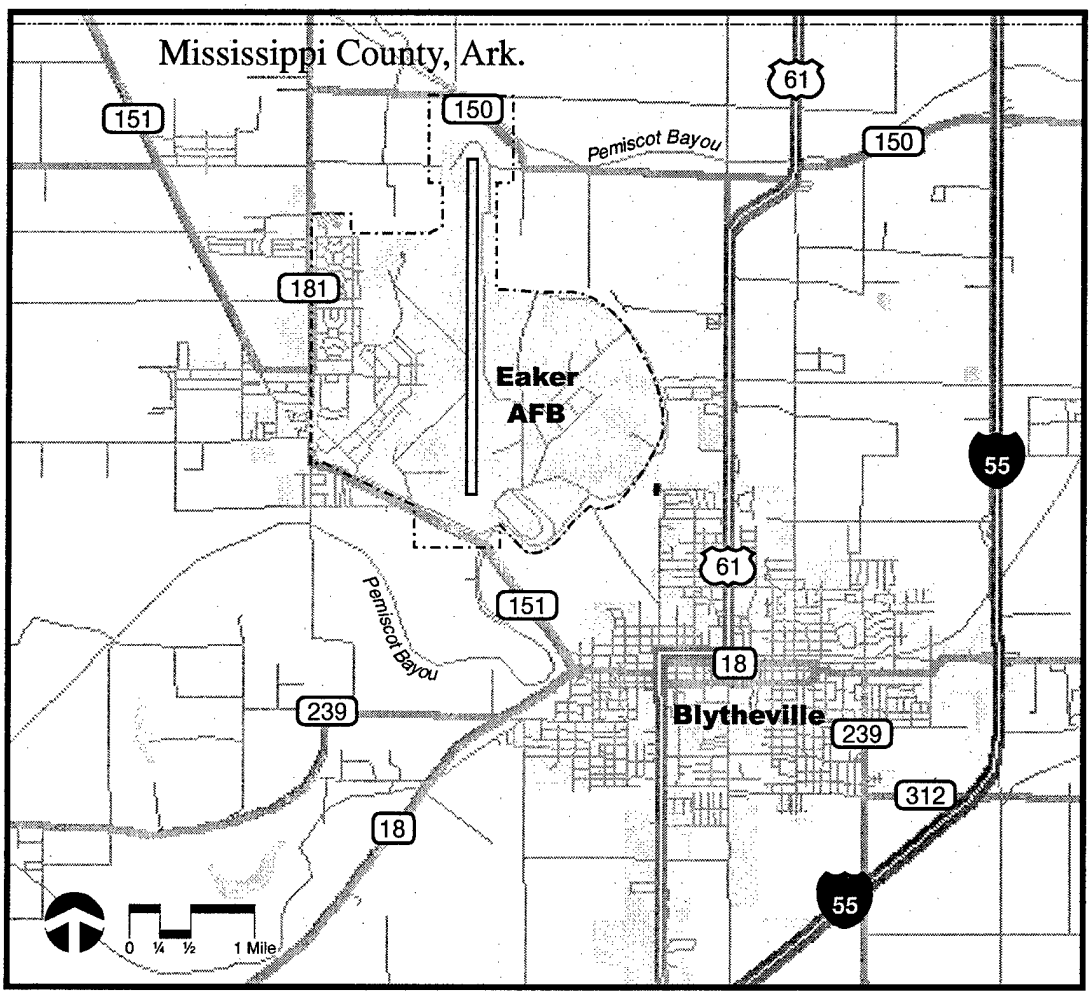
Assessment of Potential Archaeological Collections Facility Sites at Eaker Air Force Base, Blytheville, Arkansas

Archaeological Curation-Needs Assessment
Architectural-Archaeological Report No. 2



U.S. Army Corps of Engineers
St. Louis District
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In 1994, the Arkansas Archeological Survey (AAS), a unit of the University of Arkansas, contacted the St. Louis District for assistance in evaluating the feasibility of using an existing building on Eaker Air Force Base for the Mississippi Valley Cultural Heritage Center—a proposed central facility devoted to the curation needs of archaeological materials recovered from the region and to their academic and educational use. A St. Louis District architectural feasibility team evaluated five extant buildings and provided recommendations on each one's applicability for use. Two buildings—Building Numbers 552 and 1225—could be rehabilitated as a central curation facility. Cost estimates for the rehabilitation of each of these buildings, along with a cost estimate for a new, preengineered building, provide the AAS with comparative data for the planning process.

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Introduction

Archaeological collections are an important, nonrenewable cultural resource. However, curation of many archaeological collections has been largely substandard or ignored for 50 years or more. The result has been that progressive deterioration of these resources, which include many unique prehistoric and historical-period objects. A key factor relevant to the preservation of any archaeological collection is the repository in which it is stored.

The Arkansas Archeological Survey (AAS), a unit of the University of Arkansas, Fayetteville, requested the assistance of the U.S. Army Corps of Engineers, St. Louis District, to evaluate several existing buildings located on Eaker Air Force Base (AFB; Figure 1) as potential candidates for use as the Mississippi Valley Cultural Heritage Center (MVCHC). The concept of the MVCHC came about because the Mississippi Valley region was in need of a central facility devoted to curation needs of archaeological materials recovered from the region and to their scholarly study and interpretation for the public.

The AAS decided to study the feasibility of using an existing building at Eaker AFB as a cultural heritage center. Eaker AFB was selected for the site of the proposed center because of its central location in the United States, its location near the center of the Mississippi Valley, the availability of existing buildings on the base, and most importantly, its proximity to nationally important archaeological sites (Figure 2). Until a few years ago, Eaker AFB was an active military installation considered strategic to the nation's defense network. It was closed in December 1992 as a result of the Base Realignment and Closure Act. As a result, many substantial buildings, some only a few years old, were vacated. In addition to having a number of vacant buildings, Eaker AFB is the location of many significant Native American archaeological sites (Figure 3).

The evaluation team consisted of Richard L. Siemons, AIA, and Dawayne Sanders, P.E. The St. Louis District appreciates the assistance provided by the Blytheville-Gosnell Regional Airport Authority during the preparation of this report, specifically Rick Johnson and Dwayne Oliver.

This report comprises four chapters in addition to this introduction. Chapter 2 contains a building design for the MVCHC and a discussion of the spaces needed in order for the staff of the proposed facility to carry out the functions implied by its mission. Chapter 3 includes evaluations of five existing buildings at Eaker AFB in terms of the feasibility for use as the MVCHC. Chapter 4 is a summary of the building evaluations and an explanation of cost estimates for rehabilitating the two buildings at Eaker AFB deemed most appropriate for use as the MVCHC. Also presented is an estimate of the cost of constructing a new preengineered building to serve as the heritage center.

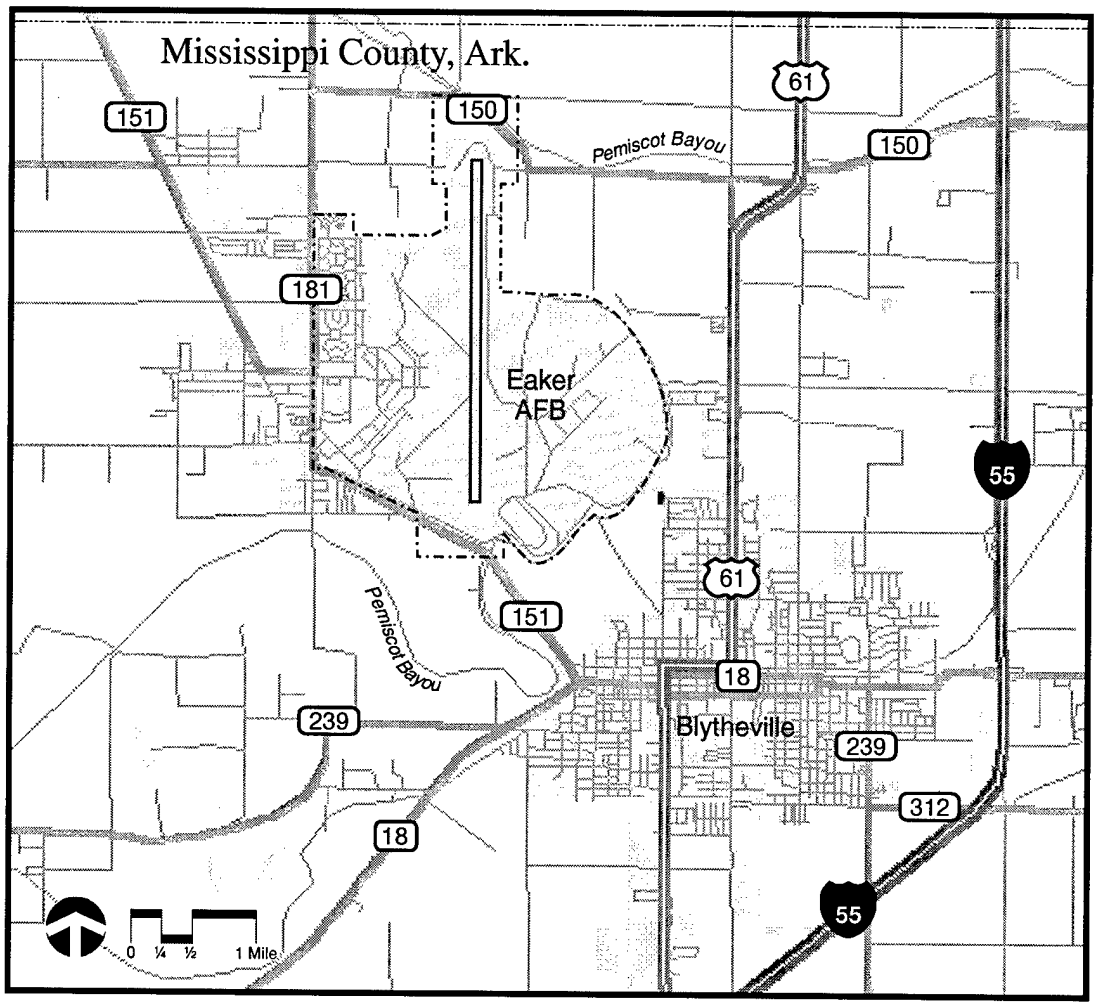

Figure 1. Eaker AFB and vicinity.

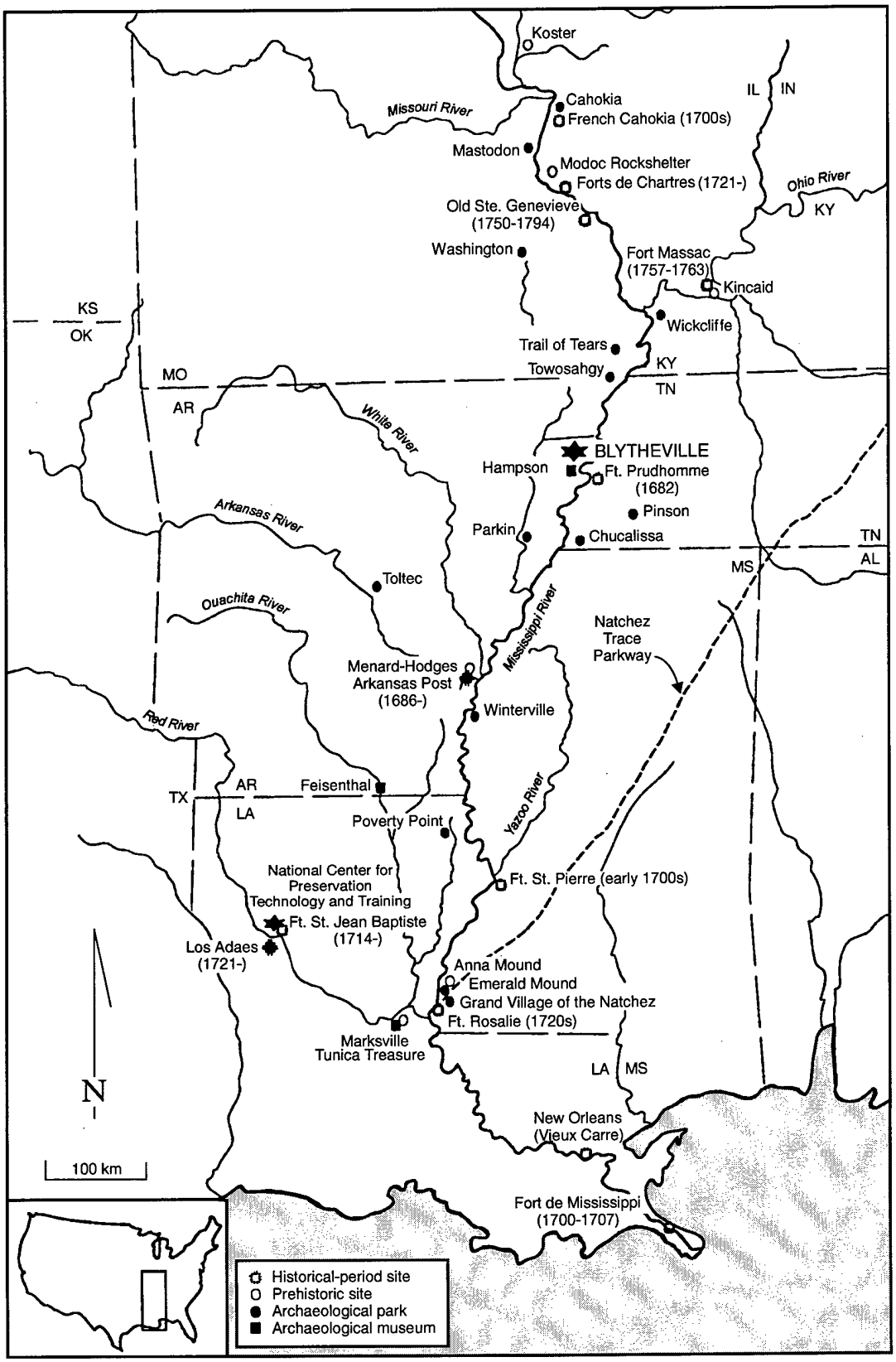

Figure 2. Nationally important prehistoric and historical-period sites in the middle and lower Mississippi River valley.

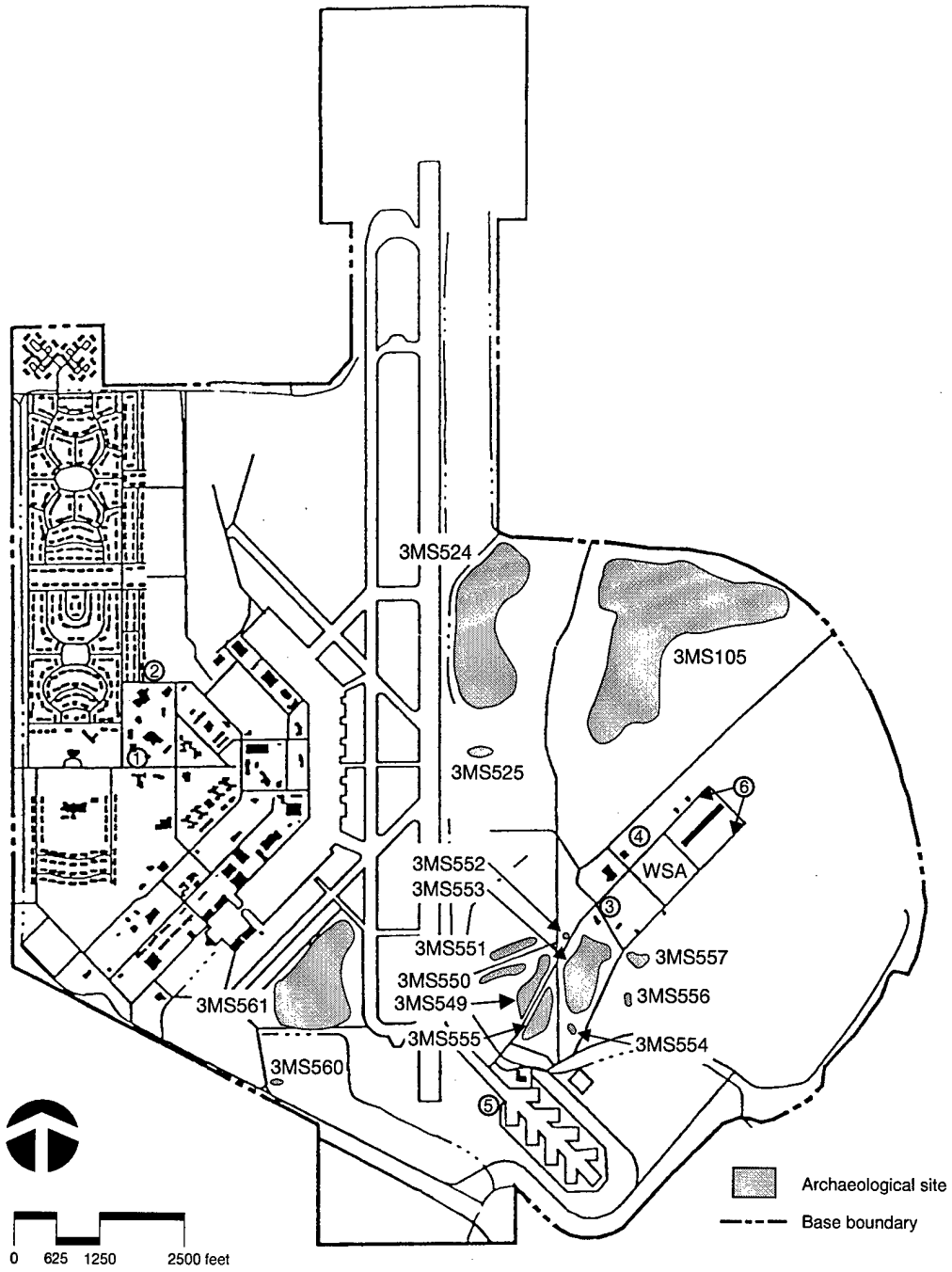

Figure 3. Map of Eaker AFB showing the locations of (a) significant Native American archaeological sites and (b) buildings evaluated for use as the MVCHC.

2

The Proposed Mississippi Valley Cultural Heritage Center

The mission of the proposed MVCHC is to interpret the early cultural history of the central and lower Mississippi River valley and to be an archaeological curation center serving the needs of state and federal agencies in the region. It is anticipated that interpretive and educational programs, curation and conservation services, and research will be carried out at the center, and that these functions would attract tourists, scholars, teachers, and scientists to the facility. The proposed center would serve as both a museum/visitor center and an archaeological curation facility. The purposes of the facility can be further divided into educational, curation and conservation, and research.

The educational goals will be implemented by interpreting the past and conducting guided tours of archaeological sites. Necessary areas include an exhibit room, an exhibit shop or work room, an archives library, and an artifact-examination room. The exhibit area will include space for permanent, temporary or seasonal, and traveling exhibits. The exhibit shop will allow for the assembly and repair of permanent exhibits, fabrication of temporary exhibits, and the crating and unpacking of traveling exhibits. Space has not been allocated for conducting tours.

Curation activities consist of caring for, cleaning, and processing archaeological materials for storage and exhibit. Large, valuable collections from the Mississippi Valley region, including those from state and federal agencies, are earmarked for curation in this facility. Necessary areas include storage and holding rooms, cleaning rooms, and an artifact-processing room.

To implement the research goal, materials and records must be made available to the public, scholars, and educators for study; space must be provided where research can be conducted. These requirements include an archives library, an artifact-examination room, and research-layout space.

Once the functions of the proposed MVCHC had been established, it was possible to estimate the space needs of the facility. These estimates are presented in Table 1.

The following assumptions were made when estimating office space, based on an estimate of 17–20 employees.

1. The conservator will work in the conservation laboratory and will not require a separate office elsewhere in the building.

2. The gift shop manager will work in the gift shop.

3. The exhibit designer and assistant will share office space.

4. The carpenter will work in the exhibit shop or work room.

5. The three part-time employees will work in the conservation laboratory, artifact-processing room, and the washing/sorting/drying areas.

6. The computer specialist will work in the computer laboratory.

Estimates for the space needs of various employees are presented in Table 2.

The following assumptions were made when estimating artifact storage space.

Table 1.
Proposed Space Requirements for the MVCHC, by Function

Proposed Functional Space	Size (ft^2)
Exhibits	6,400
Exhibit shop (work room)	750
Conservation laboratory	750
Artifact-processing room	1,000
Artifact-storage room	4,256 [a]
Washing/sorting/drying area	500 [b]
Research area	1,200
Archives & library (includes records & photographs)	800
Computer room	500
Gift shop/sales area	750
Staff offices (11–12)	1,310 [c]
Receiving and unloading area	100
Dirty storage	150
Extermination (freezers)	100
Hazardous chemicals storage	100
Mechanical room(s)	1,000
Rest rooms	1,000
Storage	1,000
Artifact-examining room	150
Multipurpose (meetings, audiovisual)	300
Corridors	750
Total	22,866 [d]

[a] With expansion potential to 21,280.
[b] Separate into individual rooms.
[c] See Table 2.
[d] With expansion capacity to 39,880.

Table 2.
Proposed Space Needs for MVCHC Employees

Employee Category	Size (ft^2)
Museum & curation section	
Director	150
Head curator	100
Assistant curator	100
Assistant curator	100
Education specialist	100
Interpreter 1	80
Interpreter 2	80
Exhibit designer & assistant	150
Secretaries (2)	150
Research section	
Archaeologists (Ph.D)	100
Archaeologists (M.A.)	100
Secretary space	100
Total	1,310

1. Boxes will be stacked on two shelves; each shelf will be stacked two boxes high.

2. Shelving units will be a maximum of 8 feet high with 4-foot-wide access aisles between units.

3. Shelving units will be back to back (i.e., two 2-feet-wide units back to back, aisle, then 2 more shelves).

4. The number of shelving units will be based on the number of boxes rather than the volume of artifacts.

5. The majority of artifacts are lithics and ceramics.

6. From the analysis, initial space needs are estimated at 22,900 ft^2, with a potential for future expansion of up to 39,900 ft^2.

The specifications developed above are used in the following chapter as the basis for evaluating the potential for five buildings at Eaker AFB to serve as the MVCHC.

3

Evaluations of Buildings at Eaker AFB

Five buildings at Eaker AFB were evaluated by St. Louis District personnel as to their appropriateness to serve as the MVCHC (see Figure 3). These include the Base Exchange Building No. 552, Commissary Building No. 556, Missile Assembly Building No. 1285, Missile Storage Shop No. 1286, and Alert Building No. 1225. The findings and recommendations for each are presented below.

When this project began, two groups of storage bunkers were considered by the AAS as potential candidates for artifact-storage areas. However, as the program requirements were defined, the bunkers were dropped out of consideration. As a result, no attempt was made to estimate the cost for using the bunkers. This decision is based on the understanding that the bunkers are suitable as storage space and nothing else. To fulfill the educational goals for the center, artifact storage should be adjacent to the research areas, rather than in a remote location.

Base Exchange Building No. 552

Base Exchange Building No. 552 (Figure 4) was constructed in 1956 and renovated in 1987; it encompasses 32,925 ft^2 (Figure 5). The initial space needed for the proposed MVCHC is 22,866 ft^2, with a potential for future expansion up to 39,880 ft^2. The expansion needs are for additional artifact-storage space; this will presumably become necessary within approximately 10 years. The initial need for 22,866 ft^2 can be met immediately, with 10,069 ft^2 unoccupied until a later time when the space will be needed. When the total of 39,880 ft^2 is needed, the storage area can be remodeled into a two-level plan. This will double the amount of storage space.

Many of the spaces within the existing building were constructed for uses similar to that needed for the proposed MVCHC. For example, the building has a loading dock, dock leveler, and receiving area, which could be used with no alteration for the MVCHC. In general, only minor structural modifications would be necessary to adapt the building to the proposed use. The majority of space in the existing building is single story; however, a portion of the building is a two-story space currently occupied with a steel mezzanine and two levels of storage (Figure 6). Medium-duty steel shelving remains from the building's previous use as the base exchange. Existing shelving would suffice for lightweight objects, but heavy-duty shelving units would be necessary to support the weight of lithic collections. The current square footage could be doubled by utilizing the mezzanine concept for storage when additional storage space is needed.

Adjacent to the main entrance are a series of rooms that formerly housed retail shops. These rooms can be converted to offices with little modification. Beyond the former retail areas, still close to the main entrance, is a large open space that can be modified to serve as exhibit space by making substantial changes to the

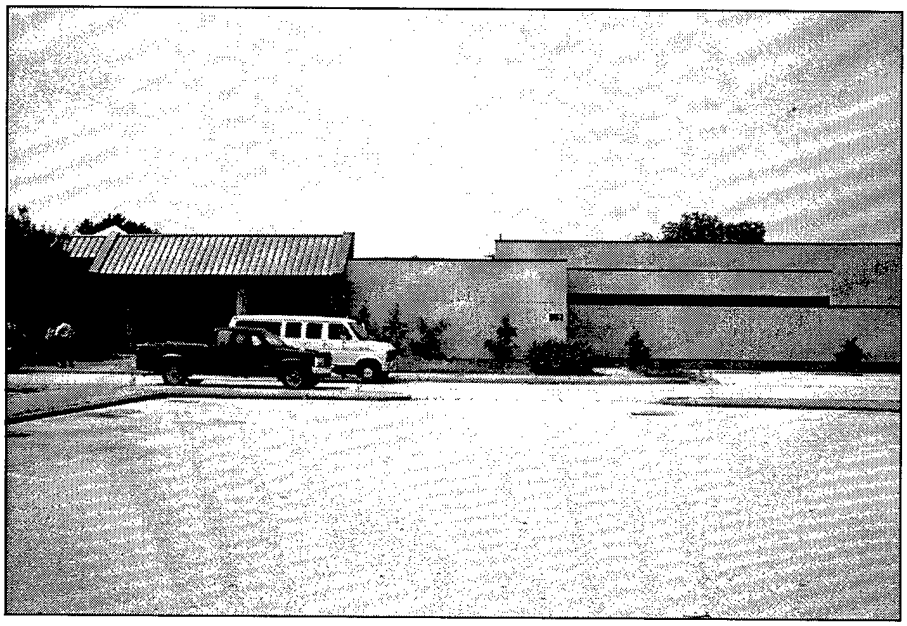

Figure 4. Base Exchange Building No. 552.

finishes and lighting (Figure 7). Processing areas can be located in the existing rooms at the south end of the building, adjacent to the storage area.

Base Exchange Building No. 552 is recommended as one of two potential buildings at Eaker AFB that could be rehabilitated for use by the AAS as the MVCHC.

Commissary Building No. 556

Constructed in 1959, and first renovated in 1973, this building (Figure 8) encompasses 38,575 ft^2. The superstructure is a steel frame, and the exterior is a combination of exterior insulation and finish (EIFS) and steel siding. The main entrance has a pleasant appearance and is consistent with a public, commercial building. Some existing areas within the building are similar to those needed for the proposed MVCHC. For example, the existing refrigeration rooms and food-processing areas could be modified to serve as specialized storage, cleaning, and processing areas, respectively. Although similar in function, the existing areas are much too large for the proposed cultural heritage center; a significant initial cost to the user would be required to renovate these areas.

The existing warehouse space is three-stories high (32 feet high), encompasses approximately 10,000 ft^2, and contains many heavy-duty storage racks. The storage racks (Figure 9) are approximately 20 feet high and must be accessed by mechanical lifting devices. This storage environment was used for bulk items such as furniture or large boxes; it is doubtful that this large space could be put to a productive use without significant alterations and additions of intermediate floor levels. This building is not considered to be a reasonable choice for use by the AAS as the MVCHC.

Missile Assembly Building No. 1285

This is a reinforced-concrete building with exterior, metal siding (Figure 10). The building was constructed in 1985; it encompasses 32,336 ft^2, of which approximately 28,104 ft^2 is ideal for industrial or manufacturing uses (Figure 11). The

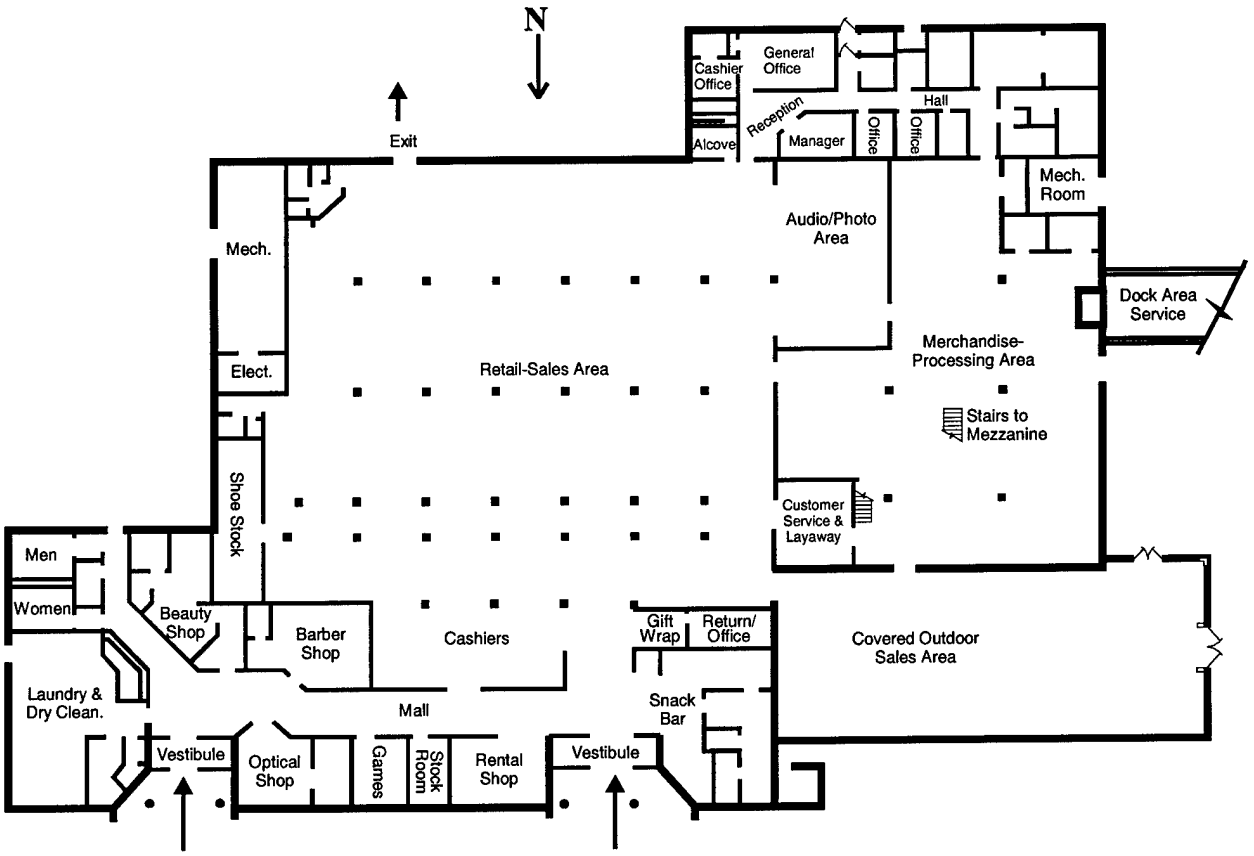

Figure 5. Floor plan of Building No. 552 (not to scale).

remaining 4,232 ft^2 is best utilized as office space. A very substantial building in good condition, it has a continuous overhead crane rail that connects all of the industrial rooms (Figure 12). The industrial areas are accessed through 12-x-20-foot swinging doors.

The industrial nature of this building makes it ideal for heavy manufacturing or assembly. One can visualize large industrial parts being attached to the overhead crane and carried to and through various rooms for assembly, painting, or finishing.

The Blytheville-Gosnell Regional Airport Authority is of the opinion that the best use of this building will include some type of manufacturing function. After inspecting the building, we agree with this conclusion and find that the building would be underutilized as a cultural heritage center. This building is not recommended for use by the AAS as the MVCHC.

Missile Storage Building No. 1286

Constructed in 1985, this preengineered, metal building is in very good condition and encompasses 8,951 ft^2. The building has a heavily reinforced concrete floor that can support substantial loads. Overhead, rolling doors allow vehicle access into and through the building (Figure 13). The interior height from the floor to the bottom of the roof structural members is 31 feet; the building could be divided vertically with an additional floor. Because the building was originally used for storage, it has an unfinished interior. As a result, the entire structural system is exposed to view and uncluttered. These characteristics make the building ideal for future development, because there is very little to modify in the building, and construction could easily begin without

Figure 6. Interior view of Building No. 552 showing existing steel shelving.

Figure 7. Interior view of Building No. 552 showing open area adjacent to main entrance that can be modified for use as exhibit space.

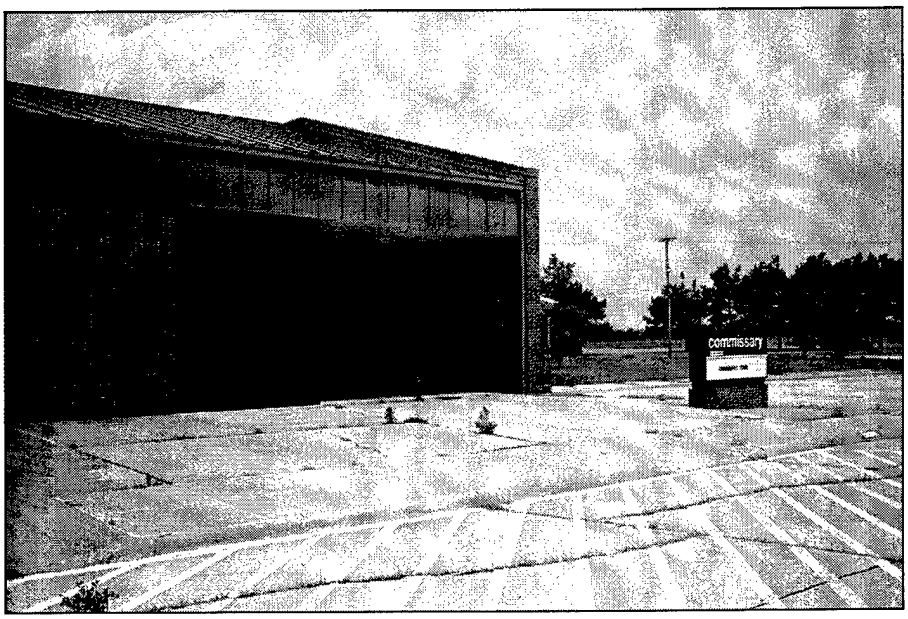

Figure 8. Commissary Building No. 556.

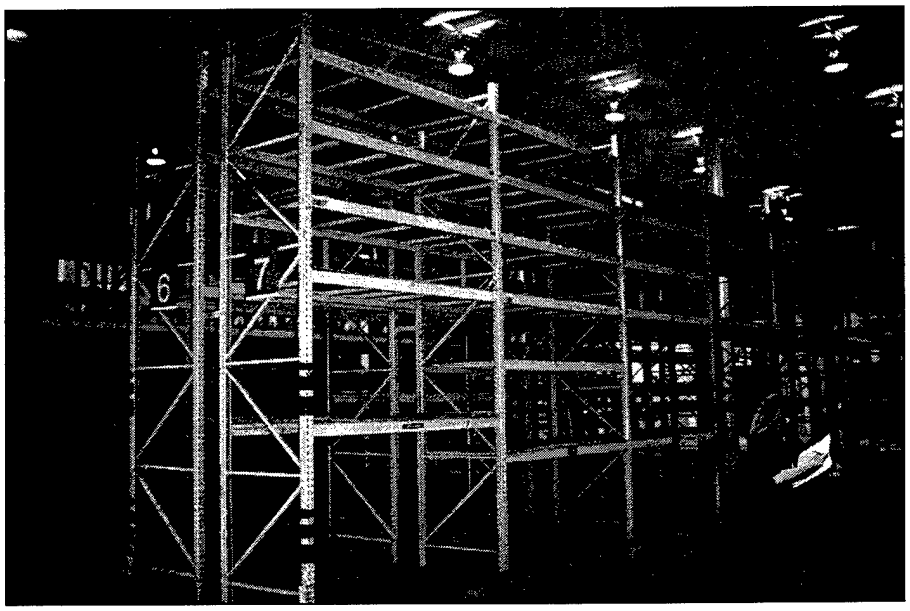

Figure 9. Interior view of Building No. 556 showing warehouse space.

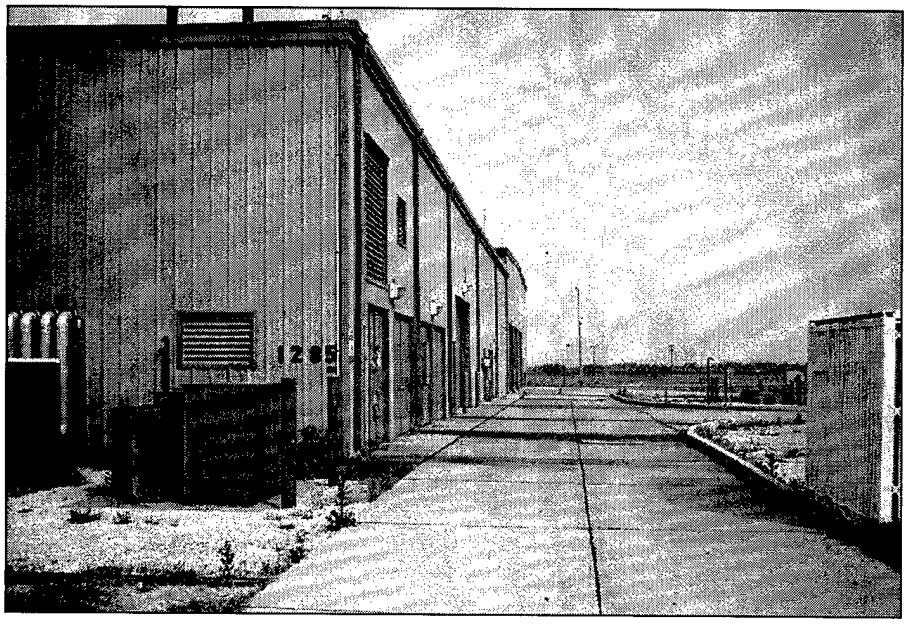

Figure 10. Missile Assembly Building No. 1285.

first removing existing finishes or unusable systems. Unfortunately, the program requirements for the MVCHC call for an initial area of 22,900 ft^2. Building No. 1286 is thus too small, even if a second floor was added. This building is not recommended for further consideration by the AAS as the MVCHC.

Alert Building No. 1225

This building was constructed in 1960, and an addition was built in either 1985 or 1986. This is a two-story building that encompasses 28,891 ft^2. The building is different from the other buildings discussed in this report because the first floor (which is at natural ground level) is earth-sheltered. An earthen berm extends from the natural ground level to just below the second-floor level. The lower level was formerly used as sleeping quarters for pilots and is partitioned into individual sleeping rooms (Figure 14). The upper level contains cooking and dining areas, recreational spaces, a meeting room with an audiovisual projection area, and offices (Figure 15).

The building is well suited to the long-term storage of archaeological collections. Because of the sensitive and fragile nature of archaeological materials, temperature and humidity controls necessary to maintain a stable interior environment are crucial to the preservation of artifacts. As a result, a significant, long-term energy cost is associated with maintaining an environmentally stable storage area. The advantage offered by the alert facility is that the first floor is naturally insulated by an earthen berm, which will significantly reduce energy costs compared to the other facilities at Eaker AFB being considered for use as the MVCHC.

Additionally, the lower level is partitioned off into many separate rooms. This would allow ample space for collections storage, and individual collections could be stored intact. This would likely be viewed as an attractive feature to curators.

The disadvantage of using this building as the MVCHC is that none of the existing entrances is well suited for a public facility. To enter the building at ground level and at the lower level, one must walk through a tunnel walkway. To access the upper level from ground level, one must walk up a long ramp. Neither of these means of access is desirable for public use.

To take advantage of the earthen berm for energy conservation requires the lower level to be used primarily for storage and processing areas

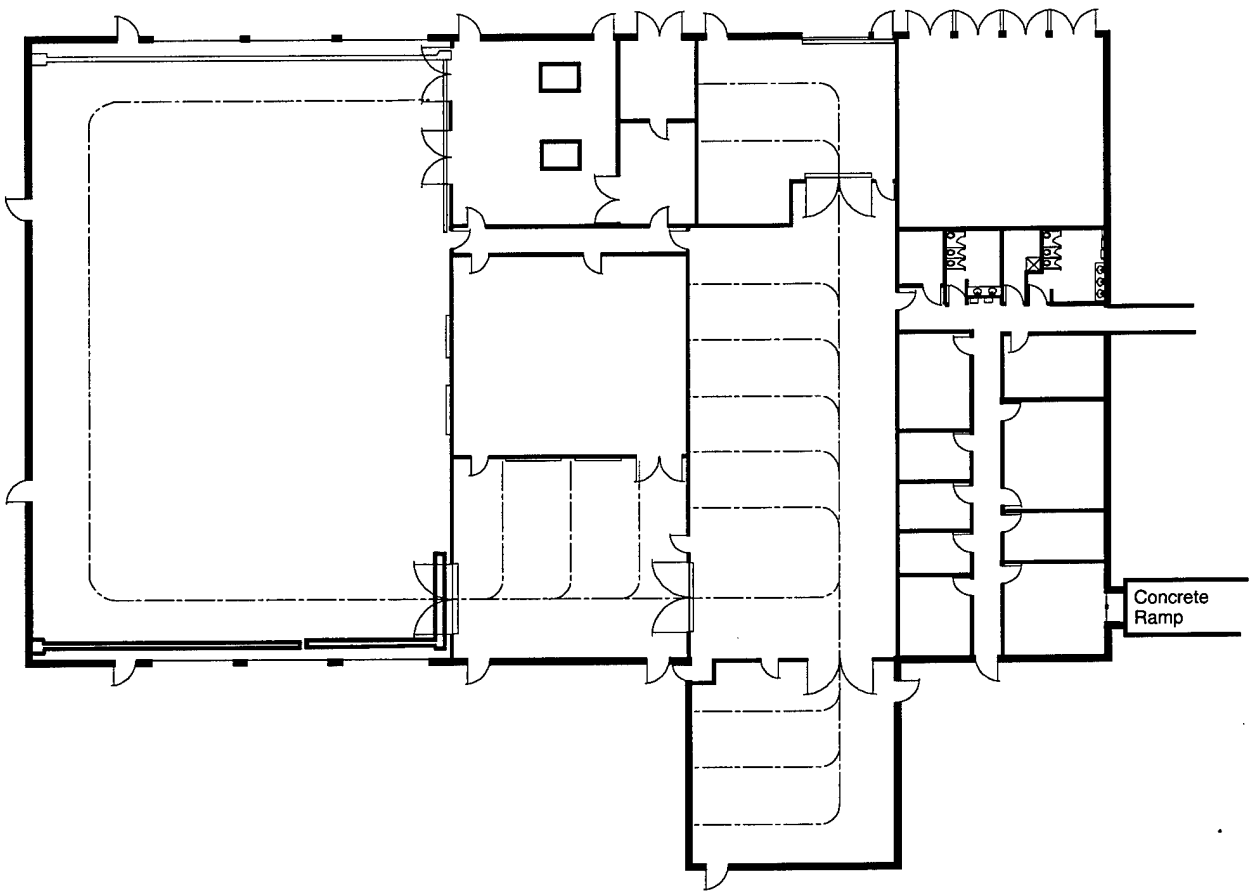

Figure 11. Floor plan of Building No. 1285 (not to scale).

and the upper level to be used for artifact exhibition, public spaces, and administrative offices. Ideally, the public should enter at the upper level.

To remedy this, it is proposed to create a public entrance at the lower level with means to transport people to the upper level immediately after they enter the building. This would be accomplished by removing a portion of the earthen berm and replacing it with an entrance plaza, constructing an appropriate lobby, and installing an elevator. These solutions would resolve the need for an appropriate public and handicapped-accessible entrance while taking advantage of the existing earthen berm for storage at the lower level.

The Alert Building No. 1225 is the second of two buildings (the other being the Base Exchange Building No. 552) at Eaker AFB recommended for rehabilitation for use by the AAS as the MVCHC.

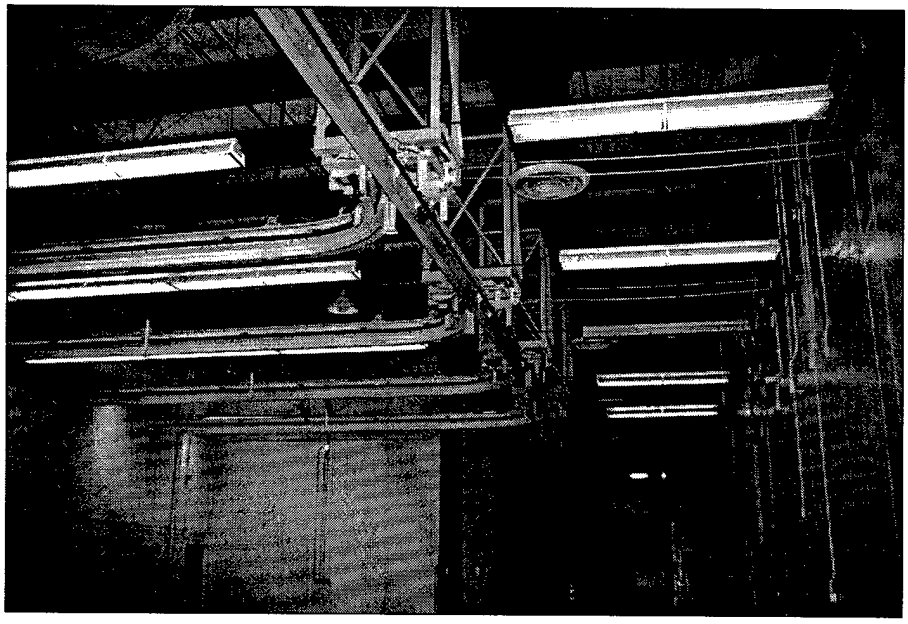

Figure 12. Interior view of Building No. 1285 showing overhead crane and doors that separate the rooms.

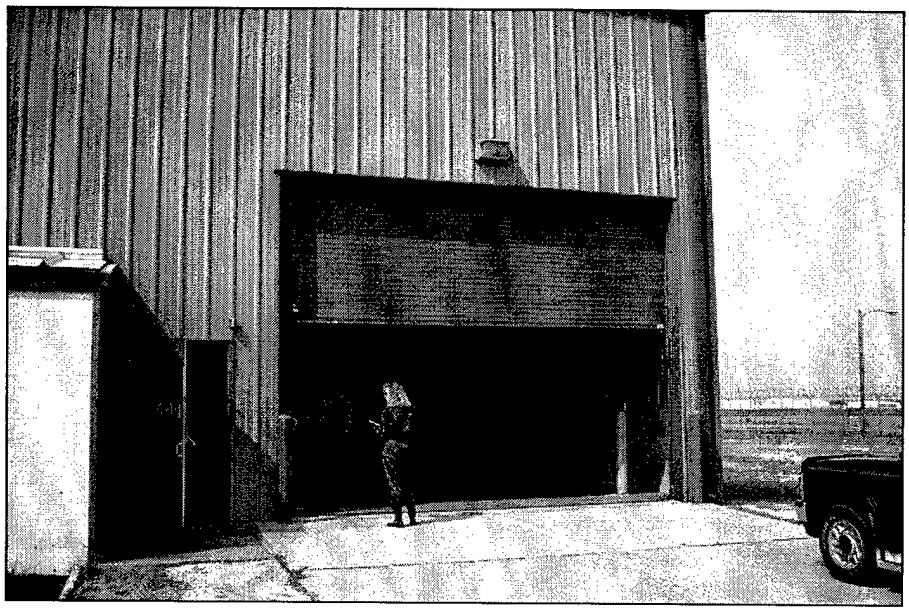

Figure 13. Missile Storage Building No. 1286.

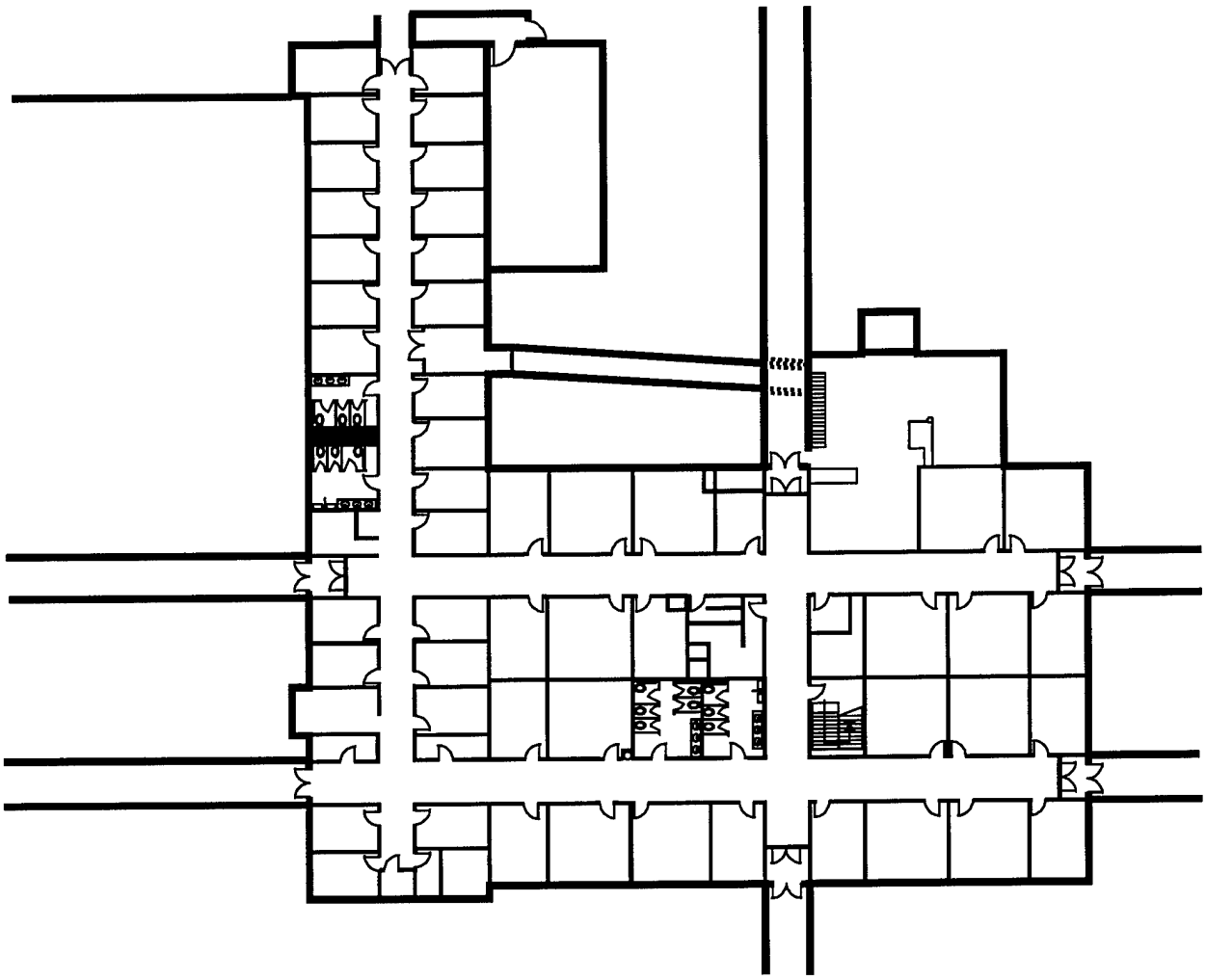

Figure 14. Floor plan of Building No. 1225, lower level (not to scale).

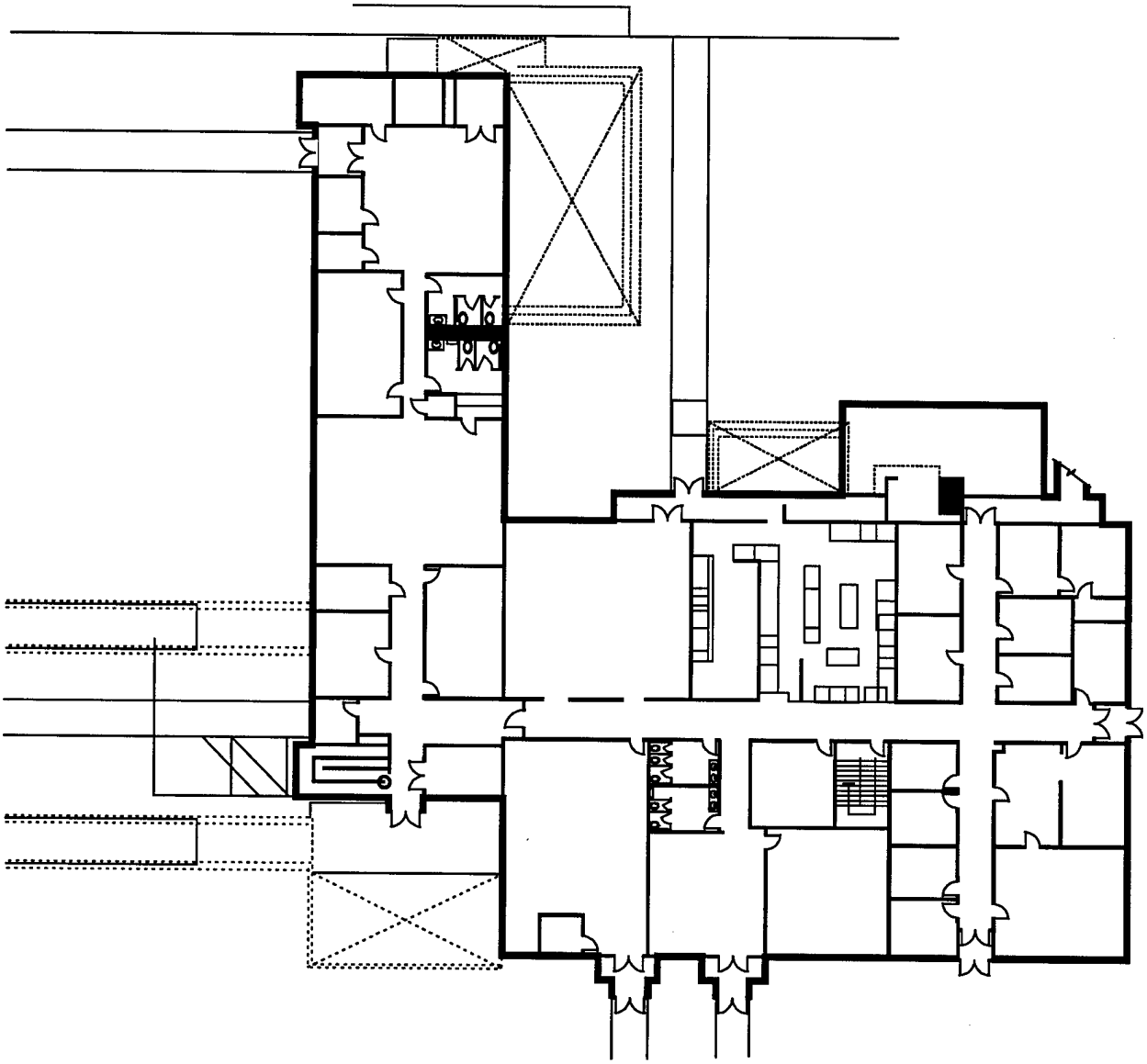

Figure 15. Floor plan of Building No. 1225, upper level (not to scale).

4

Summary and Explanation of Cost Estimates

The following five buildings were visited and evaluated for this project.

1. Base Exchange Building No. 552
2. Commissary Building No. 556
3. Missile Assembly Building. No. 1285
4. Missile Storage Building No. 1286
5. Alert Building No. 1225

Of these five, Base Exchange Building No. 552 and Alert Building No. 1225 were determined to be potentially appropriate for use as the MVCHC. Preliminary cost estimates for the rehabilitation of each of these two buildings were prepared (Tables 3 and 4). The remaining three buildings were determined to be inappropriate for use as the MVCHC, and cost estimates were not prepared for these buildings. A third cost estimate was prepared covering the construction of a new preengineered building (Table 5). The third estimate was calculated to serve as a basis for comparison with the Base Exchange and Alert Building estimates.

Estimates do not include land, site renovation, or equipment costs. In the case of the new, preengineered metal building, a cost for parking space is not included in the estimate. Nevertheless, both of the recommended buildings have outdoor, paved areas suitable for parking. The three estimates are of a preliminary nature; we suggest that more-detailed estimates be prepared subsequent to design activity.

Table 3.
Government Cost Estimate for Rehabilitation of Base Exchange Building No. 552, Eaker AFB

Item	Quantity	Unit	Unit Price ($)	Estimated Amount ($)
Site work	100	cy	7.00	700
Remove debris (ceiling material)	23,873	sf	0.65	15,517
Remove existing and clean floor	23,873	sf	0.30	7,162
Floor system				
Floor covering—vinyl	23,873	sf	1.70	40,584
Interior partitions—6-inch metal studs and GWB	500	lf	36.00	18,000
Interior painting—2 coats (new walls)	9,000	sf	0.60	5,400
Interior painting—2 coats (existing walls)	20,000	sf	0.30	6,000
Ceiling—suspended acoustical	23,873	sf	2.00	47,746
Doors (existing)				
Cleaning and painting	50	each	50.00	2,500
New doors—pair 3 x 7 feet	5	each	900.00	4,500
Roof repair (50% of roof area)	16,465	sf	2.80	46,102
Miscellaneous items				
Service existing dock leveler	1	each	500.00	500
Cabinetry (built-in)	95	lf	200.00	19,000
New toilets (men's, women's, and showers, each)	750	sf	20.00	15,000
Clean covered outdoor area (floor and walls)	2,850	sf	1.00	2,850
Paint-covered outdoor area	2,600	sf	0.30	780
Mechanical items				
HVAC system	32,925	sf	8.00	263,400
Plumbing	sum	job		17,000
Sprinkler system	sum	job		63,000
Electrical (distribution and lighting)	32,925	sf	8.16	268,668
Security system	sum	job		15,000
Subtotal				859,409
Contingencies (~25%)				214,591
Construction cost per square foot ($/sf)				32.60
Total construction costs				1,074,000

Note: The price level for this estimate is October 1994.

Table 4.
Government Cost Estimate for Rehabilitation of Alert Building No. 1225, Eaker AFB

Item	Quantity	Unit	Unit Price ($)	Estimated Amount ($)
Site work (excavate berm, 2 entrances)	880	cy	7.00	6,160
Concrete pavement and base course	800	sy	22.00	17,600
Preengineered elevator	sum	job		60,000
Demolition for elevator	sum	job		25,000
Remove existing and clean floor	28,891	sf	0.30	8,667
Floor system				
Floor covering—vinyl	28,891	sf	1.70	49,115
Sidewalk				
Concrete sidewalk—4 inches	21	cy	200.00	4,200
Welded wire fabric, 6 x 6-w4 x w4 (58#/csf)	17	csf	46.00	782
Interior partitions—8-inch CMUs (new walls)	7,500	sf	6.00	45,000
Interior painting—2 coats (new walls)	7,500	sf	0.60	4,500
Interior painting—1 coat (existing walls)	42,900	sf	0.30	12,870
Ceiling—suspended acoustical	11,450	sf	2.00	22,900
Doors, existing				
Clean and paint existing doors	80	each	50.00	4,000
Install door—8 x 8 feet, overhead	1	each	1,200.00	1,200
Miscellaneous items				
Loading dock and dock leveler	1	each	5,000.00	5,000
Entry display case	20	lf	300.00	6,000
Cabinetry, built in	95	lf	200.00	19,000
ADA compliance (toilets and rest rooms)	sum	job		20,000
Mechanical items				
HVAC system	28,891	sf	8.00	231,128
Plumbing	sum	job		15,000
Sprinkler system	sum	job		55,000
Electrical (distribution and lighting)	28,891	sf	8.16	235,751
Security system	sum	job		15,000
Subtotal				863,873
Contingencies (~25%)				216,127
Construction cost per square foot ($/sf)				37.40
Total construction costs				1,080,000

Note: The price level for this estimate is October 1994.

Table 5.
Government Cost Estimate for Construction of a New, Preengineered Building, Eaker AFB

Item	Quantity	Unit	Unit Price ($)	Estimated Amount ($)
Preengineered metal structure, 16-foot eave height				
Materials, erection, and insulation	22,900	sf	6.20	141,980
Metal siding	9,700	sf	5.00	48,500
Valley gutter	50	lf	10.00	500
Site work (cut, fill, and grading)	1,670	cy	7.00	11,690
Floor system				
Concrete floor slab, 6 inches	424	cy	180.00	76,320
Welded wire fabric, 6 x 6—w4 x w4 (58#/csf)	229	csf	46.00	10,534
Crushed stone, 4 inches compacted	421	ton	15.00	6,315
Floor covering—vinyl	22,900	sf	1.70	38,930
Wall foundation				
Concrete foundation wall	45	cy	250.00	11,250
Concrete reinforcement	5,344	lb	0.80	4,275
Footings				
Concrete spread footings	58	cy	160.00	9,280
Concrete reinforcement	6,914	lb	0.80	5,531
Retaining wall				
Concrete retaining wall	23	cy	250.00	5,750
Concrete reinforcement	2,725	lb	0.80	2,180
Sidewalk				
Concrete sidewalk—4 inches	21	cy	200.00	4,200
Welded wire fabric, 6 x 6—w4 x w4 (58#/csf)	17	csf	46.00	782
Interior partitions—8-inch CMUs	13,930	sf	6.00	83,580
Interior painting—2 coats	21,450	sf	0.60	12,870
Ceiling, suspended acoustical	11,450	sf	2.00	22,900
Doors (includes door frames)				
Doors—pair 3 x 7 feet	3	each	900.00	2,700
Doors—single 3 x 7 feet	14	each	500.00	7,000
Doors—pair 4 x 10 feet	2	each	1,100.00	2,200
Doors—8 x 8 feet, overhead	1	each	1,200.00	1,200

Item	Quantity	Unit	Unit Price ($)	Estimated Amount ($)
Miscellaneous items				
Loading dock and dock leveler	1	each	5,000.00	5,000
Entry display case	20	lf	300.00	6,000
Cabinetry	95	lf	200.00	19,000
Mechanical items				
HVAC system	22,900	sf	8.00	183,200
Plumbing	sum	job		12,000
Sprinkler system	sum	job		44,000
Electrical (distribution and lighting)	22,900	sf	8.16	186,864
Security system	sum	job		6,000
Subtotal				972,531
Contingencies (~25%)				243,469
Construction cost per square foot ($/sf)				53.10
Total construction costs				1,216,000

Note: The price level for this estimate is October 1994.