

**GAO**

Report to the Chairman, Subcommittee  
on Military Installations and Facilities,  
Committee on National Security,  
House of Representatives

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May 1997

**DEFENSE  
INFRASTRUCTURE**

**Demolition of  
Unneeded Buildings  
Can Help Avoid  
Operating Costs**



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**National Security and  
International Affairs Division**

B-276460

May 13, 1997

The Honorable Joel Hefley  
Chairman, Subcommittee on Military Installations  
and Facilities  
Committee on National Security  
House of Representatives

Dear Mr. Chairman:

This report responds to your request that we examine selected aspects of the services' management of facilities infrastructure and their use of demolition as an approach to reducing excess facilities and avoiding unnecessary operating costs. This report addresses (1) the services' funding obligations for maintenance and repair over the last 10 years, changes in building square footage in space to be maintained, and the impact of the changes on facility maintenance and repair; (2) the potential for demolition to reduce excess facilities infrastructure and avoid recurring costs; (3) the services' plans for demolition; and (4) their overall infrastructure management strategies.

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**Background**

Since the mid-1980s, the Department of Defense (DOD) has undergone significant reductions in its budget, personnel, force structure, and basing infrastructure. From fiscal years 1987 to 1996, DOD's overall budget was reduced in real terms by 31 percent. By fiscal year 1996, active military and civilian personnel were reduced by 32 and 26 percent, respectively. During the same period, there were significant reductions in the stationing of U.S. forces overseas and increased reliance on power projection of forces from bases in the United States. In addition, DOD and the services completed four rounds of domestic base realignment and closure (BRAC) actions between 1988 and 1995 that, when fully implemented, were expected to reduce the number of major domestic bases by approximately 21 percent by 2001.

Despite reductions in DOD's basing infrastructure, various DOD and service officials have continued to indicate that they still have excess, aging facilities and insufficient funding to maintain, repair, and update them. At the same time, other DOD officials are looking for reductions in infrastructure costs to free up funding for weapon system modernization.

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## Results in Brief

Over the past 10 years, the reduction in the number of DOD facilities worldwide, as measured by square footage of space, was only about 10 percent. This amount is much less than expected, considering the amount of budget reductions and the execution of four base realignment and closure rounds since 1988. However, funding by the services for real property maintenance during the same time period decreased almost 40 percent.<sup>1</sup> As a result, installations have growing backlogs of deferred maintenance and repair projects.

DOD and the services do not currently have complete, reliable information on the costs associated with either maintaining their current facilities infrastructure or with infrastructure reduction options. Such information will be needed to develop a departmentwide strategic plan that considers difficult infrastructure options to meet requirements of the Government Performance and Results Act.<sup>2</sup> It will also be critical to meet the requirements for more complete disclosure of the costs, associated with facilities' deferred maintenance and demolition in financial statements, called for by the Chief Financial Officers Act of 1990.

Each of the services is recognizing the importance of demolition as an option for eliminating old, excess buildings that are relatively costly to maintain and a drain on declining operation and maintenance funding. The Army has given the greatest emphasis to demolition in recent years, demolishing about 39 million square feet of space since 1992. Demolition offers a viable option for further infrastructure reductions and millions of dollars in savings, but it requires an up-front cost. In fiscal year 1997, the services plan to spend about \$50 million of operation and maintenance funds to demolish excess space. Data related to previous demolition projects suggests that demolition costs can be recouped within a few years, thereafter avoiding millions of dollars in recurring maintenance and repair costs and utility costs. However, future demolition costs are expected to rise as the services move beyond demolition of simple World War II-era wooden structures to other structures in which environmental factors, such as asbestos and lead paint removal, will likely play an increasing role.

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<sup>1</sup>This report focuses on operation and maintenance (O&M) funding for real property maintenance, the principal source of such funding. It also focuses on facilities infrastructure, excluding family housing.

<sup>2</sup>The Government Performance and Results Act (P.L. 103-62) requires federal agencies to develop agencywide strategic plans. The plans must describe how an agency intends to achieve its goals through its activities and its human, capital, information, and other resources, such as facilities. Agencies must also prepare annual performance plans that include measurable performance goals and indicators for measuring performance.

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The services differ in the extent to which they have developed formal demolition programs. The Army uses the greatest amount of funding for demolition and is planning the most aggressive demolition program. Conversely, the Air Force has the least centralized program and relies on installation commanders to identify and fund demolition efforts. Although requiring specific funding for demolition could strengthen program emphasis and management and ensure that demolition occurs, it could also limit the services' flexibility to shift funds within their own operation and maintenance accounts to meet the most pressing operational needs. Most service officials do not want to require funding to be used exclusively for demolition but would rather continue to use operation and maintenance funding specifically for demolition as they deem necessary.

Overall strategic plans for maintenance and repair of facilities infrastructure at the service headquarters and Office of Secretary of Defense levels appeared to be limited. The plans lacked comprehensive strategies for facilities revitalization, replacement, and maintenance tied to measurable goals, specific time frames, and expected funding.

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## Faster Reductions in Funding Than in Space to Be Maintained

In the past 10 years, maintenance and repair obligations for facilities, excluding family housing, have fallen faster than the square footage of space maintained by the services. Various DOD and service officials are concerned about the impact of declining budgets on infrastructure condition.

The O&M appropriation account provides the principal source of funds the services use to pay for day-to-day activities at the installations and bases, including maintenance and repair of most facilities.<sup>3</sup> From fiscal years 1987 to 1996, total O&M annual budget authority declined 25 percent in real terms, reflecting the overall decline in defense spending.<sup>4</sup> However, annual O&M obligations for facilities maintenance and repair, excluding family housing, declined 38 percent in real terms during the same period—a

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<sup>3</sup>Maintenance and repair activities can be funded from different sources. Thus, because of difficulties in combining all funding sources for maintenance and repair to make meaningful comparisons with other infrastructure data, this report focuses principally on O&M funding and other comparable infrastructure data for analyses.

<sup>4</sup>This report focuses on obligations rather than budget requests or appropriations because obligations provide an accounting of how funds are used for maintenance and repair activities. In addition, although information on actual expenditures and costs would be preferable over obligations, DOD has acknowledged that its inability to accumulate accurate and complete cost information is a departmentwide problem.

much steeper decline than that for total O&M obligations.<sup>5</sup> Table 1 shows changes in obligations for each service between fiscal years 1987 and 1996 (in fiscal year 1997 dollars).<sup>6</sup>

**Table 1: Percent Change in O&M Obligations for Maintenance and Repair Between Fiscal Years 1987 and 1996**

Fiscal year 1997 dollars in millions			
Service	FY 1987	FY 1996	Percent change
Army	\$2537.4	\$1,288.4	-49
Air Force	2,764.9	1,709.7	-38
Navy	1,404.3	1,014.8	-28
Marine Corps	451.8	440.1 <sup>a</sup>	-3
<b>Total</b>	<b>\$7,158.4</b>	<b>\$4,453.0</b>	<b>-38</b>

<sup>a</sup>The Marine Corps' fiscal year 1996 obligations are actually much higher than the previous year due to a one-time increase of about \$100 million for maintenance and repair that year. In fiscal year 1995, the Corps' obligations for maintenance and repair were about \$294 million. Over the 10-year period, the Corps' obligations for maintenance and repair peaked in fiscal year 1988 and did not approach that level again until fiscal year 1996.

Source: Our analysis of service data.

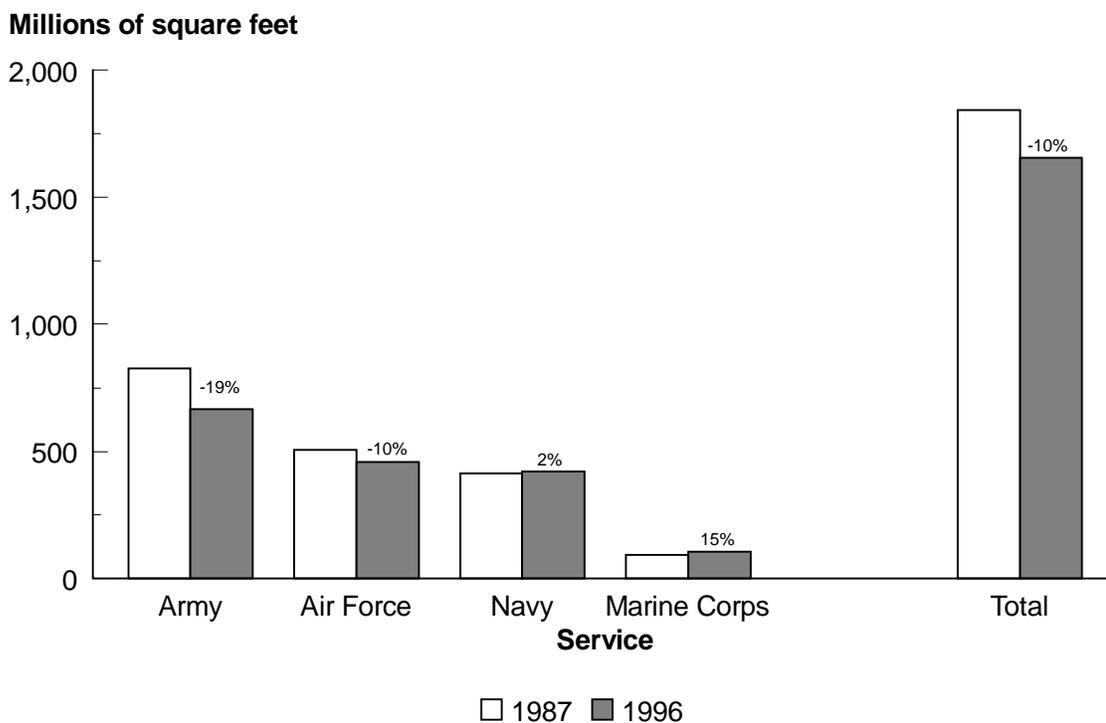
Although servicewide maintenance and repair obligations fell about 38 percent between fiscal years 1987 and 1996, reductions in square feet of space owned and managed by the services in the United States and overseas were much less—about 10 percent.<sup>7</sup> Figure 1 shows the percent change in facilities square footage by service during that time.

<sup>5</sup>Available budget data indicates that further reductions in funding of maintenance and repair are planned in most services for fiscal years 1998 and 1999. Although budget projections for future years show an upward trend in funding after 1999, many service officials questioned whether this trend was likely to occur.

<sup>6</sup>Maintenance and repair obligations include spending for facilities measured in square feet and other types of infrastructure, such as runways, that are measured using different metrics. The services were unable to break out obligations by type of measurement but told us that the majority of maintenance and repair obligations were for facilities measured in square feet.

<sup>7</sup>This figure excludes property for which title is held by the services but used by defense agencies and others.

**Figure 1: Percent Change in Facilities Square Footage Between Fiscal Years 1987 and 1996**



Source: Our analysis of service data.

The types of facilities and the relative percentage of subcategories did not change significantly between fiscal years 1987 and 1995.<sup>8</sup> For example, the Army's administration buildings comprised about 6 percent of its total square footage in fiscal year 1987 and accounted for about 8 percent of the total in fiscal year 1995. Other types of facilities managed by the services include training, utilities, troop housing, shipyard maintenance, and communication facilities.

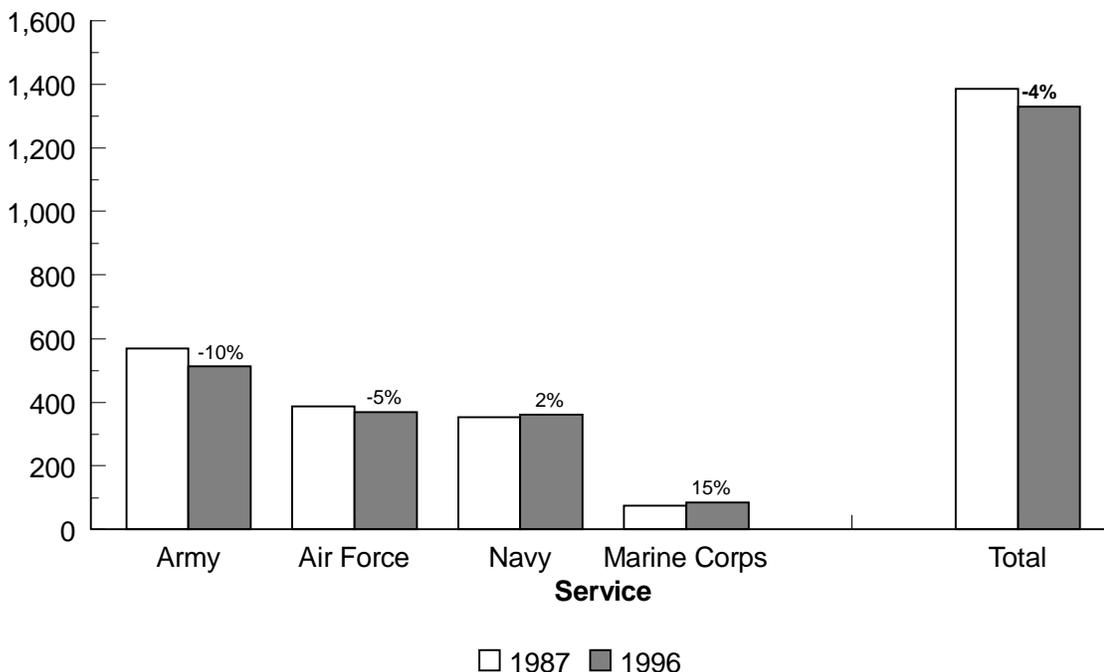
Although combined U.S. and overseas facilities space managed by the services fell about 10 percent between fiscal years 1987 and 1996, the percentage change in the continental United States (CONUS) facilities was

<sup>8</sup>The services were not able to provide this breakout for fiscal year 1996 in time for our review.

much smaller—4 percent. Figure 2 shows the percent change in square footage for CONUS facilities.

Figure 2: Percent Change in Square Footage for CONUS Facilities Between Fiscal Years 1987 and 1996

Millions of square feet



Source: Our analysis of service data.

One factor limiting the reduction in square footage to date is facilities yet to close under the BRAC process.<sup>9</sup> Although some BRAC actions call for the closure of a base, others call for portions of the land and facilities of a base slated for closure to be transferred to an adjacent base. BRAC closures are often predicated on construction of new facilities at another base slated to receive missions from a closing base. Further, quality-of-life initiatives, such as new and renovated barracks and family housing and

<sup>9</sup>Although four rounds of BRAC were held between 1988 and 1995, BRAC legislation provides up to 6 years to close facilities; thus, some BRAC closures may not occur until closer to 2001.

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new child care centers, have added square footage requirements. These initiatives will likely continue to add square footage for a number of years.

According to the services, square footage will likely decline about an additional 144 million square feet between fiscal years 1997 and 2001 due to remaining BRAC actions.<sup>10</sup> DOD officials estimated that the four BRAC rounds would result in about a 21-percent reduction in the plant replacement value for domestic bases.<sup>11</sup> Although square footage reductions have been limited, even with the results of four BRAC rounds, DOD still projects that it will realize significant recurring dollar savings from the BRAC process—the largest portion of which are associated with reductions in personnel and base operating costs.

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## Adequacy of Funding Is a Growing Concern

Absolute standards for funding maintenance and repair activities do not exist. However, recommendations of two study groups in recent years offer some perspective on DOD's current level of funding. DOD's 1989 report to the Congress recommended that the services annually budget a minimum of 1.75 percent of the plant replacement value for maintenance and repair, excluding backlogs.<sup>12</sup>

A 1990 report from the Building Research Board recommended that federal agencies, including DOD, budget about 2 to 4 percent of the plant replacement value for maintenance and repair.<sup>13</sup> The report also suggests that an even higher level of funding would be required to address maintenance and repair backlogs. Since 1990, the report has been widely quoted, but according to a Federal Facilities Council official, many federal

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<sup>10</sup>This figure also includes reductions in family housing, which we were unable to break out separately for the Army and the Air Force. If these reductions occur, then the CONUS facilities reductions would increase to 14 percent. However, even that amount is not likely because of increases in square footage in future years not related to BRAC, but we were unable to obtain data on precise amounts for such increases.

<sup>11</sup>Plant replacement value is defined as the cost to replace current facilities using today's construction costs and standards.

<sup>12</sup>Renewing the Built Environment, Department of Defense, March 1989. This study, sponsored by the Office of the Secretary of Defense (OSD), found that differences exist in how the services calculate plant replacement value. A triservice study team reviewing plant replacement value in 1994 recommended that OSD hire a contractor to review all of the services' databases, assign uniform facility category codes, and establish a standard unit of measurement. OSD did not hire a contractor because of the cost. Therefore, the plant replacement values presented here can provide a useful frame of reference, but they should not be considered absolute.

<sup>13</sup>Committing to the Cost of Ownership, Building Research Board, National Research Council, 1990. The study was requested by the Federal Facilities Council, which operates under the auspices of the Board on Infrastructure and the Constructed Environment of the National Research Council. The council is the operating arm of the Academy of Engineering and the National Academy of Sciences.

agencies have not been able to use it because it is too general. In 1996, the Federal Facilities Council initiated a study to develop more specific guidelines. According to a council official, the study should be completed by January 1998.

In contrast with these recommended funding levels, the services' obligations for maintenance and repair activities in fiscal year 1996 equaled 1.3 percent of the applicable plant replacement value. Table 2 indicates the level of maintenance and repair funding as a percentage of plant replacement value.

**Table 2: O&M-Funded Maintenance and Repair as a Percent of Plant Replacement Value in Fiscal Year 1996**

Fiscal year 1996 dollars in millions			
Service	Facilities plant replacement value	Maintenance and repair obligations	Percent of plant replacement value
Army	\$134,409	\$1,257	0.9
Air Force	113,940	1,668	1.5
Navy	59,900	990	1.6
Marine Corps	25,760	429 <sup>a</sup>	1.7 <sup>a</sup>
<b>Total</b>	<b>\$334,009</b>	<b>\$4,344</b>	<b>1.3</b>

<sup>a</sup>The Marine Corps experienced a one-time increase of about \$100 million for maintenance and repair in 1996. Without this increase, the percent of plant replacement value represented by maintenance and repair would be about 1.2 percent.

Source: Our analysis of service data.

According to a Federal Facilities Council official, there is no industry standard for maintenance and repair funding on a square footage basis. The official indicated that funding requirements vary by building type, age, and level of use. The Army has developed a model that suggests, in the aggregate, \$4 per square foot is required; this figure includes some funding to begin addressing deferred maintenance and repair.

Our analysis of current spending levels found that O&M obligations for maintenance and repair declined by 31 percent, from \$3.89 per square foot in fiscal year 1987 to \$2.69 in fiscal year 1996. However, table 3 shows the differences in obligations between the services.

**Table 3: Percent Change in Maintenance and Repair Obligations per Square Footage of Facility Space Between Fiscal Years 1987 and 1996**

<b>Service</b>	<b>FY 1987</b>	<b>FY 1996</b>	<b>Percent change</b>
Army	\$3.07	\$1.93	-37
Air Force	\$5.46	\$3.73	-32
Navy	\$3.39	\$2.41	-29
Marine Corps	\$4.82	\$4.10 <sup>a</sup>	-15 <sup>a</sup>

<sup>a</sup>The Marine Corps experienced a one-time increase of about \$100 million for needed maintenance and repair in 1996, which temporarily increased the dollar-per-square foot amount in 1996. Without this additional funding, the dollar-per-square foot amount would have been about \$2.76, and the percentage change would have been -43 percent.

Source: Our analysis of service data.

The impact of reduced funding on the services' infrastructure is not clear. Installation officials we contacted during this review cited increases in backlogs of deferred maintenance and repair projects in recent years; however, reliable composite information was not available due to differences in how the services develop and maintain this data. Further, recent efforts by OSD to develop a comprehensive system for performing facilities condition assessments have not been successful. Even though the services have their own approaches to performing condition assessments, each of these systems has important limitations. (See app. I for further discussion of this issue.)

Under the Chief Financial Officers Act of 1990, as amended, and the Federal Financial Management Improvement Act of 1996, DOD and the services are required to prepare financial statements and have them audited. Beginning in fiscal year 1998, these statements must (1) identify and disclose the estimated cost of deferred maintenance for DOD's facilities that are being used and (2) include the cost of any planned facility demolitions. Such information will also be critical if DOD is to effectively put in place the results-oriented program decision-making structure envisioned by the Government Performance and Results Act. Our previous work has shown that the quality of existing DOD data on the costs associated with its existing infrastructure has eroded its usefulness to decisionmakers. In addition, DOD has acknowledged its departmentwide problem in capturing accurate and complete cost information for its operations.

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## Deteriorating Facilities Is a Growing Concern

Despite the absence of reliable trend data, many installation officials told us that recent reductions in funding and personnel had caused them to defer maintenance and repair activities and forego recurring preventive maintenance.<sup>14</sup> This is a growing concern because of its potential to impact operations as well as increase costs. The National Research Council reported that it is often difficult to discern the direct consequences of neglect of maintenance and repair because the physical evidence may not be immediately visible. However, the council notes that a decline in appearance, increased operating costs, and premature service failures eventually occur.

At the installations we visited, facilities were in various states of maintenance and repair. For example, at Fort Hood, Texas, new barracks construction and renovation were taking place (see fig. 3), and facilities overall appeared to be in much better condition than at Fort Eustis, Virginia, where less new construction has occurred. However, officials at both installations cited growing backlogs in maintenance and repair in other base facility areas, such as sewer and water systems.

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Figure 3: New Army Barracks at Fort Hood, Texas



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<sup>14</sup>Preventive maintenance is defined as the planned, scheduled periodic inspection, adjustment, cleaning, lubrication, parts replacement, and minor repair of equipment and systems.

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Army headquarters officials told us that many of its installations are in a “breakdown maintenance mode,” resulting in increases in emergency repairs and equipment breakdowns. Officials at Fort Eustis told us that their emergency work orders increased from less than 300 for fiscal year 1992 to over 20,000 for fiscal year 1996. The officials also said that over 45 waterlines broke in fiscal year 1996. Available data on the condition of the Army’s infrastructure suggests that these conditions exist throughout the Army.

At Langley Air Force Base, Virginia, many facilities were in good condition, supporting a view generally held by many service officials that the Air Force spends more on facilities than the other services. However, base engineering officials expressed concern about being able to maintain and repair their facilities as they have in the past. Engineering officials at Langley’s Air Combat Command—the Air Force’s largest command—said that base in-house maintenance and repair funding for fiscal years 1997 through 1999 will remain constant but that contracts for maintenance and repair jobs too large for in-house personnel would decline from \$211 million in fiscal year 1996 to about \$6 million by fiscal year 1997. Officials expect the \$6 million to decline to almost zero by fiscal year 1999.

Navy headquarters officials told us funding levels allow only preventive maintenance on mission-critical systems, such as electrical and water pump distribution systems. The preventive maintenance is limited to inexpensive repairs that take as little as 15 minutes. An official from the U.S. Atlantic Fleet in Norfolk, Virginia, said most of its bases were reacting to emergencies and were not able to be proactive in trying to prevent them. Norfolk Naval Station engineering officials said they only do some preventive maintenance. At the Naval Station in Norfolk (see fig. 4), about half the piers are 50 years old and too narrow to accommodate today’s larger ships. Many piers were in poor condition and, according to Navy officials, limited the Navy’s ability to berth ships in transit and support its deck side requirements, such as loading supplies.

Figure 4: Portion of Aging Pier Structure at Norfolk Naval Station, Virginia



The Marine Corps' Cherry Point and Camp Lejeune, North Carolina, installations appeared in good condition. However, Marine Corps headquarters officials said bases on the West Coast, such as Camp Pendleton and Camp Barstow, California, were in worse condition. The officials attribute the poor condition of these bases to a large inventory of World War II-era wood facilities, strict State of California environmental oversight, and high contract and labor costs.

## Demolition Could Reduce Maintenance and Repair Costs

Faced with reductions in personnel and funding available to maintain their facilities, many service officials recognize that they continue to have more facilities than they can afford to maintain. One means of reducing facility maintenance costs is to demolish older structures that may be relatively more expensive to maintain when they become excess to the services'

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needs.<sup>15</sup> In fiscal year 1997, the services plan to set aside about \$50 million of O&M funds for demolition.<sup>16</sup>

Army officials state that they have spent as little as \$2.50 per square foot to demolish old World War II-era barrack-type structures that were unoccupied, but the officials consider \$10 per square foot a more reasonable amount for future demolition projects. This amount is more than the Marine Corps' estimate of \$8 but less than the Air Force's \$11 and Navy's estimate of \$12 per square foot. Costs vary depending on size and type of construction and presence of environmental contaminants. Demolition costs, once recouped, can provide the basis for recurring savings to maintenance and repair and utility costs, which service officials consider to be substantial. For example, with demolition costs of \$10 per square foot and operating costs totaling \$3.50 per square foot (maintenance and repair costs of \$2.50 per square foot and utility costs of \$1 per square foot), the cost of demolition could be recouped in about 3 years.<sup>17</sup> The \$3.50 per square foot used in this example is a rough estimate of actual expenditures across the entire building inventory. Actual expenditures could be considerably less, depending on building occupancy. Data were not available to predict with accuracy potential savings or pay back period for an accelerated demolition program. In any case, once up-front costs have been recouped, annual savings in maintenance and repair, as well as utility costs, would begin.

On the basis of the preceding example and the services' estimates of square footage to be demolished, we believe the potential exists for avoiding recurring costs of hundreds of millions of dollars once initial investment costs are recouped.<sup>18</sup> However, various officials indicated that demolition costs are likely to rise in the future with the elimination of simpler structures, such as the World War II-era wooden barracks-type

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<sup>15</sup>Before a building is demolished, DOD must comply with legislation that governs the preservation of historic buildings. The National Historic Preservation Act (16 U.S.C. § 470h-2) can prevent the services from demolishing a historic building, even though the building is costly to maintain. DOD must also comply with legislation concerning the use of unutilized and underutilized facilities to assist the homeless. The McKinney Act (42 U.S.C. § 11411) requires DOD to work with the Department of Housing and Urban Development to determine if such facilities are suitable for use by the homeless before the buildings can be demolished.

<sup>16</sup>These funds are in addition to normal demolition associated with new construction, which is typically funded as part of a military construction or family housing military construction authorization.

<sup>17</sup>Utility costs used in this example are a rough approximation based on Army data, which divides total expenditures on electricity by square footage of facility space.

<sup>18</sup>Although recurring costs may be avoided in the future, we were unable to calculate precisely the total amount that could be avoided because, except for the Army, the services do not know the exact amount of excess space they have.

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structures, particularly those that were no longer occupied. Increases are expected in the future as more demolition projects require relocation of occupants out of buildings slated for demolition.<sup>19</sup> These additional costs, along with the potential for demolition costs to increase due to environmental considerations, will make it important to continue to examine the cost-effectiveness of demolition projects on an individual basis.

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## Service Views on Funding

The services can derive benefits from formally earmarking, or “fencing,” funds for demolition. Fencing funds ensures that the funds will be used to accomplish a specific objective. For example, Navy funds are fenced for family housing maintenance and repair. Family housing officials at the U.S. Atlantic Fleet said they were able to better meet needed maintenance and repair needs due to the fenced funds. Family housing maintenance and repair funds are also fenced for the other services.

Various service officials expressed the view that earmarking and centrally controlling funds for demolition at the service headquarters level may help ensure that funds are used for demolition. However, officials told us they were against fencing funds for demolition, citing the lack of flexibility to use funds for higher priorities.

In deliberations on the Fiscal Year 1997 Department of Defense Authorization Bill, specific authorization for demolition was considered but ultimately not approved (H.R. 3230, 104th Cong., 2d sess.). The bill had proposed adding \$30 million for demolition (\$10 million for each service). The authorization would have limited O&M demolition projects to no more than \$300,000 and required demolition projects more than this amount to be funded by the military construction appropriation. Under the same provision, demolition projects over \$500,000 had to be reported to the Congress.

In response to the bill, DOD said it preferred to use O&M funds for demolition. DOD further said the bill would prevent O&M funds from being used for projects costing over \$300,000 and require significant administrative burdens and delays without clear benefits. In addition, base commanders’ authority and flexibility would be severely limited in responding to demolition and funding opportunities as they arise.

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<sup>19</sup>Relocations costs can also include the minor alterations of facilities at receiving sites.

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By setting aside funds at the headquarters level, many service officials think they have taken appropriate steps to ensure that funds would be used for demolition purposes but still maintain flexibility to use funds to meet other requirements. Generally, the services were opposed to more restrictive funding. Navy and Marine Corps officials said they would not be opposed to fencing funds for demolition if the funds were in addition to their O&M funds. Officials preferred using O&M funds for demolition, even though the funds could be used for higher priorities if necessary.

Service officials agreed that they wanted commanders to use available O&M funds for demolition. As a result, the services, except for the Air Force, centrally control the approval and funding for demolition. According to Air Force officials, they will allow base commanders to identify, fund, and demolish excess facilities on their own initiative.

Officials from the Army, the Navy, and the Marine Corps told us they used most of the O&M funds they earmarked for demolition. The services, except for the Navy, do not have a separate demolition account in their O&M accounts, so we were not able to compare the amount they earmarked to the amount they obligated for demolition. Service officials provided us with a summary of what they obligated for demolition for a specific time period by summing up obligations from individual demolition projects. For example, in fiscal year 1996, the Navy obligated all of the \$6.4 million it earmarked, and the Marine Corps obligated over 80 percent of the \$4 million it earmarked. The Army did not earmark funds but had a target goal to reduce square footage by about 5 million, which it met by obligating about \$15 million. Air Force headquarters does not currently allocate demolition dollars every year; however, major commands accomplish demolition using their own funds when available.

Army, Navy, and Marine Corps officials told us that demolition of facilities, which appears to happen mostly in the last quarter of the fiscal year, is not done at that time for lack of planning for demolition or use of end-of-year funds. Navy and Marine Corps officials said that it can take until the last quarter of the fiscal year for bases to complete their project designs and go through contracting procedures.

## Formal Demolition Programs Vary by Service

The services vary in the scope of their efforts and the way in which they administer their programs (centralized or decentralized). Table 4 compares each of the service's programs.

**Table 4: Service Demolition Programs**

Square feet and dollars in millions

Service	Square footage to be demolished in fiscal year 1997	Square footage to be demolished in the future	Funding designated for demolition
Army	3.3	60.0 <sup>a</sup>	\$620 <sup>a</sup>
Navy	1.5	<sup>b</sup>	147 <sup>a</sup>
Marine Corps	0.5	1.4 <sup>c</sup>	16 <sup>c</sup>
Air Force <sup>d</sup>	4.2	15.1 <sup>a</sup>	<sup>b</sup>

<sup>a</sup>These figures are through fiscal year 2003.

<sup>b</sup>These figures are unknown.

<sup>c</sup>These figures are through fiscal year 2000.

<sup>d</sup>The Air Force does not have an approved servicewide plan for facilities demolition. While the Air Force had established a percentage goal to reduce space, it had not identified, until recently, specific square footage to be demolished. Recently, Air Force headquarters surveyed its major commands to identify square footage they planned to demolished.

Source: Our analysis of service data.

## Army

The Army has the largest and most centrally directed demolition program, and it is targeting the largest amount of funds for demolition among the services—\$620 million through fiscal year 2003. The Army facilities demolition program began in 1992 and was included in the service's October 1993 Long-Range Facilities Plan.<sup>20</sup> Since then, Army officials report they have spent approximately \$95 million demolishing about 39 million square feet.

The Army determines excess space by using a model that compares an installation's inventory of space to standard Army requirements, which are based on the installation's mission. On the basis of this model, the Army determined in 1996 that it had an excess of about 134 million square feet. In fiscal year 1997, the Army plans to spend \$20 million and demolish 3.3 million square feet. Starting in fiscal year 1998, the service plans to

<sup>20</sup>This plan provides a statement of broad principles and objectives for installation planning, such as citing the need to establish and fund a capital investment plan to ensure installation revitalization, replacement, and maintenance of facilities infrastructure. It is not much more specific on how this broad objective will be accomplished over any specific time frame or at what cost.

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spend \$100 million in O&M funds per year through fiscal year 2003 to eliminate excess space at an estimated cost of \$10 per square foot. Therefore, we calculated that it would take the Army about 13 years to eliminate the excess space at a cost of about \$1.3 billion.

The Army's demolition program is being given strong top-down emphasis with project funding approved at the service headquarters level. Installations propose demolition projects to the Army's Installation Management Office at headquarters, where they are reviewed and approved. Projects are approved based on the amount of square feet to be demolished and demolition costs. The Army funds the projects out of O&M funds set aside and retained at the headquarters level for demolition.

Headquarters officials said that in fiscal year 1998 they will use an accounting code to track and ensure that the funds are used for approved demolition projects. If installation commanders do not use the funds as designated, the installation will not be provided with more funds, according to headquarters officials. Before this central control, headquarters officials provided the installations with a target amount of square feet to be demolished, but funds were not always used for demolition.

According to headquarters officials, the Army plans to approve those projects that will demolish the most square footage at the least cost. They believe this process will help achieve the goal of eliminating approximately 60 million square feet of World War II-era wood buildings included in the 134 million total excess square footage that will be demolished first.

The Army's demolition program is also being done along with restrictions on the amount of square feet that can be added to installations through new construction. The program requires the Army to dispose of one square foot of facilities to offset each square foot of new construction added to the inventory. According to headquarters officials, the Army has had this requirement since the early 1980s and kept the restriction as part of its more recent facilities reduction program that started in fiscal year 1992. This requirement will help to control the growth of excess square footage of space. (The other services do not use this restriction in managing their infrastructure.)

According to Army officials, environmental costs and relocation expenses associated with the Army's demolition have not thus far been significant

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and have been funded out of O&M funds. Funds to cover these expenses in the future are included in the \$100 million the Army has earmarked for demolition.

In demolishing facilities, the Army has used contractors as well as in-house civilian engineering personnel. For example, at Fort Hood, a 55,000-square foot World War II-era building was being used as a troop laundry facility for cleaning sheets, bedding, and towels. According to an engineering official, the roof continued to leak, even though it had been fixed several times; the laundry equipment was outdated; and the building could not accommodate new equipment. In-house engineering staff bulldozed the building late in fiscal year 1996 at a total cost of about \$134,000. A new laundry facility was not built, since the installation contracted with a private laundry company. The space is currently being used as a parking lot and marshalling area for troops.

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## Marine Corps

The Marine Corps' emphasis on demolition began in fiscal year 1994 but was given additional emphasis with the Commandant's fiscal year 1996 budget guidance, which directed headquarters to sponsor a program to prioritize the demolition of unneeded structures.<sup>21</sup> Since 1994, the Corps has demolished about 1.5 million square feet of space at a cost of about \$8.3 million. The Corps plans to demolish an additional 1.8 million square feet and spend about \$4 million each year from fiscal years 1997 to 2000. The Corps developed its demolition goal by asking its bases to determine what they would like to demolish. According to Corps officials, the amount of excess space may be based on requirements, since the base commanders know their mission and the infrastructure needed to support it.

The Marine Corps' facility database indicates that the Corps has an excess of 1 million square feet, which is less than the amount of space that the Corps plans to demolish by fiscal year 2000. Corps officials told us that facilities marked as excess in its asset database may not be necessarily marked for demolition. It is not clear how many facilities designated as excess by the Corps' database will actually be demolished. However, Corps officials told us they are in the process of reconciling the amount of

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<sup>21</sup>Demolition plans are included in the Marine Corps' infrastructure plan, known as the Installations and Logistics Campaign Plan, which was finalized and signed by the Commandant in 1996. The plan outlines a goal of improving operations, processes, and systems in support of the Corps and ensuring the best products and services at the least cost. The five key areas of emphasis in the plan include combat service support, material support management, logistics information resources, supporting establishment (infrastructure), and contracting.

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square footage in demolition plans with the amount of square footage that bases reported as excess.

Marine Corps headquarters centrally funds and manages the demolition program. The program is supported by O&M funds, which allows the Marine Corps flexibility to use the funds for unforeseen mission requirements. Demolition projects originate at the base level and are reviewed and selected by headquarters. Marine Corps officials said that they have funded, at a minimum, all design costs for demolition projects. They have also funded related environmental cleanup as needed in demolition projects. However, according to a headquarters official, no projects have required the relocation of personnel or minor alterations. The officials said the costs of these requirements will be made on a case-by-case basis to determine whether they are to be funded at the base or headquarters levels.

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Navy

The Navy describes its demolition program as a centralized initiative funded from O&M funds and managed by its military construction division at headquarters. The Navy's formal emphasis on demolition began in fiscal year 1996. However, according to service officials, some buildings were demolished in prior years when funding was available, but program data was not developed on a centralized basis. In fiscal year 1996, the Navy demolished about 400,000 square feet at a cost of about \$4.8 million and spent \$1.6 million to demolish other facilities not measured in square feet, such as fuel tanks, for a total of \$6.4 million.

The Navy's current program is not based on a projected goal of reducing a set amount of square footage; rather, it hinges on the expected availability of O&M funding to demolish facilities that are (1) in excess of current requirements, (2) costly to maintain and operate, (3) unsafe or potentially harmful to the environment, and (4) unsightly and not in keeping with the concept of "installations of excellence."<sup>22</sup> Because the program is only 1 year old, a Navy headquarters official said the Navy expected the program to become more formalized as it progresses. Navy officials told us they planned to spend about \$25 million for demolition in fiscal year 1997. After that time, they tentatively plan to spend \$13 million each year through 2000 for demolition. From fiscal year 2001 to 2003, the Navy plans to spend a total of \$83 million on demolition, but this goal may be

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<sup>22</sup>The Navy has drafted its Shore Support Infrastructure Vision and Strategic Plan, which outlines a broad strategy for reducing infrastructure costs and applying business practices to meet the Navy's fleet support mission. The plan cites demolition as the primary tool to reduce costs. The plan does not identify cost and time frames for completion of the strategy.

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adversely affected by declining O&M funds. Navy officials stated that they had established funding levels from O&M funds for the demolition program but suggested that the amount spent could be less if O&M funds are needed to meet unforeseen requirements in other areas.

Proposed Navy demolition projects originate at the activity level and are forwarded to the claimant level, such as the Commander in Chief, U.S. Atlantic Fleet. At the claimant level, projects are reviewed and prioritized and then forwarded to Navy headquarters for further review, when factors such as potential cost avoidance and O&M savings are considered. Although Navy demolition projects are approved and funded at the headquarters level, the Navy does not currently include funding for any environmental cleanup or relocation of functions to other facilities. The Navy is in the process of developing a system to track and monitor the execution of demolition projects. A Navy official said that headquarters staff currently make site visits to ensure completion of projects.

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## Air Force

The Air Force has had the least centralized demolition program among the services. Air Force officials state that they have demolished structures using available O&M funding. However, funding was not tracked until fiscal year 1996 when, according to officials, the Air Force spent \$52 million to demolish about 5 million square feet.

The Air Force has drafted a tentative goal to reduce its facilities square footage by a net of 3 percent each year between fiscal years 1997 and 2005 through consolidation and demolition.<sup>23</sup> However, it has not developed detailed plans to accomplish this goal. According to officials, if a plan to reduce its square footage is implemented, base commanders would use O&M, military construction, or military family housing funds for demolition. Program initiatives are the responsibility of individual commanders who identify, fund, and execute individual demolition projects. In October 1996, the Air Force began an initiative to develop a way to identify and track excess square footage. As of February 1997, the Air Force was still planning how it would implement this initiative. Tentative plans are to task major commands with collecting the information.

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<sup>23</sup>This goal is included in a draft strategic plan developed by the Air Force in 1996. The Air Force expected to publish the plan in April 1997. The draft plan addresses four civil engineering core functions: combat and contingency engineering; base operations, maintenance, and development; environmental leadership; and housing excellence. The plan sets forth goals in each core function, such as building a smart facility investment strategy and increasing the effectiveness and reducing the cost of doing business. Each goal has objectives to achieve, but the plan does not address the amount of funding needed to implement the goals and objectives or set year-to-year goals.

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## Emphasis on Strategic Planning Has Been Limited

OSD's and the services' strategic planning for facilities maintenance and repair, including the revitalization of facilities infrastructure, was limited. Those plans that did exist were not focused on long-term comprehensive strategies for facilities revitalization, replacement, and maintenance, and they were not tied to measurable goals to be accomplished over specific time frames or linked to funding.

Over the past 7 years, we have called attention to critical government operations that are highly vulnerable to waste, fraud, abuse, and mismanagement by designating them as high-risk areas. One area of focus has been accountability and cost-effective management of defense programs. Our February 1997 high-risk series of reports included defense infrastructure as a new high-risk area.<sup>24</sup> The defense infrastructure report noted that DOD is spending funds to operate and maintain an aging, underutilized, and excess facilities infrastructure. It noted that setting forth a clear framework for a reduced defense infrastructure is key to avoiding waste and inefficiency. It further noted that the Secretaries of Defense, the Army, the Navy, and the Air Force need to give greater structure to their efforts to attain infrastructure reductions by developing an overall strategic plan. Such a plan could be expected to encompass needed demolition as well as facilities revitalization.

The need for strategic planning for facilities infrastructure is also underscored by the requirements of the Government Performance and Results Act. The act requires federal agencies, including DOD, to develop agencywide strategic plans by September 30, 1997, annual performance plans for fiscal year 1999 and beyond, and annual program performance reports beginning March 31, 2000. The strategic plans must cover at least a 5-year period and include an agency's mission statement and goals. They must also describe how an agency plans to achieve its goals through its activities and its human, capital, information, and other resources, such as facilities.

Performance plans must include measurable performance goals, where feasible, and the indicators for measuring performance. Performance reports must compare actual performance with performance goals and explain what needs to be done when goals are not met. Such performance reporting for DOD's infrastructure should include, as part of DOD's assessment of the program's efficiency in meeting performance goals, the measurement of actual against expected facility infrastructure maintenance costs. Such periodic reporting should also identify and

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<sup>24</sup>High-Risk Series: Defense Infrastructure (GAO/HR-97-7, Feb. 1997).

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facilitate monitoring estimates of the costs associated with deferred facility maintenance.

Strategic planning can help agency components and programs to develop outcome-oriented goals and performance measures that are linked to and support agencywide goals.<sup>25</sup> Our report on DOD's implementation of the Government Performance and Results Act notes that the Senate and House reports on the legislation anticipate that strategic planning will be institutionalized and practiced at all organizational levels throughout the federal government. Our report on DOD's Logistics Strategic Plan notes the need to link organizational components' plans to agencywide strategic plans.

Our executive guide to implementing the act notes that several organizations, in implementing management reforms similar to those required by the act, found a key to successful implementation was to create clear, hierarchically linked goals and performance measures that cascaded from the top to the bottom levels of the organization. Such hierarchies of goals and measures provide a straightforward road map showing how the work of managers and staff throughout an organization contributes to attaining organizationwide strategic goals. The guide stresses that performance measurement is one of the most important features of the act. According to the guide, performance measures at each organizational level should be outcome oriented to allow demonstrating results, limited to those that are responsive to multiple priorities, and linked to responsible programs. Key to assessing performance is the need to collect sufficiently complete, accurate, and consistent data.

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## Conclusions

Disproportionate reductions have occurred in funding devoted to maintenance and repair compared with reductions in space being managed by the services over the last 10 years. This finding is consistent with concerns of various service officials that they continue to retain more facilities than they can afford to maintain. Demolition is one means of addressing this problem on installations that are being retained by the services, and it can also help avoid unnecessary maintenance and repair and utility costs in a period of declining resources. Each of the services has some plans to emphasize the demolition of excess facilities, but the Army appears to be providing the strongest program emphasis. Even

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<sup>25</sup>See DOD's GPRA Implementation ([GAO/NSIAD/GGD-97-65R](#), Jan. 31, 1997), Logistics Planning: Opportunities for Enhancing DOD's Logistics Strategic Plan ([GAO/NSIAD-97-28](#), Dec. 18, 1996), and Executive Guide: Effectively Implementing the Government Performance and Results Act ([GAO/GGD-96-118](#), June 1996).

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though stronger emphasis in the other services might be desirable, it appears that declining O&M funding levels could have the potential to constrain the existing plans of each of the services.

Changes in square footage of space being maintained by the services can provide an important basis for assessing progress of demolition and other facility reduction measures. Such data can also provide a basis for assessing changes in funding for repair and maintenance. Trend analyses of this data could help DOD measure performance and meet reporting requirements under the Chief Financial Officers Act. These analyses could also be important to making more informed operational decisions concerning facilities infrastructure programs, as contemplated by the Government Performance and Results Act. It is critical that DOD make marked strides to improve its ability to develop and disclose a complete picture of the actual costs incurred to maintain its infrastructure, as well as estimates of the costs it may incur to carry out facility maintenance that was previously deferred.

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## Recommendations

We recommend that the Secretary of Defense

- direct the services to use consistent and common criteria, to the extent feasible, for developing (1) accurate and reliable trend data on infrastructure condition, including square footage, plant replacement value, and other relevant measurements, and (2) costs associated with their current infrastructure and possible reduction options, including information on deferring facility maintenance and demolishing excess facilities;
- use the trend data as a starting point in formulating an overall strategic plan for facilities infrastructure that links to the departmentwide strategic planning requirements set forth in the Government Performance and Results Act; and
- require the Air Force, the Navy, and the Marine Corps to demolish excess infrastructure to the maximum extent feasible when facilities are being replaced by new construction.

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## Matter for Congressional Consideration

The Congress may wish to consider requiring DOD and the services to provide 7 to 10 years of comparable trend data on square footage of space being maintained and other measurements, such as plant replacement value and other facility unit measures, along with their O&M budget submissions and justifications each year.

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## Agency Comments and Our Evaluation

DOD concurred with our recommendations. However, DOD took exception to our observation that it did not currently have complete, reliable information. DOD stated that, as is the case with any similar, large, complex organization, all existing information is not and should not be immediately available at the headquarters level. It also took the position that the standard of “complete” information was too extreme and that each proposal to collect data at the headquarters level must be carefully evaluated for its cost-effectiveness.

Our statement regarding complete, reliable information was made in the context of the need for information and cost associated with either maintaining DOD’s current facilities infrastructure or reducing it. We also note important limitations in DOD and service trend data. Therefore, we continue to believe that it is beneficial for DOD and the services to develop more complete data on a consistent and continual basis to provide information for meaningful trend analyses. Although complete information is desirable, our recommendation did not use that term. Rather, we stipulated that the services needed to use consistent and common criteria, to the extent feasible, for developing accurate and reliable trend data on infrastructure condition and costs.

DOD also expressed the view that using 1987 as the beginning point for our analysis of changes in square footage of space being managed understated DOD’s accomplishments, since the recent BRAC efforts did not get underway until 1991, and would continue until 2001. It further noted that fiscal years 1987-1990 represented 4 years of physical plant growth before beginning to count the square footage drawdown.

For purposes of analysis, we chose a 10-year period, as suggested by the requester, because of his interest in having data commencing before the onset of the most recent BRAC rounds. Even extending out to 2001, the reductions in square footage are much less than typically might be expected given the approximately 21 percent reduction in domestic infrastructure often cited by DOD in reporting the results of its BRAC actions. That is one of the reasons we recommended DOD require the demolition of excess infrastructure to the maximum extent feasible when facilities are being replaced by new construction. The complete text of DOD’s response is included as appendix III. The scope and methodology of our review appears in appendix II.

We conducted our review between July 1996 and February 1997 in accordance with generally accepted government auditing standards.

Unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 15 days from its issue date. At that time, we will send copies to the Chairmen and Ranking Minority Members of the Senate and House Committees on Appropriations and on the Budget, the Senate Committee on Armed Services, and the House Committee on National Security; the Secretaries of Defense, the Army, the Navy, and the Air Force; the Commandant of the Marine Corps; and the Director, Office of Management and Budget.

Please contact me on (202) 512-5140 if you have any questions concerning this report. Major contributors to this report are listed in appendix IV.

Sincerely yours,

A handwritten signature in black ink that reads "Mark E. Gebicke". The signature is written in a cursive style with a large, stylized initial "M".

Mark E. Gebicke  
Director, Military Operations  
and Capabilities Issues

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**Figure 4: Portion of Aging Pier Structure at Norfolk Naval Station, Virginia**

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**Abbreviations**

BRAC	Base Realignment and Closure
CONUS	continental United States
DOD	Department of Defense
O&M	operation and maintenance
OSD	Office of the Secretary of Defense

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# Systems for Assessing Infrastructure Condition

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The Department of Defense (DOD) has recognized the need for a standard data system that would provide comprehensive trend data on infrastructure condition by service. However, it has not been successful in implementing such a system. A recent study sponsored by the Office of the Secretary of Defense (OSD) to develop such a system never progressed beyond the pilot phase. Consequently, DOD and the services use their own unique systems, all of which have significant limitations in providing trend data and relating infrastructure condition to readiness.

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## DOD

In the conference report accompanying the fiscal year 1992 Defense Appropriations Act, the Congress provided for the implementation of a pilot test program to conduct comprehensive maintenance surveys at selected bases. The surveys, referred to collectively as the Condition Assessment Survey, were a comprehensive effort led by OSD to develop a consistent assessment of the condition of DOD facilities. The Senate report stated that \$50 million should be used for the pilot test, noting that a lack of accurate and meaningful budget information on repair and maintenance had precluded obtaining a reasonable assessment of DOD's needs. The conference report directed DOD to use funds from the real property maintenance account to cover the cost of each survey. The survey was then tested at 12 installations servicewide.

The pilot test of the survey was completed in 1995 and, according to an OSD report, achieved all its goals set by the Congress and DOD to improve the accuracy, consistency, and credibility of maintenance and repair data. A feature of the survey was the ability of its information system to calculate costs for repair and replacement and a condition index scale of 0 (poor) to 100 (excellent). In addition, the system automatically determined when a repair should be done in a given time period based on data for the facility's return on investment. Despite these accomplishments, service officials told us that the system's information management system was labor intensive and expensive to implement and maintain. DOD projected the cost to implement the survey servicewide would be about \$715 million, but the services would be responsible for funding about \$270 million of this cost. According to an OSD official, the survey was not implemented beyond the initial pilot phase primarily because of the costs.

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## Army

To assess the condition of its infrastructure, the Army started using the Installation Status Report in 1995. The report is a three-part information system that is intended to provide decisionmakers with an objective

assessment of the infrastructure, environment, and services at Army installations. The report provides installation status in the form of C-ratings, which are also used in the Army's familiar Unit Status Report.

Part I of the report on infrastructure provides 2 years of data for fiscal years 1995 and 1996. It shows the status of installations grouped into five broad areas: mission facilities, strategic mobility facilities, housing facilities, community facilities, and installation support. Part I also provides separate C-ratings that indicate whether the Army has enough facilities and the facilities meet Army standards.

The report does not provide trend data because the system has not been fully implemented. According to Army officials, reliable trend data from the report will not be available until fiscal year 2000. Until then, the Army will be validating data and refining its data collection techniques. Examples of these refinements include revising inspection standards for utilities and including semipermanent buildings in inspections. Additionally, the report does not relate infrastructure condition to readiness. Army officials said they have not determined a measurement for this relationship.

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## Air Force

In September 1992, the Air Force began looking for a statistical tool to support requirements for maintenance and repair. The Air Force's Civil Engineering and Studies and Analysis groups jointly developed an assessment process called the Commanders' Facility Assessment. The assessment system was designed to link facility condition to mission requirements to ensure that resources for maintenance, repair, and minor construction are allocated to the most critical mission needs of field commanders. Commanders are to use the assessments to stratify their real property maintenance and repair and military construction requirements.

The assessment requires field commanders to identify recurring and nonrecurring requirements. Recurring requirements include those that are necessary to accomplish day-to-day maintenance to preclude further deterioration of the real property facilities and infrastructure. Nonrecurring requirements are broken down into three levels of facility requirements. Level I (unsatisfactory) reflects deficiencies that cause frequent mission interruptions, accelerate facility deterioration, resulting in high life-cycle maintenance costs, curtail or eliminate some operations, and degrade livability and workplace conditions. These deficiencies require a major upgrade within 2 years. Level II (degraded) reflects

deficiencies that impair mission support, reduce effectiveness of the work force, and speed deterioration of the facility. These deficiencies require a major upgrade within 2 to 6 years. Level III (adequate) reflects facilities that do not impair mission accomplishment, although minor deficiencies may exist. These requirements improve operational productivity and reduce operation costs, such as facility consolidations, demolitions, and energy conservation measures.

The assessment includes six major areas: real property maintenance (host and tenant); current mission military construction (host and tenant); all medical facility requirements; nonappropriated fund activities; Defense Business Operations Fund—Transportation (unique to the Air Mobility Command); and Defense Maintenance Industrial Fund—Research, Development, Test, and Evaluation (unique to the Air Force Material Command). However, the assessment excludes other areas, such as new mission military construction, military family housing, and environmental compliance.

The assessment only provides condition data for Air Force facilities for fiscal years 1993 and 1995. Air Force officials cited several areas that need improvement, such as clarifying guidance to the field and improving the assessment's software. They also said that assessment training was poor and that the assessment was too complex and labor intensive. The Air Force recently completed the validation of 1995 data. It plans to implement the assessment again in fiscal year 1997 and complete an upgrade of the software in fiscal year 1998. Air Force officials were reluctant to state that the assessment would provide an indication of how infrastructure related to readiness. They stated that the assessment was more oriented toward linking facilities to mission requirements rather than readiness.

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## Navy

The Navy assesses the condition of its facilities through the Annual Inspection System, which is prepared by each activity (i.e., a base). According to Navy officials, the system started in the 1960s. The objective of the system is to provide an annual condition assessment report of unfunded repair and maintenance deficiencies. The system report classifies its facilities maintenance requirements into two categories: critical and deferrable. Critical requirements need to be completed in 12 months, whereas deferrable requirements are not as pressing, and thus corrective actions are not critical. Each activity reports its backlog of critical deficiencies to the Navy, which uses this information to prepare its

departmentwide system report. Navy officials said they consider the system to be an assessment of the condition of their facilities, even though the system only tracks backlogs.

The system is a compilation of inspections performed throughout the assessment year, but not all facilities are inspected each year. Inspections performed through the year are control inspections on the physical condition of structural, mechanical, and electrical facilities; preventive maintenance inspections on critical dynamic equipment, such as electrical and water pump distribution systems; and inspections of operator-assigned major equipment. Navy guidance requires all facilities to be inspected completely within a 3-year cycle. Navy activities prepare annual maintenance action plans that are their management tools for performing repair and maintenance activities. The plans provide data that is incorporated into the system and updated annually.

Although historical data from the system is available, Navy officials told us that they are concerned about the quality of this data. One official told us that the data suffers from the lack of consistent and standardized guidelines for the inspections. That official also indicated that the quality of the inspections could vary with the experience and expertise of the inspectors. A 1995 report of the Navy Internal Audit Office's review of the U.S. Atlantic Fleet's annual inspection process cited the lack of a centrally managed quality assurance program. In response, the Commander, Atlantic Fleet, contracted with the Navy's Public Works Center to conduct all fleet annual inspection reports to ensure greater consistency and accuracy in reporting its backlog of repair and maintenance. Fleet officials told us that they are now more confident with their system data but that only 1 year of data is currently available. The quality of previous data is problematic in terms of establishing trends.

The Navy also started a Shore Base Readiness Reporting System in 1982. The system was created to link financial data to shore-based readiness missions. The system measures personnel, facilities, and equipment by their ability to support mission operations. Assets are rated from C1 to C4, and C3 and C4 ratings indicate that the assets are only marginally or not meeting mission requirements. The data is not tied to funding requirements. The system is prepared by commanding officers and staff at the activity level who review data from the annual inspection system and determine a rating by mission categories. The Navy was able to provide trend data by activity on the number of facilities that were rated C1 to C4.

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## **Marine Corps**

The Marine Corps determines its infrastructure condition by inspections, which have been done since the 1960s. Each organization has a maintenance or inspection office to perform these inspections. The inspectors are trained for performing various types of reviews, such as electrical and utilities. Before the inspections, the inspectors examine data on backlogs in the particular area they are about to review. The inspectors use engineering performance standards and estimate the cost of repair, labor, and material, using industry information and catalogs. The activity control office generally manages the standard documentation from the inspections.

The Marine Corps' annual control inspection is required to identify the base's total maintenance and repair requirements, assess physical condition, update real property records, and determine the effectiveness of maintenance programs. The inspection integrates data from various base inspections, such as preventive, cyclic, and operator inspections. Results from the inspections help build the Marine Corps bases' long-range maintenance and annual work plans. Data from the annual control inspection appears in the Marine Corps' Backlog of Maintenance and Repair report. This report contains only valid items of maintenance and repair work that remain as firm requirements in annual work plans but could not be funded in the fiscal year. The Marine Corps includes all maintenance deficiencies in its report.

The Marine Corps is in the process of developing a Commanders' Readiness Reporting System to link facility condition and mission readiness. A Marine Corps official told us that the first readiness report was expected to be prepared by April 1997. The Marine Corps has a system to report trend data on its backlog of maintenance and repair.

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# Scope and Methodology

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To determine the extent that the services' obligations for maintenance and repair correlate to changes in building square footage, we obtained worldwide operation and maintenance (O&M) funding information for maintenance and repair and minor construction obligations.<sup>1</sup> We limited the scope of our review to active Army, Air Force, Navy, and Marine Corps forces only. We selected data for fiscal years 1987 through 1996 because those years comprise the most recent 10-year period and represent a point in time before the onset of the recent period of Base Realignment and Closure (BRAC) actions.

We focused on maintenance and repair and minor construction obligations because obligations from these accounts directly affect the condition of facilities and represent the day-to-day care and upkeep of the services' facilities. We focused on budget obligations rather than budget requests or appropriations because obligations provide a more complete accounting of funds used for maintenance and repair activities than budgets or budget requests.<sup>2</sup> Obligations represent commitment of funds, such as contracts awarded. The liquidation of such obligations may not occur for some time after they are recorded.

We also obtained a breakdown of O&M funding in the continental United States and overseas from the Army and the Marine Corps; however, the Air Force and the Navy were unable to provide such a breakdown because these services do not track obligation data this way. As a result, we were not able to make DOD-wide comparisons between overseas and continental U.S. obligations. In analyzing obligation data, we converted the obligation amounts for different years into constant fiscal year 1997 dollars so that the dollar amounts of the different years could be compared without the impact of inflation. We excluded military family housing from our review because we were unable to obtain complete obligation and square footage data comparable to the data we obtained for other types of facilities and because military family housing is not funded by the regular O&M funded budget.

We also obtained and evaluated data showing changes in square footage of facilities owned and managed by the services for fiscal years 1987 through 1996 as well as the changes projected to occur in future years. We selected square footage as an indicator of infrastructure size because square

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<sup>1</sup>Although maintenance and repair activities are funded from different sources, we focused on O&M because it provides between 73 and 98 percent of each service's maintenance and repair funds.

<sup>2</sup>See Operation and Maintenance Funding: Trends in Army and Air Force Use of Funds for Combat Forces and Infrastructure (GAO/NSIAD-96-141, June 4, 1996).

footage is a consistent measure across services. Although the services' total infrastructure is measured by factors other than square footage and includes other measures, such as linear feet of runways, service officials told us that square footage represents the best measure for the majority of their facilities. Also, the majority of O&M funded maintenance and repair obligations are used to maintain and repair facilities measured in square feet.

Due to time constraints, we did not assess the services' internal controls associated with infrastructure data management, including the validity of the square footage data provided for our review. However, we determined the extent to which the services had validated their data to provide an indication of the data's relative level of accuracy and completeness. We relied on the services to provide us the best representative data regarding square footage, and the rigor of the data depended partly on whether the service used square footage to manage its infrastructure.

The Army used square footage to manage its infrastructure, and Army officials stated that recent data is about 85 to 90 percent accurate because of initiatives undertaken in the early 1990s to improve the integrity of the data. These initiatives included the use of a contractor to ensure and then update the accuracy of the Army's data, reliance on Army Audit Agency audits, and BRAC certifications. The square footage data for fiscal years 1987 through 1990 for the Army may not be as reliable as data after 1990 because the Army initiated its efforts to ensure square footage accuracy after that date. However, Army officials said that the data for 1987 through 1990 provided to us was the best available data for that time. We found that the data for these 4 years was generally in line with the Army's overall square footage data.

Navy and Marine Corps officials expressed confidence in the accuracy of their data. A February 1995 audit by the Naval Audit Service, performed along with the 1995 BRAC process, indicated a 90-percent accuracy rate for data sampled.

We had some initial concerns about the completeness and accuracy of the Air Force data. We encountered discrepancies in some initial data sets provided by Air Force officials and therefore requested the Air Force to provide us with revised data sets. The Air Force provided us with data on the square footage of space it owned and managed for 3 fiscal years—1987, 1995, and 1996—but it could not readily provide such data for

fiscal years 1988 through 1994. Air Force officials said that the square footage data they provided us was the best available.

In analyzing our data to determine the correlation between obligations and square footage, we compared the percent change in obligations to the percent change in square footage between fiscal years 1987 and 1996. We made these calculations by service and then calculated a servicewide figure. We tried to determine if the decline in obligations had impacted the condition of the services' facilities over the 10-year period. We asked the services for trend data on the condition of their facilities and the level of emergency work orders and other work orders done at the installation and base levels. The Army was the only service that had a system that conveyed the actual physical condition of its facilities; however, the Army implemented the system in 1995, and service officials indicated that additional work was still needed to refine and accumulate data before meaningful trends could be developed. Trend data on emergency work orders and other types of work orders at the installation and base levels was not available for the 10-year period, and this information was not summarized beyond the installation and base levels.

To determine the extent that the services examined the potential for long-term savings in demolishing excess infrastructure, we sought cost-benefit analyses in this area. Each of the services provided estimates for the potential savings per square foot. However, we found these estimates were often rule-of-thumb estimates or were based on simple averages associated with prior demolition activities rather than formal cost-benefit analyses.

All of the services, except the Air Force, provided the amount of excess facilities for 1996. Air Force officials told us their major commands had been required to submit annual reports on the extent that their excess facilities could be demolished, but the Air Force discontinued this requirement several years ago because the report was considered unnecessary. The Army had the most rigorous method to determine excess space. The Army developed a model that compared required square footage based on mission needs with actual square footage. This data could be summarized at the installation, major command, or headquarters level. The Navy obtained one estimate of excess from its asset database. However, in terms of identifying square footage of space for demolition purposes, the Navy relies on its bases to estimate the amount of square footage to be reduced from demolition. For the Marine Corps,

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headquarters officials periodically ask the bases to report the amount of square footage they consider excess and want to demolish.

To determine the extent that the services developed a formal demolition program as a means of reducing excess space as part of an overall infrastructure management plan, we reviewed the services' demolition programs and plans and evaluated the extent to which they were included as part of overall service infrastructure management plans. We interviewed service officials responsible for infrastructure planning to determine the services' current efforts to include demolition, condition assessment survey data, and funding needs in their overall infrastructure plans. We visited the following locations:

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**Office of the Secretary of Defense**

Office of the Deputy Under Secretary of Defense, Industrial Affairs and Installations, Washington, D.C.

Directorate of Installation Management, Arlington, Virginia

Readiness, Programs, and Assessment Directorate, Washington, D.C.

Comptroller, Military Construction, Washington, D.C.

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**Department of the Army**

Assistant Secretary of the Army, Financial Management (Business Resources), Washington, D.C.

Office of the Assistant Chief of Staff, Installation Management, Washington, D.C.

Resource Integration Office, Installation Management, Washington, D.C.

Facilities and Housing Directorate, Washington, D.C.

Army Forces Command, Fort McPherson, Georgia

Army Training and Doctrine Command, Fort Monroe, Virginia

Army Base, Fort Eustis, Virginia

Army Base, Fort Hood, Texas

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Center for Public Works, Army Corp of Engineers, Fort Belvoir, Virginia

Army Military District of Washington, Fort McNair, Washington, D.C.

Army Materiel Command, Alexandria, Virginia

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**Department of the  
Air Force**

Air Force Deputy Chief of Staff for Installations and Logistics, Office of the Civil Engineer, Washington, D.C.

Office of the Assistant Secretary of the Air Force, Financial Management, Budget Operations Division, Washington, D.C.

Air Force Real Estate Agency, Bolling Air Force Base, Washington, D.C.

Air Combat Command, Langley Air Force Base, Virginia

1st Fighter Wing, Langley Air Force Base, Virginia

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**Department of the Navy**

Office of the Assistant Secretary of the Navy, Financial Management Comptroller, Washington, D.C.

Naval Facilities Engineering Command Headquarters, Alexandria, Virginia

Naval Facilities Engineering Command—Atlantic Division (Engineering Field Division), Norfolk, Virginia

Chief of Naval Operations, Shore Installation Management Office, Crystal City, Virginia

Commander in Chief, U.S. Atlantic Fleet, Norfolk, Virginia

Norfolk Naval Station, Norfolk, Virginia

Navy Public Works Center, Norfolk, Virginia

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**Commandant of the  
Marine Corps**

Marine Corps Headquarters, Installation and Logistics Department—Facilities Branch, Housing Management Section, and Land Use and Military Construction Branch, Arlington, Virginia

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**Appendix II**  
**Scope and Methodology**

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Marine Corps Air Station, Cherry Point, North Carolina

Marine Corps Base, Camp Lejeune, North Carolina

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**Other**

The Association of Higher Education Facilities Officers, Alexandria,  
Virginia

Federal Facilities Council, Washington, D.C.

# Comments From the Department of Defense



ACQUISITION AND  
TECHNOLOGY

## OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON DC 20301-3000

April 23, 1997

Mr. Mark Gebicke  
Director, Military and International Affairs Division  
U.S. General Accounting Office  
Washington, D.C. 20548

Dear Mr. Gebicke:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) Draft Report, "Defense Infrastructure: Demolition Is an Important Element of Facilities Management," Dated March 20, 1997 (GAO Code 703166/OSD Case 1322).

The Department concurs with the report's recommendations. The following are supplementary comments concerning the report:

- The draft report notes that "DoD and the Services do not currently have complete, reliable information." As is the case with any large, complex organization such as DoD, all information existing in an organization is not immediately available at organizational headquarters, nor should it be. Further, the standard of "complete" information is too extreme. As with most organizations, DoD operates and makes decisions in the face of uncertainty, without "complete" information but with the best possible information. Data collection in an enterprise as large as DoD is potentially very expensive. With current resource constraints, each proposal to collect detailed data at the headquarters level must be carefully evaluated for its cost-effectiveness.
- The report states that there has only been a 10 percent reduction in square footage over the time frame 1987-1996. This analysis understates DoD's accomplishments. The large drawdown overseas and Base Realignment and Closure (BRAC) did not get underway until 1991. By using the time frame FY87 to FY96, the analysis includes four years of physical plant growth (FY87-90) before beginning to count the square footage drawdown. The drawdown had to first offset FY87-90 growth and then realize the 10 percent reduction, and this was accomplished in just six years (FY91-96), not 10. Further, as the report correctly states, the BRAC related drawdown continues until FY01.

Comments concerning recommendations from the report are enclosed. The Department appreciates the opportunity to comment on the draft report.

Sincerely,

John B. Goodman  
Deputy Under Secretary  
(Industrial Affairs and Installations)

Enclosure



GAO DRAFT REPORT  
OSD CASE 1322, GAO CODE 703166

“DEFENSE INFRASTRUCTURE: DEMOLITION IS AN IMPORTANT ELEMENT  
OF FACILITY MANAGEMENT”

DEPARTMENT OF DEFENSE COMMENTS

RECOMMENDATION 1: Direct the Services to use consistent and common criteria, to the extent feasible, for developing (1) accurate and reliable trend data on infrastructure condition, including square footage, plant replacement value, and other measurements, and (2) costs associated with their current infrastructure and possible reduction options, including information on deferring facility maintenance and demolishing excess facilities.

DOD Response: Concur. The Office of the Secretary of Defense (OSD) has already started the process of collecting improved data via improved exhibits in the Program Objective Memorandum. These new exhibits, which were launched by OSD in early 1996, actually assisted GAO in its analysis by providing answers to some of GAO’s questions. The exhibits were not releasable to GAO because they contain preliminary, uncoordinated, data – but they represent a step in the direction recommended by GAO. In addition, each of the Services has developed or are developing better facilities data systems. The major impediment in establishing standard measurements and their implementation is the cost of development and execution. The Department’s most recent effort was the Condition Assessment Survey (CAS). The projected fielding cost of \$715 million in a constrained resource environment precluded its full implementation.

RECOMMENDATION 2: Use the trend data as a starting point in formulating an overall strategic plan for facilities infrastructure that links to the departmentwide strategic planning requirements set forth in the Government Performance and Results Act.

DOD Response: Concur.

RECOMMENDATION 3: Require Air Force, the Navy, and the Marine Corps to demolish excess infrastructure to the maximum extent feasible when facilities are being replaced by new construction.

DOD Response: Concur. The military construction program already accomplishes significant amounts of demolition within the cost of construction projects. Demolition made possible by new construction can also be funded from other appropriations. The Army already has a system to track the net effect of construction and disposal to ensure a one-for-one reduction in square foot inventory for each construction project. There are specific cases, such as construction associated with new missions, where this is not possible. Nevertheless, the Department currently supports and will take further steps to emphasize the need to maximize demolition where feasible.

# Major Contributors to This Report

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