum	Horsetail

Scientific Name	Common Name
Eriogonum	Wild buckwheat
Euphorbia	Spurge
Fabaceae	Bean or Legume family
Petalostemon	Prairie clover
Lamiaceae	Mint family
Nyctaginaceae	Four o'clock family
Onagraceae	Evening primrose family
Phlox	Phlox
Poaceae	Grass family
Polygonaceae	Knotweed/smartweed family
Polygonum	Knotweed
Portulaca	Purslane
Rosaceae	Rose family
Solanaceae	Potato/tomato family
Sphaeralcea	Globemallow
Indeterminate	
SPORES:	
Selaginella densa	Little clubmoss

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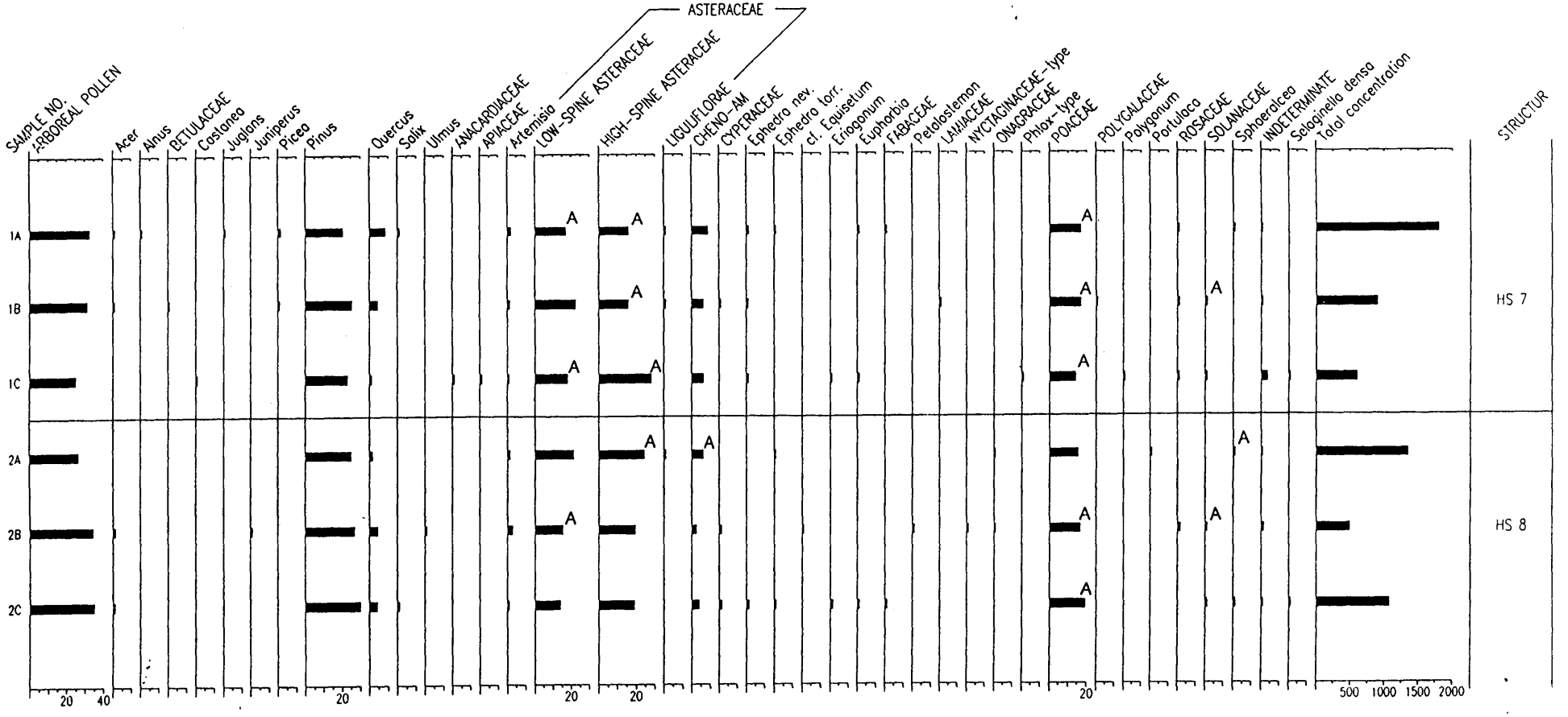


FIGURE 1. POLLEN DIAGRAM FOR FORT LARNED, KANSAS

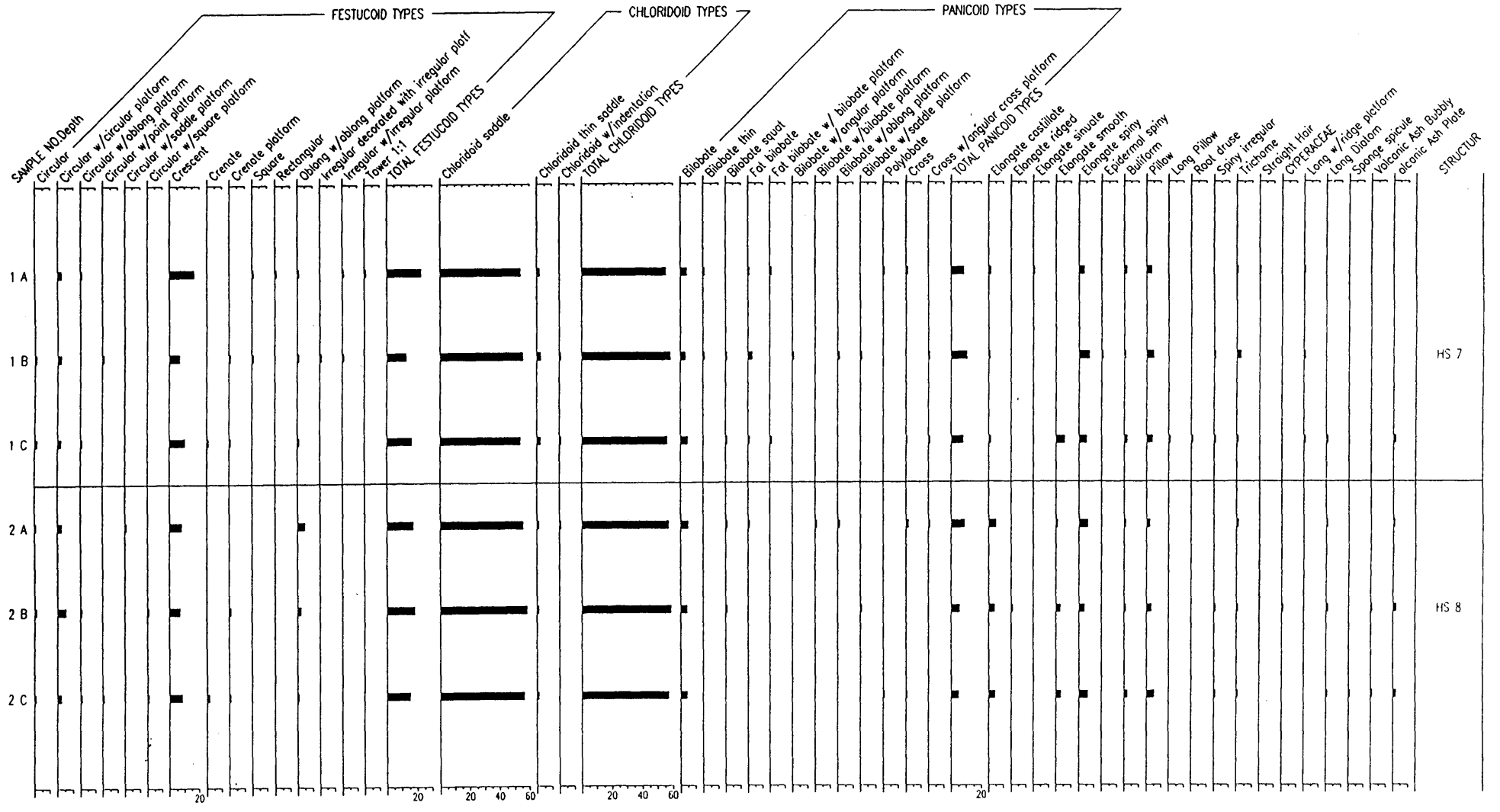


FIGURE 2. PHYTOLITH DIAGRAM FOR FORT LARNED, KANSAS.

Appendix B / Circulation for Universal Access

The Uniform Federal Accessibility Standards (UFAS) sets guidelines for facility accessibility by physically handicapped persons for Federal and federally-funded facilities. The buildings and grounds of Fort Larned National Historic Site are qualified, and may be granted variances with regard to the requirements of the UFAS.

Summary of General Accessibility Requirements

The preliminary design recommendations for access to the ten historic buildings at Fort Larned are largely based on several primary general requirements of the Uniform Federal Accessibility Standards. A summary of these requirements is included below to provide an overview of the major issues which shaped the design solutions for building access included in this report.

- The minimum clear width of an access route shall be 36 inches, except at doors.
- Doorways shall have a minimum clear opening of 32 inches, with the door open 90 degrees, measured between the faces of the door and the stop.
- If the doorways have two independently operated door leaves, then at least one leaf shall have a minimum clear opening of 32 inches.

Existing single leaf doors, hallways, and access routes at Fort Larned generally meet these minimum clear opening requirements. The double-leaf doors at Fort Larned, however, do not comply with this requirement. In many cases, double-leaf doors remain open during the hours of visitation, when weather permits, and do not constitute an obstacle. Yet, during foul weather, or where the interior environment is conditioned, the double-leaf doors remain closed and in non-compliance. In such cases, a new barrier-free entry vestibule will be constructed to allow the historic doors to remain open during the hours of visitation. Doors which are not required for egress will remain closed.

- Where fire code provisions require more than one means of egress from any space or room, then more than one accessible means of egress shall also be provided for handicapped people.

More than one barrier-free means of egress have been provided in the treatment options, where required. The control of occupant load to limit the number of egress routes in some buildings or spaces is addressed in the report *Fire Protection, Intrusion Alarm, and Life Safety Evaluation.*

- Ground and floor surfaces along accessible routes shall be stable, firm, and slip-resistant.
- Outdoor ramps and their walking surfaces shall be designed so that water will not accumulate on walking surfaces.
- Changes in level up to 1/4 inch may be vertical and without edge treatment. Changes in level between 1/4 and 1/2 inch shall be beveled with a slope no greater than 1:2. Changes in level

greater than 1/2 inch shall be accomplished by means of a curb ramp, ramp, elevator, or wheelchair lift.

- Objects projecting from walls with their leading edges between 27 inches and 80 inches above the finished floor shall protrude no more than 4 inches into walks, halls, corridors, passageways, or aisles. Objects mounted with their leading edges at or below 27 inches above the finished floor may protrude any amount. Freestanding objects mounted on posts or pylons may overhang 12 inches maximum from 27 inches to 80 inches above the ground or finished floor. Protruding objects shall not reduce the clear width of an accessible route or maneuvering space.
- Walks, halls, corridors, passageways, aisles, or other circulation spaces shall have 80 inches minimum clear headroom. If vertical clearance of an area adjoining an accessible route is reduced to less than 80 inches, a barrier to warn blind or visually-impaired persons shall be provided.

The surfaces of accessible routes must be stable, firm, well drained, and easily maneuverable so that the chances of slipping or tripping are minimized. Soft or loose material, like thickly padded carpet, turf, or gravel, make it difficult to maneuver narrow wheeled vehicles such as wheelchairs or strollers. Door sills and thresholds, which are often substantial in the structures at Fort Larned, must be adapted or otherwise circumvented.

- An accessible route with a running slope greater than 1:20 is a ramp.
- The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. (Some exceptions for maximum slope and rise are permitted in existing and historic structures and sites.)
- Ramps shall have level landings at the top and bottom of each run. The landing shall be at least as wide as the ramp, and at least 60 inches in length. If ramps change direction at landings, the minimum landing shall be 60 by 60 inches.
- If a ramp run has a rise greater than 6 inches, or a horizontal projection greater than 72 inches, then it shall have handrails on both sides.
- Ramps and landings with drop-offs shall have curbs, walls, railings, or projecting surfaces that prevent people from slipping off the ramp. Curbs shall be a minimum of 2 inches high. The inside of curbs shall be painted white.

In most locations where sloped surfaces must be used to achieve a change in elevation, there is ample room to utilize a slope of 1:20, or less, which is not a ramp, and does not require handrails or curbs. Since the railings surrounding ramps will add visual clutter to the site, ramps have been proposed only at those locations where slopes of 1:20 cannot provide an adequate accessibility solution. While boardwalks, porches, and sloped walkways have drop-offs, they are by definition not ramps and do not require railings or edge treatments.

- Outdoor stairs and their approaches shall be designed so that water will not accumulate on walking surfaces.
- Stairways shall have handrails at both sides of all stairs.

Existing stairs, particularly on the entry porches of the North and South Officers' Quarters (HS-9 and HS-7) and the Commanding Officer's Quarters (HS-8), do not currently meet the handrail requirement.

Buildings and Structures Accessibility Options

OPTION 1 – RECOMMENDED TREATMENT *(Exhibit 15a)*

Barracks / Visitor Center (HS-1) Recommended Treatment *(Exhibit 15b)*

The west end of the Barracks / Visitor Center (HS-1) porch is currently connected to barrier-free parking by an asphalt walk which accommodates the existing grade changes and meets flush with the porch deck. This walk should be modified to allow for the change in the porch height described in the following sentences and the surface treatment used. To provide barrier-free access to the main visitor entrance, the top of the finished porch level will be raised by reconstructing the porch or adding new wood construction on top of the existing porch to a height within 1/2" of the top of the existing stone threshold at the west door. The stone threshold will be beveled at the edge and the existing wood threshold will be reshaped to conform with UFAS requirements, as noted above. A new, barrier-free, glass entrance vestibule will be constructed within the visitor center at the main (west) entrance to allow the historic doors to remain open during the hours of operation, providing the clear opening width required by UFAS. The east doors on the south elevation will remain closed. New wooden platforms will be constructed at the rear (north) required exit doors conforming to the UFAS requirements. These will slope gently to grade.

The porches of HS-1 and HS-2 will be connected, for barrier-free accessibility, by creating a raised pathway, flush with the finished porch elevations, between the two buildings. The pathway should be a minimum of five feet in width with sloping sides at a maximum slope of 1:2; less if possible. The level portion of the pathway and the two side slopes should have a chip and seal bituminous surface with aggregate, indicating a non-historic walkway.

Barracks / Post Hospital (HS-2) Recommended Treatment *(Exhibit 15c)*

To provide barrier-free access to the barracks and post hospital entrances, the top of the finished porch level will be raised by reconstructing the porch or adding new wood construction on top of the existing porch to a height within 1/2" of the top of the existing stone thresholds. The stone thresholds will be beveled at the edge and the existing wood thresholds will be reshaped to conform with UFAS requirements, as noted above. At the east hall, the unusual 3-1/2 inch height differential, from the top of the threshold to the interior floor level, requires a special ramp two feet in length. This is permitted under the UFAS Section 4.1.7 on historic preservation, and produces a slope of 1:6.85. The existing sets of double doors will remain open during hours of operation providing the UFAS required clear access width. New wooden boardwalks will be constructed at the rear (north) required exit doors conforming to the UFAS requirements. These will slope gently to grade. The east end of the porch is connected to the grade level by a new access walk sloped at 1:20, or less. The area at the base of the walk should be reconfigured to create a suitable landing connecting to the company street.

Shops Building (HS-3) Recommended Treatment *(Exhibit 15d)*

The entries to the bakery work room and store room, the carpenter shop, and the blacksmith shop are all located on the east elevation, which is not readily visible from the parade ground. The elevation differential between grade and threshold heights varies between 11" and 15". To provide barrier-free access to the bakery work room, and doorways of the blacksmith and wheelwright shop, grade will be raised the entire length of the building to a height within 1/2" of the top of the stone thresholds.

The stone threshold at the bakery will be beveled at the edge and the existing wood threshold will be reshaped to conform with UFAS requirements, as noted above, to provide access to the demonstrations at the bake oven. The level platform will extend outwards to the eastern edge of the columns' stone foundations and slope downwards towards the western edge of the access road. This slope will differ in grade, but will allow access with varying degrees of difficulty. The platform and southern and eastern slopes will be covered in chip and seal bituminous materials (*non-historic route surface treatment*) while the side slopes will have sod and grass coverings. To eliminate the intrusion of accessible construction on the interiors of the blacksmith and wheelwright shops, it is recommended to limit access to these spaces by erecting vision barriers at the doorways.

New Commissary (HS-4) Recommended Treatment *(Exhibit 15e)*
An accessibility plan will be developed to be implemented after the artifact storage facility is removed from HS-4 and the building is restored. Following restoration, it is anticipated that the main entrances to the building will be from the east.

Old Commissary (HS-5) Recommended Treatment *(Exhibit 15f)*
To provide barrier-free access to the storehouse and arsenal, the entire area to the north of HS-5 will be regraded to slope up to within 1/2" of the top of the stone thresholds at all three doors. The stone thresholds at the storehouse and arsenal will be beveled at the edge and the existing wood thresholds will be reshaped to conform with UFAS requirements, as noted above. A *historic route surface treatment* will cover the strip of grade between the company street and the edge of the building at the three entrances. A *non-historic route surface treatment* will be applied at the remaining locations.

Quartermaster Storehouse (HS-6) Recommended Treatment *(Exhibit 15g)*
Three means of egress are currently required for the Quartermaster Storehouse (HS-6). On the interior, access should be provided to the raised floor in the west end of the building by a walkway sloped at 1:20, or less and steps. Egress from the raised floor area, historically the quartermaster office and issue room, should occur through its west door, with a connection out to the parade street. Two other egress routes should occur from the lower storehouse floor out through its northeast and southeast doors. The accessible route to the north storehouse door should consist of the entire area to the north of HS-6 regraded to slope up to within 1/2" of the top of the stone threshold. The stone threshold will be beveled at the edge and the existing wood threshold will be reshaped to conform with UFAS requirements, as noted above. A *historic route surface treatment* will cover the strip of grade between the company street and the edge of the building at the two entrances. A *non-historic surface treatment* will be applied at the remaining locations. The northwest door into the issue room will remain closed. Access to the southeast storehouse door and to the raised quartermaster's office west door will require raising the grade at a maximum 1:20 slope up to within 1/2" of the top of the stone threshold. A level platform will be created at each door conforming to UFAS requirements. The surfaces of the platform and sloped walkway will be a *non-historic surface treatment*, while the side slopes will be native grass. The stone thresholds will be beveled at the edge and the existing wood thresholds will be reshaped to conform with UFAS requirements, as noted above.

Officers' Row Recommended Treatment *(Exhibits 15h-j)*
The greatest impact of providing barrier-free accessibility at the Fort occurs at Officers' Row due to the height difference between the front porches and interior finished floors and grade. The

physical size of accessible ramps would have a negative effect on the historic character of the three buildings. The General Management Plan for the Fort designates that visitors will enter the site to the southwest of Officers' Row bringing traffic past the rear fences. This flow will allow a new walkway path to be developed west of the rear fence line to provide accessible walks to each of the west porches of all three buildings.

Because the North and South Officers' Quarters (HS-7 and HS-9) have virtually identical plans and site conditions, access to both the South and North Officers' Quarters can be addressed simultaneously. A *non-historic route surface treatment* will be applied on a new path developed from the rear fenceline rising gradually to meet the finished floor elevation of the west porches on each half of HS-7 and HS-9. A short connecting walk will run between the two approach walks west of the latrines. The top of the finished porch level will be raised by reconstructing the porch or adding new wood construction on top of the existing porch to a height within 1/2" of the top of the existing stone thresholds. The stone thresholds will be beveled at the edge and the existing wood thresholds will be reshaped to conform with UFAS requirements, as noted above.

At the Commanding Officer's Quarters (HS-8) a new walkway will be developed with a *non-historic route surface treatment* from the rear fenceline rising gradually to meet the finished floor elevation of the west porch. The top of the finished porch level will be raised by reconstructing the porch or adding new wood construction on top of the existing porch to a height within 1/2" of the top of the existing stone thresholds. The stone thresholds will be beveled at the edge and the existing wood thresholds will be reshaped to conform with UFAS requirements, as noted above.

Blockhouse (HS-10) Recommended Treatment *(Exhibit 15k)*
The path leading to the Blockhouse (HS-10) will be regraded to slope gradually to the building entrance, using the *historic route surface treatment.* The interior wooden recessed platform should be reconstructed to be flush with the surrounding earthen floor to eliminate any tripping hazards.

OPTION 2 *(Exhibit 16a)*
Barracks/Visitor Center (HS-1) Treatment Option 2 *(Exhibit 16b)*
The west end of the Barracks/ Visitor Center (HS-1) porch is currently connected to barrier-free parking by an asphalt walk which accommodates the existing grade changes and meets flush with the porch deck. It should remain. Two means of egress are required, and as such, access should be provided at the two doors on the porch. Each entry should have a level platform which meets the existing threshold, and a walk which slopes at 1:20, or less, from the porch deck to the platform. This treatment is utilized at several similar locations, and could have one or two sloped walks at each platform. No handrails are required. The double-leaf doors should either be altered to provide the minimum 32 inch clear width, or fitted with automatic door openers to actuate both leaves simultaneously. The porch is linked at the east end by a level boardwalk which connects to the porch of the Barracks/Post Hospital (HS-2). This linking boardwalk is more efficient and direct than landings and ramps at each porch.

Barracks/Post Hospital (HS-2) Treatment Option 2 *(Exhibit 16c)*
Platforms and walks sloped at 1:20, or less, should provide access to the east and west halls of the Barracks/Post Hospital (HS-2). At the east hall, the unusual 3_ inch height differential, from the top of the threshold to the interior floor level, requires a special ramp two feet in length. This is

permitted under the UFAS Section 4.1.7 on historic preservation, and produces a slope of 1:6.85. One or two sloped walks may be used at each access platform. The east end of the porch is connected to the grade level by a boardwalk sloped at 1:20, or less. The area at the base of the walk should be reconfigured to create a suitable landing connecting to the parade street.

Shops Building (HS-3) Treatment Option 2 *(Exhibit 16d)*
The entries to the bakery work room and store room, the carpenter shop, and the blacksmith shop are all located on the east elevation, which is not readily visible from the parade ground. The elevation differential between grade and threshold heights varies between 11" and 15". One long, level platform, in effect a porch deck, should be constructed. Barrier-free ramps, with a 1:12 slope, or less, should extend from the north and south ends of the platform. Stairs and landings should be constructed along the east edge of the platform to provide direct access for able-bodied visitors to each door. The ramps and stairs are required to have handrails, but it is also recommended that the sections of platform between the sets of stairs have railings, at the handrail height, for added safety. A landing at the base of each set of stairs is provided, in part for attachment of the required handrails. Guardrails are required only when the drop-off is 30" or more. The blacksmith shop has a dirt floor, which is currently accessible by an interior wood ramp sloping down from the threshold. It is recommended that the ramp be removed, and an interior viewing platform deck be constructed level with the exterior access platform. The new viewing platform should have a surrounding handrail, and a gate with stairs providing access to the dirt floor for the able-bodied living history interpreter. Some adjustments to the site will be necessary to link the ramp landings with the street/access path.

New Commissary (HS-4) Treatment Options 2 and 3 *(Exhibits 16e* and *16l)*
The least obtrusive solution to providing access to the schoolroom utilizes a video camera inside and a screen at an accessible site. Individuals who cannot access the room could view the interpretive program that is conducted inside the building on the screen. A camera could be installed in the schoolroom with feed to the visitor's center monitor in Barracks 1. The main disadvantage from the perspective of resource preservation would be the potential impact on archeological resources that running a cable underground between the two buildings would create. Another disadvantage is that it provides a limited experience for individuals with disabilities.

Another possible solution (Option 3), to providing access to the school room utilizes an upper landing, stairs, and a retractable wheelchair lift. The wheelchair lift should be integrated in the boardwalk landing which is accessible from grade, along the adjusted pathway. The lift, landings and stairs should be located outside of the roof eaves drip line to minimize water accumulation and long term moisture damage. Handrails are required on the lift, upper landing, and stairs. An alternate scheme relies on a typical ramp at 1:12 slope, or less, which is wrapped around the northwest corner of the structure and folded to accommodate the necessary landings and ramp runs. Handrails would be required at all ramps, upper landings, and stairs. This solution would be more visually intrusive than the lift approach, since the visually dense composition of overlapping railings and balusters would obscure more of the structure. In either case, the site path will have to be reconfigured to accommodate a new access structure.

Old Commissary (HS-5) Treatment Option 2 *(Exhibit 16f)*
Public access to the storehouse and to the arsenal in the Old Commissary (HS-5) are provided by boardwalks sloped at 1:20, or less, and platforms, constructed level with the doorway thresholds. One or two sloped boardwalks may be located at each platform. The area at the base of each walk should be reconfigured to create a suitable landing connecting to the parade street.

Quartermaster Storehouse (HS-6) Treatment Option 2 *(Exhibit 16g)*
Three means of egress are currently required for the Quartermaster Storehouse (HS-6). On the interior, access should be provided to the raised floor in the west end of the building by a walkway sloped at 1:20, or less. Egress from the raised floor area, historically the quartermaster office and issue room, should occur through its north door, out to the parade street. Two other egress routes should occur from the lower storehouse floor out through its north and southeast doors. The accessible route to the north storehouse door should consist of a boardwalk sloped at 1:20, or less, and a platform level with the threshold. Access to the southeast storehouse door and to the raised issue room north door will require ramps and stairs because of the greater change in elevation form the adjoining grade. Ramps at 1:12 slope, or less, landings level with the thresholds, stairs, and associated railings should be constructed. Level landings are also required at the bottom of each ramp. The site should be reconfigured to establish accessible routes from the parade street to these three locations.

South Officers' Quarters (HS-7) Treatment Option 2 *(Exhibits 16h* and *16l)*
Because the North and South Officers' Quarters have virtually identical plans and site conditions, access to both the South and North Officers' Quarters can be addressed simultaneously. The first option is presented here, and a second option is presented under North Officers' Quarters (HS-9). In both cases, it is recommended that platforms level with the front door thresholds, and boardwalks sloped at 1:20, or less, be constructed on the entry porches. Barrier-free ramps at a slope of 1:12, or less, can be constructed to run from the existing north-south boardwalk to the end of the porch. The ramp runs and intermediate landing require handrails. Handrails are also required at the front stairs on the entry porch.

Commanding Officer's Quarters (HS-8) Treatment Option 2 *(Exhibits 16l* and *16m)*
The first option utilizes a retractable wheelchair lift located at the end of the entry porch, and a boardwalk which connects it with the existing stairs. The existing stair landing will have to be enlarged. A level platform, which meets the existing threshold, should be constructed on the porch deck. A section of existing porch railing should be modified to create a gate, which will provide access between the lift and platform. The second option substitutes ramps sloped at 1:12, or less, and an intermediate landing for the boardwalk and lift. Handrails are required along the ramps and landing. This solution would be more visually intrusive, since the elevated ramps and handrails would obscure parts of the lower building and porch elevations.

North Officers' Quarters (HS-9) Treatment Option 2 *(Exhibits 16j* and *16l)*
A second option for barrier-free access to the entry porch of the North and South Officers' Quarters utilizes a retractable wheelchair lift, which should be integrated in a new boardwalk landing, designed as an extension of one of the existing walks leading to the front porch stairs. A section of the porch railing should be modified to create a gate which would provide access from the lift in its raised position, flush with the porch deck. Handrails are required on the lift, and at both sets of entry porch stairs.

Blockhouse (HS-10) Treatment Option 2 *(Exhibit 16k)*
The entry to the Blockhouse (HS-10) should have a level platform which meets the existing threshold, and a boardwalk which slopes at 1:20, or less, from the platform down to the path.

Historic and Non-Historic Routes Accessibility Options

OPTION 1 – RECOMMENDED TREATMENT

- *Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that matches the existing gravel surface to provide a universally accessible surface for the company streets and other historically gravel-paved circulation at and adjacent to the parade.
- *Non-Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that contrasts in color and surface appearance with that used for historic circulation to provide a universally accessible surface for all existing and proposed non-historic circulation within or serving the historic core.

This option would provide for universal accessibility while retaining the color and texture of the historic routes. It would also provide long-lasting impervious surfaces for all paving at the site. Application of the chip and seal paving would involve laying down a geotextile fabric and then placing the bituminous paving over it, ultimately resulting in approximately 4 inches of new material. Since the majority of the grounds at the Fort contain original fabric and potential archeological resources that have not been investigated, excavation during construction of the surface would pose a threat to any archeological resources located in the area. The roads and paths are highly visible elements in this historic landscape, and any change in their elevation in relation to the parade grounds and buildings will create an incongruent appearance on the site. In order to balance these concerns, it is recommended that a dual approach be applied when constructing the new surface.

In order to minimize the impacts to the archeological resources, it is recommended that limited archeological investigations be conducted to determine the depth of the historic road materials prior to construction. Once the depth of the original material is determined, the new surface should be constructed in a manner that avoids disturbing archeological materials while striving to result in a new surface at elevations that are as close as possible to the existing grade. It is recommended that an archeologist be on-site during excavation to oversee and provide guidance should any archeological resources be disturbed.

It is anticipated that this treatment approach will require applying the new surface over the existing surface in some areas (particularly in front of HS-5 and HS-6, where it is believed that the historic materials are very close to existing grade). In other areas it will be possible to excavate before placing the new materials. The final result would be a route that is level with existing grade whenever possible, and above existing grade only when this condition is necessary to protect the underground resources. In all cases, the change in treatments should be undetectable in the final surface appearance. Required changes in grade should be extremely gradual and should avoid exceeding the slope on the existing surface. Use of the geotextile fabric would be more expensive than applying a gravel base under the bituminous paving, however this treatment should be used uniformly on all continuous surfaces in order to avoid surface disturbances resulting from freeze

and thaw impacts. Where the paving is placed over non-historic route surfaces and there is no danger of impacting archeological resources, a gravel base could be used.

Where the paving is placed over existing grade and results in a raised surface, earth fill should be applied at the edges to create a gentle slope back to existing grade. The side slopes should be returned to native grass. The raised path would create a slightly different appearance on the site, and could create drainage problems in some areas. However, it would avoid any disturbance of archeological resources. The contrasting color and texture would differentiate the historic routes from non-historic routes while the use of chip and seal bituminous paving throughout would maintain a consistent surface appearance for all routes.

OPTION 2

- *Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that matches the existing gravel surface *applied over the existing surface* to provide a universally accessible surface for the company streets and other historically gravel-paved circulation at and adjacent to the parade. This treatment is intended as a non-invasive overlay to protect the historic material.
- *Non-Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that contrasts in color and surface appearance with that used for historic circulation to provide a universally accessible surface for all existing and proposed non-historic circulation within or serving the historic core.

This option would provide for universal accessibility while retaining the color and texture of the historic routes. It would also provide long-lasting impervious surfaces for all paving at the site. The contrasting color and texture would differentiate the historic routes from non-historic routes while the use of chip and seal bituminous paving throughout would maintain a consistent surface appearance for all routes. Application of the chip and seal paving would involve laying down a geotextile fabric and then placing the bituminous paving over it, ultimately resulting in approximately 4 inches of new material. In order to avoid disturbing the potential archeological resources below grade, the paving would be applied over the existing surface. This would result in a raised path, requiring earth fill to be applied at the edges to create a gentle slope back to existing grade. The side slopes would be returned to native grass. The raised path would create an incongruent appearance on the site. The roads and paths are highly visible elements in this historic landscape, and the change in their elevation in relation to the parade ground and buildings will impact the visual character and integrity of the historic landscape. In addition, this application could create drainage problems at the site. Since the road encloses the parade ground, raising it uniformly could result in turning the parade ground into a storm water detention area.

OPTION 3

- *Historic Route Surface Treatment* — Use a soil consolidant with geotextile base and gravel surface at a fine enough grain to allow accessibility for wheelchairs and strollers for all historic, gravel circulation within the parade quadrangle. This treatment is intended as a non-invasive overlay to protect the historic material.

- *Non-Historic Route Surface Treatment* — Use a soil consolidant with geotextile base but without a gravel surface for all existing and proposed non-historic circulation within or serving the historic core.

This option would provide for universal accessibility while retaining the color and texture of the historic routes. It would also provide the surface most similar to the historic surface in both color and texture. In order to avoid disturbing the potential archeological resources below grade the geotextile base would be applied over the existing surface then covered with the consolidated soil and finally the gravel. This would result in a raised path, requiring earth fill to be applied at the edges to create a gentle slope back to existing grade. The side slopes would be returned to native grass. The raised path would create an incongruent appearance on the site. The roads and paths are highly visible elements in this historic landscape, and the change in their elevation in relation to the parade ground and buildings will impact the visual character and integrity of the historic landscape. The unconsolidated gravel would erode gradually and require periodic maintenance to maintain a consistent and universally accessible surface. The consolidated soil is susceptible to frost damage, which would cause it to degrade and potentially require re-application of the technique periodically.

OPTION 4

- *Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that matches the existing gravel surface to provide a universally accessible surface for the company streets and other historically gravel-paved circulation at and adjacent to the parade.
- *Non-Historic Route Surface Treatment* — Use chip and seal bituminous paving with aggregate that contrasts in color and surface appearance with that used for historic circulation to provide a universally accessible surface for all existing and proposed non-historic circulation within or serving the historic core.

This option would provide for universal accessibility while retaining the color and texture of the historic routes. It would also provide long-lasting impervious surfaces for all paving at the site. Application of the chip and seal paving would include excavating 6 to 8 inches below the existing surface, placing a compacted aggregate base, then applying the chip and seal bituminous wearing course over it. This approach would disturb any underground archeological resources. Therefore, it is recommended that an archeologist be on-site during excavation to oversee and provide guidance should any archeological resources be disturbed. This application would result in a path that would be level with the existing route. The side slopes would be returned to native grass. The contrasting color and texture would differentiate the historic routes from non-historic routes while the use of chip and seal bituminous paving throughout would maintain a consistent surface appearance for all routes.

Appendix C / Drainage System Options

The following options address the need to protect the historic buildings in the NHS historic core from the damaging effects of inadequate surface drainage, high water table, and moisture penetration into building foundations.

OPTION 1 – RECOMMENDED TREATMENT

- Install an underground drainage system within the historic core, consisting of a perimeter drainage loop around each of the ten historic buildings surrounding the parade. Also install a network of collection lines, which discharges into the Pawnee River just west of the fort as indicated on Drawing C.1 / Mechanical Site Plan *(Exhibit 17)*. At the point of discharge, a flared end section or headwall should be installed to reduce the velocity of discharge and minimize soil erosion. The system should employ perforated drain tiles located at a depth of approximately 3'6" below grade looped around the perimeter of each building. Porous material should be provided around the entire length of each tile to facilitate the removal of ground water adjacent to the building foundations. The purpose of this procedure is to provide a valid drainage path for all ground water above the level of the tile.
- During the time when the foundation wall is exposed for installation of the foundation drainage system, apply a bituminous dampproofing or waterproofing material to the exposed foundation to retard moisture penetration into the stone.
- Since the majority of the grounds at the fort contain original fabric and potential archeological resources that have not been investigated, construction of the system would pose a threat to any archeological resources located in the area disturbed by implementation. In order to minimize the threats to these resources, an archeologist should be on-site during excavation. This on-site archeologist should document any artifacts or information uncovered during excavation. In the event that a potentially significant collection of artifacts is uncovered, the archeologist should provide guidance for proceeding with the project.

This option would provide a means of substantially reducing damage to buildings caused by inadequate site drainage by collecting water around the building foundations and minimizing the absorption of ground water into the foundation stone. It would entail considerable excavation posing a potential threat to archeological resources. However, the threats to unknown archeological resources have to be weighed against the current threats to the historic buildings. The on-site archeologist would be responsible for evaluating the below-ground resources and guiding the excavation process to minimize impacts to archeological resources.

OPTION 2

- Install gutters and downspouts on all of the historic buildings, directing all roof runoff away from the foundations of the buildings.

This option would provide a means of minimally reducing damage to buildings caused by inadequate site drainage. However, it would also impact the buildings by adding non-historic features to the exterior of the buildings. The gutters and downspouts would be inconsistent elements contrasting with the historic appearance of the buildings. Daylighting the downspouts would create a drainage problem, since the collected water would pose erosion threats when expelled. In the short-term this option would not pose an increased threat to archeological resources. However, the existing high water table currently poses a threat to these resources *and* to the historic buildings. This option would not substantially address this problem.

OPTION 3

- Install gutters and downspouts on all of the historic buildings, and tie the downspouts into an underground drainage system.
- Install an underground drainage system within the historic core, consisting of a perimeter drainage loop around each of the ten historic buildings surrounding the parade. Also install a network of collection lines, which discharges into the Pawnee River just west of the fort as indicated on Drawing C.1 / Mechanical Site Plan *(Exhibit 17)*. At the point of discharge, a flared end section or headwall should be installed to reduce the velocity of discharge and minimize soil erosion. The system should employ perforated drain tiles located at a depth of approximately 3'6" below grade looped around the perimeter of each building. Porous material should be provided around the entire length of each tile to facilitate the removal of ground water adjacent to the building foundations. The purpose of this procedure is to provide a valid drainage path for all ground water above the level of the tile.
- During the time when the foundation wall is exposed for installation of the foundation drainage system, apply a bituminous dampproofing or waterproofing material to the exposed foundation to retard moisture penetration into the stone.
- Since the majority of the grounds at the fort contain original fabric and potential archeological resources that have not been investigated, construction of the system would pose a threat to any archeological resources located in the area disturbed by implementation. In order to minimize the threats to these resources, an archeologist should be on-site during excavation. The archeologist should document any artifacts or information uncovered during excavation. In the event that a potentially significant collection of artifacts is uncovered, the archeologist should provide guidance for proceeding with the project.

As with Option 1, this option would provide a means of substantially reducing damage to buildings caused by inadequate site drainage. However, like Option 2, it would also impact the buildings by adding non-historic features to the exterior of the buildings. The gutters and downspouts would be inconsistent elements contrasting with the historic appearance of the buildings. In addition, implementation of this option would entail considerable excavation posing a potential threat to archeological resources. The option could potentially result in a greater overall negative impact to resources.

Appendix D

Managing Pocket Gophers

Description and Distribution

Pocket gophers are medium sized (9-12 inches long and 7-14 ounces), burrowing rodents that spend most of their lives below ground (**Figure 1**). They are named after the paired fur-lined cheek pouches located on the outside of the mouth. The pockets are used to carry food. Gophers have powerfully built forequarters with large claws on their front feet, a short neck, external ears, small eyes, and lips that close behind their large incisors. Their fine and soft fur ranges in color from dark brown, to pale brown, to nearly white. The vibrassae (whiskers) on their face and the sparse hairs on the tail serve as sensory mechanisms, guiding the gopher either forward or backward through their underground burrows.

Two species of pocket gophers are found in Kansas. The plains pocket gopher (*Geomys bursarius*) is distributed throughout Kansas except for the southeastern corner. The yellow-faced pocket gopher (*Pappogeomys castanops*) is found only in a limited part of southwestern Kansas. Distinguishing between the two species is rather easy, the plains pocket gopher has 2 grooves on the midline of the paired upper incisor teeth while the yellow-faced pocket gopher has 1 groove. Both species are about the same size.

Pocket gophers attain the highest densities on light-textured soils with good herbage production. Shallow soils limit pocket gophers due to tunnel cave-ins and poor insulation from warm summer and cold winter temperatures.

Food Habits

Pocket gophers feed on roots encountered while digging, on vegetation pulled into the tunnel from below, and on above ground vegetation near the tunnel. Pocket gophers prefer above ground portions of vegetation when it is green and succulent. Plains pocket gophers prefer succulent forbs in spring and summer but also feed on grasses. Alfalfa is preferred by gophers. Many trees and shrubs are clipped just above ground, especially under snow cover.

Biology, Reproduction, and Behavior

Pocket gophers construct burrow systems by loosening the soil with their claws and incisors. Gophers then use their forefeet and chest to push the soil out of the burrow. The soil is deposited in fan-shaped mounds 12 to 18 inches wide and 4 to 6 inches high.

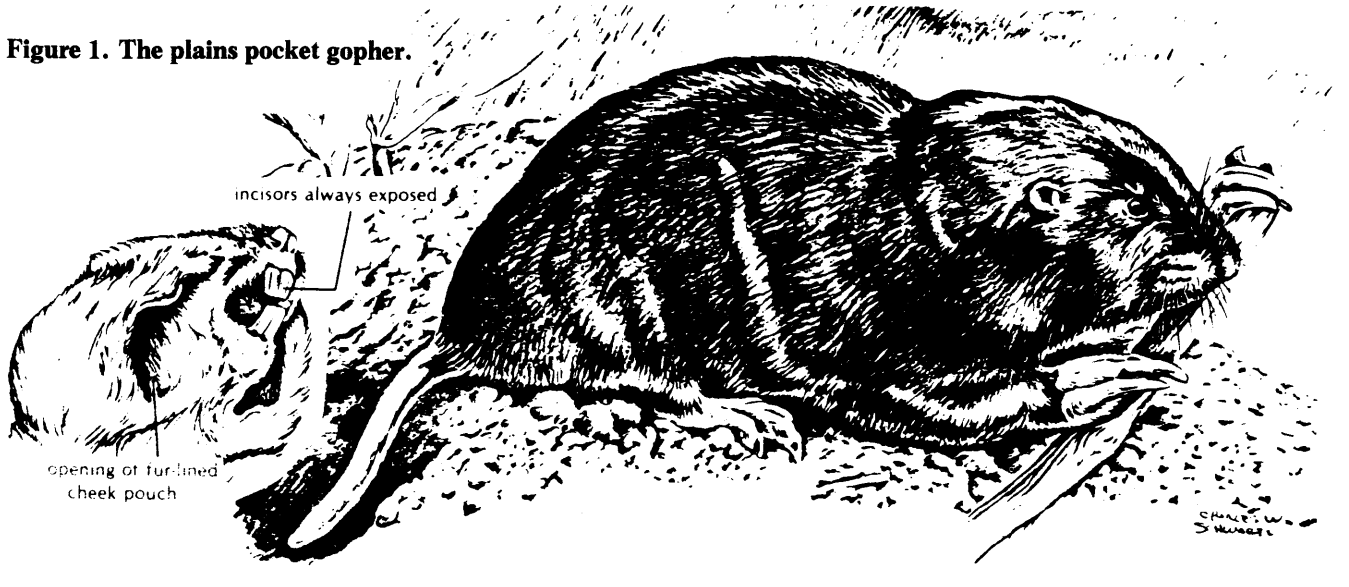
Burrow systems consist of a main tunnel generally 4 to 18 inches below the soil surface and a variable number of lateral burrows extending from the main. Lateral burrows end with a soil mound or only a soil plug at the surface. Burrows are about 3 inches in diameter, depending on size of the gopher. A burrow system may be linear to highly branched, may contain 200 yards of tunnels, and may have several mounds.

Pocket gophers usually construct 1 to 3 mounds per day although the rate is variable. This mound building by 1 gopher brings about 2¼ tons of soil to the surface each year. Mound building activity is usually greatest in spring and fall.

The plains pocket gopher breeds from February to April and produces 1 litter of usually 3 to 6 young after a gestation period of about 20 days. Usually, only 1 adult is found in each burrow system except during breeding and while raising young. Six to 8 plains pocket gophers per acre are considered high densities. Young pocket gophers usually begin dispersing from the natal burrow in June, when about half grown.

Pocket gophers are consumed by several predators including owls, hawks, badgers, coyotes, foxes, bobcats, skunks, weasels, bullsnakes, and rattlesnakes.

Figure 1. The plains pocket gopher.



Economic Damage

Pocket gophers reduce the productivity of those portions of alfalfa fields and native grasslands on which they are found by 20 to 50 percent. If gophers are present on 10 percent of a field, they may reduce overall forage productivity of the field by 2 to 5 percent. Gopher mounds dull and plug sickel bars when harvesting hay or alfalfa. Gophers sometimes damage trees by girdling or clipping stems and by pruning roots. Gophers may, at times, destroy underground utility cables and irrigation pipes.

In retrospect, gophers are beneficial in several ways. Their burrowing activities increase soil fertility by adding organic matter in the form of plant materials and feces. Their burrowing increases soil aereation, increases water infiltration, reduces compaction, and increases the rate of soil formation by bringing up subsoil and subjecting it to weatherization.

Legal Status

Gophers are not protected by state or federal laws.

Control Methods

Exclusion

Pocket gophers can be excluded from valuable ornamental trees and shrubs with a 1/4 to 1/2-inch mesh hardware cloth fence buried at least 18 inches. This method is of limited practicality because of expense and labor. Cylindrical plastic netting placed over the entire seedling, including bare root, significantly reduces damage to newly planted forest seedlings.

Alfalfa Varieties

Varieties of alfalfa with several large roots rather than a single tap root suffer less when pocket gophers feed on them.

Crop Rotation

Rotating alfalfa with grain crops effectively controls pocket gophers because annual grains do not produce large enough roots to support gophers year round.

Grain Buffer Strips

Buffer strips of grain around a hay field provide unsuitable habitat and can minimize immigration of pocket gophers.

Weed Control

In orchards and shelterbelts, control of forbs, which usually have large roots preferred by gophers, likely will effectively limit gopher damage.

Flood Irrigation

Flood irrigation can effectively control pocket gophers especially in fields that have been leveled to remove high spots which might serve as refuges. The wet flooded soil generally prevents diffusion of gases in and out of the burrow and sticks to the pocket gopher's fur and claws creating an inhospitable environment.

Trapping

Trapping is one of the best methods for reducing pocket gopher numbers on small to moderate sized fields (less than 50 acres) and to remove remaining animals after a poison control program. Body gripping traps (Death Clutch 1, Macabee, Victor, Guardian Gopher Trap), available from hardware and trapping supply stores, work exceptionally well for capturing gophers (**Figure 2**). Traps

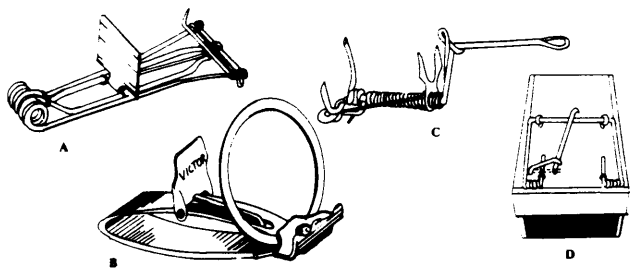


Figure 2. Typical gopher traps: (A) Macabee; (B) Victor Gopher Getter; (C) Death-Klutch 1; and (D) Guardian (California Box-Type).

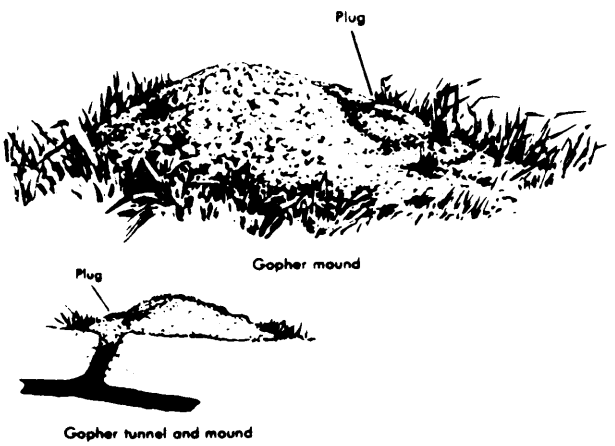


Figure 3. Pocket gopher mound and its relation to tunnel system.

can be set in the main tunnel or in a lateral, preferrably near the freshest mounds. The lateral tunnel usually can be located by a circular plug (sometimes a depression) in the fan shaped mound (**Figure 3**). Probe into the depression, usually in the direction away from the mound, until the direction of the tunnel is determined. Remove the several-inch plug of soil with a garden trowel or a spade. A trap, secured to a wire and marker stake, can be inserted with the body gripping jaws about 6 to 8 inches into the tunnel (**Figure 4**). Traps also can be set in the main tunnel located about 12 to 18 inches from the mound. After uncovering the main tunnel with a shovel, set 2 traps as shown in **Figure 4**. The tunnels either can be left open or covered after setting traps. Traps can be checked twice daily since gophers often visit the traps within a few hours. If a trap is not visited within 48 hours, move it to a new location. Trapping usually is most successful in the spring and fall when gophers are actively building mounds.

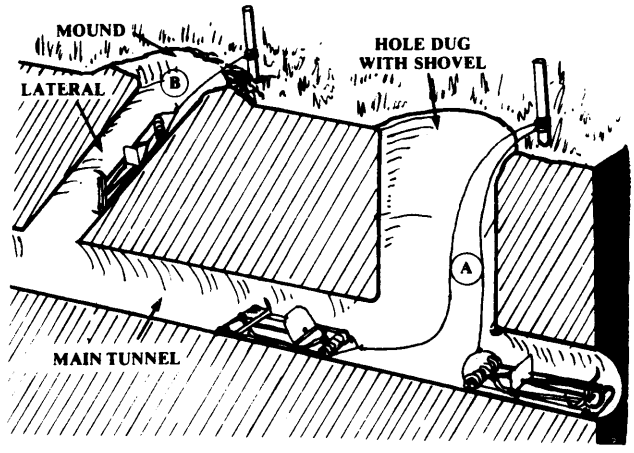


Figure 4. Methods of placing gopher traps into burrow systems: (A) Place two traps set in opposite directions in main tunnel; (B) set single trap in lateral tunnel from which soil plug has been removed. Wire each trap to a stake.

Toxicants

Three rodenticides, strychnine (0.31 to 0.5% active ingredient) zinc phosphide (2% active ingredient), and chlorophacinone (Rozol) (0.005% active ingredient) are registered for pocket gopher control in Kansas. Strychnine, formulated on milo, barley, or wheat, is a widely used toxicant. Because strychnine is highly toxic and potentially hazardous to all wildlife, it is usually labeled as a Restricted Use Pesticide. Underground baiting with strychnine presents minimal hazards to non-target wildlife but any grain spilled on the surface may be hazardous to ground-feeding birds. In some studies, zinc phosphide has been less effective than strychnine. Since chlorophacinone (Rozol) is a multiple dose anticoagulant, a greater amount of bait is required to achieve adequate control. To poison pocket gophers, the bait must be placed in their tunnel systems by hand or with a burrow builder machine.

Hand Baiting

Bait can be placed into a burrow system by hand after opening the main tunnel or with a hand probe. To place bait in the burrow system by hand, locate the main by digging with a shovel 12 to 18 inches from the plug side of the mound. Place the recommended amount of bait, following label directions, in each direction of the opened main tunnel and well into the system. Close off each tunnel with sod clumps and soil so gophers do not attempt to close the system and cover the bait with soil.

A less time-consuming baiting method involves using a pointed-rod hand probe. Locate the main tunnel 12 to 18 inches from the plug side of the mound by pressing the probe into the ground (figure 5). Location of the tunnel can be determined by the decreased friction on the probe. Bait can be placed through the probe hole into the tunnel. A reservoir-type bait probe dispenser is also available for poisoning gophers (**Figure 5**). A button is pushed on the bait probe when it is pushed in the burrow and a metered dose of bait drops into the burrow. Place the recommended amount of bait down each of 2 or 3 probe openings and then cover the probe holes with sod.

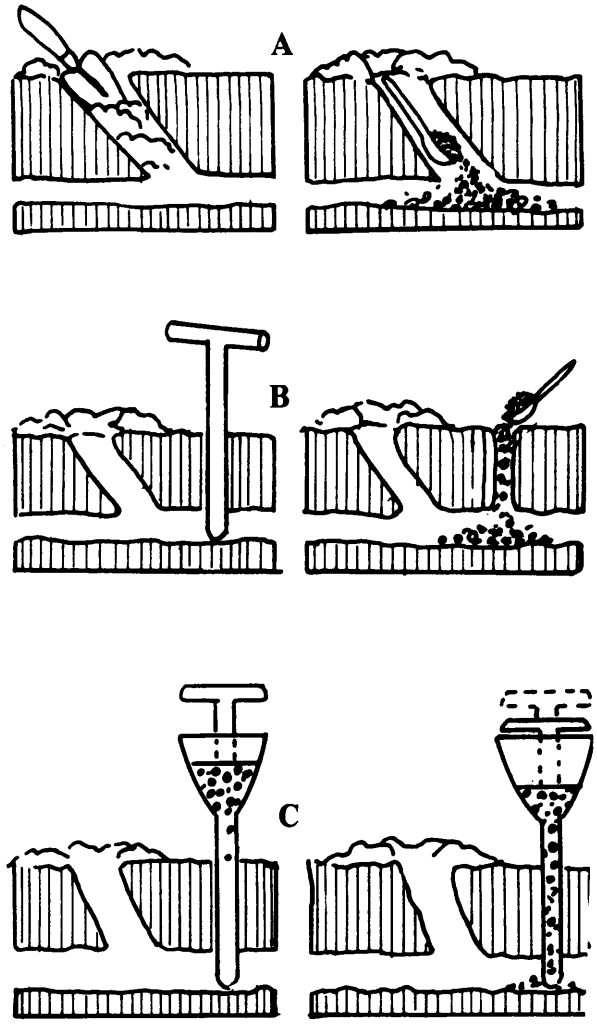


Figure 5. Methods of applying gopher bait by hand or with a probe.

(A) Hand application: remove plug in tunnel, starting from gopher mound. Place quantity of bait into main tunnel with a long-handled spoon. Seal tunnel with sod, taking care not to cover bait with soil.

(B) Probe application: Locate main tunnel with probe as described in text. With spoon, drop bait into tunnel through hole made by probe. Cover probe hole with sod.

(C) Bait-dispensing probe: Locate main tunnel with probe. Push lever or plunger to dispense bait into tunnel. Cover probe hole with sod.

Mechanical Burrow Builder

The burrow builder **(Figure 6)** mechanically delivers bait underground so large acreages can be economically treated for pocket gopher control. Burrow builders are available in a standard hydraulically operated unit or a three-point hitch model. The device consists of a knife and torpedo assembly which makes the artificial burrow at desired soil depths, a coulter blade which cuts roots of plants ahead of the knife, a seeder assembly for bait dispensing, and the packer wheel assembly to close the furrow behind the knife. The seeder box has a metering device for dispensing various poison baits at desired rates.

To achieve good results with a burrow builder: 1) adjust the burrow builder to construct tunnels at the same depth as those constructed by gophers in your area so gophers intercept the tunnels, 2) use the machine only when the soil moisture is adequate, if the soil is too dry the burrow may collapse and if the soil is too wet the slot over the tunnel may not close (generally, the soil moisture is adequate if it is damp enough so that a compressed handful will hold its shape), 3) space the burrows at 20 to 25 feet intervals in areas of infestation, 4) periodically check to assure formation of a good burrow and check if bait is dispensing down the tube, 5) enclose the perimeter of the field with artificial burrows to prevent reinvasion, 6) follow directions provided with the burrow builder machine. Recommended application rates of 1 to 2 pounds per acre of 0.35 to 0.5% strychnine provide 85 to 95% control. Any spilled bait should be cleaned up and properly disposed. Any dead gophers found above ground should be buried to reduce hazards to predators and scavengers.

Fumigants

Several types of materials and devices are available for fumigating pocket gophers. Fumigants are not very successful for controlling pocket gophers because gophers either sense the poisonous gas and plug the tunnel or the fumigants diffuse into the soil, particularly when it is dry.

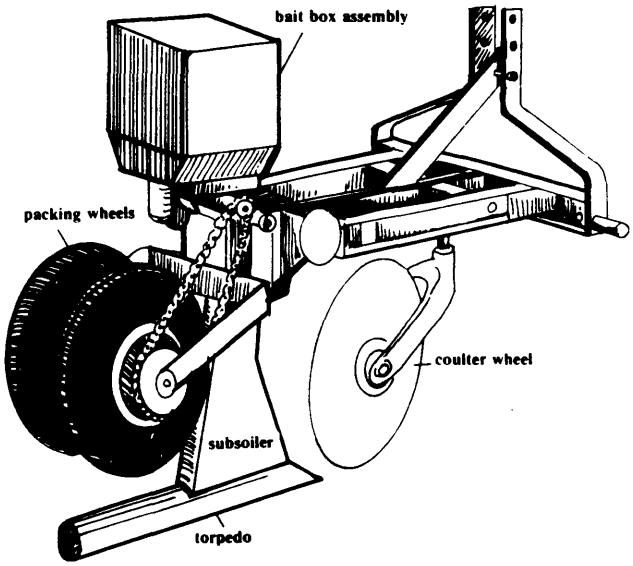


Figure 6. The "burrow-builder" machine may be used to control pocket gophers on large acreages.

Shooting

Shooting pocket gophers is impractical because they seldom wander above ground.

Other Methods

Buried utility cables and irrigation lines can be protected by enclosure with lead, PVC, or other conduit materials exceeding 2.1 inches in diameter. Pocket gophers can readily damage cables armored with soft metals such as lead and aluminum if the diameters are less than 2.1 inches.

Figures 1 and 3 adapted from The Wild Mammals of Missouri (1981), by Charles W. and Elizabeth R. Schwartz, University of Missouri Press, Columbia.

Figures 2, 4, 5, and 6 adapted from Pocket Gophers and Their Control (1984), by Robert M. Timm, Ronald M. Case, and J. Stubbendieck, Cooperative Extension Service, University of Nebraska, Lincoln.

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COOPERATIVE EXTENSION SERVICE, MANHATTAN, KANSAS

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File Code: Wildlife 1-2

Appendix E

PLANT SURVEY OF THE RESTORED PRAIRIE AT FORT LARNED NATIONAL HISTORIC SITE

Natural Science Research Associates

409 East Eleventh Street

Hays, Kansas 67601-3505

11 December 1989

The Natural Science Research Associates conducted field surveys using the modified step-point method to quantitatively sample the flora of the restored prairie at Fort Larned National Historic Site on 10 June and 16 September 1989. In the following report and tables the 10 June survey will be referred to as the spring sample and the 16 September survey will be referred to as the fall sample. The spring sample consisted of 2513 points and the fall sample consisted of 2742 points.

The tables following the text contain the field data collected during the spring and fall samples. Plants marked with an asterisk are considered undesirable in a native prairie. They include smooth brome, *Kochia*, bermudagrass, alfalfa, field bindweed, downy brome, puncture vine, Japanese brome, sour dock, dandelion, rough pigweed, foxtail, crabgrass, and velvet leaf. We consider them undesirable because they are not native to the Great Plains of North America and therefore would not have been found in the prairie surrounding the historic fort.

RECOMMENDATIONS

The most effective method of managing a native prairie ecosystem is with fire. All of the management areas, with the exception of unit 5c, would benefit by being burned once every 3-5 years in the early spring. The 2-4 year period during which the prairie is not burned will allow a good base of litter to accumulate, which will support a more effective controlled burn in a subsequent year. Properly timed spring burning will reduce the presence of many undesirable annuals and control encroachment of woody vegetation (i.e., eastern red cedar and riparian trees and shrubs). Yearly burning will not improve the quality of the prairie beyond what can be accomplished with a 3-5 year cycle of controlled burns, and annual burns would be detrimental to desirable prairie wildflowers.

If policies of the Park Service continue to restrict the use of burning on the restored prairie, we recommend that the prairie be hayed as an alternative treatment, except units 5c and 12. This should be performed on the same cycle as with the burning pro-

gram. Baled prairie hay is a desirable and valuable crop, with a current market price of $50 - $60 per ton. It should not be difficult to find a contractor interested in harvesting it, given the quality of grasses in the units that can be baled. Most contractors will agree to a one third (landowners) and two thirds (contractor) share. It is important that the haying be done only once during the designated year and be completed no later than June or early July. Although not as effective as burning, haying is the next best method to speed the improvement of the prairie. In addition to haying, we recommend 'spot spraying' some small areas of undesirable vegetation with herbicides.

We also recommend that you do not utilize 'flash grazing' as a prairie improvement method since it may do more damage than good to the prairie. Seeds of undesirable plants will be brought in with the livestock and areas where the animals congregate and mill around will be degraded. Also, fence building would cause short term damage from post holes and tire tracks.

Mowing can be used as an effective management technique to control smooth brome. This introduced species occurs in units where it has invaded from the roadside ditches. Closely mowing smooth brome to prevent development of its seed heads in the spring and early summer would provide reasonable control until desirable plants can replace it.

Unit 5c, the oxbow, presents an interesting problem. Historically it was probably an ephemeral wetland with an aquatic flora and fauna. Its flora is now comprised almost entirely of *Kochia.* Spraying this unit would damage the trees and it is not likely to significantly reduce the *Kochia.* If the soil in the unit could be kept saturated, the *Kochia* would die and be replaced by sedges and other native wetland species. Also, prairie cordgrass, a native marsh species, could be introduced into the unit. Prairie cordgrass quickly spreads by rhizomes, and this tall-grass species would soon dominate the oxbow. Because it prefers moist habitat, it would not invade the surrounding units. The cordgrass could be obtained locally and transplanted into the unit with very little time and expense. Providing a means of pumping water into the oxbow to saturate the soil when necessary presents the only obstacle to

maintaining this marsh.

Unit 12, the detached ruts area, presents unique problems. Being surrounded by cropland on three sides and a road on the fourth, it is invaded by *Kochia* and field bindweed from the cultivated fields and smooth brome from the roadside. *Kochia* is a problem in the north third of the unit and in the water ways. Burning in early spring would help control the *Kochia*. The use of haying as an alternative in this unit would not be practical because of the rough topography and the limited value of the hay that could be obtained. The present practice of spraying field bindweed is the best control method available. Control of smooth brome by mowing has been discussed above. In addition to these three undesirable species, threeawn dominates the area of the unit around the observation platform. Its dominance is probably an artifact of overgrazing by prairie dogs. Although it is a native plant, it is considered to be a weed. It may be desirable to reduce its abundance and encourage other more preferable species of grasses and wildflowers to grow in this area visited by the public. As its growth is mainly from mid to late summer, it is best controlled by burning in early fall when its seeds can be destroyed. This would allow the area it once dominated to be invaded by more desirable species.

CONCLUSION

We feel that the restoration of the prairie at Fort Larned National Historic Site is progressing well. The diversity of native plants in the units was greater than we had expected. Desirable grasses, such as bluestems, Indian grass, gramas, and buffalo grass, seem to be effectively competing with undesirable plants in most of the units. We also were encouraged by the variety and abundance of native wildflowers, which add to the attractiveness of the site and to the dynamic stability of the native prairie ecosystem. The oxbow unit needs the most attention, but with effort could become an asset to the park. Invasion of undesirable species from the surrounding cropland will always present a problem, but as the prairie matures it will become more resistant to these invaders.

UNIT 1 - SPRING

	PLANTS	POINTS	% OF TOTAL
	big bluestem	49	19.6%
	blue grama	43	17.2%
	buffalo grass	29	11.6%
	Indian grass	29	11.6%
*	Kochia	24	9.6%
	little bluestem	20	8.0%
	sand dropseed	16	6.4%
	sideoats grama	13	5.2%
	silver beardgrass	8	3.2%
*	smooth brome	7	2.8%
	lamb's quarter	7	2.8%
	western wheatgrass	4	1.6%
	wild lettuce	1	0.4%
	TOTAL	250	

FALL

	PLANTS	POINTS	% OF TOTAL
	Indian grass	57	20.7%
	silver beardgrass	42	15.2%
	blue grama	35	12.7%
*	smooth brome	27	9.8%
	sideoats grama	24	8.7%
*	Kochia	18	6.5%
	buffalo grass	17	6.2%
	little bluestem	13	4.7%
*	foxtail	17	6.2%
	yellow sweetclover	7	2.5%
	big bluestem	6	2.2%
	western wheatgrass	4	1.4%
	tall dropseed	3	1.1%
	wild lettuce	1	0.4%
	giant ragweed	1	0.4%
*	bermuda grass	1	0.4%
	sand dropseed	1	0.4%
	carpetweed	1	0.4%
	snow-on-the-mountain	1	0.4%
	TOTAL	276	

UNIT 2A - SPRING

	PLANTS	POINTS	% OF TOTAL
	blue grama	47	30.1%
*	Kochia	23	14.7%
*	smooth brome	19	12.2%
	sideoats grama	16	10.3%
	western wheatgrass	12	7.7%
	buffalo grass	12	7.7%
	silver beardgrass	10	6.4%
	switch grass	9	5.8%
*	field bindweed	5	3.2%
	windmill grass	1	0.6%
	little bluestem	1	0.6%
	sand dropseed	1	0.6%
	TOTAL	156	

FALL

	PLANTS	POINTS	% OF TOTAL
	silver beardgrass	57	35.6%
	sideoats grama	25	15.6%
*	foxtail	21	13.1%
	blue grama	14	8.8%
*	smooth brome	13	8.1%
	western wheatgrass	11	6.9%
	Indian grass	9	5.6%
	switch grass	4	2.5%
*	Kochia	4	2.5%
	big bluestem	1	0.6%
	sandbur	1	0.6%
	TOTAL	160	

UNIT 2B - SPRING

	PLANTS	POINTS	% OF TOTAL
	silver beardgrass	66	37.9%
*	Kochia	30	17.2%
	sideoats grama	17	9.8%
	yellow sweetclover	13	7.5%
	blue grama	12	6.9%
	big bluestem	8	4.6%
	Indian grass	7	4.0%
	western wheatgrass	4	2.3%
	switch grass	4	2.3%
	witch grass	3	1.7%
	little bluestem	2	1.1%
*	field bindweed	2	1.1%
	sand dropseed	2	1.1%
	scarlet gaura	1	0.6%
	western ragweed	1	0.6%
	buffalo grass	1	0.6%
	windmill grass	1	0.6%
	TOTAL	174	

FALL

	PLANTS	POINTS	% OF TOTAL
	blue grama	52	28.9%
*	Kochia	32	17.8%
	western wheatgrass	19	10.6%
*	smooth brome	19	10.6%
*	foxtail	25	13.9%
	sideoats grama	15	8.3%
	silver beardgrass	10	5.6%
	sandbur	3	1.7%
	switch grass	3	1.7%
	Indian grass	1	0.6%
*	bermuda grass	1	0.6%
	TOTAL	180	

UNIT 3 - SPRING

	PLANTS	POINTS	% OF TOTAL
*	Kochia	92	40.0%
	western wheatgrass	50	21.7%
	big bluestem	14	6.1%
	sand dropseed	11	4.8%
	buffalo grass	9	3.9%
*	downy brome	8	3.5%
	western ragweed	8	3.5%
	lamb's quarter	8	3.5%
	blue grama	7	3.0%
*	alfalfa	4	1.7%
	Indian grass	4	1.7%
	salmon-colored mallow	3	1.3%
*	dock	2	0.9%
*	foxtail	2	0.9%
*	smooth brome	2	0.9%
	sideoats grama	1	0.4%
*	dandelion	1	0.4%
*	crabgrass	1	0.4%
	silver beardgrass	1	0.4%
	wild alfalfa	1	0.4%
*	rough pigweed	1	0.4%
	TOTAL	230	

UNIT 3 - FALL

	PLANTS	POINTS	% OF TOTAL
*	Kochia	87	31.5%
	western wheatgrass	44	15.9%
	big bluestem	24	8.7%
	sideoats grama	19	6.9%
*	foxtail	19	6.9%
	Indian grass	16	5.8%
	buffalo grass	16	5.8%
	blue grama	12	4.3%
	silver beardgrass	5	1.8%
	little bluestem	5	1.8%
	tall dropseed	5	1.8%
	yellow sweetclover	4	1.4%
	snow-on-the-mountain	3	1.1%
	sand dropseed	3	1.1%
	prairie coneflower	2	0.7%
	dotted gayfeather	2	0.7%
	sandbur	2	0.7%
*	alfalfa	2	0.7%
	toothed spurge	1	0.4%
	windmill grass	1	0.4%
	pitcher sage	1	0.4%
	western ragweed	1	0.4%
	annual ragweed	1	0.4%
	annual sunflower	1	0.4%
	TOTAL	276	

UNIT 4 - SPRING

	PLANTS	POINTS	% OF TOTAL
	silver beardgrass	33	21.9%
	blue grama	22	14.6%
	salmon-colored mallow	16	10.6%
	switch grass	13	8.6%
*	Kochia	9	6.0%
	little bluestem	9	6.0%
*	smooth brome	7	4.6%
	western wheatgrass	6	4.0%
	big bluestem	6	4.0%
	sand dropseed	5	3.3%
*	foxtail	4	2.6%
	scarlet gaura	4	2.6%
*	alfalfa	3	2.0%
	buffalo grass	3	2.0%
	yellow sweetclover	2	1.3%
*	field bindweed	2	1.3%
*	dandelion	2	1.3%
	prairie coneflower	1	0.7%
	purple poppy mallow	1	0.7%
	buffalo gourd	1	0.7%
	sedge	1	0.7%
	yellowspine thistle	1	0.7%
	TOTAL	151	

FALL

	PLANTS	POINTS	% OF TOTAL
	silver beardgrass	55	36.7%
	blue grama	27	18.0%
	switch grass	22	14.7%
	buffalo grass	11	7.3%
*	foxtail	10	6.7%
	western wheatgrass	9	6.0%
	tall dropseed	5	3.3%
*	Kochia	3	2.0%
	big bluestem	2	1.3%
*	smooth brome	1	0.7%
	plains milkweed	1	0.7%
	Indian grass	1	0.7%
	purple poppy mallow	1	0.7%
	salmon-colored mallow	1	0.7%
	sedge	1	0.7%
	TOTAL	150	

UNIT 5A - SPRING

	PLANTS	POINTS	% OF TOTAL
	blue grama	57	46.0%
*	Kochia	22	17.7%
	silver beardgrass	18	14.5%
*	foxtail	10	8.1%
*	smooth brome	7	5.6%
	little bluestem	4	3.2%
	buffalo grass	3	2.4%
	windmill grass	1	0.8%
	western wheatgrass	1	0.8%
	ground cherry	1	0.8%
	TOTAL	124	

FALL

	PLANTS	POINTS	% OF TOTAL
	blue grama	34	27.2%
	silver beardgrass	24	19.2%
*	foxtail	19	15.2%
	buffalo grass	13	10.4%
*	Kochia	12	9.6%
*	smooth brome	11	8.8%
	western wheatgrass	6	4.8%
	little bluestem	3	2.4%
	sideoats grama	2	1.6%
	big bluestem	1	0.8%
	TOTAL	125	

UNIT 5B - SPRING

	PLANTS	POINTS	% OF TOTAL
*	Kochia	94	52.8%
	western wheatgrass	36	20.2%
*	puncture vine	15	8.4%
	sideoats grama	14	7.9%
	big bluestem	6	3.4%
	silver beardgrass	5	2.8%
*	dock	2	1.1%
	Louisiana sagewort	2	1.1%
	Indian grass	1	0.6%
	switch grass	1	0.6%
*	smooth brome	1	0.6%
*	downy brome	1	0.6%
	TOTAL	178	

FALL

	PLANTS	POINTS	% OF TOTAL
*	Kochia	123	64.7%
	western wheatgrass	23	12.1%
*	foxtail	17	8.9%
	sideoats grama	14	7.4%
	big bluestem	6	3.2%
	switch grass	5	2.6%
	Indian grass	2	1.1%
	TOTAL	190	

UNIT 5C - SPRING

	PLANTS	POINTS	% OF TOTAL
*	Kochia	81	89.0%
*	velvet leaf	1	1.1%
*	field bindweed	2	2.2%
*	rough pigweed	6	6.6%
*	dock	1	1.1%
	TOTAL	91	

FALL

	PLANTS	POINTS	% OF TOTAL
*	Kochia	80	88.9%
	big bluestem	3	3.3%
	switchgrass	2	2.2%
	Indian grass	2	2.2%
	lamb's quarter	1	1.1%
	sideoats grama	1	1.1%
	Louisiana sagewort	1	1.1%
	TOTAL	90	

UNIT 6 - SPRING

	PLANTS	POINTS	% OF TOTAL
	Indian grass	40	33.3%
	silver beardgrass	34	28.3%
	western wheatgrass	17	14.2%
*	Kochia	7	5.8%
	big bluestem	6	5.0%
*	smooth brome	6	5.0%
	blue grama	3	2.5%
	lamb's quarter	2	1.7%
	goat's beard	2	1.7%
	wild lettuce	1	0.8%
	western ragweed	1	0.8%
	buffalo grass	1	0.8%
	TOTAL	120	

FALL

	PLANTS	POINTS	% OF TOTAL
	silver beardgrass	24	19.4%
	Indian grass	21	16.9%
*	foxtail	21	16.9%
*	smooth brome	14	11.3%
	sideoats grama	12	9.7%
	western wheatgrass	8	6.5%
*	Kochia	8	6.5%
	big bluestem	7	5.6%
	sandbur	2	1.6%
	little bluestem	2	1.6%
	pokeweed	1	0.8%
	tall dropseed	1	0.8%
	switchgrass	1	0.8%
	blue grama	1	0.8%
	common ragweed	1	0.8%
	TOTAL	124	

UNIT 7 - SPRING

	PLANTS	POINTS	% OF TOTAL
*	smooth brome	43	33.9%
	western wheatgrass	31	24.4%
	buffalo grass	23	18.1%
	blue grama	12	9.4%
	silver beardgrass	10	7.9%
*	Kochia	2	1.6%
	sideoats grama	2	1.6%
	big bluestem	2	1.6%
	Indian grass	1	0.8%
*	field bindweed	1	0.8%
	TOTAL	127	

FALL

	PLANTS	POINTS	% OF TOTAL
*	smooth brome	39	29.1%
*	foxtail	31	23.1%
	silver beardgrass	17	12.7%
	western wheatgrass	13	9.7%
	blue grama	7	5.2%
	big bluestem	6	4.5%
	sideoats grama	6	4.5%
	Indian grass	5	3.7%
	switchgrass	4	3.0%
	buffalo grass	4	3.0%
*	Kochia	1	0.7%
	little bluestem	1	0.7%
	TOTAL	134	

UNIT 8 - SPRING

	PLANTS	POINTS	% OF TOTAL
	western wheatgrass	56	25.0%
*	smooth brome	49	21.9%
	silver beardgrass	32	14.3%
	Indian grass	18	8.0%
	blue grama	16	7.1%
	little bluestem	11	4.9%
*	Kochia	8	3.6%
	big bluestem	8	3.6%
*	alfalfa	6	2.7%
*	foxtail	6	2.7%
*	crabgrass	3	1.3%
	buffalo grass	2	0.9%
*	puncture vine	1	0.4%
*	dandelion	1	0.4%
	western ragweed	1	0.4%
	salmon-colored mallow	1	0.4%
	broad leaf four-o-clock	1	0.4%
	ground cherry	1	0.4%
	scarlet gaura	1	0.4%
*	Japanese brome	1	0.4%
*	field bindweed	1	0.4%
	TOTAL	224	

FALL

	PLANTS	POINTS	% OF TOTAL
*	smooth brome	59	21.5%
	silver beardgrass	47	17.1%
	western wheatgrass	42	15.3%
	Indian grass	33	12.0%
*	foxtail	22	8.0%
	sideoats grama	14	5.1%
	blue grama	13	4.7%
	little bluestem	11	4.0%
	yellow sweetclover	10	3.6%
	big bluestem	10	3.6%
*	Kochia	3	1.1%
	tall dropseed	2	0.7%
	windmill grass	2	0.7%
	sand dropseed	2	0.7%
	buffalo grass	2	0.7%
	switchgrass	1	0.4%
	stinking gourd	1	0.4%
	pitcher sage	1	0.4%
	TOTAL	275	

UNIT 12 - SPRING

	PLANTS	POINTS	% OF TOTAL
*	Kochia	157	22.8%
	western wheatgrass	143	20.8%
	blue grama	108	15.7%
	threeawn	83	12.1%
	buffalo grass	79	11.5%
	sedge	23	3.3%
	big bluestem	19	2.8%
	western ragweed	17	2.5%
	salmon-colored mallow	10	1.5%
*	smooth brome	9	1.3%
	lamb's quarter	8	1.2%
	sand dropseed	6	0.9%
	sideoats grama	5	0.7%
*	field bindweed	5	0.7%
*	rough pigweed	3	0.4%
	scarlet gaura	3	0.4%
	snow-on-the-mountain	2	0.3%
	windmill grass	2	0.3%
	common pricklypear	1	0.1%
	snakeweed	1	0.1%
	Canada wild rye	1	0.1%
	pincushion cactus	1	0.1%
	rush skeleton plant	1	0.1%
	witchgrass	1	0.1%
	TOTAL	688	

UNIT 12 - FALL

	PLANTS	POINTS	% OF TOTAL
	blue grama	276	36.4%
*	Kochia	130	17.1%
	threeawn	97	12.8%
	western wheatgrass	83	10.9%
	buffalo grass	76	10.0%
	sedge	21	2.8%
	big bluestem	16	2.1%
	sand dropseed	9	1.2%
	witchgrass	8	1.1%
	tall dropseed	6	0.8%
	sideoats grama	6	0.8%
	sheep sorrel	5	0.7%
	Missouri goldenrod	4	0.5%
	carpet weed	4	0.5%
	western ragweed	4	0.5%
*	field bindweed	3	0.4%
	plains milkweed	2	0.3%
	windmill grass	2	0.3%
*	smooth brome	1	0.1%
	common pricklypear	1	0.1%
	purple poppy mallow	1	0.1%
	wavyleaf thistle	1	0.1%
	Kentucky bluegrass	1	0.1%
	Sedum	1	0.1%
	broadleaf milkweed	1	0.1%
	little bluestem	1	0.1%
	TOTAL	759	

Appendix F

PLANT SURVEY OF THE RESTORED PRAIRIE AT

FORT LARNED NATIONAL HISTORIC SITE

SPRING 1994 & FALL 1995

Natural Science Research Associates

409 East Eleventh Street

Hays, Kansas 67601

RR2, Box 152

Ellinwood, Kansas 67266

9 March 1996

The Natural Science Research Associates conducted a field survey of the restored prairie at Fort Larned National Historic Site in the spring of 1994 and the fall of 1995 using the modified step-point method. The spring portion of the survey was completed on 25 June with 2726 points sampled. The fall portion of the survey was not conducted in 1994, as most of the primary management areas had been mowed immediately prior to the proposed sampling time in September. The fall survey was completed on 1 October 1995 and combined with the spring data of the previous year.

Tables in this report summarize the data collected on 25 June 1994 and 1 October 1995. Plants marked with an asterisk are considered undesirable in the restored prairie, as they are introduced species.

RECOMMENDATIONS

As has been discussed in previous reports, the most effective method to manage a prairie ecosystem is fire. If fire cannot be utilized as a management tool, mowing or 'haying' is the next best method. Mowing and the removal of the hay from the management areas in early summer or late spring in such a way as to simulate the results of burning is the method to be employed. Only one mowing and removal of the hay should be done per growing season. Subsequent mowing and removals during the summer are detrimental to the desirable species, namely the native grass species. They must be allowed to complete their growth through the summer and fall to build their root reserves and most importantly, produce seed. Desirable forbs (flowering plants) are also harmed by repeat mowing during the summer by being directly killed or stunted and prevented from setting seed. By mowing and removing the hay in the late spring, species such as Japanese brome, downy brome, and smooth brome (the principal problem species present) which produce seed in early spring are cut after they have set seed and the plants are still green enough to prevent shattering of their seed heads during the mowing process.

Recommendations for the management of unit 5c remain unchanged.

Spot spraying is again recommended to eliminate small areas of undesirable species, specifically those with Bermuda grass. Broad spectrum spraying of entire units is discouraged as this practice will reduce diversity and removes desirable forbs. As was discussed with park personnel during the fall 1995 field survey, units with high percentages of smooth brome should be treated with herbicides to control and eliminate this species. Information about specific herbicides and their treatment methods to control this species should be obtained from an agricultural chemical specialist.

CONCLUSION

With the implementation of a burning program and chemical control of smooth brome the restoration of the prairie ecosystem at Fort Larned will continue to progress. If burning is not possible, the mowing and haying method should be utilized with only one treatment per season in late spring or early summer.

Plants of the spring 1994 and fall 1995 plant survey of Fort Larned National Historic Site.

alfalfa	*Medicago satavia*
annual sunflower	*Helianthius annuus*
aster	*Aster ericoides*
Bermuda grass	*Cynodon dactylon*
big bluestem	*Andorpogon gerardii*
blackseed plantain	*Plantago rugelii*
blue grama	*Bouteloua gracilis*
broadleaf milkweed	*Asclepias syriaca*
buffalo-bur	*Solanum rostratum*
buffalograss	*Buchloe dactyloides*
Canada wildrye	*Elymus canadensis*
coral berry	*Symphoricarpos orbiculatus*
dandelion	*Taraxacum officinale*
devils claw	*Proboscidea louisianica*
dock	*Rumex altissimus*
downy brome	*Bromus tectorum*
false dandelion	*Tragapogon dubius*
field bindweed	*Convolvulus arvensis*
green foxtail	*Setaria viridis*
groundcherry	*Physalis heterophylla*
hairy grama	*Bouteloua hirsuta*
hemp dogbane	*Apocynum cannabinum*
Indian grass	*Sorgastrum nutans*
Japanese brome	*Bromus japonicus*
Kansas sage	*Artemisia ludoviciana*
knotweed	*Polygonum arenastrum*
Kochia	*Kochia scoparia*
lamb's quarter	*Chenopodium album*
leadplant	*Amorpha canescens*
little bluestem	*Andropogon scoparius*
mare's tail (horseweed)	*Conyza canadensis*
pigweed	*Amaranthus retroflexus*
plains milkweed	*Asclepias pumila*
poison hemlock	*Conium maculatum*
poison ivy	*Toxicodendron radicans*
prairie coneflower	*Ratibida columnaris*
prickly lettuce	*Lactuca serriola*
prickly pear cactus	*Opuntia macrorhiza*
puncture vine	*Tribulus terrestris*
purple poppy mallow	*Callirhoe involucrata*
salmon colored mallow	*Sphaeralcea coccinea*
sedge	*Carex spp.*
sheep sorrel (wood sorrel)	*Oxalis stricta*
sideoats grama	*Bouteloua curtipendula*
silver beardgrass	*Bothriochloa saccharoides*
smooth brome	*Bromus inermis*
smooth sumac	*Rhus glabra*
switch grass	*Panicum virgatum*
tall dropseed	*Sporobolus asper*
threeawn	*Aristida longiseta*
Virginia wildrye	*Elymus virginicus*
western ragweed	*Ambrosia psilostachya*
western salsify	*Tragopogon pratensis*
western wheatgrass	*Agropyron smithii*
wild alfalfa	*Psoralea tenuiflora*
wild four o'clock	*Mirablis nyctaginea*
wild lettuce	*Lactuca saligna*
witch grass	*Panicum capillare*
wolly verbena	*Verbena stricta*
yellow foxtail	*Setaria glauca*
yellow spine thistle	*Cirsium ochrocentrum*
yellow sweetclover	*Melilotus alba*