

# THE COST OF MAINTAINING HISTORIC MILITARY FAMILY HOUSING



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Cover Illustration: Officer's Quarters, United States Military Academy, West Point, NY

# The Cost of Maintaining Historic Military Family Housing

For the

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## *EXECUTIVE SUMMARY*

The maintenance and management of the military housing stock has been an issue of debate since the formation of a formal Army. Whether or not housing should be provided, how it should be paid for and maintained, and whether it is considered appropriate compensation for the stresses associated with military service. These questions have all been the focus of seemingly endless examinations and reports. At the conclusion, the results have always been the same:

1. it is appropriate for the military to provide housing on-base for uniformed personnel and their dependents to insure readiness and efficient operations;
2. the cost of maintaining family housing is substantial and increasing;
3. the condition of historic military family housing diminishes as maintenance continues to be deferred; and,
4. the size and cost of historic military family housing units exceeds acceptable standards.

All of these conclusions were cited in the “Report of the Defense Science Board Task Force on Quality of Life”, chaired by former Secretary of the Army, John O. Marsh, Jr., and the reports of the Services’ response to Senate Report 104-287, which concurred with the Marsh Panel Report.

Based on field observations, interviews, and surveys, it appears that there are two primary causes for the high cost of maintaining historic family housing: the size of the units, and the presence of hazardous material (lead-based paint). The per square foot cost of operating and maintaining the units is no higher than Operation and Maintenance (O&M) cost for non-historic units, and, in many instances, lower. However, because the unit size exceeds that allowed under current standards, the overall cost per year is higher. Attempts have been made at some installations to close off portions of larger homes, hoping to save on energy costs, and, in some instances, to investigate converting the large single family units into duplexes. Neither effort proved very successful.

The cost directly associated with lead-based paint is somewhat unreliable because of two related factors: the lack of any basis or guidance for assessment of risk, and the resulting inconsistent treatment of lead-based paint across the Services and at each installation. In almost all cases, it appears that lead-based paint is being over treated. This has resulted in excessive costs in remediation of this material.

In addition, there are a number of conflicting attitudes toward historic family housing. From interviews with installation housing staff, it appears that the opinion of those assigned to installations containing such housing, is that the properties add significantly to the positive quality of life for personnel and their dependents. On the other hand, for those individuals responsible for management of military real estate, the properties hold little value and, thus, any investment in them represents a burden on the overall housing budget.

There appears to be universal acceptance that the first impression is correct—the quality of life is greatly improved by the existence of historic housing at an installation, especially for those living in that housing. The second assumption is subject to interpretation, especially in an environment where the Services are attempting to sell off properties to private developers and corporations under Base Realignment and Closure (BRAC) and privatization programs. The reality is that the family housing units represent no less of a value than a private residence in the marketplace, and their resale value can be significant.

This study looked at the current conditions of the historic family housing, and the factors affecting operational and maintenance costs, compliance with laws and regulations, and issues raised in the Marsh Report and Congressional directives. The conclusion reached is that the cost per square foot for operations and maintenance of historic units is the same or less than non-historic units and that cost savings can be achieved through improved management and operational procedures for both historic and non-historic housing.



Upper right: Officer's Quarters, Ft. Benning, GA; middle right: Building 172, Ft. Belvoir, VA; all others: Quarters, USMA.

# I

# BACKGROUND

## HISTORY OF MILITARY FAMILY HOUSING

Throughout the history of the military in the United States there has been a need to house and provide for uniformed personnel and their dependents. The quality and quantity of facilities designed to meet this need have varied greatly over the years—from family housing in old stables and shanties in frontier posts to the substantial, masonry, single family quarters constructed in the 1930s.

Consistently, however, two major problems can describe military family housing— inadequate quantity and inadequate maintenance. These two issues have existed from the beginning of the military, and continue to influence housing programs and decision-making in the Department of Defense and throughout the Services.

The lack of adequate numbers of family housing units has generally been influenced by military conflict and a lack of peacetime funding. Although the housing need was identified as early as the Revolutionary War, expenditures on permanent quarters during military conflict has been eclipsed by the need to direct funds to the war effort. Housing needs during these periods have been satisfied through the construction of temporary facilities. Once the conflict is over, historically, the numbers of uniformed personnel diminish, the immediate need for housing is temporarily abated, and legislators are anxious to reduce military spending. The result is that limited funds have been available to keep pace with family housing needs. The other issue, inadequate maintenance, is a result of the same conflict. However, in the case of maintenance, deferring work results in greater future expense. The condition of housing was so poor in the early 1920s that articles titled “Our Homeless Army” and “Army Housing: A National Disgrace,” were appearing in national magazines.

There have been four major development periods for family housing in the United States military. The first occurred in the last decade of the 19th century, and first decade of the 20th

century. Although the military had committed itself to housing its officers earlier in the 19th century, it was not until 1890 that the Quartermaster Corps developed standardized plans and initiated a major effort to improve the quantity and quality of family housing. The Quartermaster General reported in 1903 that the preceding year’s construction had vastly exceeded that of any previous year in the history of the Army. A quantity of these housing units remain in active service throughout the military, as do a number of individual units constructed earlier in the 19th century.

The second major housing development period came after WWI during the Great Depression. In response to the Stock Market collapse President Hoover ordered federal agencies to expedite public works projects, triggering the Quartermaster Corps to initiate housing contracts. This effort carried on during the Roosevelt Administration, up until the outbreak of WWII. Also based on standardized Corps plans, the family housing units constructed during this period represent the largest number of historically significant family housing units in the military inventory.

The third period occurred during the 1950s with construction of Wherry and Capehart housing. This was the largest increase in family housing units, adding over 55,000 to the military inventory. In an effort to address a major housing shortage following WWII, and to avoid the use of tax money to build all of the units needed to meet demand, Congress passed the Wherry Bill in 1949, providing mortgage insurance through the Federal Housing Administration to private developers willing to construct housing on military bases. Congressional limitations on the amount of money which could be spent on Wherry housing units made it difficult to construct adequate numbers of units in high cost areas. Military personnel paid rent on the units directly to the developers out of their housing allowance. In 1955 Congress established a variation on the program, Capehart Housing.

Similar to Wherry Housing, the Capehart program relied on private developers to construct housing units but, instead of having personnel pay rent, the government paid off the principal and interest on the units over a 25-year period. As part of the Capehart program, all Wherry Housing units were purchased by the government.

During the Administration of John F. Kennedy, the Secretary of Defense asserted a new military housing policy. Robert McNamara stated that, to the extent possible, the military would depend on the civilian economy to provide housing for service families.

The fourth major family housing development period came as part of the defense spending increases during the Reagan Administration. It was at this point that DoD used a variety of funding and construction programs to accomplish its goal. Housing units were built using direct Congressional appropriations, Section 801 and 802 programs, build-to-lease, rental guarantee, and other programs authorized under the FY84 military authorization.

Prior to the late 19th century, military family housing was generally individually designed in the style of the day. Starting in the 1870s standardized plans for a variety of building types started to be used selectively across the country, including plans for family housing. After 1890 most family housing units are direct copies, or variations of standardized plans. Regional availability of materials and craftsmanship influenced final design but, for the most part, variations were minimal. Wherry and Capehart housing, on the other hand, relied on developers to design the units, meeting minimum standards established by the military. Accordingly, these units reflect regional differences.

#### WHAT IS HISTORIC?

The mere fact that a property is old does not make it “historic.” There has to be some reason beyond age to recognize a property—for its place in history, architectural style, association, or some other value. For the purposes of this study,

the designation of “historic family housing” refers to those properties that are:

- listed in the National Register of Historic Places as an individual property, including National Historic Landmarks;
- properties that have been determined eligible for listing in the National Register;
- properties that meet the criteria for listing in the National Register; and,
- properties that are contributing elements to a National Historic Landmark or National Register historic district.

Non-historic properties are defined as those that do not meet the criteria for listing in the National Register, and properties that are not contributing elements to a historic district.

For a property to be considered historic, it must meet criteria that have been established by the Department of the Interior. Under Public Laws 74-292, and 89-665, the Department of the Interior was charged with establishing criteria for identification of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These would be properties at the local, State, and national level that contribute to an understanding of the historical and cultural foundations of the Nation. All agencies are required to use these criteria to evaluate properties under their jurisdiction, and nominate those properties for recognition—listing them in the National Register of Historic Places.

#### National Register Criteria

A property is “historic” if it possess integrity of location, design, setting, materials, workmanship, feeling, and association, and meets any one of the following criteria:

- A. Association with events that have made a significant contribution to the broad patterns of our history. (*Examples of this would be buildings that were constructed as part of or played a role in the settlement of the Nation, structures associated with the struggle for independence, WWI, WWII, and similar events.*)

B. Association with the lives of persons significant in our past. (*Examples include sites and buildings associated with military and political leaders, engineers and architects, or great statesmen*).

C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction. (*Examples of properties that qualify under this criterion would include buildings that are characteristic of a particular period of architecture, such as Colonial, Victorian, Beaux Arts, or International Style, properties that illustrate unique or outstanding engineering, and buildings that contain elements that represent earlier periods of craftsmanship or art. This criterion also encompasses buildings that contribute to historic districts, but would not be individually eligible for listing.*)

D. Have yielded, or may be likely to yield, information important in prehistory or history. (*The best example of properties eligible under criterion D are archeological sites, however, traditional cultural properties, buildings, and engineering systems could also fit within this category.*)

Another level of recognition of a property is National Historic Landmark status. For a property to qualify as a NHL it must meet criteria similar to, but not identical to, the National Register, and be of national significance. A previous Keeper of the National Register defined NHLs as properties whose presence is necessary to trace the history and development of the United States. All NHLs are automatically listed in the National Register.

There are some instances where a property is not ordinarily considered eligible for listing, such as properties that have achieved significance within the past 50 years. However, such properties qualify if they are integral parts of districts that do meet the criteria, or if they are considered of exceptional importance at the local, State, or national level. Other exceptions to the criteria can be found in National Register Bulletin 16A.

Each Service has an internal system of categorizing buildings and structures; their classifications ranging from very important to intrusions. These categories assist the Services and installations in establishing treatment plans for the property, however, the National Register limits their recognition to those properties meeting the aforementioned criteria, either individually or as part of a historic district. National Register listing is recognition of the importance of a property, it is not directly related to its treatment or disposal.

#### MARSH REPORT

The “Report of the Defense Science Board Task Force on Quality of Life”, chaired by John O. Marsh, Jr., former Secretary of the Army, addressed, among many other things, the cost of maintaining historic family housing. The report, issued in October 1995, focused on issues associated with housing, personnel tempo, and community and family services, all directly related to the quality of life for uniformed personnel and their dependents.

As part of the Task Force’s investigations into the status and condition of housing, questions were raised regarding the prudence of maintaining historic family housing units. These questions were generated by estimates of the funds required to upgrade existing housing to meet current livability standards, and to maintain those properties to a level so that they contributed positively to the quality of life at their installation. The Task Force’s conclusion, based on cost estimates drawn from Service budget requests, was that maintenance of historic family housing was imposing an undue burden on the overall military housing accounts, and that this burden should be decreased.

The Task Force’s investigations and its findings were not unique. As far back as 1870 official inquiries found military housing to be inadequate and in poor condition. The studies indicate that since its inception, family housing has existed in a cycle of improvement and disrepair. As funds are available, housing units are revitalized and adequate maintenance is provided to insure efficient operations.

When funding is decreased, or diverted to more immediate issues, improvements to units do not occur, and maintenance diminishes.

The Task Force found four major problems affecting the ability of the military to properly maintain family housing:

- funding is not sufficient to produce, maintain, and operate quality housing adequately;
- current financial rules virtually preclude any innovative, creative methods to encourage or promote private sector resource opportunities;
- housing policy is unclear, incomplete, and lacks the vision and strategy to affect change; and,
- federal laws and regulations restrict DoD's ability to use its resources and the practices of private industry to best advantage.

The Task Force, when referring to the full, 387,000 units of military housing, also found that "... inadequate and inconsistent funding have resulted in poor maintenance and repair, and has deferred revitalization and replacement of unsuitable homes." Their estimate for correcting these deficiencies was more than \$20 billion.

Based on the Task Force's conclusions, the Marsh Report recommended that DoD, in conjunction with the Services, review current inventories of historic quarters and initiate actions to remove all but the most significant historic homes from the National Register. (The Task Force report places the number of family housing properties listed in the National Register at 2,675, approximately .69% of the military housing inventory.) The logic of this conclusion was that:

- there was inadequate funding to support family housing needs;
- the budget requests for revitalization and maintenance of historic family housing units far exceeded requests for non-historic properties;
- the listing of the property on the National Register was the trigger that made it historic;
- the fact that a property is considered historic required the expenditure of the requested funds; and,

- because the property is historic, the military is required to comply with administrative reviews which add cost to the project through delays and enhanced treatment.

The Report also concluded that the condition of family housing in the military was in direct contradiction to the understood value of family housing. In the Report, the Task Force indicates that "Housing can and should play a pivotal role in mitigating some of the extraordinary stresses of military life", and that "unsuitable housing unnecessarily distracts Service members from jobs that demand full attention to maintain constant readiness ...". The Task Force also found that "The condition of family housing reflects the priority a Service gives to quality of life in relation to other competing mission and readiness requirements."

#### CONGRESSIONAL DIRECTIVES

In response to the Task Force recommendations, language in the FY97 Military Construction Appropriation Bill (Report 104-287) directed the Services to "review current inventories of historic quarters and provide a report to the appropriate committees on specific plans to remove all but the most significant historic homes (from the National Register.) The report should provide what statutory impediments are being encountered in implementing such plans."

The Committee agreed with the Task Force's conclusion that maintenance of historic quarters was overburdening the military housing accounts, and the language of the directive suggests that the Committee presupposed that the placement of a property in the National Register had a direct relation to the cost of its operation and maintenance.

Each of the military Services undertook the tasks under the directive, resulting in three separate reports:

- Report to Congress on Historic Army Quarters, March 1997;
- Department of the Navy Response to Congress on Historic Preservation, April, 1997; and,

- United States Air Force Congressional Report on Historic Homes, undated.

Each of the Service reports concluded that the military did not have statutory authority to remove properties from the National Register, but that there were administrative procedures which could be taken to relieve management cost burdens. The reports also concluded that the additional cost to maintain these units was more a result of their physical size than the fact that they were historic, and listed in the National Register.

*Multi-family housing units at USMA, West Point, NY*



*Superintendent's Quarters USNA, Annapolis, MD*



## II SCOPE OF THE STUDY AND METHODOLOGY

The purpose of this study was to determine if the cost of maintaining historic family housing in the military was excessive, as compared to non-historic housing units located on military bases. To undertake this work it was necessary to first develop an acceptable definition of “maintenance.”

Maintenance can be defined as the action necessary “to keep a building in good repair and efficiency.” This definition encompasses the work required to ensure that the building is structurally stable, and that all of the building systems, such as electrical, plumbing, heating, and moisture protection, are operating as necessary for the functional requirements of the building to be met in a cost effective manner.

For the purposes of this study, the cost of providing utilities to the property is considered part of the cost of operating it as an active housing unit.

It was also necessary to define “historic” family housing unit. This task offers some interesting alternatives, but the deciding factor for federal property is whether it meets the criteria established by the Department of the Interior for listing a property on the National Register of Historic Places.

The factors which could affect both operating and maintenance cost of a property were then identified—unit size; condition; meeting livability and treatment standards; hazardous materials; and energy conservation. Administrative procedures that may contribute to the cost were also identified, such as, in-house reviews; consultation required under internal or external regulations with interested parties; reviews and consultation with State Historic Preservation Officers, and other federal agencies.

In citing maintenance costs, the Marsh Report used funding requests submitted by each Service. To ground truth the cost data, eight military installations were selected among the Services to provide current information on costs to

maintain historic and non-historic family housing units (results shown on page 35.) The units recorded were selected by the installation housing office, and represented a cross section of unit types and sizes found at the installation.

A survey was created to gather consistent information from these installations. The goal of the survey was to twofold: to identify actual, rather than projected maintenance costs, and to compare costs for maintaining historic and non-historic units (see survey questionnaire, pages 13 and 14.)

Three Department of the Army installations were selected; two Department of the Navy facilities, one Navy and one Marine Corps; and, three Department of the Air Force sites. Each installation housing Point of Contact (POC) was contacted, along with the cultural resource manager, and the goals of the survey were discussed and explained. Survey forms were sent, and results received and tabulated.

For the purposes of the survey, the installations were given the following guidance.

- Historic Family Housing (question #5): For a property to be considered historic it must either be:
  - listed in the National Register of Historic Places;
  - determined eligible for listing in the National Register;
  - a contributing element in a National Register listed historic district, or a National Historic Landmark district; or,
  - meet any one of the criterion for listing in the National register.
- New Family Housing: To qualify as new construction for this study a family housing unit must be at least five years old, but no older than 20 years.
- Major Repairs & Alterations (question #8): Work that was completed more than ten years ago—additions, revitalization, new roof, etc.

- Utility Cost (question #11): Estimated if not metered.
- Livability vs. Historic Preservation (question #14): This question is attempting to separate out work that would normally be required to maintain the unit in a livable condition vs. work that is specifically required because the unit is historic. An example would be replacement of a kitchen. It would be assigned to meeting livability requirements, while the restoration of a tin ceiling in the kitchen would be appropriately assigned to historic preservation cost. Another example would be the replacement of windows. If the replacement windows were designed to match the historic windows, that cost could be attributed to historic preservation.
- Standards (question #15): This question refers to any in-house design or construction standards, or standards such as the Secretary of the Interior's Standards for the Treatment of Historic Properties.
- SHPO/ACHP (question #16): SHPO = State Historic Preservation Officer; ACHP = Advisory Council on Historic Preservation.
- Hazardous Materials (question #17): Lead based paint; asbestos; radon; bird droppings; etc.

The categories of data requested from each installation were:

- Installation Name;
- Housing Unit Number;
- Category Code;
- Unit Configuration (single family; duplex; fourplex; other);
- Historic/Non-Historic;
- Construction Date;
- Original Construction Cost;
- Unit Size (in square feet);
- Major Repair & Alterations;
- Physical Condition (good; fair; poor);
- Meets Livability Standards (yes; no);

- Utilities cost per year;
  - Minor Repair (description);
  - Minor Repair Cost;
  - Percentage of work necessary to meet livability standards;
  - Standards or guidelines used;
  - Required review by the SHPO and/or the ACHP;
  - Whether reviews delayed or postponed the project, added cost;
  - Contain hazardous materials, what percentage of project cost;
  - Energy conservation component;
  - Accessibility requirements component;
  - Contracting methods;
  - Major Repair (description);
  - Major Repair Cost;
- (Same data sought on major repair as on minor repair);
- Estimated Maintenance Cost per Year;
  - Estimated cost to improve property to meet livability standards;
  - Current or Future Planned Major Improvements; and,
  - Estimated Value of Planned Improvements.

In addition, discussions were held with headquarters and other installation personnel, Corps of Engineers staff, and selected construction management professionals.

The results of the interviews, combined with site visits, survey data, and anecdotal information, was used in development of a series of conclusions on how the cost of maintaining historic family housing can be reduced.

## Department of Defense Study on the Cost of Maintaining Historic Military Family Housing

### Test Site Survey

1. Installation Name: \_\_\_\_\_
2. Housing Unit Number \_\_\_\_\_ 3. Cat Code: \_\_\_\_\_
4. Unit Configuration: single family, duplex, fourplex, (circle one), other \_\_\_\_\_
5. Historic: yes \_\_\_\_\_ ; no \_\_\_\_\_ 6. Date of Construction: \_\_\_\_\_ 6a. Original Const. Cost: \_\_\_\_\_
7. Unit size in square feet: \_\_\_\_\_ 8. Major Repairs & Alterations (with date & cost): \_\_\_\_\_
9. Physical Condition good \_\_\_\_\_ ; fair \_\_\_\_\_ ; poor \_\_\_\_\_ 10. Meets Livability Standards yes \_\_\_\_\_ ; no \_\_\_\_\_

### Operation & Maintenance Costs

11. Utilities cost per year (electric, gas, oil, water): \_\_\_\_\_
12. Minor Repair (carried out in last five years) (painting, roof patching, window repair, etc.)  
\_\_\_\_\_  
\_\_\_\_\_
13. Minor Repair Cost (est) \_\_\_\_\_
14. What percentage of the work was necessary to meet livability standards, code requirements, etc., vs. historic preservation requirements? \_\_\_\_\_ %
15. Were any standards or guidelines used when designing or undertaking the work, other than applicable building codes? yes \_\_\_\_\_ ; no \_\_\_\_\_. If yes, what?: \_\_\_\_\_
16. Did any of the work require review by the SHPO and/or the ACHP? yes \_\_\_\_\_ ; no \_\_\_\_\_. Did these reviews delay or postpone the project? yes \_\_\_\_\_ ; no \_\_\_\_\_. Did it add cost? yes \_\_\_\_\_ ; no \_\_\_\_\_.
17. Did the property contain hazardous materials that required special attention under any of the work? yes \_\_\_\_\_ ; no \_\_\_\_\_. What percentage of project cost? \_\_\_\_\_ %
18. What percentage of the project(s), if any, was designed to meet energy conservation goals? \_\_\_\_\_ %
19. What percentage of the project(s), if any, was designed to meet accessibility requirements? \_\_\_\_\_ %
20. What were the contracting methods used for the work? (circle all that are appropriate)  
Low Bid \_\_\_\_\_ ; JOC \_\_\_\_\_ ; Self-Help \_\_\_\_\_ ; Debit Card \_\_\_\_\_ ; Credit Card \_\_\_\_\_ ; SABER \_\_\_\_\_ ; Other \_\_\_\_\_  
What? \_\_\_\_\_ Would a different contracting method have been better? yes \_\_\_\_\_ ; no \_\_\_\_\_.  
Why? \_\_\_\_\_

21. Major Repair (carried out in the last ten years) (revitalization, roof replacement, window replacement, etc.)  
(date & cost): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

22. Total Major Repair Cost (est): \_\_\_\_\_

23. What percentage of the work was necessary to meet livability standards, code requirements, etc., vs. historic preservation requirements? \_\_\_\_\_ %

24. Were any standards or guidelines used when designing or undertaking the work, other than applicable building codes? yes \_\_\_\_\_; no \_\_\_\_\_. If yes, what?: \_\_\_\_\_

25. Did any of the work require review by the SHPO and/or the ACHP? yes \_\_\_\_\_; no \_\_\_\_\_. Did these reviews delay or postpone the project? yes \_\_\_\_\_; no \_\_\_\_\_. Did it add cost? yes \_\_\_\_\_; no \_\_\_\_\_. \_\_\_\_\_

26. Did the property contain hazardous materials that required special attention under any of the work? yes \_\_\_\_\_; no \_\_\_\_\_. What percentage of project cost? \_\_\_\_\_ %

27. What percentage of the project(s), if any, was designed to meet energy conservation goals? \_\_\_\_\_ %

28. What percentage of the project(s), if any, was designed to meet accessibility requirements? \_\_\_\_\_ %

29. What were the contracting methods used for the work? (circle all that are appropriate)  
Low Bid \_\_\_\_\_; JOC \_\_\_\_\_; Self-Help \_\_\_\_\_; Debit Card \_\_\_\_\_; Credit Card \_\_\_\_\_; SABER \_\_\_\_\_;  
Other \_\_\_\_\_; Would a different contracting method have been better? yes \_\_\_\_\_; no \_\_\_\_\_.  
What? \_\_\_\_\_ Why? \_\_\_\_\_

30. Estimated Maintenance Cost per Year: \_\_\_\_\_

31. Estimated cost to improve property to meet livability standards: \_\_\_\_\_

32. Current or Future Planned Major Improvements: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

33. Estimated Value of Planned Improvements \_\_\_\_\_

### III

## QUANTITY AND AGE OF QUARTERS

#### QUANTITY AND AGE OF QUARTERS

The recorded number of historic family housing quarters within the military varies, depending on the types of units counted, and who is developing the list (see Table 1 below.) The Marsh Report estimated the total number of units of military family housing to be 387,000. This number includes all units owned or leased by the military, on- and off-base. Their estimate of the average age of these units is 33 years. The Task Force reported that out of that total, 2,675 units were listed in the National Register of Historic Places, or just under 0.7% of the total.

The military Services, in their reports to Congress, listed the number of “historic” family housing buildings under their jurisdiction. The Department of the Army indicated that their inventory of family housing listed in or eligible for the National Register is 2,600, or approximately 2% of their total family housing inventory. The Department of the Air Force itemized, in their report, a total of 1,649 listed or eligible family housing buildings. The Navy reported 516 listed or eligible properties, approximately 0.6% out of their total 80,200 unit inventory. The average age of Navy historic family housing is 88 years. Property age of the Army and Air Force units was not reported.

The total number of listed and eligible properties reported by the Services was 4,765. Although the Task Force report appeared to count only those family housing units listed in the National Register, the Services listed the number of buildings containing family housing units that were either listed in or eligible for listing in the National Register. The discrepancy in numbers is a product of reporting on units vs. buildings that can contain more than one unit, and in counting numbers of properties listed in vs. number of properties both listed in and eligible for listing in the National Register. Regardless, the total amount of historic family housing in the military inventory is small, ranging between .5% to 2% of the family housing inventory.

Out of those properties, a number have been identified as “nationally significant.” Those properties have been designated by the Secretary of the Interior as National Historic Landmarks (NHL). The Department of the Army lists 11 (eleven) such properties. There are 100 NHLs listed in the Air Force inventory, all located at F.E. Warren AFB. The Navy lists 172 of its historic family housing quarters as NHLs.

Table 1 illustrates the numbers of units reported to Congress in response to the Marsh Report questions. Table 1a, found on the next page, contains current inventory data.

Table 1	Total MFH Units	NR Listed	NR Eligible	NHL	% of Inventory
Marsh Report (Oct. 1995)		387,000	2,675		0.7
Department of the Army Report		786	<sup>1</sup>	11 <sup>2</sup>	2
Department of the Air Force Report		943	706	100	
Department of the Navy Report	80,200	420	96	172	0.6

1. Eligible properties are included in NR Listed number.  
 2. Some of the NHL properties are districts containing a number of contributing family housing units.

Subsequent to providing housing data to the Congress in response to the Marsh Report, the military services have completed a full survey of their current housing inventory. The results of that inventory are listed below. Housing unit totals have been completed, and historic housing numbers adjusted.

Table 1a Unit Quantities November 2000	Total MFH Units	NR Listed	NR Eligible	NHL	% of Inventory
Department of the Army	84,527	4,380	1	11 <sup>2</sup>	5.2
Department of the Air Force	110,000	1,043	1,155	100	2
Department of the Navy	55,525 <sup>3</sup>	366	296	172	1.5

1. Eligible properties are included in NR Listed number.  
 2. Some of the NHL properties are districts containing a number of contributing family housing units.  
 3. Current to close of FY99.

*A unique Navy property—Kiskiack*



## *IV FACTORS AFFECTING OPERATION AND MAINTENANCE COSTS*

### **DIRECTIVES, INSTRUCTIONS, FEDERAL LAWS, REGULATIONS AND STANDARDS**

#### **COMPLIANCE WITH CULTURAL RESOURCE REQUIREMENTS**

##### **NATIONAL REGISTER OF HISTORIC PLACES**

The “Report of the Defense Science Board Task Force on Quality of Life” recommended removal of “all but the most significant historic homes from the National Historic Register”. The Task Force’s report directly associated listing in the National Register of Historic Places with a requirement to expend funds to maintain buildings. This association was assumed in the Congressional directives responding to the Task Force’s recommendations, and, in turn, was addressed in the Services’ responses to the Congressional language.

The association of preserving and maintaining properties because of their listing in the National Register is both incorrect and accurate. The “listing” of a property is recognition of the value of that property to the history, architecture, or culture of the United States. There is no direct link between “listing” and treatment, either through law or regulation. If a property is historic, however, federal policy, as established in the National Historic Preservation Act of 1966 (Public Law 89-665; 80 Stat. 915, 16 U.S.C. 470 et seq., as amended,) dictates that federal agencies take steps to avoid damage to that property.

Listing in the National Register does not make a property historic, or significant, it merely recognizes that status. If the National Register did not exist, the property would still be historic, and subject to protection under the policies established in the NHPA, and numerous Executive Orders, directives, instructions, and regulations. If a property is significant in history, design, planning, or culture, it is historic, whether or not the Keeper

of the National Register, the State Historic Preservation Officer, local authorities, or an installation commander have recognized it as such.

On the other hand, the association of listing in the National Register and treatment is accurate because the military has made the assumption that there is a link. The assumption is that if a property is listed it must be maintained, and if a property is not listed, it need not be maintained. This results in the presumption that removal of a property from the National Register, or avoiding nominations of properties all together, will reduce maintenance costs. Whether or not a historic property is listed in the National Register, the agency’s responsibility for management of that property remains the same—it must be maintained at a level that both supports that agency’s mission, and is in the national interest.

Listing of a property in the National Register of Historic Places is not, and should not be, a factor affecting operation and maintenance costs. The listing of a property, however, can provide a major benefit to the military in a period of base closures. If a property is listed in the National Register, certain provisions of the Tax Reform Act of 1976, as amended by the Revenue Act of 1978 and the Tax Treatment Extension Act of 1980, may apply. These provisions encourage the preservation of depreciable historic structures by allowing favorable tax treatments for rehabilitation. Owners and developers of historic buildings may benefit from the investment tax credit provisions of the Revenue Act of 1978. The Economic Recovery Tax Act of 1981 generally replaces the rehabilitation tax incentives under these laws beginning January 1, 1982 with a 25% investment tax credit for rehabilitations of historic commercial, industrial and residential buildings. This can be combined with a 15–year cost recovery period for the adjusted basis of the historic building. Historic buildings with certified rehabilitations receive additional tax savings by their exemption from any

requirement to reduce the basis of the building by the amount of the credit. This has proven to be a major incentive in the privatization of historic military property. Accelerating nominations of properties under the BRAC program to the National Register will enhance their value to developers and private owners.

The issue of appropriate authority for identifying properties for listing in the National Register was also raised in the Department of Army's "Report to Congress on Historic Army Quarters." That report recommends that the Secretary of Defense and the Congress examine ways of "providing a means for (the) Army to have final decision-making authority to de-list properties from the National Register of Historic Places and to determine what properties are eligible for listing."

The National Historic Preservation Act of 1966 (NHPA) authorizes, and places the responsibility on the Secretary of the Interior to maintain a National Register of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering and culture. This listing crosses all agency lines, State lines, and local community jurisdictions. The list is a reflection of the history and development of the entire country. Military history is an integral part of that record and, appropriately, is part of the context in which all cultural properties are recognized. The absence of those properties, or the use of different criteria for listing military properties, would diminish the value of that record, and our ability to trace and understand our history.

#### NATIONAL HISTORIC PRESERVATION ACT— POLICY & COMPLIANCE

The National Historic Preservation Act, as amended (Public Law 89-665; 80 Stat 915; 16 U.S.C. 470), sets forth national policy regarding the treatment of historic properties. Section 2 (16 U.S.C. 470-1) of the Act states: "It shall be the policy of the Federal Government, in cooperation with other nations and in partnership with the States, local governments, Indian

tribes, and private organizations and individuals to—

(1) use measures, including financial and technical assistance, to foster conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations;

(2) provide leadership in the preservation of the prehistoric and historic resources of the United States and of the international community of nations and in the administration of the national preservation program in partnership with States, Indian tribes, Native Hawaiians, and local governments;

(3) administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations;

(4) contribute to the preservation of nonfederally owned prehistoric and historic resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;

(5) encourage the public and private preservation and utilization of all usable elements of the Nation's historic built environment; and

(6) assist State and local governments, Indian tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities."

In addition to upholding the stated "policies" set forth by Congress, the NHPA requires federal agencies to follow specific administrative processes in identifying, evaluating, and nominating properties to the National Register, and when any action they intend to take will adversely affect a historic resource.

The Department of the Interior and other federal agencies have published volumes of regulations and directives interpreting each section of NHPA, and detailing how to follow the administrative process. As it relates to agency responsibility for historic properties, however, the basic premise

of the law is very simple. The federal government should not participate in destruction or loss of our national heritage, and government agencies should practice and promote preservation within the government and within the private sector.

Section 110 (16 U.S.C. 470h-2) of the law sets forth the goal of “preservation of historic properties which are owned or controlled by such agency”, and specific agency responsibility for identification of resources.

The “Secretary of the Interior's Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to Section 110 of the National Historic Preservation Act of 1966, as amended”, April 24, 1998, provides advice and direction on development of internal agency programs for identifying, evaluating, and nominating properties to the National Register, and directives to fully consider historic properties in the agency planning process.

Section 106 (16 U.S.C. 470f) of the NHPA establishes the responsibility of the agency to afford the Advisory Council on Historic Preservation an opportunity to comment on any undertaking that may have an effect on a historic property. These two sections of the law are the basis for a majority of preservation-related work undertaken by the military Services.

The NHPA created the Advisory Council on Historic Preservation to advise the President and Congress on preservation matters. The Advisory Council was structured as a peer review agency, to assist other federal agencies in management of historic resources. Through its regulations, 36 CFR Part 800, “Protecting Historic Properties” the Advisory Council provides specific guidance on how to consider historic resources in agency undertakings.

### **Section 110**

The cost of identifying, evaluating, and nominating properties to the National Register is an agency-wide administrative responsibility. This expenditure is not related to the cost of operating and maintaining historic family housing. Funding for surveys and nominations is usually through the

planning or cultural resources management office, not through housing, and is undertaken on a programmed schedule not sensitive to individual projects. The cost of a survey would impact an individual family housing project if the survey had not been completed prior to project implementation. Project delays resulting from completing survey work could increase project cost. In most cases, however, project planning ensures that all administrative requirements are completed before initiating work.

### **Section 106**

Compliance with Section 106 of the NHPA can be accomplished in a number of ways. The first method is on a project-by-project basis. In this case the 106 process would be initiated at the time the project is in the initial planning stages. If the process is started at this stage the potential for increased project cost attributable to compliance is minimal. General practice at installations, however, starts the Section 106 process well into the project planning and implementation phases. When initiated late in the planning process, or after the project has moved into implementation, the potential for increasing cost due to delays rises significantly. Delaying the Section 106 process can add cost to a project through delays in implementation, resulting in increased construction cost; enforcement of requirements to consider alternatives to actions that would adversely affect historic properties; and possible project redesign, resulting in lost or increased planning and design costs.

A second way in which Section 106 compliance can be accomplished is through a programmatic agreement (PA) among the consulting parties. When implemented, a PA establishes standards by which work will be carried out, and generally relieves the installation or agency of a majority of the project-by-project administrative compliance effort and cost.

A third alternative is development of agency counterpart regulations. These would require the same considerations as 36 CFR Part 800, but would be customized to the agency's specific needs and operating procedures. Potential

cost savings would be derived through reduction in project administrative cost, but increased staffing requirements, or partnerships with SHPOs or other review agencies, could offset those savings.

Compliance with §§110 and 106 are generally considered to be burdensome and costly at the installation level. This appears to be a result of a number of factors:

- a. incomplete or inaccurate surveys, resulting in the need to undertake survey work on a project-by-project basis, and in an atmosphere of urgency;
- b. failure to involve cultural resource managers in the initial stages of project planning;
- c. failure to agree on whether properties are historic, resulting in endless debates with review agencies;
- d. failure to fully consider alternatives to actions that may have an adverse effect on cultural resources;
- e. initiation of the 106 review process after critical decisions have been made in project design and development, or after the project has been implemented;
- f. failure to be fully informed when choosing treatment options;
- g. failure to act in the best long-term interest of the Service and public when selecting treatment; and,
- h. failure to act decisively once treatment and disposition choices have been made.

There are no clear statistical data on the cost incurred as a result of these failures, although there is an ample anecdotal record to suggest that a significant number of projects have been delayed in the review process and, at times, significant cost has been incurred as a result of failures to coordinate projects with in-house and outside agency reviews.

Evidence also suggests that, at times, outside review agencies have not carried out their responsibilities in the most effective and efficient manner, also resulting in project delays.

Compliance with §110 of the NHPA is an agency-wide responsibility. It should not be considered a responsibility of the housing office, or

its cost be assigned to any individual project. If an installation survey is complete and is maintained, resource identification does not delay project activity.

Compliance with §106 of the NHPA can be streamlined in the manner detailed above, either through use of programmatic agreements, or through development and implementation of counterpart regulations. Until such mechanisms are in place, delays due to compliance can be avoided through early consultation, a common sense approach to treatment, and decisive action once final choices have been made.

#### SECRETARY OF THE INTERIOR'S STANDARDS

One issue regarding the cost of operating historic family housing is whether the military services are required to maintain that property to a higher standard than non-historic units. Under policy, regulation and instruction, the "Secretary of the Interior's Standards for the Treatment of Historic Properties" (Standards) is the basis by which all federally controlled historic properties are to be treated. The Standards focus on a number of goals

- no action will be taken that will damage or destroy the qualities of the historic property;
- as much of the original building fabric will be retained as possible;
- whenever feasible, damaged material will be repaired, rather than replaced; and,
- to the extent available, replacement material will match the original.

How the Standards are interpreted and applied is where additional cost can be found. Interpreting the Standards as requiring slavish replication of missing materials or building systems is incorrect and would result in excessive cost. Applying the Standards uniformly to all buildings, and to all portions of those buildings would, likewise, be inappropriate and costly. Application of the Standards must be undertaken with common sense, and a clear understanding of what is

important to preserve, and what does not require preservation. This is best accomplished by having well trained personnel working directly on projects, and allowing those individuals to use their expertise. The goal is to treat historic properties in a manner that ensures they continue to support the agency mission, and preserve those aspects of our heritage that are significant. This is nothing more than a heads-up approach to resource management.

Experience within the military, and throughout the federal government, suggests that this can be accomplished without adding cost to O&M budgets if undertaken professionally, creatively, and in a timely manner. This can be done by ensuring that installation staff are aware of the values of the historic resources to the mission, and understand the limits of treatment. A professional, full-time, cultural resource manager, located within the Public Works Office, and within the decision-making loop, is essential to developing a successful program. This individual should be the point of contact (POC) with internal and external review agencies, as well as assisting in interpretation of the Standards.

Under Public Law 89-665; 80 Stat 915; (16 U.S.C. 470), as amended, the Secretary of the Interior is responsible for establishment, in consultation with the Secretaries of Agriculture and Defense, the Smithsonian Institution, and the Administrator of the General Services Administration, professional standards for the preservation of historic properties in federal ownership or control. This responsibility extends to providing training in, and information concerning professional methods and techniques for the preservation of historic properties, and for the administration of the historic preservation program at the federal, State, and local level.

The “Secretary of the Interior’s Standards for the Treatment of Historic Properties” (36 CFR Part 68), along with their associated “Guidelines for Preserving, Rehabilitating, Restoring, & Reconstructing Historic Buildings” are the basis for planning, design, and work on historic buildings, structures, landscapes, and sites under government jurisdiction. The Standards and Guidelines are nothing more than applying good common sense to the treatment of properties.

The Standards and Guidelines are broken down into four sections of work—preservation, rehabilitation, restoration, and reconstruction. For the most part, work done by the Services on historic properties will fall into the preservation and rehabilitation categories. It is unusual for the Services to undertake restoration or reconstruction of a building or structure, although all projects will usually have aspects of each treatment type. The following commonly used definitions are from the “Secretary’s Standards.”

**Preservation is the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property.** *Work, including preliminary measures to protect and stabilize the property, generally focuses on the ongoing maintenance and repair of historic materials and features, rather than extensive replacement and new construction.*

**Rehabilitation is the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions of features which convey its historical, cultural, or architectural values.** *For military purposes, rehabilitation is the same level of action as revitalization.*

**Restoration is the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.** *The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.*

**Reconstruction is the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.** *Reconstruction of an entire building or structure is seldom used in the military, but it may apply to elements of a property that is undergoing rehabilitation or restoration.*

Each of the sets of Standards focus on common sense approach to treatment of buildings. Their emphasis is on repair of features where feasible, and replacement with compatible materials when necessary. The two most widely applied standards—Preservation and Rehabilitation, do not require replication of historic features, preservation of inadequate or nonfunctional elements, or retention of components or systems that do not meet current use or code requirements.

### STANDARDS FOR PRESERVATION

Preservation may be considered as a treatment when the property's distinctive materials, features, and spaces are essentially intact, and thus convey the historic significance without extensive repair or replacement; when depiction at a particular period of time is not appropriate; and when a continuing or new use does not require additions or extensive alterations.

There are eight Standards for Preservation, all of which focus on stabilizing the property to prevent deterioration, repairing the property to continue its useful life, and avoiding actions that will damage the property. The Standards are:

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces, and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place and use. Work needed to stabilize, consolidate, and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection, and properly documented for future research.

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color and texture.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

### STANDARDS FOR REHABILITATION

Rehabilitation (Revitalization) will be the most common level of treatment for a historic property. It may be considered as a treatment when repair and replacement of deteriorated features are necessary; when alterations or additions to the property are planned for a new or continued use; and when its depiction at a particular time is not appropriate.

There are ten Standards for Rehabilitation, all of which focus on preserving the character of the property, while improving its physical condition and extending or changing its use. The Standards must be applied in a rational, logical manner, neither placing emphasis on restoring lost character nor abandoning existing fabric and systems. The Standards and their intent are:

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.

*This standard simply means that if a property was constructed as a residence, ideally it would continue in that use.*

2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.

*The intent of this Standard is to avoid situations where important portions of a property are removed in the process of rehabilitation, and the value of the property diminished. An example would be where a clay tile roof was removed and replaced with a new composition roof. The form, color, pattern and texture of the clay tile roof would be a distinctive, character defining element to the building and its environment. Its replacement with any material that did not retain those features of form, color, pattern, and texture, would diminish the value of the property.*

3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.

*This Standard was developed to avoid situations where a project would basically rewrite history. The construction industry has sufficient technical skills to duplicate the design and materials used on historic building and structures. But the use of those skills should be limited to restoration and reconstruction projects.*

4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.

*Although you may not be allowed to place something strange on a historic building now, if someone did it long enough ago, there is a good possibility that it should be saved. If changes were made in the past that do not detract from the character of the building, and*

*that represent the design and style of the era in which it was done, it should be retained. The exception to this is when you are undertaking a restoration and the period of the change does not fall within the period of the restoration, or where the change does detract from the historic building or is not of value in itself.*

5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.

*Many historic family housing units contain materials and features that are representative of the original design, the style of architecture, or the function of the building which should be preserved. This Standard addresses the issue of removal, destruction, or covering of these features.*

6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and, where possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

*The priority for treatment of features and materials on a historic property is a) preservation; b) repair; c) replacement "in-kind"; and last, d) replacement with a substitute material. Preservation of the feature would entail keeping it in-place, repainting it or recoating it, and basically maintaining it.*

*A majority of the work at an installation involves preservation, which is standard maintenance. The repair option would come into use when the feature is broken. By repainting it you are fixing it, that's basically all. If the crank arm is not working on a steel window the repair action might involve its removal, cleaning, and possible replacing some worn or broken parts, then returning it to the original window. Only if the feature is broken beyond repair is the option of replacement "in-kind" considered.*

An “in-kind” replacement would involve removal of the broken feature and replacing it with the “same” feature. If a steel window is broken beyond repair, “in-kind” replacement would mean putting back in place another steel window of the same size, configuration, operation, and design. Elements of the window that do not affect its form and design can be modified in an “in-kind” undertaking. An example would be replacing a single-glazed steel window with a double-glazed steel window, and an originally unfinished steel window with a pre-finished steel window.

The last option is replacement with a substitute material. This is undertaken only if the original material, design, configuration or workmanship is no longer available. Given the technology currently available, there are very few features that cannot be obtained as originally designed. Great care should be taken to avoid situations where a project calls for replacement of a feature, such as original wood or steel windows, with a substitute material, such as aluminum. Such an undertaking would violate the Standards and require substantial administrative efforts, plus possibly adding time and expense to the project.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.

This Standard was originally written to prevent abrasive cleaning of buildings, such as sandblasting. As alternative abrasive cleaning techniques have developed, the Standard was expanded to include all chemical or physical treatment that could damage the historic fabric, including the use of acids, sand, ice crystals, corn cobs, walnut shells, high pressure water. Basically, any treatment that will abrade the surface of the material and either remove its protective surface, change its texture, or otherwise damage its integrity. It is feasible to clean a building without damaging its fabric using the correct materials, equipment and techniques. While abrasive cleaning of a material, such as masonry, will cause a visual change to the property, more significant effects are changes in the physical characteristics of the material, shortening its

usable life, and contributing to higher maintenance costs, and eventual loss.

For a majority of situations, a simple cleaning using a biodegradable soap, soft bristle brushes, and water will clean normal dirt and grime off of a building. For more difficult cleaning problems, such as graffiti, a number of manufacturers have solvents that are effective and will not damage the building fabric. In all cases, 2’ x 2’ test panels should be used to assess the effectiveness of the cleaning system and its effect on the property before proceeding.

8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

The purpose of this Standard is to avoid damage to the integrity of archeological sites. Unless a project is going to disturb the site, it should be left alone.

If the project, as designed, would damage the site, consideration should be given to modifying the design to avoid the site. An example of this would be the installation of an underground utility line. The utility line should go around the site rather than through it.

If the archeological site cannot be avoided, then mitigation would be to conduct a professional archeological excavation. This would include development of a research design, carrying out the research, and, if appropriate, excavation of the site and then curation or management of artifacts recovered.

9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.

The explanation of this Standard is similar to Standard #3. The intent is to preserve the design integrity of the property. This would apply to projects involving rehabilitation, new construction, planning,

*and landscaping. Additions to a building should be designed in such a manner so that the historic property is not destroyed or overwhelmed, or that its physical integrity is lost. Ideally, an addition should not be larger than the original building. The connection between the two should not damage materials or features any more than is absolutely necessary, and the design of the addition should be compatible with, but not duplicate the original.*

10. New additions and adjacent or related new construction will be undertaken in a such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

*This Standard is recommending that all new work be designed in such a manner that it can be removed. The thought behind this is that at some time in the future a situation could arise where there is interest in restoring the historic property. New construction that removes or destroys any portion of the property that is*

*essential to defining its character would make that action impossible.*

THE INTENT OF ALL OF THE STANDARDS, REGARDLESS OF TYPE OF TREATMENT, IS TO PRESERVE AS MUCH OF THE ORIGINAL FABRIC AND CHARACTER OF THE PROPERTY AS IS POSSIBLE, AND TO TREAT THE PROPERTY GENTLY. IF THE STANDARDS ARE USED AS THE BASIS FOR ALL WORK ON HISTORIC FAMILY HOUSING UNITS, THE PROJECTS WILL BE ACCEPTABLE TO ALL EXTERNAL REVIEW AGENCIES. SIMPLY BY CITING AND USING THESE STANDARDS, THE INDIVIDUAL INSTALLATIONS AND SERVICES CAN VIRTUALLY ELIMINATE ADMINISTRATIVE COSTS RELATED TO SHPO AND ACHP DELAYS IN PROJECT REVIEWS.

Restoration and reconstruction are specialized treatments that rarely apply to military housing. When either restoration or reconstruction is to take place, consultants expert in those fields will be utilized. No law or regulation requires a federal agency to restore or reconstruct a property.



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## FIRE SAFETY, CODE COMPLIANCE AND HANDICAP ACCESSIBILITY

Historically, fire safety codes were designed to minimize damage to property. Eventually these codes were rewritten to prevent harm to occupants, with the value of property being a secondary concern. When addressing the issue of fire safety in historic family housing, it is essential to maintain that priority—occupant safety first, property protection second.

Each of the national building codes, such as BOCA and the Uniform Building Code, as well as the National Fire Prevention Code, provide certain exceptions for historic properties. These exceptions allow alternative means of providing the same level of protection when exact adherence to the requirements of the code would damage the historic integrity of the property. It is generally assumed that many historic buildings and structures, as originally designed, will fail to meet modern code requirements in the use of materials, methods of construction, and exiting systems. The goal in rehabilitation: to provide an equivalent level of protection without damaging the historic character of the property, can be accomplished in two ways—through alternative approaches to protection, or through application of contemporary protective measures in ways that avoid or minimize damage to the property.

An example of the first approach would be the installation of a fire suppression system in a multifamily building, such as a sprinkler system, which would allow retention of the historic open stairways. An example of the second approach would be placement of the sprinkler heads in inconspicuous locations.

There are two sets of guidance available to apply fire safety and code compliance to historic properties—The U.S. Corps of Engineer’s “Architectural and Engineering Instructions, Design Criteria, Chapter 16, Preservation of Historic Structures”, and, although its emphasis is on nonresidential structures, the General Services Administration and the Advisory Council on Historic Preservation’s joint publication “Fire

Safety Retrofitting in Historic Buildings.” (Available through GSA Public Building Service, Washington, DC or the Advisory Council on Historic Preservation, Washington, DC.)

The COE Design Criteria provides a general, policy approach to meeting life safety requirements, with emphasis on equivalent protection without degradation of historic character. The GSA/ACHP guidance offers detailed alternatives and examples. Both can be used when developing a fire safety plan for a family housing unit.

Developing a fire-safety or code compliance plan under the assumption that the letter of the law and regulations must be met in a historic building will result in excessive cost and possible damage to the resource.

The first step in the design process is an assessment of the building or structure, aimed at identifying significant spaces and character defining elements that should be protected. Although a building may be historic, not all of its parts are equally important. Accordingly, different approaches to meet fire safety requirements may be used in different parts of the building.

The second step is evaluation of alternative means of providing fire safety. Selection of a system will be based on the level of personnel risk, the type of occupants and uses, and the type of materials to be protected. In some instances it may be necessary to have more than one type of fire safety system in a single building. An example of that would be a property that housed important museum pieces, such as the Superintendent’s Quarters, USMA, that is shown on page 40. While a majority of the building could be protected with a traditional fire suppression system, if necessary, that portion containing the museum pieces would be better protected with a dry fire suppression system to avoid the possibility of water damage to the collection.

In addition, issues involving egress must be integrated into the overall system. In historic multifamily housing units, it may not be possible to provide the corridor or door widths required for new construction under current code. Or, there may be instances where open stairs are significant architectural elements of the building. In such

cases, creative solutions must be developed that provide the level of protection required by code, but that do not damage the property. In all cases, a balance of solutions should be developed that meet the objectives.

The third step in the process is review of the proposed systems with the authorities having jurisdiction to ensure compliance with fire safety requirements, and protection of the property. This has to be undertaken in a timely manner to avoid delays that will result in additional costs.

Finally, care in the installation of the system is critical to protecting the building fabric. It is important that there is clear guidance given to contractors and workmen to avoid collateral damage to historic fabric, and to ensure that the system is installed as originally designed and approved.

## HANDICAP ACCESSIBILITY

Although handicap accessibility can be one of the most difficult issues when treating historic family housing, it is only undertaken on an as needed basis. Each instance of providing accommodation for families is unique. Accordingly, the cost associated with such provisions does not have a significant effect on the overall housing budget, and is not a factor in maintenance costs.

Successful accommodation, however, will require both imagination and effort. The goal is to provide full access without destroying the physical integrity or historic character of the resource.

As with life safety and building code issues, handicap accessibility at historic properties can be accomplished through a variety of direct and alternative means. It is important when addressing this issue not to make assumptions about what is required, or what can be accomplished. Each accessibility concern must be viewed individually, and in the context of the historic property that will be affected.

Both the Uniform Federal Accessibility Standards, Federal Standard 795 (UFAS), and the Americans with Disabilities Act, Public Law 101-336, Accessibility Guidelines (ADAAG), provide

the standards for making buildings and facilities accessible to the disabled. In December 1993 DoD issued a memorandum to all military Services and other offices establishing a policy to "... Use ADAAG to provide equal or greater accessibility that would be achieved if only UFAS were applied." For historic properties, however, provisions are made to allow alternative means of providing access when strict compliance with UFAS or ADAAG would threaten or destroy the historic significance or a feature of the property. The requirement to provide access is not diminished, but the means by which it is accomplished can vary from that which may be required in new construction.

## COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

### HAZARDOUS MATERIALS

Some of the most critical issues to address when working on historic family housing center around hazardous substances—lead paint, asbestos, and other materials once commonly used in construction, but which are now known to be hazardous. Concern over the presence of these substances in homes has generated numerous studies and tests, resulting in a better understanding of the real risks involved when living and working with these materials. However, installations continue to overreact to their presence, and tend to overremediate. This consistently results in excessive costs and, at times, damage to a property. The level of treatment is inconsistent across and within the Services. As an example, one Air Force installation will treat lead-based paint through encapsulation, while another insists on the removal of all materials previously coated with the offending paint.

Initially, regulations and guidance were issued that, basically, established a zero tolerance level for lead-based paint and asbestos in housing units. Research has proven that if the material is stable, and in good condition, it does not pose a danger under normal use. The problems occur when the level of risk increases, either due to the

TABLE 2—MANAGING OR REMOVING LEAD-BASED PAINT IN HISTORIC MILITARY FAMILY HOUSING

INTERIM SOLUTIONS			
General Maintenance	Dust Control	Paint Stabilization	Soil Treatment
<p>Repair deteriorated materials</p> <p>Control leaks;</p> <p>Maintain exterior roofs, siding, etc. to keep moisture out of buildings;</p> <p>Perform emergency repairs quickly if lead-based paint is exposed;</p> <p>Maintain building file with lead test date and reports on completed lead mitigation work.</p>	<p>Damp mop floors, wet broom sweep porches and steps;</p> <p>Damp dust window sills and window troughs;</p> <p>Washdown painted surfaces periodically using tri-sodium phosphate;</p> <p>Clean or vacuum carpets regularly, using HEPA vacuum if there is evidence of lead dust;</p> <p>Undertake periodic inspections with annual dust wipe tests.</p>	<p>Wet-sand loose paint and repaint;</p> <p>Keep topcoats of paint in good condition;</p> <p>Selectively remove paint from friction and chewable surfaces (window sills, railings) and repaint;</p> <p>Use good quality latex, latex acrylic or oil/alkyd paints compatible with existing paint;</p> <p>Consider more durable encapsulating paints and wall lining systems, if necessary.</p>	<p>Notify users as to the location of lead-based paint;</p> <p>Instruct users as to how to keep the property clean, what materials to use, how often, etc.</p> <p>Instruct users to notify authorities when repairs are needed;</p> <p>Provide users with appropriate information on the hazards of lead-based paint.</p>
HAZARD ABATEMENT			
Paint Removal	Paint Encapsulation	Replace Elements	Soil Treatment
<p>Remove deteriorated paint or paint on friction, chewable, or impact surfaces to sound layer, repaint;</p> <p>Use gentlest means possible to remove paint: wet sand, low-level heat guns, chemical strippers, or HEPA sanding;</p> <p>Send easily removable items off-site for paint stripping, reinstall, repaint.</p>	<p>Use encapsulating paint with 20 year warranty;</p> <p>Seal lead-based painted surfaces behind rigid enclosure, such as drywall; new coverings over painted floors;</p> <p>Use rubber stair treads on painted steps.</p>	<p>Replace, only when necessary, seriously deteriorated painted elements, such as windows and doors, with new elements that match existing in design and material;</p> <p>Replace component elements of a friction surface (parting bead or windows stops) or of impact surfaces with new elements that match existing.</p>	<p>Remove contaminated soil around foundation to a depth of 3", replace with new soil;</p> <p>If site is highly contaminated, consult with environmental specialist;</p> <p>Do not alter significant historic landscape design or elements.</p>
Compliance		Compliance	
<p>Be aware of all federal, State, and local laws, regulations, policy, and instructions regarding lead-based paint abatement, environmental controls, and worker safety;</p> <p>Dispose of hazardous waste according to applicable laws;</p> <p>Be aware that removal of lead-based paint can create lead dust which can be dangerous.</p>		<p>Be aware of all federal, State, and local laws, regulations, policy, and instructions regarding lead-based paint abatement, environmental controls, and worker safety;</p> <p>Dispose of hazardous waste according to applicable laws;</p> <p>Be aware that removal of lead-based paint can create lead dust which can be dangerous.</p>	

condition of the material, its location, and who will be exposed to the substances. Any treatment plan must take these and other issues into consideration before committing resources to remediation. Too often installations attempt to use blanket solutions for different types of problems, often resulting in excessive cost and damage to historic properties. Thoughtful consideration must be given to treatment options and alternative actions.

### LEAD-BASED PAINT

Addressing the issues of when to remove lead-based paint, how much to remove, and the most appropriate removal technique, have been critical in management and treatment of historic family housing for many years. If a building or structure is more than 40 years old, chances are that somewhere, it contains lead-based paint. White lead, linseed oil, and inorganic pigments were the basic components of almost all paint used from the 18th century through the middle of the 20th. Lead gave paint and other finishes, such as varnishes, great adhesion, strength, durability, and density. It was the ideal ingredient when painting everything from metal to masonry to wood. Unfortunately, its real dangers were not fully recognized until 1978 when the federal government banned its use in all housing.

The first and most obvious concerns over lead poisoning centered around poorly maintained low income housing. The condition of the properties created situations where lead paint chips could be ingested by children, resulting in lead poisoning. A second, and equally dangerous problem has been found in self-help renovation projects, where occupants undertook paint removal, exposing their children and themselves to lead dust. Any situation where lead can be ingested—through eating paint chips, inhaling dust containing lead, or from lead contaminated soil—is a serious health hazard.

The fact that this material is poisonous requires that there be an informed, thoughtful management plan developed to address the issue on a project-by-project basis.

There is no blanket formula that will solve the lead-based paint problem at an installation. Each situation must be evaluated individually

based on risk, the value of the resource, and the methods available for treatment.

### RISK ASSESSMENT

The danger of lead poisoning comes from ingesting the material, either by inhaling it or eating it. Consequently, the most critical issue to address is the level of risk the lead-based paint represents. While all lead-based paint is poisonous, not all of it poses a risk. An example would be paint on a ship. The potential for ingesting the material is negligible, thus the level of risk would not dictate removal of the lead-based paint. On the other hand, a building that is being used as a day care center for young children would present a high risk. This would require treatment of the paint to ensure that there was no danger to the children.

The National Park Service Preservation Brief #7, "Appropriate Methods for Reducing Lead Paint Hazards in Historic Housing" lists seven points that should be examined when assessing risk:

- the location of the lead-based paint (lead-based paint that is out of the reach of children represents minimum risk);
- the condition of the paint (flaking or chipping paint creates a higher risk than a solid paint surface);
- the lead content of the paint or soil (the amount of lead used in paints varied considerable. A low level, .05% or less, poses no risk);
- the type of surface on which the paint is located (surfaces that are accessible to young children are a high risk, as are friction surfaces);
- how much lead dust is currently present (this can indicate paint chalking);
- how the property is used and maintained (lead-based paint in a residential situation is a higher risk than the same paint in an administrative space); and,
- the age of the occupants who might come into contact with lead paint (young children are at a higher risk of damage due to lead poisoning than adults.)

## Treatment

In most cases, what are called “Interim Controls” can be used to mitigate risk (see Table 2, page 28.) These are “short term” solutions, lasting less than 20 years. They include good housekeeping and maintenance, dust control, paint stabilization, replanting on top of contaminated soil, and occupant education. In selective, high risk cases, “Hazard Abatement” may have to be undertaken. These are long-term solutions, and involve removal of the paint, selective substrate removal, encapsulation of the material, and, possibly, soil replacement.

Management of lead-based paint in historic family housing can range from a “do nothing” approach where risk does not exist, to complete removal where risk is critical, with many different solutions in between. Assuming that complete removal is always the best solution would be incorrect. The very process of removing the material poses a risk to workman, inhabitants, and the environment, as well as to the integrity of the structure. Where lead-based paint does not represent a risk, it should be left undisturbed. Where the risk is minimal, “Interim Controls” should be used, and where it is high, “Hazard Abatement” should be used.

If abatement is the appropriate option, then there is guidance in determining where to start work, and where to use limited resources (see Table 2.) The National Park Service has identified what paint should be removed in order of risk (with 1 being the highest health threat, and 8, the least.)

1. Peeling, chipping, flaking, and chewed interior lead-based paint surfaces.
2. Lead dust on interior surfaces.
3. High lead levels in soils around residential units and in play areas.
4. Deteriorated exterior paint.
5. Friction surfaces (windows, doors, painted floors or stairs.)
6. Accessible, chewable surfaces (window sills, stair rails) if small children are present.
7. Impact surfaces (baseboards, door jambs.)

8. Other interior surfaces showing age or deterioration (walls, ceilings.)

Reaction to the presence of lead-based paint should be measured. It can be managed without breaking the budget or destroying historic resources. The risk it poses can be assessed and its treatment designed to reduce or eliminate that risk. Within the context of historic preservation and stewardship of cultural resources, the most appropriate method will always be the least invasive.

Consult the National Park Service Preservation Brief #7, “Appropriate Methods for Reducing Lead Paint Hazards in Historic Housing”, for detailed information on remediation of lead-based paint.

## ASBESTOS

Between the latter part of the 19th century and 1970, asbestos was used extensively in the construction industry. Its fire proof and insulating qualities made it ideal as spray-on fireproofing and sound absorbing ceiling and floor tile material, building insulation, piping, pipe insulation, exterior wall and roof shingles and panels, and many other building products. As with lead-based paint, the real danger of asbestos occurs when it becomes friable and is ingested. If the material is stable, and in a location where it is not subject to friction or deterioration, it poses no danger. However, the same material in poor condition, or when it is used on surfaces where it is subject to friction, such as floor tile, can create a serious hazard, and must be addressed.

For the most part, earlier asbestos remediation programs have already addressed the most critical situations. There is no evidence that the presence or removal of asbestos from historic family housing constitutes a significant ongoing maintenance or operational cost.

## ENERGY CONSERVATION

Over the past two decades a substantial number of projects affecting historic family housing have focused on energy conservation efforts. Executive Order 11912, dated April 13, 1976 directed all federal agencies to reduce energy consumption at installations by 35% by FY'85. To achieve that goal, the Services undertook numerous conservation projects on individual buildings, either as part of whole house renovations, or as stand alone projects. These ranged from the simple installation of roof insulation to more extensive work, including window replacement and resurfacing buildings.

Research and project data support the energy conservation value of increasing the use of certain types of insulation in buildings. The greatest value is in the reduction of heat gain and loss in attic spaces with the use of fiberglass batts, 12"-18" thick, installed above the top floor ceiling. Research studies have found that up to 80% of the heat loss in a residential structure is through the roof. During heating months, unimpeded heat will rise from living spaces through the ceiling into the attic space, and from there, directly through the roof. Conversely, during cooling seasons, air in the attic space will become super heated, reaching temperatures of 170°F. This, in turn, reduces the efficiency of the cooling system. Preventing the super heated air from either entering the attic space, or mixing with conditioned air, significantly reduces utility cost, and will provide a pay back in less than 10 years.

The support for window replacement as an energy conservation measure, however, appears to come, in great part, from assertions made by material manufacturers.

The assumption has been that savings resulting from reduced utility consumption would pay for the cost of replacing existing windows over a short period of time. There is no research or project data supporting that assumption, and manufacturers have ceased making those assertions. Yet, projects calling for the replacement of historic windows on family housing units continue to be justified based on energy conservation.

During the late 1970s, and throughout the 1980s, the military services used a 25 year life-cycle cost as the basis for determining the economic efficiency of a repair or replacement project. There are no instances where the replacement of traditional wood historic windows with aluminum or vinyl double-glazed units were found to be justified on the basis of a 25 year life-cycle cost. And, there are numerous instances where a comparative analysis of repair and replacement of such windows illustrated that retention and repair of existing wood windows was the best economic alternative (Ft. Totten, NY, COE; Agriculture South Building, Washington, DC, GSA.)

In 1999 Executive Order 13123, "Greening the Government Through Efficient Energy Management", was issued, superseding previous energy conservation orders. This EO established energy reduction goals, and required each federal agency to reduce energy consumption per gross-square foot of its facilities by 30 percent by the year 2005, and 35% by 2010, relative to the agency's 1985 energy use.

The EO also defines what constitutes "life-cycle cost-effective." This means that the life-cycle costs of a product, project, or measure are estimated to be equal to or less than the base case (current or standard practice or product.)

There are a number of instances where the replacement of windows, and the use of synthetic materials, such as aluminum and vinyl, would significantly reduce maintenance expenditures. However, neither the reduction in maintenance cost, nor the reduction in energy used, can justify the cost of replacement, or meet either the 10 year payback threshold, or the 25 year life-cycle cost. Therefore, retrofitting existing historic windows can both meet energy conservation goals and provide a payback within the 10 year period (Agriculture South Building, Washington, DC, GSA).

The reason for this lies in why historic windows are inefficient. Historically, weather-stripping was not used in the manufacture of these windows. Through years of use, the original tight

fit of the windows has diminished, allowing air infiltration at the top, bottom, sides, and meeting rails of the windows. This has allowed both heat gain and heat loss, and has created a situation where it can be uncomfortable for tenants to sit close to the windows. The consistent complaint appears to be that the rooms are drafty. Over 80% of the heat loss through a window or door can be attributed to air infiltration. The solution to this problem has been to retrofit the existing window with contemporary weather-stripping. When installed properly, the weather-stripping will allow existing windows and doors to meet or exceed both air pressure and water infiltration standards used for testing new windows.

Another concern has been that the single pane glass historically used in windows transmits cold into a house. This problem can be solved through the use of storm windows, installed either on the exterior or interior of the window.

Also, through the process of retrofitting the windows, the glass can sometimes be upgraded to double glazing. Again, the economic value of this action is not supported by any research. But, unless the historic glazing is of a unique character, such as cylinder glass, tinted, or concave or convex, replacement of the glazing will generally not affect the historical importance of the window.

New glazing systems using inert gases have made significant improvements in "R" values, but their costs are generally prohibitive for use in military structures, and would far exceed the payback period.

Other window treatment alternatives that have been used to reduce heat loss, and energy consumption, have included the installation of insulated drapery, or insulated shutters. Both of which have minimal impact on the historic window, and can offer significant savings.

Different attempts to reduce energy consumption have involved the replacement of exterior finishes on buildings, or the covering of exterior surfaces. At one Air Force base all of the historic stucco walls on the half timber, frame and brick housing units was removed to allow the insertion of batt insulation between studs. The stucco was then replaced with a new synthetic

stucco material (EIFS), which has recently been proved not to be waterproof. Regardless of how long these housing units remain in use, the cost for undertaking the initial work could never be recovered, and the cost of removing and replacing the synthetic material will add to the fiscal damage.

In theory, if a product (window, door, roof, stucco, stone, brick, wood, or other material) has lasted 40, 50, 60 or more years, it will generally continue to meet its functional requirements. If, after all those years, the product fails, replacing it with a matching product should provide another 40, 50, or 60 years of service. If something lasts 60 years, there is no need to seek a material that will last longer.

When addressing energy conservation, the most effective and economic ways of saving energy at an installation include:

- upgrading old heating plant equipment;
- insulating underground distribution lines, and any other exposed distribution lines;
- inserting energy conservation shower heads in all showers through out the installation—no exception, even the Generals' quarters, VIP housing, and locker room showers;
- reducing water heater temperatures throughout the installation;
- reducing the number of window mounted air conditioners (ideally this is done through installation of central air systems);
- installing, or increasing the amount of fiberglass batt insulation under the roofs of buildings (80% of the heat loss and gain in a building is through the roof); and,
- installing weather-stripping at all windows and doors.

Some of these actions will be expensive, some will cost very little, or nothing. In each case, the 10 year payback rule must be followed.

## OPERATION AND MAINTENANCE COSTS COSTS ATTRIBUTABLE TO HISTORIC HOUSING

A recurring issue regarding the cost of historic military family housing is trying to determine what operation and maintenance costs are appropriately attributable to the “historic” status of a building. There is recognition that elements of historic properties are unique, and that the cost of maintaining, repairing, or replacing those unique elements may cost more than what would normally be expended for similar, non-historic features. There is also acceptance that some materials commonly used in construction when the historic structures were originally built have a life-cycle far exceeding commonly used new materials. Combined, these factors complicate assessing values and costs.

We have found no instances in any of the Services where records are kept separating maintenance and repair costs into “historic” and “non-historic” actions. Whatever costs are incurred in maintaining a property are attributed to that property on a straight-line basis, regardless of the cause or purpose of that activity. Accordingly, it is not possible, based on available data, to make a determination that the historic character or designation of a building is the basis for excessive maintenance costs.

When anecdotal information is used as the basis for comparison, the results are confused. Again, installation staff are not normally cognizant of whether an action is taken to protect the “historic” character of a property, or to meet livability requirements. In addition, the overlap of allocation of project costs appears to be endlessly confused.

As an example:

- The installation has a historic house, its slate roof needs replacement;
- The need for a new roof is livability requirement, not because the building is historic; thus,

- The difference in cost between installing slate and composition shingles is attributable to historic nature of building, but not the entire cost of the roof.

However, the projected life of a new slate roof exceeds that of a composition shingle roof by four to five times, making the slate roof the best economic option for a roof material, in spite of its increased initial cost, or the historic status of the building.

The same type of conflict can exist in every type of work carried out on historic family housing. Another example would be the upgrading of kitchens. Kitchen fixtures and styles have a finite life, and it is appropriate to assume that renovation of kitchens will be necessary every 15 years or less. The basic cost for such renovation is attributable to meeting livability standards, but the cost of matching or accommodating historic elements, such as decorative tin ceilings (Ft. Totten), belongs to the historic nature of the structure.

To effectively determine the actual cost of maintaining a historic, vs. a non-historic, property, it will be necessary to identify categories to be assessed, procedures for allocation of costs, and methods of recording, comparing, and reporting those costs.

Once this is done, and data are available to analyze, there will be an objective basis for comparing direct repair and maintenance costs. This will eliminate one variable in the decision making process, leaving utility cost and the assigned value (both hard and soft value) of a property as additional factors to be considered. Due to the differences in property types, building materials, the project location, availability of materials and craftsmen, and other factors, the separation of repair and maintenance costs will not be uniform.

**Table 3**  
**Historic Military Family Housing Quantity & Cost Data**

Comparative Analysis of Service Reports<sup>a</sup>

Service	# of Historic Units <sup>b</sup>	% of Total Units <sup>c</sup>	Average Unit Size Historic/Non-Historic	Cost Per Unit/Year Historic/Non-Historic	Cost Per Square Foot/Year Historic/Non-Historic
Army	2600	2%	3376/1490	7,556/3,903	2.60/2.60
Air Force	1649	2%		1,630/3,590	
Navy	420	0.5%	3060/1390	7,344/2,085	2.40/1.50
Marine Corps	12	0.2%	6167/1418	25,065/4,651	4.10/3.23

a. Service Reports issued in accordance with Senate Report 104-287

Department of the Army "Report to Congress on Historic Army Quarters", March 1997

"United States Air Force Congressional Report on Historic Homes (Ref: Senate Report 104-287)", June 1997

"Department of the Navy Response to Congress on Historic Preservation", April 2, 1997

United States Marine Corps

b. "Historic Units" represent properties that are either listed in the National Register of Historic Places as individual properties, are contributing elements to a National Register historic district, a National Historic Landmark, or that meet the criteria for listing.

c. Percent of Historic Units to the Service's total family housing stock.

Table 4

**Historic Military Family Housing Ground Truth Costs**

Comparative Analysis of Service Survey Conducted August 1999

Service	# of Units Hist/Non-Hist	Average Unit Size Hist/Non-Hist	Utility Cost/Year Hist/Non-Hist	Maintenance Cost/Year Historic/Non-Historic	Total Cost/Square Foot/Year Historic/Non-Historic		
Army							
A	6/5	5205/1908	2012/1209	2446/1757	\$.86/\$1.55		
B	6/0	3148/-	2392/-	1625/-	\$1.27/-		
C	6/6	2523/1589	2554/2193	2016/666	\$1.88/\$1.79		
D	12/7	4088/1213	1452/1026	992/992	\$.59/\$1.66		
Air Force							
A	342/677	2262/1227	461/501	1030/1106	\$.66/\$1.31		
B	229/500	2178/1250	462/1	1434/1	\$1.51/-		
C							
Navy							
A	102/673	2760/1255	2834/1962	3637/1493	\$2.34/\$2.75		
Marine Corps							
A	5/0	3955/-	2935*/-	4000*/-	\$1.75/-		
Unit Types Tested	Single Family H/NH	Duplex H/NH	Triplex H/NH	Fourplex H/NH	Fiveplex H/NH	Sixplex H/NH	Townhouse H/NH
Army	12/6	8/5	0/2	1/4	2/1	0/0	0/0
Air Force	6/0	5/0	0/0	1/0	0/0	0/0	0/0
Navy	44/223	21/200	0/0	36/0		1/0	0/250
Marine Corps							

\* = budget amounts, not actual cost.  
 1 = 300-500 non-historic housing units constructed in FY99. Insufficient data to provide accurate maintenance and utility costs.

## MATERIALS COST

Some major issues surround the issue of using traditional historic materials vs. the use of nontraditional materials:

- availability of the traditional material;
- availability of contractors who have the skill necessary to use the traditional material;
- initial material cost;
- the durability of the nontraditional material;
- the impact of the use of nontraditional material on the resource; and,
- maintenance of the material.

There appears to be little question regarding the durability and quality of the building materials traditionally used in military construction that predated WWII, including historic family housing. A majority of the buildings were built of masonry, either stone or brick, with wood framing or masonry backup. Roofs were generally covered in slate or clay tile, depending on the geographic location of the installation, and finish floors and trim were hardwood—red and white oak, ash. Interior finishes were plaster, with ceramic tile floors and walls in the bathrooms.

In a vast majority of situations, the materials used in the original construction continue to serve their function, requiring minimal maintenance. Subsystems have limited service lives, such as roof underlayment, but the basic building materials appear to have almost unlimited durability. In contrast, materials used in military family housing post WWII were consistent with private industry. Solid masonry walls gave way to brick veneer or wood siding, roofs, for the most part, were covered with composition shingles, wallboard took the place of plaster on interior surfaces, and, in many cases, plywood floors were carpeted.

Current construction uses aluminum and vinyl siding, aluminum and vinyl windows and doors, and artificial wood surfaces.

Contemporary composition materials, such as vinyl, have lower initial costs, and the promise of low maintenance. When cost benefit analysis have been done comparing traditional materials to commonly used contemporary materials, the benefit always falls toward the traditional materials. The primary reason for this is durability.

As an example, a slate roof has an expected life of 60-80 years. In reality, unless there is an imposed cause of failure, such as damage due to a storm or fire, or someone walking on the roof, the slate material itself will last 100+ years. The underlayment on the roof generally lasts 60 years. So the useful life of the roof would be limited to the life of the underlayment. In contrast, a common composition shingle roof has a life expectancy of 15-20 years. It will fail after that time, and will require replacement on a regular 20 year cycle. The result is that the composition shingle roof will be replaced three times to the single rehabilitation of the slate roof. Based on life-cycle cost benefit analysis, it is more economical to install a slate roof than a composition roof. Regardless of this evidence, composition shingle material is commonly used on projects replacing slate, tile, and metal roofs, and on new roofs throughout the Services.

Recently, an installation was faced with the need to replace a 70 year old standing seam metal roof on a historic building. A debate arose over the most appropriate material, with composition shingles being the most favored. Because the building was historic, assistance was sought from a COE office. Through discussion it became obvious that if the standing seam metal roof had lasted 70 years, it should be the material of choice for the replacement roof, even though currently it is not commonly used at military installations.

Basic, traditional materials appear to be available for use throughout the country. In some cases, the distribution of some material is not as wide spread as it was historically, which can increase cost nominally. In addition, reproductions of unique features, such as hardware, are also available, and widely distributed through numerous outlets.

There are, however, fewer workmen and craftsmen with the skills to use traditional materials. An example of this can be found at one of the Service academies where stone retaining walls, originally designed to appear as dry laid stone, are repaired using visible mortar. The lack of masons skilled enough to repair this type of stone wall has resulted in a negative impact on the character of the resource. Similar situations arise on the repair of plaster and stucco, slate and clay tile roofs, copper flashing, tuckpointing, and many other skills. The result appears to be a reduction in the overall quality of construction on both revitalization and new construction projects. This converts into increased maintenance cost.

## MAINTENANCE PRACTICES

Table 5, on the following page, illustrates the estimated maintenance cost implications of reactive maintenance vs. proactive maintenance on historic military family housing. In the past, a vast majority of maintenance practices affecting family housing have been reactive, i.e., repairing what is broken. Estimates of correcting current deficiencies in all military housing have been as high as \$30 billion, and would take 30-40 years to accomplish. Utilizing proactive maintenance practices would have avoided such deficiencies. Utilizing proactive maintenances now will avoid future deficiencies.



*Officers' Row, USNA*

# Effects of Maintenance Procedures on Building Life Expectancy & Life-Cycle Cost

Table 5

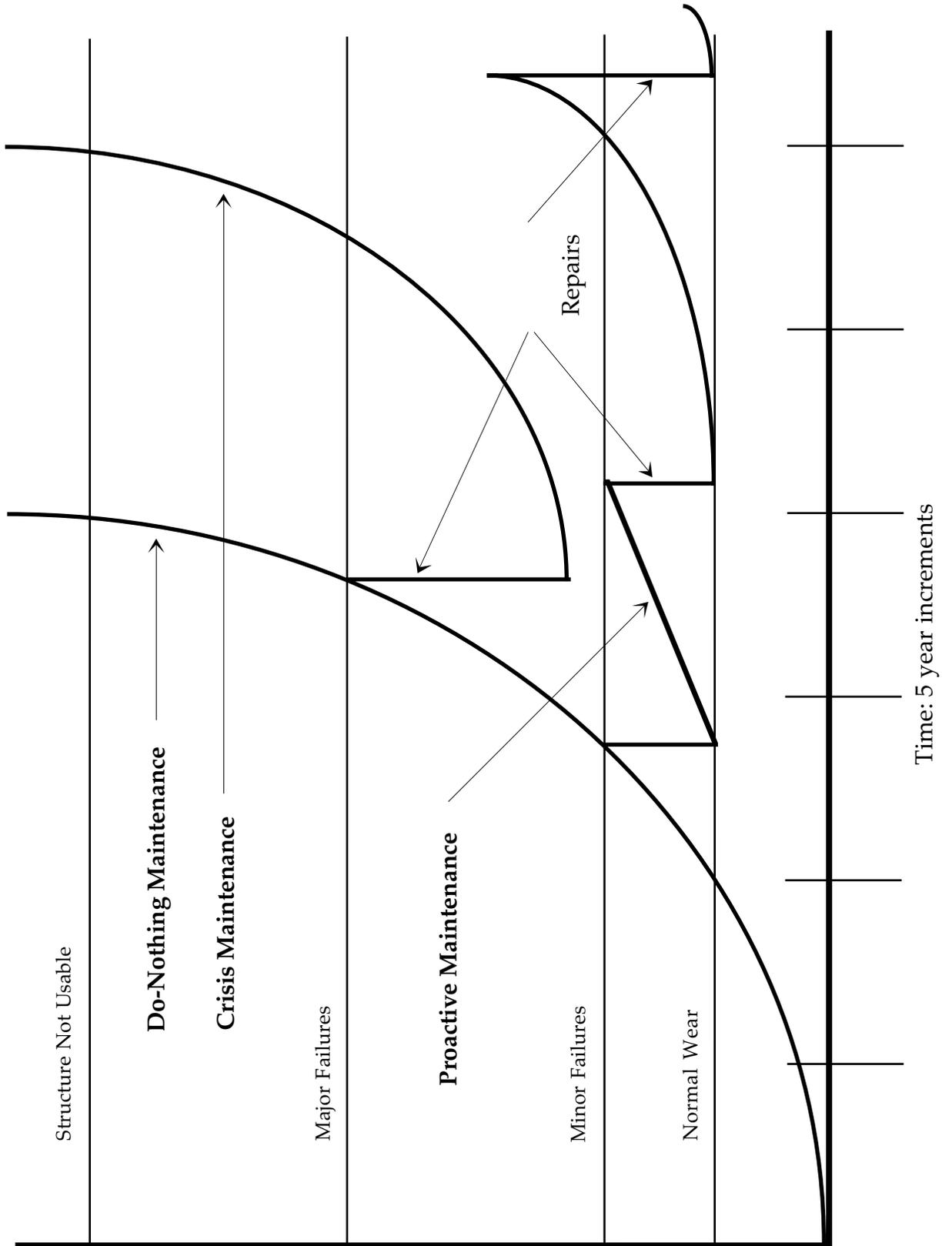


Illustration from "Proactive Maintenance Planning for Historic Buildings", USACERL Technical Report CRC-94/01, March 1994.

# V THE COST OF HISTORIC HOUSING VS NON-HISTORIC HOUSING

Although the costs and value of family housing units reported in this study were based on a limited number of units, at a limited number of installations, there is no evidence that these figures are inconsistent with what would be found at other installations throughout the military Services.

The survey asked for the original construction cost for both the selected historic family housing units, and the non-historic units. The dates of construction for the historic units ranged from 1841 to 1950, with a vast majority falling between 1925 and 1935. The non-historic units reported were constructed between 1957 and 1994, with a majority built between 1980 and 1990. The square footage of the individual units ranged widely for both historic and non-historic properties.

On average, the original construction cost per historic housing unit reported by the surveyed installations was \$16,254, or \$4.40 per square foot. The cost for non-historic units averaged \$41,051, or \$25.87 per square foot.

As would be expected, the earlier the construction date of the unit, the lower the initial cost. Currently, residential construction throughout the United States is averaging \$65.50 per square foot, not including land. (U.S. Census Bureau, “Characteristics of New Housing C-25A(98).”) The actual cost per square foot varies substantially depending on the region of the country, the particular State in which the work is being done, and specific site location. But, based on the national average, replacement of those buildings report on by the surveyed installations would be \$8,223,983, as opposed to the original investment of \$552,636. Even if the allowed square footage for residential units was used as a measure, the replacement cost would exceed 10 times the original cost of the buildings.

In addition to the original investment in construction, virtually all of the historic military housing units have been modified, repaired, and improved over the years. These expenditures, if used for durable items or construction, represent an additional investment by the government. Examples of these would be new kitchens and baths, new mechanical equipment, rewiring, reroofing, and additions. Non-durable items, such as paint, wall finishes, furnishings, and normal repair and maintenance costs would not be considered a measurable investment, but rather an ongoing operational expense.

The actual costs for durable items and construction on historic and non-historic housing units has not been available due to inconsistencies in recording and reporting techniques among the installations and Services. Accordingly, with such a limited sampling, it is not possible to accurately compare the rate of repair between historic and non-historic units. Based on preliminary figures, it appears that the high quality of design, construction material, and craftsmanship found in historic family housing units tends to minimize repair costs. The cost for major improvements, such as kitchen and bath upgrades, tends to be triggered by changes in style and user needs, rather than failure of the existing historic systems. Other improvements—rewiring, mechanical system upgrade, and roof repair—generally are a direct result of the age of the property. Newer, non-historic housing units will be subject to the same major repair requirements as they age, and as systems reach the end of their usable life.

	Historic	Non-Historic
Avg. Const. Cost	\$16,254.	\$41,051.
Cost/ sq. ft.	\$4.40	\$25.87
Total Orig. Cost	\$552,636.	\$1,067,328.
Replace Cost	\$8,223,983.	
Sq. ft. Cost	\$65.50	

Table 6—Replacement Cost Analysis

*Superintendent's Quarters, USMA, West Point, NY*



## VI

## RECOMMENDATIONS FOR REDUCING COSTS

Data gathered by the Services and through site surveys and interviews indicates that ongoing maintenance of historic family housing is, on a square foot basis, no more expensive than maintenance of non-historic units. Additional costs attributable to historic family housing that may contribute to excessive expenditures fall into five categories:

- design and treatment of the property;
- scheduling and coordination procedures;
- maintenance and repair procedures;
- material selection; and,
- contracting.

Historically, each of these categories have created, and continue to create, conditions that add cost to the maintenance and operation of historic family housing. Actions under these issues can be modified to reduce overall costs.

### RECOMMENDED

#### DESIGN & TREATMENT ALTERNATIVES:

◆ Costs can be reduced by providing installations and housing offices with concise, standardized policy and procedures for the treatment of historic family units. Currently, each installation and housing office treats housing units on basically an ad hoc basis. **Responsible installation personnel should be provided with criteria and guidance for decision-making that includes:**

- a clear threshold for determining if a property or building system should be retained or replaced, which takes into account both hard and soft criteria, such as rehabilitation cost and quality-of-life value;
- guidance for evaluating building deficiencies and determining appropriate levels of treatment and the order of work;

- guidance for the use of substitute materials and contemporary systems;
- standards for treatment that are understandable and relate directly to historic family housing;
- guidance for the measurement of risk to occupants from hazardous materials; and,
- guidance for the removal or encapsulation of hazardous materials.

◆ Costs can be reduced by providing installations, project designers, and contracting offices with construction specifications created specifically for use on historic properties. Currently, the Corps of Engineers standardized construction specifications are designed for use in new construction. Given the fact that a vast majority of construction activity at military installations deals with existing facilities, current Corps specifications cannot be used effectively. The Corps of Engineers, Seattle District, Center of Expertise for Preservation of Historic Structures and Buildings ([www.nws.usace.army.mil/tcx\\_psb/histpres.htm](http://www.nws.usace.army.mil/tcx_psb/histpres.htm)) has published a series of specifications for selected work on historic buildings. **It is recommended that a complete set of Corps construction specifications for rehabilitation be developed.** This would provide installations with needed guidance on treatment that would eliminate the costs added to projects through adaptation of inappropriate specifications after a project is under contract.

◆ Costs can be reduced by providing appropriate installation and contract personnel with training on the maintenance and treatment of historic properties. This will allow personnel to better participate in and monitor project development from design through construction. Such informed participation will provide greater assurance that smart decisions are made at the planning and design level, thus reducing costly changes in the review and construction phases of a project.

Such training should be made available to all personnel who have any decision making authority on the operation or maintenance of historic family housing, regardless of rank, grade, or department. Training opportunities should take advantage of courses offered by both the COE and non-military agencies and institutions, such as the National Park Service, National Preservation Institute, and many educational institutions.

◆ Costs can be reduced by ensuring that project designers are qualified to work on historic buildings. There are three ways in which inappropriate design adds cost to a project—a design that is either excessive, or that does not fully consider the attributes of the historic property; a design that is unacceptable to review authorities and must be changed; a design that does not work properly and must be changed during construction. Using qualified designers, either in-house or as contractors, can eliminate or greatly reduce add-on costs. **It is recommended that a system of pre-qualification of designers be instituted for all historic family housing work.**

#### SCHEDULING and COORDINATION PROCEDURES

One of the repeated concerns of installation personnel is that work on historic family housing must be reviewed by outside review agencies (State Historic Preservation Officer and Advisory Council on Historic Preservation), and that these reviews cause project delays, which result in added costs. There can be two opportunities for outside agencies to review historic family housing work: one is in determining if the property is historic; the second is in determining if the proposed treatment of the property is appropriate.

Ideally, the regulatory-required identification and evaluation of properties (Section 110 of the National Historic Preservation Act) on an installation has been completed, eliminating the first review process. In cases where it has not, an evaluation must occur prior to initiating work. This process can take time, cost more than necessary, and delay a project if it is not made part of the overall project schedule.

◆ Costs can be avoided if installation surveys of cultural resources are completed.

◆ Costs can be avoided if survey and evaluation requirements are incorporated into the project schedule.

◆ Costs can be avoided if the assessment of a qualified consultant and SHPO on whether a property meets the criteria for listing in the National Register of Historic Places is accepted. There are numerous instances where battle lines have been drawn between installation personnel and SHPO offices over the eligibility of properties that have unnecessarily delayed projects for months or years. Legislation places the authority for determining if a property contributes to America's history, or architectural, or cultural patrimony, in the hands of the Secretary of the Interior, as it places the responsibility of protecting America's patrimony with the Secretary of Defense. If a property clearly does not meet the criteria for listing, treat it as such, but, if there is a question of meeting the criteria, installations can avoid significant delays by accepting the determination of the SHPO, and moving on to determine how that property should be managed. Installation actions should focus on management of those resources.

**It is recommended that each installation complete its resource identification and evaluation process as the earliest possible opportunity, designating this as a "must fund" activity.**

The second outside review, to determine if the proposed work is appropriate, focuses on application of the Secretary of the Interior's Standards for the Treatment of Historic Properties, with Guidelines of the Preservation, Rehabilitation, Restoration & Reconstruction of Historic Buildings (U.S. Department of the Interior, National Park Service ISBN 0-16-048061-2.) If a project meets the Standards, its effect on the historic property will be accepted by the review agencies. If it does not, it will, generally, not be accepted.

◆ Cost can be avoided if project designers are directed to meet the Standards on all projects

involving historic family housing, including additions to historic buildings, and construction adjacent to historic properties. By following the Standards, redesigns and extensive administrative reviews can be avoided. **It is recommended that compliance with the Secretary of the Interior's "Standards" be established as "Policy" for all work carried out on historic family housing.**

◆ Costs could be reduced by decreasing the administrative burden of historic family housing projects. This can be done through development and implementation of either counterpart regulations for the agency, or a programmatic agreement for individual installations, or class of activities. Counterpart regulations, which are encouraged under the National Historic Preservation Act and its implementing regulations, 36 CFR 800, would effectively place decision-making on the treatment of historic properties at the agency level.

A programmatic agreement entered into by the installation or Service and State Historic Preservation Officer(s) could be customized to the installation or to the class of work being applied to historic family housing nationwide. In either case, the administrative burden associated with case-by-case project reviews by the SHPO's office would be eliminated, and both the authority and responsibility for decision-making would be vested with the installation. **Until such time that counterpart regulations are fully developed and implemented, each installation containing historic properties should develop and implement a Programmatic Agreement to address all potential work to be carried out on historic family housing units.**

#### RECOMMENDED MAINTENANCE and REPAIR PROCEDURES

Currently, evidence indicates that a vast majority of historic family housing maintenance activity takes place after a reported system failure. This work more appropriately, falls into the category of repair rather than maintenance. Generally, the cost of repairing a system will be greater than maintaining it in a condition that prevents failure.

◆ Costs can be reduced if maintenance of historic family housing units is carried out in a proactive, rather than a reactive manner. Site observations and interviews provide evidence that simple maintenance procedures carried out on a regular basis can prevent significant damage from taking place. An example of this is regular cleaning of gutters and rain water leaders (RWLs). Very often, if the gutters or RWLs are allowed to clog, water backup will infiltrate wood trim, soffits, siding, columns, and decks. The cost of repairing any one of these is significantly more than cleaning leaves and debris out of gutters. **Every installation should develop and implement a pro-active maintenance plan, and develop funding requests to ensure appropriate funds for such work. This plan should be incorporated into the installation Integrated Cultural Resource Management Plan.**

◆ Costs can be reduced if maintenance and repair is carried out using materials that are compatible with the existing historic fabric. The use of incompatible materials, such as galvanized nails in copper flashing, or aluminum gutters on a slate roof, can cause significant damage and reduce the usable life of a building system. From observations, it appears that very often repair activities are undertaken using either materials that are readily available, or materials that have been specified improperly. In either case, the result usually is increased maintenance, additional repairs, or costly replacement. **It is recommended that each installation undertake a survey of its historic family housing inventory to identify historic building materials, and, based on that inventory, acquire appropriate specifications for the repair and replacement of that material or building system.**

◆ Cost can be reduced if only necessary repair work is undertaken. There are numerous instances where "necessary repair" projects have been expanded to include "while we are at it" work. This work expansion is based on the assumption that the remaining similar material or building system will also fail soon, and that it would be cheaper to do all the work at once, rather than bringing the contractor back a second time.

Both assumptions may be correct, but economic use of building fabric, as cited by the Secretary of the Interior's Standards, requires preservation of as much of the original fabric as possible, for as long as possible. Also, the deteriorated material or fabric may be a result of a condition, such as a leaking gutter, that is unique to a specific property, making replacement on other properties unnecessary. **An objective analysis of building systems and materials should be undertaken prior to any decision to expand repair, revitalization, of replacement work.**

◆ Costs can be reduced on each historic family housing unit, and the overall family housing program, if the Services develop and uniformly apply a realistic and consistent method of risk assessment and a treatment policy for asbestos and lead-based paint. Site interviews revealed that the type of treatment of hazardous materials ranges widely by installation, from simple encapsulation to total removal of building material. This appears to result from varying interpretations of Service policy, and concerns over personal or installation liability. Application of a uniform method of assessing risk based on anticipated unit demography and building condition would greatly reduce the amount of funds expended on this effort. In addition, clear and uniform policy and guidance should be provided to installation housing officers, contract officers, project managers, and maintenance personnel on alternative methods of treating historic buildings and building fabric when hazardous materials are present. **It is recommended that Service-wide risk assessment standards, and guidelines for those standards be developed and implemented at all installations containing historic family housing. And, that a clear treatment policy and guidelines for hazardous material remediation be developed for application on historic family housing.**

## MATERIAL SELECTION

A critical issue affecting the cost of maintaining historic properties is the material that is used in the rehabilitation (revitalization), or

replacement process. For historic family housing units that are pre-WWII, the materials used in original construction were generally of a consistent high quality. The woods used in finishes, trim, decorative features, windows, and doors, were either hardwoods, or very high quality pine. Roofing materials were slate, clay tile, or metal—all designed and installed to last forever. Construction of these units assumed permanent ownership and occupancy by the military. Accordingly, the Quartermaster and the Corps of Engineers demanded and received material and workmanship of highest quality. This is evidenced by the current, consistent good condition of the historic units. For the most part, the systems that were installed 70+ years ago continue to function as originally designed, with minimal maintenance and failure.

On the other hand, materials of lesser quality than the original proved to be higher in short- and long-term costs. An example of this was found at an Air Force installation where historic (1935) double-hung wood windows were being replaced with new double-glazed aluminum windows. The historic windows were constructed of red oak, with true divided panes of glass. The shortcomings of the windows were identified as:

- a) not energy efficient because they were single glazed, and leaked air;
- b) difficult to maintain because they had to be painted on a regular basis; and,
- c) difficult to operate because the sash weight cords would break.

The assumed advantages of the replacement windows were:

- a) energy efficient double glazing;
- b) easy to maintain because painting is unnecessary; and,
- c) easy to operate because of the spring-loaded sash counterbalance system.

After installation and use of the new windows in a number of housing units it was found that:

- a) the energy savings was imperceptible, but the new windows provided more comfort to the occupants because they eliminated air infiltration;

b) the units did not require painting but the seals on the glazed units would fail, requiring replacement of the entire glazed unit, and the exterior caulking of the units required continued maintenance; and,

c) the spring-loaded counterbalance systems would require replacement on a regular and frequent basis.

The net benefit appeared to be the reduction in the required painting of the window units, and the elimination of air infiltration. Both of these benefits were achievable through the use of quality exterior paint (currently available with a 15-20 year warranty), and retrofitting the historic windows with weather-stripping. The sash cord breakage appears to occur every 30-40 years, which does not appear to be a major factor in the question of changing materials.

Using the right quality paint, applying it properly, and installing weather-stripping would have saved the cost of engineering the new window unit project, the removal and disposal of the historic windows, the installation of the new windows, and the regular maintenance costs associated with replacement of double-glazed glass units and caulking. Plus, it would have preserved the historic integrity and value of the housing unit.

Generally, replacement materials being used on historic properties are of a lesser quality than that use in the pre-WWII housing units. In addition, the design and workmanship found in a majority of projects that involve replacement of historic materials lacks the craftsmanship quality of the original. An example of this is the extensive use of caulking as a waterproofing material. As originally used, caulking was primarily to prevent air infiltration. The design of the material and the method of its installation prevented moisture penetration. Current projects rely on caulking to seal joints directly exposed to moisture. When exposed to sunlight and the elements, caulking will dry out, and/or pull away from the connecting materials, allowing moisture to penetrate. This process can take as little as 6 months to a year.

Similar examples were found at other installations related to the substitution of historic roofing materials with low cost composition

shingles, and wood siding with aluminum or vinyl siding. In instances where repair or replacement of the historic material was necessary, and matching material was used, such as the repair of clay tile roofs at Ft. Lewis, WA, the long-term maintenance for the new work is proving to be as cost efficient as the original construction.

- ◆ Costs can be reduced by retaining as much original building fabric as possible during rehabilitation (revitalization) work;

- ◆ Costs can be saved by matching quality historic building material and workmanship, or if matching material is not possible, ensuring that replacement material is of equal or higher quality;

- ◆ Costs can be reduced by ensuring that work is only undertaken after a life-cycle cost analysis has been undertaken and the results of the analysis is that the work will result in a net savings to the government.

**It is recommended that, prior to final materials or systems selection, an objective, life-cycle cost analysis be undertaken, and that the materials and systems most economically beneficial to the government be selected for use on historic family housing projects.**



*Typical historic family housing unit at Randolph AFB, San Antonio, Texas*

## CONTRACTING

The goal of any installation command is to maintain the historic family housing units under its jurisdiction in the most cost effective manner possible, while meeting user needs and regulatory requirements. To accomplish this goal, it is necessary to have all offices and individuals involved in facilities management work together. This effort includes ensuring that appropriate contractors are selected at all phases of the work, and that approved plans and specifications are adhered to during execution of a project.

◆ Costs can be saved by providing contracting officers with training appropriate to their participation in the management of historic family housing. This training should provide contract personnel with the following:

- a clear understanding of the use of appropriate materials and building systems;
- a clear understanding of the methods of selecting qualified contractors for all phases of work; and,
- a clear understanding of alternative contracting methods to enable contract officers to select contractors most qualified for the project, rather than assuming that Indefinite Quantity Contract (IQC) or Job Order Contract (JOC) contractors, or SABER must be used.

**See recommendations for training under Recommended Design & Treatment Alternatives.**

◆ Costs can be saved by using pre-qualification screening for design and construction contractors. This would result in more efficient, uniform, and cost effective work.

**See recommendations for training under Recommended Design & Treatment Alternatives.**

◆ Costs can be reduced by taking positive steps to ensure that approved construction drawings and specifications are followed by contractors. This would reduce instances where inferior materials or incorrect applications are applied to historic

family housing units, which often result in reduced life of materials, and damage and deterioration of historic materials that, eventually, must be corrected.

**To accomplish this goal, it is recommended that project managers and contract officers be provided with the following tools:**

- guidance and training on correct construction techniques to be used on historic buildings; and,
- the authority to inspect construction activities and take appropriate administrative action to ensure compliance with contract documents.

## VII

## CONCLUSIONS

The conclusions reached through this study are based on three elements—documentation from previous studies on selected aspects of building maintenance; data obtained from site surveys and interviews with housing personnel, Service representatives, and others; and, observation made at installations.

- The cost of maintaining historic military family housing can be reduced over current expenditures through a number of administrative and treatment actions.
- Historic family housing represents a significant monetary and historic investment that continues to have value as a usable resource, and as a reflection of both the architectural and historic evolution and diversity found in the United States.
- Historic family housing units represent a better value to the military than family housing constructed after 1950. *Overall workmanship and quality of materials has allowed historic family housing to meet mission needs with minimum expenditure well beyond the accepted life-cycle of currently constructed housing units.*
- Although historic family housing represents a small percentage of the current housing within the jurisdiction of the Services, where they exist, these units are generally at the physical and command center of the installation, representing and helping to maintain a central command presence and authority essential to order. *This situation can be seen at all of the Service Academies, and at most major installations. The highest ranking officers occupy these very visible properties, providing a identifiable command presence to uniformed personnel*
- Historic family housing is often a primary element in establishing a satisfying quality-of-life at an installation, creating a pleasant physical environment for military personnel, dependents, and visitors.
- *In a general era of “new is better”, and a military cultural that focuses on acquiring the “latest*

*and most modern” tools to accomplish their task, historic family housing is an enigma. At installations where they exist, historic family housing is traditionally occupied by the highest ranking officers, at their choice. In most situations, access to these properties is tightly associated with rank and seniority, and is considered by many uniformed personnel and their dependents as a benefit.*

- Historic family housing units, in general, contain more square footage than currently recommended for military personnel. *This difference varies depending on the installation. There are cases, however, where historic family housing units fall below allotted square footage and/or room size standards.*

- Past maintenance practices carried out on historic family housing have often contributed to deterioration of building systems and diminished the ability of quarters to meet mission needs.

- As a general rule, the Services assume that the cost of undertaking work on a historic housing unit is 50% higher than on a non-historic unit. *This contingency is automatically added to Army installation funding requests, and is over and above any contingency placed on the project at the installation or command levels.*

The Military Services maintain thousands of units of family housing through out the United States. Approximately 2% of those units are in buildings identified as historic, and which may receive some level of consideration because of that designation. The age of the units varies greatly, from buildings constructed in the early part of the 19th century to the 1940s. The condition of these properties varies also, from poor to excellent.

Based on existing data, and that obtained from site surveys, it appears that there are a number of factors affecting the cost of maintaining historic family housing. Some of the factors can be addressed at the headquarters level, and some at the Activity, MAJCOM, and MACOM levels. Most, however, are installation issues. These include:

- the cost of maintaining historic family housing on a square foot basis is effectively equal to the cost of maintaining non-historic family housing units;
- the cost of improving historic family housing units to meet current livability and operational standards averages 3% to 16% less than comparable new construction;
- the presence, or lack of a pro-active maintenance program at the installation; *if maintenance has been based on reactive needs, systems are allowed to fail before work is undertaken. This results in maintenance personnel and programs always being behind the curve, excessive cost, redundant work, and displaced personnel.*
- past maintenance practices; *if maintenance has been deferred for an extended period of time (more than 3 years), there usually are significant amounts of remedial work that must be carried out to stabilize the building condition.*
- the condition of the property; *the cost of operating and maintaining a deteriorated property is more expensive than operating and maintaining a property in good or better condition.*
- status and use of the property; *generally speaking, General and Flag officer's quarters demand a higher level of maintenance than units of lesser status. This can be attributed to a number of justifiable factors, including public access.*
- the method of providing maintenance; *installation staff vs. contractor; maintenance carried out by permanent installation staff appears to be less costly and more affective than that undertaken through job order contracts (JOC) or other contract methods.*

## COST ISSUES

If the square foot cost of maintaining historic family housing units is about equal to that of non-historic units, the "excessive" cost identified in the Marsh Report can be attributed primarily to five factors.

1. **The size of historic family housing units.** The lower grade units are generally equal to current square foot allocations for uniformed personnel. The higher grade units generally exceed the allowed square footage, and, in many instances, substantially.
2. A majority of historic family housing units contain **lead-based paint**. The quantity and condition of this paint varies considerably, as does the cost of removing or encapsulating the material.
3. **Deferred maintenance** on housing has been a long-identified problem. The cost of repairing facilities exceeds the cost of maintaining them in good, functioning condition.
4. The automatic **application of significant levels of contingency** into work budget estimates for work on historic family housing units.
5. **Superfluous work carried out at the behest of incoming personnel.** (This situation occurs in senior officers' quarters).

## VIII

## GLOSSARY

The following are commonly used terms in the fields associated with cultural resource conservation and preservation.

**Adaptive Use.** The process of adapting a historic building to meet the functional requirements of a use other than that for which it was designed.

**Adverse Effect.** A project, activity, or other undertaking has an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

**Advisory Council on Historic Preservation (ACHP).** An independent Federal agency, established by the National Historic Preservation Act of 1966 (NHPA), to advise the President and Congress on historic preservation matters and to administer the protective process established under Section 106 of the NHPA.

**Area of Potential Effects (APE).** The geographic area or areas within which an undertaking may cause changes in the character or use of historic properties, if any such properties exist.

**Assessment of Effect.** A process to determine whether an undertaking may affect in any way the qualities of a property that make it eligible for the National Register of Historic Places. The assessment is made by the federal agency in consultation with the State Historic Preservation Officer (SHPO).

**Building.** A construction intended to shelter any form of human activity.

**BRAC.** Base Realignment and Closure.

**Conservation.** The protection, improvement, and use of cultural resources according to principles that will support the federal agency mission and provide optimum public benefits.

**Consultation.** A process initiated by the federal agency wherein the agency confers with the SHPO to seek ways to reduce or avoid adverse effects on historic properties. The ACHP and certain interested persons may participate as consulting parties.

**Context.** Contexts or "historic contexts" are those patterns, themes, trends, or cultural affiliations in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within prehistory or history is made clear.

**Cultural Resource.** The definition of cultural resource can be fluid, changing with social attitudes and new discoveries. Properties that may not have been considered significant just a few years ago, such as relics of the Cold War, assume new meaning in the shadow of historic events. Other resources may be recently recognized as important symbols to other cultures, such as Native American religious sites. Accordingly, the definition of cultural resources must be broad and inclusive, allowing for different interests and interpretations.

As defined in DoDI 4715.3, cultural resources are: Buildings, structures, sites, districts, and objects eligible for or included in the National Register of Historic Places; "cultural items" as defined in 25 U.S.C. 3001 (reference (u)); American Indian, Eskimo, Aleut, or Native Hawaiian sacred sites for which access is protected under 42 U.S.C. 1966 (reference (d)); "archeological resources" as defined by Section 470 aa-11 of 16 U.S.C. (reference (h)); and "archeological artifact collections and associated records" defined under 36 CFR 79 (reference (e).)

**Determination of Eligibility.** A process to determine if a property is eligible for listing on the National Register of Historic Places. Ten- to 45-day determinations may be rendered so that project

and program decisions may proceed quickly. If a property is determined eligible, it is treated as if it were on the National Register pending completion of the nomination procedure.

**District.** A district is a geographically definable urban or rural area possessing a significant concentration, linkage, or continuity of sites, buildings, structures, elements, landscapes, or objects united by past or present events, or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.

**Effect.** A project, activity, or other undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that qualify it for inclusion in the National Register of Historic Places. For the purpose of determining effect, alteration to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered.

**Embodied Energy.** The total amount of energy invested in manufacturing, delivering, and placing building materials in the construction of a building or structure.

**Environment.** The aggregate of social, cultural, biological and geophysical conditions that influence the life or condition of a resource, community, people or lifeway.

**Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER).** A division of the National Park Service, Department of Interior, responsible for documenting the history of building and works of engineering in America.

**Integrated Cultural Resource Management Plan (ICRMP).** A document, either written or electronic, designed to provide users with guidance on the preservation, management, and use of cultural resources on a particular military installation in ways that are economically and socially responsible.

**Inventory.** Inventories are conducted to determine the location of cultural resources that may have national, State, or local significance.

**Landscape (Designed).** A parcel of land deliberately shaped or otherwise modified in accordance with a plan or design.

**Memorandum of Agreement (MOA).** An agreement among an agency, the ACHP, and the SHPO that specifies how the agency will manage an activity or historic property so as to ensure historic preservation. It typically identifies legal requirements, responsibilities, historic features to be protected, agreed-on protection measures, and coordinating mechanisms.

**Mitigation.** Action(s) taken to lessen the adverse effect of an undertaking on historic properties or to offset that adverse effect.

**National Historic Landmark (NHL).** Districts, sites, buildings, structures, or objects that have been determined by the Secretary of the Interior to be nationally significant in American history. Such properties are also included on the National Register of Historic Places.

**National Historic Preservation Act, as amended, (16 USC 470) (NHPA).** Initially passed in 1966, the NHPA established a national policy for the preservation and treatment of historic properties. The NHPA set forth the following findings and policy:

“Section 1

- (1) the spirit and direction of the Nation are founded upon and reflected in its historic heritage;
- (2) the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;
- (3) historic properties significant to the Nation's heritage are being lost or substantially altered, often inadvertently, with increasing frequency;

(4) the preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans;

(5) in the face of ever-increasing extensions of urban centers, highways, and residential, commercial, and industrial developments, the present governmental and nongovernmental historic preservation programs and activities are inadequate to insure future generations a genuine opportunity to appreciate and enjoy the rich heritage of our Nation;

(6) the increased knowledge of our historic resources, the establishment of better means of identifying and administering them, and the encouragement of their preservation will improve the planning and execution of federal and federally assisted projects and will assist economic growth and development; and

(7) although the major burdens of historic preservation have been borne and major efforts initiated by private agencies and individuals, and both should continue to play a vital role, it is nevertheless necessary and appropriate for the Federal Government to accelerate its historic preservation programs and activities, to give maximum encouragement to agencies and individuals undertaking preservation by private means, and to assist State and local governments and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

## Section 2

It shall be the policy of the Federal Government, in cooperation with other nations and in partnership with the States, local governments, Indian tribes, and private organizations and individuals to—

(1) use measures, including financial and technical assistance, to foster conditions under which our modern society and our prehistoric and historic resources can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations;

(2) provide leadership in the preservation of the prehistoric and historic resources of the United States and of the international community of nations and in the administration of the national preservation program in partnership with States, Indian tribes, Native Hawaiians, and local governments;

(3) administer federally owned, administered, or controlled prehistoric and historic resources in a spirit of stewardship for the inspiration and benefit of present and future generations;

(4) contribute to the preservation of nonfederally owned prehistoric and historic resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;

(5) encourage the public and private preservation and utilization of all usable elements of the Nation's historic built environment; and

(6) assist State and local governments, Indian tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

**National Register of Historic Places.** An inventory of districts, sites, buildings, structures, and objects significant in American history, architecture, engineering, archeology, landscaping, and culture, and evaluated as significant at the national, State, or local level. Depending on their significant characteristics, properties must possess integrity of location, design, setting, materials, workmanship, feeling, and association.

**Object.** A material artifact of functional, aesthetic, cultural, historical, or scientific value that may be, by nature or design, movable yet related to a specific setting or environment.

**Preservation.** The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property.

**Programmatic Agreement.** A document similar to an MOA, but used when a program or classes of undertakings are repetitive in character or similar

in affect. A programmatic agreement enables an agency to obtain the benefit of consulting the ACHP while making it unnecessary to refer individual actions to the ACHP for comment as long as they are conducted according to the agreement. The agreement satisfies requirements of Section 106 of the National Historic Preservation Act of 1966.

**Reconstruction.** The act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

**Rehabilitation.** The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions of features which convey its historical, cultural, or architectural values.

**Responsible Official.** The official with command authority who is responsible for authorizing a project or action and for ensuring that it is conducted according to applicable laws and directives.

**Restoration.** The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.

**Section 106.** The section of the National Historic Preservation Act that directs federal agencies, prior to the approval of the expenditure of any federal funds on an undertaking or prior to the issuance of any license, to take into account the effect of the undertaking on any cultural resource that is included in or eligible for inclusion in the National Register. As part of that process, the agency is also directed to afford the ACHP with a reasonable opportunity to comment with regard to such undertaking. Regulations promulgated by the ACHP under their rulemaking authority (16 U.S.C. 470s) to implement Section 106 may be found in 36 CFR Part 800.

**Section 110.** The section of the National Historic Preservation Act that, among other things, directs federal agencies to:

- Assume responsibility for the preservation of historic properties which are owned or controlled by the agency; and
- Consistent with the agency's mission and mandates, carry out agency programs and projects in accordance with the purposes of the National Historic Preservation Act, and give consideration to programs and projects which will further the purposes of the National Historic Preservation Act.

**Significant (Effect).** In analyzing impacts of a development project or other potentially detrimental activity on historic properties, significant impacts are those that are judged to have an adverse effect.

**Significant (Resource).** Essential to understanding the meaning of some larger element, e.g., the significance of a single building to a historic theme, or the significance of a single species of plant life to a community.

**Site.** The location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure.

**Structure.** A construction intended for some purpose other than to shelter human activity.

## *IX*

## *SOURCES*

Air Force Instruction 32-1052 Facility Asbestos Management, 22 March 1994.

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