HERMIT'S REST GRAND CANYON NATIONAL PARK BUILDING CODE REVIEW

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Summary

As an existing building and an historic property, Hermit's Rest is generally not required to meet *current* Code standards (The exception to this is the accessibility requirements defined in the Americans with Disabilities Act). Codes for existing structures are generally applied in cases of change of occupancy, or when alterations are made to the facility. Separate code requirements have been created to provide flexibility for protection of existing historic structures, while at the same time addressing issues of life safety. So a status review of code compliance for an existing building (not facing a change of use or alteration) primarily focuses on issues of life safety and accessibility.

Hermit's Rest is also a National Historic Landmark, and therefore consideration of the exceptional significance of the property must be taken into account when making specific recommendations.

The National Park Service and the Grand Canyon National Park have not adopted specific building codes for the Park's facilities, nor have they adopted a specific code for historic structures. Based on review of various codes, NPS directives, and discussions with Robert Powell, Historical Architect for the Grand Canyon, the following codes have been adopted for the analysis of Hermit's Rest.

International Building Code	2006
International Existing Building Code	2006
Uniform Federal Accessibility Standards (UFAS)	1984
ADA-ABA Guidelines	2004
ADA Accessibility Guidelines (ADAAG)	2002
NFPA 914 Code for Fire Protection of Historic Structures	2007
NFPA 101 Life Safety	2006

The International Building Code and International Existing Building Code were selected in part because they are part of the International Code Council, which has been widely adopted across the country in recent years and is intended to bring uniformity to the broad range of codes and jurisdictions.

UFAS, ADA-ABA, and ADAAG codes have been adopted per NPS *Director's Order 28:* Cultural Resource Management Guideline. NFPA codes have been adopted per NPS *Director's Order 58: Structural Fire Management.*

Building Code Review

IBC 2006 (assumes new construction)

Occupancy M—mercantile

Construction Type V-B

Fire Rating 0 hours (<30 feet to nearest structure)
Area Limitation 6000 s.f. maximum (existing OK)

Height Limitation 1 story

Occupancy Load 30 s.f. per person, 200 s.f. per person in kitchen; total load 44

(per 1003.2.2)

of Exits required 1 (when occupant load is less than 50)

Sprinkers required? no (per Chapter 9)
Exit signs required? no (per Chapter 10)
Fire alarm required? no (per Chapter 9)

Accessibility

Section 4.1.7(1) of the ADA Accessibility Guidelines (ADAAG) requires **alterations** to historic structures to comply with the requirements for other existing buildings unless it is determined that compliance with the requirements would threaten or destroy the historic significance of the building. Section 4.1.7(3) of the ADA Accessibility Guidelines (ADAAG) establishes the following minimum requirements for historic structures (significant issues for Hermit's Rest in **bold**):

(a) At least one accessible route complying with 4.3 from a site access point to an accessible entrance shall be provided.

EXCEPTION: A ramp with a slope no greater than 1:6 for a run not to exceed 2 ft (610 mm) may be used as part of an accessible route to an entrance.

(b) At least one accessible entrance complying with $\frac{4.14}{4.14}$ which is used by the public shall be provided.

EXCEPTION: If it is determined that no entrance used by the public can comply with <u>4.14</u>, then access at any entrance not used by the general public but open (unlocked) with directional signage at the primary entrance may be used. The accessible entrance shall also have a notification system. Where security is a problem, remote monitoring may be used.

(c) If toilets are provided, then at least one toilet facility complying with <u>4.22</u> and <u>4.1.6</u> shall be provided along an accessible route that complies with <u>4.3</u>. Such toilet facility may be unisex in design.

- (d) Accessible routes from an accessible entrance to all publicly used spaces on at least the level of the accessible entrance shall be provided. Access shall be provided to all levels of a building or facility in compliance with 4.1 whenever practical.
- (e) Displays and written information, documents, etc., should be located where they can be seen by a seated person. Exhibits and signage displayed horizontally (e.g., open books), should be no higher than 44 in (1120 mm) above the floor surface.

The Department of Justice's guidelines for the implementation of the ADA require alternative methods of access where compliance with the special access provisions in 4.1.7(3) would threaten or destroy the historic significance of a qualified facility. However, this "does not require a public entity to take any action that would threaten or destroy the historic significance of an historic property." (ADA.gov/reg2.html; DOJ implementation guidelines, Section 35.150)

Accessibility at Hermit's Rest is limited by the building's unique character, location and environment. However, minor modifications can be made to meet these minimum requirements for the public. Full accessibility for staff areas is more difficult to achieve, especially in the Kitchen, where space is limited.





Figure 1 : First step down into Front Patio

Figure 2: Exterior door into Secondary Room

Deficiency	Recommended Treatment	Impact
A portion of the path from the parking lot to the building exceeds the minimum slope requirements for accessibility	The path should be modified to conform to the required minimum slope of 1:12, and 1:6 for a maximum length of 2 feet	
The first step down into the Front Patio from the entry path is irregular and does not have a consistent surface for adequate footing	Concrete and asphalt surfaces should be repaired, and stone should be replaced and regrouted to provide smoother walking surface (3 ft. width, min.)	Irregular surfaces are a character-defining feature of Hermit's Rest; final surface should not be perfectly smooth
There is no accessible entrance into the building	The entry to the Secondary Room should be utilized for accessibility to the building; this will require modification of door hardware, including threshold; facility management may consider controlling access at this location and limiting entrance only to those requiring an accessible route	Access into and out of the Secondary Room may pose a security problem for facility management

The wood threshold between the Great Room and the Secondary Room is greater than ½" tall and 1:2 slope	The threshold should be replaced or removed to reduce the height and angle to meet code requirements	
Retail displays reduce accessible width to less than 36" between shelving in 2 locations near northwest column in Great Room	Modify existing store fixture layout to obtain 36" min. path of travel in all locations; future fixture arrangements should maintain 36" width	
Main entry door hardware does not meet accessibility requirements	Knob handle should be replaced with hardware that meets accessibility code	Change of hardware is not necessary if exterior door into Secondary Room is utilized to provide accessible entrance; appropriate hardware selection is crucial to retain historic character
Office door wood handle does not meet accessibility requirements	None	Wood handle is a character- defining feature; Office is not a public space and not fully accessible otherwise
Double doors between Great Room and Kitchen are only 27" wide and do not meet accessibility requirement of 32" clear width; Kitchen layout is not accessible	None	Modification to the Kitchen to meet accessibility requirements would impose significant limits on services that could be provided from the existing space
Door into Office is not fully accessible from Hallway side; clear space on hardware side of door is not provided	None	Modification of hallway or door to meet requirements would significantly impact character-defining features of the building

Egress

The building can be exited at three locations: the main entry in the Great Room, the Kitchen door and the Secondary Room door. Only two of these—the main entry and Kitchen door—are in use currently, and only the main entry can be accessed by the public. Primary issues of egress include door sizes and the irregular stone walking surfaces that pose potential trip hazards. Another issue is the hardware configuration that requires two separate actions to unlock and then open the doors.

The exterior door into the Secondary Room is currently blocked by store fixtures and not used as part of the egress system. As noted previously, use of this door would provide an accessible entrance; but it would also increase the safety of the building's egress system by providing a second method of egress for the public. It should be noted, however, that the current configuration of a single exit for the public does meet code.

A fire protection assessment by a contractor for the Regional Structural Fire Management Office identified the following deficiency:

"Main entrance has double doors that swing inward; but doors are propped open during business hours. If doors are closed during colder months, existing doors would be required to swing out."

However, IBC section 1003.1.2 (and NFPA 101, section 7.2.1.4.2) requires doors to swing in the direction of travel (outward) *only if the occupant load is greater than 50*. As currently utilized, the building occupant load is less than 50 (44) and would therefore not require modification to the doors.





Figure 3: Main Entry doors showing landing and door swing

Figure 4: Exterior door into Secondary Room blocked by merchandise and fixtures

Deficiency	Recommended Treatment	Impact
Main Entry and Kitchen door hardware do not meet egress code requirements; knob and deadbolt require 2 separate actions to open door	Install sign that says "Door to remain unlocked while building is occupied" on or adjacent to door	Sign should be removable, and installation should not adversely affect substrate materials
Erosion of concrete and 10" width of step outside main entry doors poses a trip hazard and does not meet code requirement for landing width	Repair erosion on existing concrete step	This does not meet code; the modifications necessary to meet the code requirement would have a significant adverse impact on the character of the exterior patio; an alternative solution (that would also not meet code) would be to repair and expand the step to 12" wide
Stair between Great Room and fireplace area: irregular surface poses a trip hazard in one location (see figure 5)	Replace stone and regrout to provide smoother walking surface	Irregular surfaces are a character-defining feature of Hermit's Rest; final surface should not be perfectly smooth
Office door is 6'-6" tall and does not meet the minimum code requirement of 6'-8"	None	Modification to the existing doors would have adverse impact on the door frame and surrounding trim; 6'-6" height provides adequate headroom for safety

Main entry doors are 6'-7" tall and do not meet the minimum requirement for egress doors	None	Modification to the existing doors would have adverse impact on the door frame and surrounding trim; 6'-7" height provides adequate headroom for safety
Door between Kitchen and Great Room is 6'-5" tall and does not meet the minimum code requirement of 6'-8"	None	Modification to the existing doors would have adverse impact on the door, frame and surrounding trim; door is not a primary egress door
Kitchen door width of 30" does not meet required width for egress door	None	Modifying door width would require extensive modification of door and adjacent window or wall
Stone wall along canyon edge of exterior patio is 12-28" tall and does not provide adequate height as a safety guard	None	NPS waiver in place for alternate methods of protection of open walking surfaces; 18-24" width of wall provides additional protection



Figure 5: Stair into fireplace area





Figure 6 and Figure 7: Stone wall along canyon edge of Front Patio

Building Systems

Electrical, mechanical and plumbing systems generally appear to be in good working order and code compliant. This review was a visual inspection only and did not include an exhaustive investigation into the current condition of existing equipment, wiring or pipes. Chuck Easton from Xanterra Facilities Management indicated that the entire electrical system was upgraded in the late 1990's; it appears to be in good condition, with wiring located in conduit in most locations. The holding tank and pump for the sink drains in the kitchen may or may not meet health code requirements; that is outside the scope of this investigation. A propane fueled heater is located in the Great Room; propane is piped in over the roof and through the window trim.

Deficiency	Recommended Treatment	Impact
Wiring inside kitchen for oven appears to have a splice connection using electrical tape; and interferes with access to fire extinguisher	Modify installation to provide proper, waterproof installation per code; re-route in an unobtrusive manner	
Light above fireplace is not working	Check and repair as necessary	
Exterior outlet adjacent to greywater holding tank poses fire hazard; outlet services 3 plugs that appear to serve permanent installations, and does not have adequate moisture protection	Hard wire systems as appropriate; provide exterior grade, waterproof outlet to meet code	
Propane gas line on roof not properly installed	provide permanent support and installation of pipe, per code; re- route in an unobtrusive manner	





Figure 8: View of Kitchen showing wiring and fire extinguisher

Figure 9: Propane gas line on roof, lower right hand corner of photo





Figure 10: Electrical conduit; board and batten wall surfacing in background

Figure 11: Propane heater in Great Room

Fire Protection

The current fire protection system consists of fire extinguishers in four locations. There are no smoke detectors, fire alarms or sprinklers.

A fire protection assessment by a contractor for the Regional Structural Fire Management Office identified the following deficiency:

"Interior walls appear to be covered with combustible surfacing which does not meet Class A, B or C interior finish requirements. Remove and/or cover with Class A, B or C rated surfacing material such as gypsum wall board or treat surface with an approved fire retardant."

It is unclear which building materials this refers to; it is likely a reference to the board and batten wall coverings in the Secondary Room, Office and Hallway. Our research indicates that most solid wood materials, at a minimum, do meet Class C requirements. However, the rough-sawn character of the surface in some locations may further reduce the flame spread rating of the wood panels to below Class C. Without actual analysis of the species, cut, density and finish of the boards, however, an actual fire spread rating can only be estimated. These wall surfaces contribute to the overall character of the building, and therefore removal or covering of these boards is not recommended. One solution would be the application of an approved fire retardant. However, care must be taken to avoid finishes that would alter the appearance of the wood surface.

Deficiency	Recommended Treatment	Impact
No smoke detectors present	Install smoke detectors; if it is determined that normal functioning of the detector will be adversely impacted by the presence of the fireplace, heat detectors should be installed	Install in locations to minimize visual impact; select color and finishes that closely match underlying substrate

Although a sprinkler system and fire alarm are not required at Hermit's Rest, Director's Order 58 includes the following policy statement regarding the protection of cultural resources:

"In the preservation of historic structures..., every attempt will be made to comply with national building and fire codes. When these cannot be met without significantly impairing a structure's integrity and character, the management and use of the structure will be modified to minimize potential hazards, rather than modifying the structure itself.

Subject to the previous paragraph, when warranted by the significance of a historic structure..., adequate fire detection, warning and suppression systems will be installed. 'Pre-fire plans' will be developed for historic structures...designed to identify the floor plan, utilities, hazards, and areas and objects requiring special protection. This information will be kept current and made available to local and park fire personnel."

The remote location of Hermit's Rest, its unique character and designation as a national historic landmark may warrant the installation of additional fire protection measures beyond code requirements. However, care must be taken to minimize the impact on the existing structure.

Miscellaneous Code Issues

Deficiency	Recommended Treatment	Impact
Glazing in doors and adjacent panels at 1) Main Entry, 2) Secondary Room, and 3) Kitchen do not appear to have appropriate safety glazing installed	When glazing requires replacement, install approved glass to meet safety code requirements; glass should have stamp indicating that it meets safety requirements	Glazing should match existing in color and appearance

Hazardous Materials

Painted surfaces on the interior and exterior of the building were tested for lead. Samples were tested at the following locations:

Location	Result	Recommended Treatment
West-facing clerestory window frame on roof, exterior (green)	no lead detected	
Secondary Room entry door jamb, exterior (green)	no lead detected	
Lintel over west-facing clerestory window on roof, exterior (brown)	no lead detected	
Beam near main entry, interior (brown)	no lead detected	
Beam in Office closet, interior (yellow wash)	lead detected	Additional testing; abatement if necessary

From visual inspection, no other suspected hazardous materials were identified.