
DDESS Facility Transfer Study Facility Condition Report (Final)



Fort Campbell, Kentucky

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PSC Project # 03811102



Parkhill, Smith & Cooper, Inc.
Engineers ■ Architects ■ Planners

FORT CAMPBELL SCHOOLS
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT

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**BARKLEY ELEMENTARY SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Barkley Elementary School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 77,800 square foot, one-story masonry veneer building originally constructed in 1954 with several building additions and renovations. The most recent addition was a 4-classroom PTR addition in 2001. This facility serves 609 students from prekindergarten to fifth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete in addition to several ADA issues and some life safety issues. This facility requires alterations to correct deficiencies in the plumbing system and roof, as well as ADA and life safety issues.

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$871,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$140,000

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$1,235,000

Total remediation project costs are approximately \$2,246,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$11,142,000. By comparing the remediation costs, plant replacement costs and the age of the

building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment required for a new building. The ratio for Barkley Elementary School is .49. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEN D
67	*39.5	*27.5	11,142,000	166,300	2,246,000	81,700	.49	Renovate

* Indicates Composite Number



Roof Ponding



Paving in Poor Condition

**FORT CAMPBELL HIGH SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Fort Campbell High School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 106,200 square foot, one-story masonry veneer and precast concrete panel building originally constructed in 1986 with additional construction in 1988, 1990, 1991 and 1997. This facility serves 618 students from ninth to twelfth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete. This facility requires alterations to correct deficiencies in the mechanical system, plumbing system and roof, as well as ADA and life safety.

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$3,400,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$0

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$1,532,000

Total remediation project costs are approximately \$4,932,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$16,924,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recaptalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment

required for a new building. The ratio for Fort Campbell High School is .38. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*15.5	*51.5	16,924,000	252,600	4,932,000	95,800	.38	Renovate

* Indicates Composite Number



Roof Flashing Problem



Non-compliant Door

**JACKSON ELEMENTARY SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Jackson Elementary School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 78,500 square foot, one-story masonry veneer building originally constructed in 1957 with additional construction in 1966, 1985 and 1991. This facility serves 655 students from pre-kindergarten to fifth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete, and code and life safety issues. This facility requires alterations to correct deficiencies in the plumbing system and structure, as well as life safety, ADA and site work.

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$1,539,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$66,000

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$723,000

Total remediation project costs are approximately \$2,328,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$11,226,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment

required for a new building. The ratio for Jackson Elementary School is .42. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*33.9	*33.1	11,226,000	167,600	2,328,000	70,300	.42	Renovate

* Indicates Composite Number



Foundation Problem at Broken Water Pipe



Typical Classroom with Horn but no Visual Alarm

**LINCOLN ELEMENTARY SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Lincoln Elementary School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 70,000 square foot, one-story masonry veneer building originally constructed in 1951 with additional construction in 1988, 1989, 1991, 1994 and 2001. This facility serves 634 students from pre-kindergarten to fifth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete, in addition to ADA and life safety code issues. This facility requires alterations to correct deficiencies in the mechanical system and roof, as well as ADA and life safety codes and asbestos abatement.

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation- Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$603,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$107,000

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, non-life-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$1,108,000

Total remediation project costs are approximately \$1,818,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$10,092,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is

defined as the required investment to correct deficiencies divided by the target investment required for a new building. The ratio for Lincoln Elementary School is .37. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*34.5	*32.5	10,092,000	150,600	1,818,000	55,900	.37	Renovate

* Indicates Composite Number



Damaged Brick



Roof Ponding

**LUCAS ELEMENTARY SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Lucas Elementary School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 80,000 square foot, one-story masonry veneer building originally constructed in 1996. This facility serves 529 students from pre-kindergarten to fifth grade.

Observed deficiencies primarily consisted of major building systems which are not functioning properly. This facility requires alterations to correct deficiencies in the mechanical system, plumbing system and roof, as well as current ADA guidelines.

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$768,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$0

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$79,000

Total remediation project costs are approximately \$847,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$11,448,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment required for a new building. The ratio for Lucas Elementary School is .08. A ratio over one

indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	6	61	11,448,000	170,900	847,000	13,900	.08	Renovate



Non-compliant Play Area



History of Roof Leak Here

**MAHAFFEY MIDDLE SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Mahaffey Middle School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 74,100 square foot, one-story masonry veneer and pre-cast concrete building originally constructed in 1967 with additional construction in 1988, 1990, 1992, 1994 and 1997. This facility serves 352 students from sixth to eighth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete. This facility requires alterations to correct deficiencies in the mechanical system, electrical system, plumbing system and roof, as well as asbestos abatement. It also requires work for ADA and life safety compliance.

Opinions of probable costs are calculated for immediate and long-term remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$3,771,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$0

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$1,344,000

Total remediation project costs are approximately \$5,115,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$10,852,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is

defined as the required investment to correct deficiencies divided by the target investment required for a new building. The ratio for Mahaffey Middle School is .73. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*23.5	*43.5	10,852,000	162,000	5,115,000	117,600	.73	Renovate

* Indicates Composite Number



Roof Deterioration



Bad Ceiling and Lighting

**MARSHALL ELEMENTARY SCHOOL &
FORT CAMPBELL SCHOOLS ADMINISTRATIVE OFFICES
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Marshall Elementary School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 82,400 square foot, one-story masonry veneer building originally constructed in 1961 with additional construction in 1963, 1967, 1985, 1987, 1990, 1991, 1992 and 2001. This facility serves 581 students from pre-kindergarten to fifth grade.

Observed deficiencies primarily consisted of major building systems which have worn out or become obsolete and ADA issues. This facility requires alterations to correct deficiencies in the mechanical system, roof, asbestos abatement, and ADA and life safety upgrades. (At the time of this printing, the mechanical and lighting replacement work needed has been awarded in a construction contract. Therefore, costs for this work have been removed from this study.)

Opinions of probable costs are calculated for immediate and longterm remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$540,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than longterm remediation costs.

Total Intermediate Remediation Costs \$82,000

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, nonlife-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$1,491,000

Total remediation project costs are approximately \$2,113,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is

\$11,792,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment required for a new building. The ratio for Marshall Elementary School is .34. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*31.5	*35.5	11,792,000	176,000	2,113,000	59,500	.34	Renovate

* Indicates Composite Number



Roof Ponding and Deterioration



HVAC Needing Replacement

**WASSOM MIDDLE SCHOOL
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
EXECUTIVE SUMMARY**

1.0 Executive Summary

Data obtained from the survey provides an objective and impartial evaluation of the Wassom Middle School for the Department of Defense Education Activity (DoDEA) in their object benefit analysis, to ascertain the feasibility of renovating or replacing facilities.

This facility is a 68,100 square foot, one-story masonry veneer and precast concrete building originally constructed in 1957 with additional construction in 1962, 1988, 1989, 1990 and 1992. This facility serves 437 students from sixth to eighth grade.

Observed deficiencies primarily consisted of ADA and life safety issues. This facility also requires alterations to correct deficiencies in the plumbing system, brick veneer and exterior site and lighting.

Opinions of probable costs are calculated for immediate and long-term remediation planning. Opinions of probable costs are listed in Paragraph 4.0 and are summarized as follows:

1. Immediate Remediation - Items recommended for repairs or replacement within one year to resolve life safety fire code requirements, ADA accessibility guidelines and potential major building system failures:

Total Immediate Remediation Costs \$723,000

2. Intermediate Remediation – Items such as force protection, additional site paving, Title IX compliance costs, or playground equipment or surfacing. These are items of lower priority than immediate costs, but are higher priority than long-term remediation costs.

Total Intermediate Remediation Costs \$0

3. Long-term Remediation - Items recommended for repair or replacement within one to ten years for deferred maintenance of aging systems, non-life-threatening issues, other code requirements and remainder of ADA accessibility guidelines:

Total Long-term Remediation Costs \$313,000

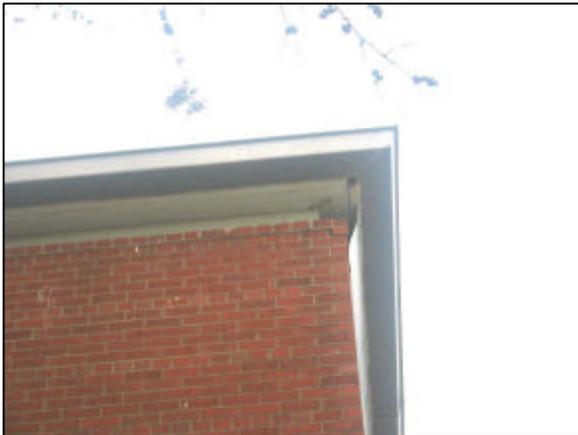
Total remediation project costs are approximately \$1,036,000.

The report scope also included the cost of Plant Replacement Value (PRV), defined as the cost of a new facility, including associated sitework and parking. The estimated PRV for this facility is \$10,013,000. By comparing the remediation costs, plant replacement costs and the age of the building, we determined a modified recapitalization metric (MRM) for this facility. This ratio is defined as the required investment to correct deficiencies divided by the target investment

required for a new building. The ratio for Wassom Middle School is .24. A ratio over one indicates it is more cost effective to build a new school rather than renovate the existing facility. It is our recommendation that the school be scheduled for renovation within the next year to correct immediate deficiencies and other repairs to major building systems be scheduled within the next ten years. A summary of the MRM calculation is shown below.

ESL(yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN. (Annual \$)	REMED. COSTS (\$)	REQUIRED INVEST. (Annual \$)	MRM	RECOMMEND
67	*38.2	*28.8	10,013,000	149,400	1,036,000	36,000	.24	Renovate

* Indicates Composite Number



Damaged Brick Veneer



Corridor Walls not to Deck

**FORT CAMPBELL SCHOOLS
FORT CAMPBELL, KENTUCKY
PROPERTY CONDITION REPORT
PURPOSE AND SCOPE**

2.0 Purpose and Scope

2.1 Survey Team

An inspection team from Parkhill, Smith & Cooper, Inc., Engineers-Architects-Planners, performed a Property Condition Assessment for these facilities in March and April of 2003. The administration and staff fully cooperated with the survey team. The survey is based on the process, scope and intent of ASTM E 2118-01 - Standard Guide for Property Assessments: Baseline Property Condition Assessment Process.

Parkhill, Smith & Cooper, Inc., working as an independent contractor, staffed the property survey with qualified registered professional architects and engineers as field observers. Each observer has experience commensurate with the subject property type and scope.

2.2 Published Standards

The following published standards, codes and guidelines were used for the property assessment survey:

- a. Americans with Disabilities Act Accessibility Guidelines (ADAAG) - ADA Standards for Accessible Design - 28 CFR Part 36, Revised July 1,1994 (ADAAG) - The Americans with Disabilities Act of 1990

This standard establishes guidelines for accessibility for individuals with disabilities under the Americans with Disabilities Act of 1990. The guideline specifies design tolerances for parking spaces, accessible routes, curb ramps, ramps, detectable warnings, signage, walkways, egress, entrances, exits, aisle and corridor widths, stairs, clear floor areas, toilets, doors, windows, drinking fountains, telephones, elevators, life safety warning systems and play areas.

The guideline specifies that no additions or alterations shall be undertaken which decreases accessibility or usability of a facility below that of new construction. Additions or alterations are not required to achieve greater accessibility than that required for new construction. Remediation recommendations are considered mandatory to achieve an acceptable facility.

The survey included a Tier I: Visual Accessibility Survey to identify possible problems concerning the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The survey was limited to observations during the walk-through survey and included path-of travel, parking, entrances/exits, signage,

public toilet rooms, drinking fountains, elevators/lifts, recreational facilities and alarm systems. The survey did not include physical measurements or counts for any component or system. Opinions of probable costs for ADA remediation are identified separately and are not combined with other physical deficiencies.

- b. ASTM E 2018-01 - Standard Guide for Property Assessments: Baseline Property Condition Assessment Process - American Society of Testing Materials International

This guide defines customary practice for conducting a baseline property condition assessment to identify and communicate physical deficiencies to a user in a Property Condition Report. Walk-through procedures are outlined recommending various systems, components and equipment that should be observed. Physical deficiencies include presence of conspicuous defects or material deferred maintenance of a subject property's material systems, components or equipment.

The resulting Property Condition Report incorporates the information obtained from the walk-thorough survey, document review, staff interviews and opinions of probable costs for suggested remedies of identified physical deficiencies. Remediation of specific items in non-compliance is mandatory to achieve an acceptable facility.

- c. NFPA 101 Life Safety Code - ASNI/NFPA 101, 1994 Edition, Chapter 11 Existing Educational Occupancies - National Fire Protection Association

This code provides minimum requirements, with regard to function, for the design, operation and maintenance of new and existing buildings and structures to protect occupants by providing for safety from fire and similar emergencies. Safety is achieved by a combination of prevention, protection, warning systems and unobstructed egress. The code addresses construction, protection and occupancy features necessary to minimize danger to life from fire, smoke, fumes and panic. Warning systems are required to conform to ADAAG/ADA guidelines.

The resulting Property Condition Report incorporates the information obtained from the walk-thorough survey, document review, staff interviews and opinions of probable costs for suggested remedies of identified physical deficiencies. Remediation of specific items in non-compliance is mandatory to achieve an acceptable facility.

- d. Title IX Gender Equality - 34 CFR Part 106, Paragraph 106.41, Federal Register, May 9, 1980 - Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance

The major federal law prohibiting sex discrimination in educational institutions receiving financial assistance. A school must provide equal athletic opportunity

for both sexes, including facilities, equipment, supplies, game and practice schedules, travel and per diem allowances, coaching (including assignment and compensation of coaches), academic tutoring, housing, dining facilities and publicity. For the purposes of this study, only comparable facilities for each gender were considered. The facilities investigated were limited to those on each school campus. Off-site athletic facilities are not included in this study.

- e. Technical Manual TM 5-800-4, May 1994 - Programming Cost Estimates for Military Construction - Headquarters, Department of the Army

The basis of estimating opinions of probable costs, including unit cost values, escalation and contingency factors, and application of area location factors for military projects.

- f. RS Means Building Construction Cost Data, 60th Edition – 2002

The basis for determining unit and construction assembly values for detailed opinions of probable costs included as an Exhibit in this report.

- g. Guidance from the Under Secretary of Defense, June 3rd, 2002.

This guidance lists the most recent area location factors for each military installation.

- h. Facilities Recapitalization Front-End Assessment, Department of Defense, August 2002

The basis for determining the recapitalization metric for Department of Defense facilities.

2.3 Property Assessment Survey Requirements

A walk-through property assessment survey was conducted during the field observers' site visit of the subject property to ascertain material physical deficiencies of the subject property and opinions of probable costs for remediation. Data obtained from the survey provides an objective and impartial evaluation of Domestic Dependent Elementary and Secondary Schools (DDESS) schools in the continental United States for the Department of Defense Education Activity (DoDEA), to ascertain the feasibility of facility transfers to Local Education Agencies (LEAs). The data will also aid DoDEA's analysis of associated costs to the Government for the possible transfer of DDESS students, facilities and operations to the corresponding adjacent LEAs.

2.4 Analysis

An analysis of each school was required to determine current physical condition, noting deficiencies and providing opinions of probable costs of remediation for each building

and system component in accordance with minimum acceptable standards and guidelines as listed previously.

2.5 Observations

The survey was based on the field observers' visual observations of representative areas and materials while walking through the subject property. The survey included interviews with administrative and facilities personnel, review of available construction documents, prior assessment reports and asbestos inspection reports.

2.6 Survey Methods

The survey consisted of non-intrusive visual observations, which were readily accessible and easily visible components and systems of the subject property. The survey was not technically exhaustive, excluded the operation of equipment and was conducted without the use of special protective clothing. The scope of work did not include removal of materials, testing, or use of equipment, such as scaffolding, metering/testing equipment or other devices.

2.7 Document Review and Interviews

The survey included interviews with administrative and facilities personnel, review of available construction documents, prior assessment reports and asbestos inspection reports. A copy of the Pre-Survey Questionnaire including facilities services responses to various physical conditions is included as Exhibit 7.3.

2.8 Out-of Scope Considerations

Out of scope considerations include, but are not limited to:

- a. Temporary maintenance buildings or classrooms.
- b. Entering crawl or confined spaces; walking on pitched roofs or roofs without built-in access.
- c. Determination of plumbing pressures, flow rates or fixture counts.
- d. Observation of flue connections, interiors of chimneys, flues or boiler stacks.
- e. Removal of electrical panel and device covers or operating electrical devices.
- f. Examination of elevator cables, sheaves, controllers, motors inspection tags or entering pits or shafts.
- g. Determining NFPA hazard classifications.
- h. Classifying, or testing fire rating assemblies.
- i. Operating appliances or fixtures.
- j. Determining sound transmission coefficient (STC) ratings, flammability issues or regulations.
- k. Engineering calculations to determine any system's adequacy or compliance with any specific or commonly accepted design requirements.

- l. Adherence with AHERA or other hazardous material identification, abatement or operations and maintenance programs. Information from previous AHERA cost estimates is included in the opinions of probable costs.
- m. Identification, damage assessment or remediation recommendations for any type of mold, mildew or algae formations.
- n. Additional issues are outlined in ASTM E 2018 Paragraph 11.
- o. Force protection. As no Joint Service Integrated Vulnerability Assessments were provided to the survey team, no costs are shown in this study for any recommendations contained in them. Some costs were included for specific force protection items requested by DoDEA.
- p. Determination of playground surfacing compliance with ASTM F 1951-99.

2.9 Professional Services

The survey is not a professional architecture or engineering service and the resulting report and opinion of probable costs is not subject to laws governing the professional practice of architecture or engineering. Documents will not include an architects' or engineers' seal.

2.10 Assumptions

The following assumptions are included in the recommended remediation work and opinions of probable costs:

- a. Professional consulting service fees for remediation actions are excluded from opinions of probable costs.
- b. Replacement of HVAC supply ducting includes costs for removal and replacement of existing ceilings, light fixtures and other accessories with new.
- c. Sealing between the top of walls and roof or floor deck to achieve required fire rating includes costs for sealing all conduit and duct penetrations through the fire rated walls.
- d. Structural systems, general construction and utilities obscured by earth, paving, concrete slabs, solid walls or ceilings may have deterioration that was undiscoverable during the property survey. Remediation costs for undiscoverable conditions are excluded from opinions of probable costs. Contingency factors are included as described in Paragraph 4.0.
- e. New or existing duct penetrations through fire rated walls between rooms and paths of egress will have fire/smoke dampers. Fire rated walls between two spaces that are not utilized as a path of egress will have fire dampers. Costs are included for this work.
- f. Costs are included for future scheduled work not already awarded under construction contract as of 1 October 2003. The exception is that PTR (Pupil-Teacher Ratio) projects are included in the study even though some have not been awarded. Per direction from DoDEA, these additions are included in the overall square footage of each school facility for the purposes of this study.

- g. Opinions of probable costs are expressed in FY04 values. Phase II cost escalation will be required for all work scheduled after this time.
- h. Title IX costs are for athletic facilities and associated amenities. Costs for personnel required under the law are not included.
- i. Life safety features such as fire sprinklers, fire alarms, strobes, emergency lighting and other equipment was assumed to be operational unless visible damage was observed. Equipment maintenance, repair and testing were assumed to be the Owner's responsibility.
- j. Costs for ADA compliance are based on current ADAAG accessibility guidelines. Compliance with all laws regarding ADA varies in each jurisdiction and may affect costs accordingly. Within this report, immediate remediation ADA items include the main public route into the building, at least one set of restrooms along the public route and accessible exits out of classrooms. Long-term items include signage, secondary exits and other toilet rooms. It is important to note that ADAAG accessibility guidelines are not immediate action requirements for existing buildings. The immediate priorities listed in this report are reasonable expectations of an LEA's requirements for transfer.
- k. Asbestos abatement costs exclude costs of consulting design, air monitoring or air testing during abatement activities or at final clearance, or material disposal.
- l. PRV costs are based on the size of the existing building.

2.11 Indoor Air Quality

The subject of indoor air quality has been receiving considerable attention by school officials all across the country, whether public, private or DDESS school system. Indoor air quality complaints can be due to a wide variety of factors that include: personal perceptions, a person's health, the amount of fresh air in a building, the humidity of the air in a building, and the building envelope. Some of these factors are difficult to quantify or detect. Terms like mold or mildew are often attached to indoor air quality complaints. It is important to note that there are several thousand types of mold and a relatively small portion have been tied to health problems. The issue of indoor air quality is difficult to address because there is not a set of definable symptoms and it is also difficult to define the source of an individual's discomfort.

People's symptoms are difficult to document. Allergies could be a contributing factor to IAQ complaints. Factors outside the school environment cannot be controlled by school staff. Fresh air, humidity control, and the building exterior envelope are areas school officials concentrate on to try to achieve acceptable indoor air quality. There are recommended guidelines for mechanical systems published by the American Society of Heating, Refrigeration and Air Conditioning Engineers that address fresh air requirements and humidity control. These guidelines have been implemented by building designers over the past ten to fourteen years. As such, schools designed and constructed before 1989 were not subject to these guidelines. Moisture intrusion in a building can also contribute to the possibility of mold growth. Older buildings in particular can have leaks in roofs, pipes or wall cavities that could allow moisture in a building. It is important for building owners to address moisture intrusion problems promptly.

In the responses received from Local Education Agencies during the course of this study, indoor air quality was listed as a high priority concern. Older schools or schools with older air conditioning systems generally do not comply with the ASHRAE standards and guidelines mentioned previously. In many cases, renovating a building to comply fully with current ASHRAE standards would be so costly as to require building a new school rather than renovating an existing facility. This cost is not economically possible in many school districts. In discussing the approach taken by LEA's, one responded saying their district makes improvements when a piece of mechanical equipment fails. They cannot satisfy all ASHRAE requirements in an older building, but they try to improve the overall air quality when they install new equipment.

The purpose of our study was to document the physical condition of the building and its systems. Indoor air quality testing was beyond the scope of our report. If a facility had IAQ complaints, we asked the school staff to report them to us in their pre-survey questionnaire and provide us an IAQ report if one had been performed. Where IAQ reports were provided, we used them to include costs for repair in the immediate term. In the case where a report was not performed, we recommended an IAQ study report with microbe classification. In the case where staff voiced an IAQ concern and we noticed a physical deficiency in the mechanical system or building envelope, we included cost to repair the physical deficiency. We did not perform any calculations on the mechanical systems.

3.0 System Description and Observations: Barkley Elementary School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 72,140 square foot, one story single building originally constructed in 1953. Subsequent additions have been numerous over the years.</p> <p>This facility serves 609 students in grades pre-school through five. Total student capacity is 596.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. Area drains are provided in the courtyards. The system does appear to be adequate for storm water control. During heavy rains, playgrounds can retain water. Corrective action is required to repair the drain at the playground. Costs are shown in 3.2.4.</p>
		3.2.2 Paving, Curbing and Parking
	X	<p>Parking area paving is asphaltic concrete in poor condition. Corrective action is required.</p> <p>Parking areas do not appear to provide adequate parking spaces. Corrective action is required.</p>
		3.2.3 Flatwork
	X	Concrete walkways and ramps are in poor condition. Corrective action is required to replace damaged areas.
		3.2.4 Recreational Facilities and Title IX Compliance
		<p>The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>A gymnasium provides indoor court sport recreational and assembly space. Corrective action is not required.</p>

I	LT	Reference
X		Play areas are provided with various types of equipment in fair condition. Corrective action is required.
X		Play surfaces are in poor condition. Play surfaces in all areas do not appear to comply with the U.S. Consumer Safety Commission "Handbook for Public Playground Safety" requirements. Corrective action is required.
		3.2.5 Utilities
		3.2.5.1 Water
	X	<p>Domestic water main service is without metering. The service does appear to be adequate and is in fair condition. Corrective action will be required in the next ten years due to its age.</p> <p>A relatively new required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is multiple service, does appear to be adequate and is in good to fair condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
X	X	The sanitary sewer service does appear to be adequate and is in fair to poor condition. Corrective action is anticipated long-term.
	X	A single-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in fair condition. Replacement with a two-compartment grease trap is required.
		3.2.5.4 Special Utility Systems
		Not applicable.
		3.2.5.5 Electrical Service and Metering
		Electrical service is multiple service with metering, which feeds an underground pad mounted transformer. It does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
		The foundation is assumed to be concrete grade beams, supported by continuous spread and spot footings with concrete slab-on-grade floor in good condition. Corrective action is not required.
		3.3.2 Building Frame
		Building frame for the main building is concrete masonry unit walls or structural steel columns and beams with steel joists. Roof decking is structural metal or bulb tees and gypsum and fibrous board. The structural system is in good condition. Corrective action is not required.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
X		Building exterior is face brick masonry veneer in fair condition. Corrective action is required to repair areas exhibiting cracks or moisture intrusion problems.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is hollow metal doors and frames with glazing in fair condition. Corrective action is not required. Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing or hollow metal doors and frames with glazing in fair condition. Corrective action is not required.
		3.3.3.3 Fenestration System
X		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels in fair condition. Staff reports moisture intrusion problems around the windows during heavy rains. Corrective action is required to re-seal some of the windows.
		3.3.3.4 Soffits
		Soffits at main entrance/exit and auxiliary exit/entrances are painted structure in fair condition. Corrective action is not required.

I	LT	Reference
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with metal coping in fair condition. Corrective action is not required.
		3.3.4 Roofing
X	X	<p>Low slope modified bitumen roofing is located on the entire building and is in good to poor condition. Leaks are evident. Leaking areas should be patched immediately. Corrective action is required long-term to replace areas in poor condition, which is approximately 75% of the roof.</p>
	X	<p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal and painted metal in fair condition. Corrective action is required for those portions receiving new roofing.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
	X	<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile in fair condition. Some localized areas have severely damaged tile from what appeared to be roof leaks. Walls are concrete masonry units or face brick masonry veneer in good condition. Suspended acoustical lay-in panel ceilings are in good condition. Replacement of damaged floor tile is required.</p> <p>Public, Private and Classroom Toilets:</p> <p>Flooring is ceramic tile in fair condition. Walls are painted concrete masonry units or ceramic tile wainscot and concrete masonry units in fair condition. Solid ceilings are gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is carpet and paved pebble surface (in art room) in fair condition. Walls are painted concrete masonry units or face brick masonry veneer in fair condition. Solid ceilings and furring are gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Cafeteria:</p> <p>Flooring is vinyl tile in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p>

I	LT	Reference
		<p>Gymnasium:</p> <p>Flooring is poured rubber surface in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Stage:</p> <p>Flooring is vinyl tile in fair condition. Walls are concrete masonry units in fair condition. Solid ceilings are exposed structure and decking in fair condition.</p> <p>Kitchen:</p> <p>Flooring is terrazzo in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Kitchen equipment is in good condition. Corrective action is not required.</p>
		3.5 Mechanical, Plumbing and Electrical Systems
		3.5.1 HVAC System
		<p>The HVAC systems are gas fired roof top units, relatively new and in good condition. Rooftop units allow individual room control. These units were installed in 1998 as part of a renovation.</p> <p>The control system is a new DDC (direct digital control) system installed with the roof top units. No action is required.</p>
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
	X	Domestic water supply and waste piping within the facility does appear to be adequate and is in fair condition. Given the age of the original piping, corrective action will be required to replace some of the piping over the next ten years.
		3.5.2.2 Domestic Hot Water Production
	X	Domestic hot water is provided by gas fired hot water heaters in good condition. They serve the kitchen and support areas. Corrective action is required long-term due to the expected lifespan of the equipment.

I	LT	Reference
		3.5.2.3 Fixtures
	X	Plumbing fixtures and connections appear to be adequate and are in fair condition. Due to the age of the fixtures, it is anticipated that some will require replacement in the next ten years. Corrective action is required.
		3.5.2.4 Fuel Piping
		Not applicable.
		3.5.3 Electrical System
		3.5.3.1 Main Service
X		The main electrical distribution panel for the original building is a 800-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does not appear to be adequate and is in poor condition. It was not replaced in the 1998 renovation. Corrective action is required.
X		The main electrical distribution panel for the second service is a 2,000-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does not appear to be adequate and is in poor condition. It was not replaced in the 1998 renovation. Corrective action is required.
X		Lighting circuit service also requires replacement back to the panel when the panels are replaced. The main electrical distribution panel for the third service is a 1,000-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in fair condition. Corrective action is not required.
		3.5.3.3 Interior Lighting
		Administrative area, media center and classroom lighting is recessed troffer fluorescent fixtures in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required. Corridor lighting is recessed troffer fluorescent fixtures in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.

I	LT	Reference
		Gymnasium lighting is ceiling mounted metal halide fixtures in good condition. Light levels appear to be adequate. Corrective action is not required.
		3.5.3.4 Exterior Lighting
	X	<p>Exterior lighting is provided and is surface mounted high-pressure sodium fixtures in fair condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Entrance lighting is provided and is surface mounted high-pressure sodium fixtures in fair condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
	X	Parking lot lighting is provided and is pole mounted high-pressure sodium fixtures in fair condition. Lighting levels do not appear to be adequate. Corrective action is required.
		3.5.3.5 Security System
	X	A security system is provided and is monitored by a central agency. However, the system is not operable and it is not able to recharge some of the emergency lights. Corrective action is required.
		3.5.3.6 Intercom System
	X	Intercom system does not allow communication to individual classrooms or outside telephone calls. The system is in poor condition and not operating properly. Corrective action is required.
		3.5.3.7 Educational Television
		Educational television is provided and does allow internal broadcasting. The system is in good condition. Corrective action is not required.
		3.5.3.8 Computer Network
		A computer network system provides approximately 6 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.
X		Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required.
X		<p>The walkway approach to main entrance doors does appear to provide accessible slopes with threshold entry restrictions. Corrective action is required.</p> <p>Ramps along the on-site accessible route are required and are provided. Ramps appear to comply with accessibility guidelines. Required handrails are provided and appear to comply with height and extension requirements. Corrective action is not required.</p>
X		Ramps along the interior accessible route are required and are provided. Ramps do not appear to comply with accessibility guidelines. Required handrails are provided and do not appear to comply with height and extension requirements. Corrective action is required.
X		Steps are provided in corridors along the interior accessible route at elevation changes. Steps do not appear to comply with accessibility guidelines. Required handrails are provided and do not appear to comply with height and extension requirements. Corrective action is required.
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.
		3.6.3 Entrances/Exits
		Main entrance/exit approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.

I	LT	Reference
X	X	<p>Some auxiliary exit/entrance doors exit to porches that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required.</p> <p>Interior doors along the accessible route are inset or flush with corridor walls and appear to allow clearance and approach accessibility. Corrective action is not required.</p> <p>Door assemblies, except in the classroom addition, do not appear to meet accessibility guidelines. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.</p>
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		<p>Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.</p> <p>X Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.</p> <p>X Classroom toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.</p>
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.

I	LT	Reference
		3.6.8 Elevators/Lifts
	X	Elevators are not required. Required platform/wheelchair lifts are not provided at the stage. ADA guidelines require access to stage areas. Corrective action is required.
		3.6.9 Recreational Facilities
X		Required accessible routes to play areas are provided and appear to comply with accessibility guidelines. Accessible play areas, equipment and surfacing do not appear to be available in individual play area groups. ADA guidelines require a minimum of one play area with an accessible route, equipment and accessible surfacing material for each play area group. Corrective action is required.
3.7 Life Safety and Fire Protection		
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
	X	A sprinkler system is provided for one storage room. Corrective action is not required.
	X	A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.
	X	A required sprinkler system is not provided for the stage. Corrective action is required.
		The kitchen hood is compensating type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in good condition. Corrective action is not required.
		A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is not required.
	X	Provision of fire extinguishers within required travel distances do not appear to comply with life safety standards. Corrective action is required.
		3.7.2 Alarm Systems
X		The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.

I	LT	Reference
X		<p>A fire alarm panel is provided. A required smoke detector is provided in front of the panel. Staff has reported problems with the fire alarm. Corrective action is required to repair it.</p> <p>Required pull stations are provided at emergency egress doors and are mounted at heights complying with ADA guidelines. Corrective action is not required.</p>
		3.7.3 Corridor and Separation Walls
X		<p>Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights appear to have fire resistive construction. Some duct penetrations also require fire sealing and/or required fire/smoke dampers. Corrective action is required.</p>
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards except in the classroom addition. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		<p>Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.6 Emergency Egress Lighting
		<p>Corridor emergency egress lighting is provided. Fixtures are wall mounted package units with required testing devices. Corrective action is not required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>

I	LT	Reference
		3.8 Asbestos Concerns
	X	According to the AHERA Report, this facility does have some remaining asbestos-containing material (ACM). Remaining material is non-friable. Corrective action is required long-term.

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Barkley Elementary)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the Under Secretary of Defense June 3, 2003. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 871,000
Intermediate	\$ 140,000
Long-term	<u>\$ 1,235,000</u>
Total Remediation Costs	\$ 2,246,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$11,142,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$143.10/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Barkley is a combination of several additions and renovations, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Barkley Elementary School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*39.5	*27.5	11,142,000	166,300	2,246,000	81,700	.49	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Fort Campbell High School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 106,200 square foot, one story pre-cast concrete and masonry veneer building originally constructed in 1986. Subsequent additions were:</p> <ul style="list-style-type: none"> ? Classrooms in 1988 ? Classrooms in 1990 ? Classrooms in 1991 ? Expansion of Media Center in 1997 <p>This facility serves 618 students in grades nine through twelve. Total student capacity is 846.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. The system does not appear to be adequate for storm water control. Some areas may require some grading by maintenance personnel to eliminate possible tripping hazards. Corrective action is not priced here.</p>
		3.2.2 Paving, Curbing and Parking
		<p>Parking area paving is asphaltic concrete in fair condition. Corrective action is not required.</p> <p>Parking areas appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
		<p>Concrete walkways and ramps are in fair condition. Corrective action is not required.</p> <p>Walkways from drop off areas and between the buildings are protected by covered structures in good condition. Corrective action is not required.</p>

I	LT	Reference
		3.2.4 Recreational Facilities and Title IX Compliance
		<p>The school does sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>Play fields for boys' and girls' field sports are available on-site and off-site and are in good condition. Bleachers, concession buildings and toilets are in good condition. Corrective action is not required.</p> <p>Tennis courts are provided and are in fair condition. Corrective action is not required.</p> <p>Play field lighting is available and is required for Title IX compliance and is in good condition. Corrective action is not required.</p> <p>A gymnasium provides indoor court recreational and assembly space. Equal toilet and locker facilities are available for boys and girls indoor team sports. Corrective action is not required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
		<p>Domestic water main service does appear to be adequate, without metering and is in good condition. Corrective action is not required.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is single service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
		<p>The sanitary sewer service does appear to be adequate and is in good condition. Corrective action is not required.</p> <p>A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in fair condition. Corrective action is not required.</p>

I	LT	Reference
		3.2.5.4 Special Utility Systems
X		A generator provides emergency power. It does appear to be adequate, but is in poor condition. Corrective action is required.
		3.2.5.5 Electrical Service and Metering
		Electrical service is single service with metering, is underground and emerges in a transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
		The foundation is assumed to be concrete grade beams, supported by drilled piers with concrete slab-on-grade floor in good condition. Corrective action is not required.
		3.3.2 Building Frame
X		<p>Building frame is structural steel columns and beams or cast-in-place concrete columns and beams with steel joists. Roof decking is structural metal. The structural system is in good condition. Corrective action is not required. There is one area where a steel lintel supports CMU, but the CMU does not appear to be bearing fully on the lintel. Corrective action is required. There is also a beam at the entry which needs a structural modification.</p> <p>Mezzanine floor framing is steel joists. Floor decking is structural metal. The structural system is in good condition. Corrective action is not required.</p>
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
		Building exterior is face brick masonry veneer and pre-cast concrete panels in good condition. Corrective action is not required.
		3.3.3.2 Entrances/Exits
		<p>Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required.</p> <p>Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required.</p>

I	LT	Reference
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing in good condition. Corrective action is not required.
		3.3.3.4 Soffits
		Soffits at main entrance/exit and auxiliary exit/entrances are stucco in fair condition. Corrective action is not required.
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with metal coping in fair condition. Corrective action is not required.
		3.3.4 Roofing
X	X	<p>Low slope fully adhered EPDM roofing is located on the entire building and is in fair condition. Major leaks are evident, particularly where the low roof meets wall extensions. Roof leaks should be patched immediately. Corrective action is required long-term. This replacement should include the skylights, which also have been a source of leaks.</p>
	X	<p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal in fair condition. Corrective action is required when the roof is replaced.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile, carpet or ceramic tile in good condition. Walls are concrete masonry units, gypsum board or pre-cast concrete panels in good condition. Solid ceilings and furring are gypsum board and sloped glazing systems in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Public and Private Toilets:</p> <p>Flooring is ceramic tile in good condition. Walls are concrete masonry units or ceramic tile wainscot and concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p>

I	LT	Reference
		<p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is vinyl tile or carpet in good condition. Walls are concrete masonry units in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Cafeteria/Auditorium:</p> <p>Flooring is carpet in good condition. Walls are concrete masonry units, gypsum board or face brick veneer in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Gymnasium:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units and pre-cast concrete panels in fair condition. Solid ceilings are exposed structure and decking in good condition.</p> <p>Gymnasium Toilets and Locker Rooms:</p> <p>Flooring is ceramic tile and carpet in fair condition. Walls are concrete masonry units and ceramic tile wainscot and concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Stage:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units in good condition. Solid ceilings are exposed structure and decking in good condition.</p> <p>Kitchen:</p> <p>Flooring is ceramic tile in good condition. Walls are ceramic tile wainscot and concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Kitchen equipment is in fair condition. Corrective action is not required.</p>
		<p>3.5 Mechanical, Plumbing and Electrical Systems</p>
		<p>3.5.1 HVAC System</p>
X		<p>HVAC systems include heating, cooling and control equipment.</p> <p>The system is water source heat pumps with boiler and cooling tower. The system and controls are in poor condition. Corrective action is required.</p>

I	LT	Reference
		The system in the classroom addition is rooftop units and controls in good condition. Corrective action is not required.
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
		Domestic water supply and waste piping within the facility does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.2.2 Domestic Hot Water Production
	X	Domestic hot water is provided by gas water heaters in fair condition. Corrective action is required long-term, as their lifespan is not more than ten years.
		3.5.2.3 Fixtures
	X	Plumbing fixtures and connections appear to be adequate and are in fair to poor condition. Corrective action is required long-term to replace a portion of the bathroom fixtures.
		3.5.2.4 Fuel Piping
		Natural gas piping does appear to be adequate and in is in good condition. Corrective action is not required.
		3.5.3 Electrical System
		3.5.3.1 Main Service
	X	The main electrical distribution panel for the entire facility is a 2,000-amp, 277/480-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is required to upgrade the electrical service for the new HVAC system.
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in good condition. Distribution and dry type step down transformers provide power. Corrective action is not required.
		3.5.3.3 Interior Lighting
		Administrative area, media center and classroom lighting is recessed troffer or parabolic fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.

I	LT	Reference
	X	<p>Corridor lighting is recessed troffer fixtures with fluorescent lamps in fair condition. Fluorescent lamps are T-8. Light levels do not appear to be adequate. Corrective action is required.</p> <p>Gymnasium lighting is surface mounted fixtures with metal halide lamps in good condition. Light levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.4 Exterior Lighting
		<p>Exterior lighting is provided and is surface mounted wall pack, pole mounted and bollard fixtures with high-pressure sodium or metal halide lamps in fair condition. Lighting levels appear to be adequate. Corrective action is not required.</p> <p>Soffit and entrance lighting is not provided. Corrective action is not required.</p> <p>Covered walkway lighting is not provided. Corrective action is not required.</p> <p>Parking lot lighting is provided and is pole mounted fixtures with high-pressure sodium lamps in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.5 Security System
X		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring, but needs repair in one location in order to allow access. Corrective action is required.
		3.5.3.6 Intercom System
		Intercom system does allow communication to individual classrooms. The system is in good condition. Corrective action is not required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.
		3.5.3.8 Computer Network
		A computer network system provides approximately 8 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.
X		Curb ramps on approaches to the facility from student drop off areas and parking are not provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required. The walkway approach to main entrance doors does not appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.
		3.6.3 Entrances/Exits
		Main entrance/exit and auxiliary exit/entrance approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.
X		Some auxiliary exit/entrance doors exit to porches that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required. Interior doors along the accessible route are inset or flush with corridor walls and appear to allow clearance and approach accessibility. Corrective action is not required.
X		Door assemblies do not appear to meet accessibility guidelines. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.

I	LT	Reference
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.
	X	Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.
		3.6.8 Elevators/Lifts
		Elevators are not required. Required platform/wheelchair lifts are available, but not currently provided at the stage. Corrective action is not required.
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided. Corrective action is not required.

I	LT	Reference
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		<p>A sprinkler system is provided for the entire facility. Corrective action is not required.</p> <p>The kitchen hood is make-up air type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in poor condition after years of use. Corrective action is required.</p> <p>A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation.</p> <p>Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.</p>
		3.7.2 Alarm Systems
X		<p>The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.</p> <p>A fire alarm panel is provided. A required smoke detector is provided in front of the panel. Corrective action is not required.</p>
X		Required pull stations are not provided at emergency egress doors. Corrective action is required.
		3.7.3 Corridor and Separation Walls
		Exit corridor and area separation walls appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights appear to have fire resistive construction. Ductwork penetrations appear to have required fire/smoke dampers. Corrective action is not required.
		3.7.4 Doors
		Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.

I	LT	Reference
		<p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
X		Corridor emergency egress lighting is provided. Fixtures are selected light fixtures without required testing devices. Corrective action is required to add testing devices.
X		Emergency egress lighting is not provided in required windowless rooms. Corrective action is required.
X		Illuminated directional emergency exit signs are not provided at every required location and are not clearly visible. Corrective action is required.
		3.8 Asbestos Concerns
		According to the AHERA Report, this facility does not have asbestos-containing material (ACM).

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Fort Campbell High School)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 3,400,000
Long-term	<u>\$ 1,532,000</u>
Total Remediation Costs	\$ 4,932,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$16,924,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$159.36/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Fort Campbell High School is a combination of several small additions and the original building, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Fort Campbell High School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*15.5	*51.5	16,924,000	252,600	4,932,000	95,800	.38	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Jackson Elementary School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 78,400 square foot, one story single building originally constructed in 1957. Subsequent additions were:</p> <ul style="list-style-type: none"> ? Classroom addition and Special Education Room in 1966 ? Classroom addition and walkway enclosure in 1985 ? Special Education Addition in 1991 <p>This facility serves 655 students in grades pre-kindergarten through five. Total student capacity is 652.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
	X	<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems, except at a localized area on the south side of the building. Corrective action is required to correct this localized flooding problem.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p>
		3.2.2 Paving, Curbing and Parking
	X	<p>Parking area paving is asphaltic concrete in poor condition. Corrective action is required.</p> <p>Parking areas do not appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
	X	<p>Concrete walkways and ramps are in poor condition. Corrective action is required.</p> <p>Walkways from drop off areas and between main building are protected by covered structures in fair condition. Corrective action is not required.</p>

I	LT	Reference
		3.2.4 Recreational Facilities and Title IX Compliance
X		<p>The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>A cafeteria/gymnasium and gymnasium provide indoor court sport recreational and assembly space. Corrective action is not required.</p> <p>Play areas are provided with various types of equipment in fair condition. Corrective action is not required.</p> <p>Play surfaces are in poor condition. Play surfaces in some areas do not appear to comply with the U.S. Consumer Safety Commission “Handbook for Public Playground Safety” requirements. Corrective action is required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
X		<p>Domestic water main service does appear to be adequate, without metering and is in poor condition. At the time of the survey, one large water line was broken and flowing under the building. We were informed that this pipe had broken before and was a constant maintenance problem. As we understand, Base Public Works has repaired it. Corrective action is required.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is single service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
X		<p>The sanitary sewer service coming in at the kitchen does not appear to be adequate and is in poor condition. Corrective action is required. Staff reports that lines back up frequently, particularly at the kitchen area.</p> <p>A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in good condition. Corrective action is not required.</p>
		3.2.5.4 Special Utility Systems
		Not applicable.

I	LT	Reference
		3.2.5.5 Electrical Service and Metering
		Electrical service is multiple service with metering, is underground and feeds a transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
X		The foundation is assumed to be concrete grade beams, supported by spread and spot footings with concrete slab-on-grade floor in fair condition in most areas. Corrective action is required at areas where settlement has caused brick cracking. Also, a portion of grade beam will need to be underpinned where a broken pipe has caused water to erode soil support.
		3.3.2 Building Frame
		<p>Building frame is concrete masonry unit walls and structural steel columns and beams with steel joists. Roof decking is structural metal or fibrous board. The structural system is in good condition. Corrective action is not required.</p> <p>The existing roofing system for the entire building has been covered with a sloped pre-finished standing seam metal roofing system with light gauge steel framing. Decking is structural metal. The structural system is in good condition. Corrective action is not required.</p>
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
X		Building exterior is face brick masonry veneer in fair condition. Several areas exhibit discoloration from efflorescence, likely due to moisture and salts in the mortar. Corrective action is not required, except to replace areas damaged by settlement.
		3.3.3.2 Entrances/Exits
		<p>Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required.</p> <p>Auxiliary exit/entrances are hollow metal doors and frames with glazing in fair condition. Corrective action is not required.</p>

I	LT	Reference
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels or composite translucent plastic panels in good condition. Corrective action is not required.
		3.3.3.4 Soffits
		Soffits at main entrance/exit, auxiliary exit/entrances and roof overhangs are pre-finished aluminum or exterior gypsum board in fair condition. Corrective action is not required.
		3.3.3.5 Parapets
		Not applicable.
		3.3.4 Roofing
		<p>The existing roofing system has been covered with a sloped pre-finished standing seam metal roofing system and is in fair condition. Some sealing tiles had been damaged by roof leaks. However, staff reported that they did not know of any current roof leaks. Corrective action is not required.</p> <p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal in fair condition. Corrective action is not required.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile or carpet in poor condition. Walls are concrete masonry units, gypsum board or face brick masonry veneer in fair condition. Solid ceilings and furring are gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Public, Private and Classroom Toilets:</p> <p>Flooring is ceramic tile in good condition. Walls are concrete masonry units or ceramic tile wainscot and concrete masonry units in fair condition. Solid ceilings are gypsum board or plaster in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p>

I	LT	Reference
		<p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is carpet in poor condition. Walls are concrete masonry units, gypsum board or face brick masonry veneer in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Cafeteria/Gymnasium:</p> <p>Flooring is poured resinous surface in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Gymnasium:</p> <p>Flooring is carpet in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Stage:</p> <p>Flooring is vinyl tile in fair condition. Walls are concrete masonry units in fair condition. Solid ceilings are gypsum board in fair condition.</p> <p>Kitchen:</p> <p>Flooring is poured resinous surface in good condition. Walls are concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Kitchen equipment is in good condition. Corrective action is not required.</p>
		<p>3.5 Mechanical, Plumbing and Electrical Systems</p>
		<p>3.5.1 HVAC System</p>
X		<p>HVAC systems include heating, cooling and control equipment:</p> <p>Water source heat pumps serve the school and are supplied by a boiler and cooling tower. The controls and HVAC system are in fair condition. Corrective action is required. The school has experienced problems with the thermostats and currently has problems with heat pump units in the corridors, as approximately half are not working. In addition, the concrete around the cooling tower requires replacement.</p>

I	LT	Reference
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
X		Domestic water supply and waste piping within the facility does not appear to be adequate and is in poor condition. Corrective action is required.
		3.5.2.2 Domestic Hot Water Production
	X	Domestic hot water is provided by gas water heaters in fair condition. Corrective action is required long-term as they will not last ten years.
		3.5.2.3 Fixtures
	X	Plumbing fixtures and connections do not appear to be adequate and are in fair condition. Corrective action is required to replace approximately thirty fixtures.
		3.5.2.4 Fuel Piping
		Natural gas piping does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3 Electrical System
		3.5.3.1 Main Service
X		The main electrical distribution panel for the HVAC system is a 800-amp, 277/480-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required. The main electrical distribution panel for the original building is a 1,600-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does not appear to be adequate and is in poor condition. The school reports problems with the breakers tripping when kitchen equipment is used. Corrective action is required.
		3.5.3.2 Distribution and Panels
	X	Electrical distribution and branch panels do not appear to be adequately sized and are in poor condition. Corrective action is required.
		3.5.3.3 Interior Lighting
		Administrative area, media center and classroom lighting is recessed troffer fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.

I	LT	Reference
		<p>Corridor lighting is recessed troffer fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.</p> <p>Gymnasium lighting is pendant mounted fixtures with metal halide lamps in good condition. Light levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.4 Exterior Lighting
	X	<p>Exterior lighting is provided and is surface mounted wall pack fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Soffit and entrance lighting is provided and is surface mounted fixtures with high-pressure sodium lamps in fair condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
	X	<p>Covered walkway lighting is provided and is surface mounted fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Parking lot lighting is provided and is pole mounted fixtures with high-pressure sodium lamps in fair condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.5 Security System
		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is not required.
		3.5.3.6 Intercom System
		Intercom system does not allow communication to individual classrooms. The system is in good condition. Corrective action is not required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.

I	LT	Reference
		3.5.3.8 Computer Network
		A computer network system provides approximately 8 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.
X		Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required.
X		The walkway approach to main entrance doors does appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.
		Ramps along the interior accessible route are required and are provided. Ramps do not appear to comply with accessibility guidelines. Required handrails are not provided. Corrective action is required.
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.
		3.6.3 Entrances/Exits
		Main entrance/exit and auxiliary exit/entrance approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.
X		Some auxiliary exit/entrance doors exit to porches and ramps that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required.
X		Interior doors along the accessible route are inset or flush with corridor walls and do not appear to allow clearance and approach accessibility. At least one door is

I	LT	Reference
X		<p>required for each accessible space with adequate maneuvering, width and opening clearances from both sides. Corrective action is required.</p> <p>Door assemblies do not appear to meet accessibility guidelines. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.</p>
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		<p>Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.</p> <p>X Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required and is priced with the public way toilets.</p> <p>X Classroom toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required to provide accessible restrooms in at least one classroom per wing so that accommodations can be made for handicapped students.</p>
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.

I	LT	Reference
		3.6.8 Elevators/Lifts
	X	Elevators are not required. Required platform/wheelchair lifts are not provided at the stage. Corrective action is required.
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided. Accessible play areas, equipment and surfacing do not appear to be available in individual play area groups. ADA guidelines require a minimum of one play area with an accessible route, equipment and accessible surfacing material for each play area group. Corrective action is required. Costs are shown in 3.2.4.
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.
X		A required sprinkler system is not provided for the stage. Corrective action is required. The kitchen hood is make-up air type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in fair condition. Corrective action is not required. A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is not required. Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.
		3.7.2 Alarm Systems
X		The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.

I	LT	Reference
X		A fire alarm panel is provided. A required smoke detector is not provided in front of the panel. The school reports some dead spots in alarm coverage, and areas with strobes are not functioning properly. Corrective action is required.
X		Required pull stations are not provided at emergency egress doors. Corrective action is required.
		3.7.3 Corridor and Separation Walls
X		Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights do not appear to have fire resistive construction. Ductwork penetrations do not appear to have required fire/smoke dampers. Corrective action is required.
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units and exit doors to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
X		<p>Corridor emergency egress lighting is provided. Fixtures are wall mounted package units with required testing devices. Corrective action is not required.</p> <p>Emergency egress lighting is not provided in required windowless rooms. Corrective action is required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>

I	LT	Reference
		3.8 Asbestos Concerns
		According to the AHERA Report, this facility does not have asbestos-containing material (ACM).

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Jackson Elementary)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 1,539,000
Intermediate	\$ 66,000
Long-term	<u>\$ 723,000</u>
Total Remediation Costs	\$ 2,328,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$11,226,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$143.10/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Jackson is a combination of several additions and the original building, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Jackson Elementary School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*33.9	*33.1	11,226,000	167,600	2,328,000	70,300	.42	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Lincoln Elementary School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 70,520 square foot, one story single building originally constructed in 1951. Subsequent additions were:</p> <ul style="list-style-type: none"> ? Classroom addition in 1988 ? Classroom addition in 1989 ? Special Education Addition in 1991 ? Classroom addition in 1994 ? PTR addition in 2001 <p>This facility serves 634 students in grades pre-kindergarten through five. Total student capacity is 697.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts do not connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p>
		3.2.2 Paving, Curbing and Parking
X		<p>Parking area paving is asphaltic concrete in poor condition. Corrective action is required.</p> <p>Parking areas do not appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
	X	Concrete walkways are in poor condition. Corrective action is required.
		3.2.4 Recreational Facilities and Title IX Compliance
		The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.

I	LT	Reference
X		<p>A gymnasium provides indoor court sport recreational and assembly space. Corrective action is not required.</p> <p>Play areas are provided with various types of equipment in fair condition. Corrective action is not required.</p> <p>Play surfaces are in poor condition. Play surfaces in all areas do not appear to comply with the U.S. Consumer Safety Commission “Handbook for Public Playground Safety” requirements. One play area surface is pea gravel; others are sand. Corrective action is required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
		<p>Domestic water main service does appear to be adequate, without metering and is in fair condition. Corrective action is not required.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is multiple service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
		<p>The sanitary sewer service does appear to be adequate and is in fair condition. Corrective action is not required.</p> <p>A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in fair condition. Corrective action is not required.</p>
		3.2.5.4 Special Utility Systems
		Not applicable.
		3.2.5.5 Electrical Service and Metering
		Electrical service is single service with metering and feeds underground to a transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
X		The foundation is assumed to be concrete grade beams, supported by continuous spread and spot footings with concrete slab-on-grade floor in fair condition. Corrective action is required at settling foundation and cracked face brick masonry areas.
		3.3.2 Building Frame
		Building frame for the main building is concrete masonry unit walls and structural steel columns and beams or cast-in-place concrete columns and beams with steel joists. Roof decking is structural metal, bulb tees and gypsum or pre-cast concrete planks. The structural system is in good condition. Corrective action is not required.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
X		Building exterior is face brick masonry veneer in poor condition. Corrective action is required to replace approximately twenty percent. Some corner areas could be potentially hazardous if left alone.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is hollow metal doors and frames with glazing in fair condition. Corrective action is not required. Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing or hollow metal doors and frames with glazing in fair condition. Corrective action is not required.
		3.3.3.3 Fenestration System
X		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels or composite translucent plastic panels in good condition. The school reports problems with water-tightness in some areas. Corrective action is required.
		3.3.3.4 Soffits
		Soffits at main entrance/exit and auxiliary exit/entrances are stucco or wood in fair condition. Corrective action is not required.

I	LT	Reference
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with metal coping in fair condition. Corrective action is required in areas where the roof will be replaced.
		3.3.4 Roofing
	X	<p>Low slope modified bitumen roofing is located on two areas of the building and is in fair condition. Minor leaks are evident. Corrective action is required to repair areas that pond and areas already patched. Staff reports that patches are holding.</p> <p>Low slope fully adhered EPDM roofing is located on four areas of the building and is in good condition. Corrective action is not required.</p> <p>Sloped pre-finished standing seam metal roofing is located on the Media Center and is in good condition. Corrective action is not required.</p> <p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal in fair condition. Corrective action is not required.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is carpet or ceramic tile in fair condition. Walls are concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Public, Private and Classroom Toilets:</p> <p>Flooring is ceramic tile or vinyl tile in good condition. Walls are concrete masonry units or ceramic tile wainscot and concrete masonry units in good condition. Solid ceilings are gypsum board or exposed structure and decking in good condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is vinyl tile or carpet in fair condition. Walls are concrete masonry units or vinyl wall covering in good condition. Solid ceilings and furring are gypsum board and vinyl wall covering in good condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p>

I	LT	Reference
		<p>Cafeteria:</p> <p>Flooring is vinyl tile in good condition. Walls are concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Gymnasium:</p> <p>Flooring is carpet in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Stage:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units in fair condition. Solid ceilings are exposed structure and decking in fair condition.</p> <p>Kitchen:</p> <p>Flooring is poured rubber surface in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Kitchen equipment is outside the scope of this report.</p>
		3.5 Mechanical, Plumbing and Electrical Systems
		3.5.1 HVAC System
X		<p>HVAC systems include heating, cooling and control equipment.</p> <p>The original building has roof top units with individual controls in good condition. Corrective action is not required. Most are Carrier three- or four-ton units. There are also four ten-ton weathermaster units.</p> <p>The school reports approximately six units leak onto the ceiling due to incorrect installation of valves. Corrective action is required.</p> <p>The classroom addition has a fair to good 2-pipe fan coil system with a boiler and chiller in good condition. Corrective action is not required.</p>
X		<p>Domestic hot water control system is in poor condition. Corrective action is required.</p>

I	LT	Reference
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
		Domestic water supply and waste piping within the facility does appear to be adequate and is in fair condition. Corrective action is not required.
		3.5.2.2 Domestic Hot Water Production
		Domestic hot water is provided by gas water heaters in fair condition. Corrective action is not required.
		3.5.2.3 Fixtures
		Plumbing fixtures and connections appear to be adequate and are in fair condition. Corrective action is not required.
		3.5.2.4 Fuel Piping
		Natural gas piping does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3 Electrical System
		3.5.3.1 Main Service
		The main electrical distribution panel for the entire facility is a 1,600-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in good condition. Corrective action is not required.
		3.5.3.3 Interior Lighting
		Administrative area, media center and classroom lighting is recessed troffer fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required. Corridor lighting is recessed troffer fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required. Gymnasium lighting is pendant mounted fixtures with metal halide lamps in good condition. Light levels appear to be adequate. Corrective action is not required.

I	LT	Reference
		3.5.3.4 Exterior Lighting
	X	<p>Exterior lighting is provided and is surface mounted wall pack fixtures with high-pressure sodium lamps in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p> <p>Soffit and entrance lighting is provided and is recessed fixtures with fluorescent or incandescent lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Covered walkway lighting is not provided. Corrective action is not required.</p> <p>Parking lot lighting is provided and is pole mounted fixtures with high-pressure sodium lamps in fair condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.5 Security System
X		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is recommended. The school requests additional security features at three exits.
		3.5.3.6 Intercom System
		Intercom system does allow communication to individual classrooms. The system is in good condition. Corrective action is not required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.
		3.5.3.8 Computer Network
		A computer network system provides approximately 8 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X	X	<p>A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.</p> <p>Curb ramps on approaches to the facility from student drop off areas and parking are not provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required.</p> <p>The walkway approach to main entrance doors does not appear to provide accessible slopes without threshold entry restrictions. Corrective action is required.</p>
		3.6.2 Parking
X		<p>Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.</p>
		3.6.3 Entrances/Exits
X		<p>Main entrance/exit and auxiliary exit/entrance approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.</p> <p>Some auxiliary exit/entrance doors exit to porches that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required. Costs are included with 3.6.1.</p> <p>Interior doors along the accessible route are flush with corridor walls and appear to allow clearance and approach accessibility. Corrective action is not required.</p> <p>Door assemblies do not appear to meet accessibility guidelines except in the classroom addition. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.</p>

I	LT	Reference
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.
	X	Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.
	X	Classroom toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.
		3.6.8 Elevators/Lifts
		Elevators are not required.
	X	Required platform/wheelchair lifts are not provided at the stage. Corrective action is required.

I	LT	Reference
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided. Accessible play areas, equipment and surfacing do not appear to be available in individual play area groups. ADA guidelines require a minimum of one play area with an accessible route, equipment and accessible surfacing material for each play area group. Corrective action is required. Costs are shown in Section 3.2.4.
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		<p>A sprinkler system is provided for the classroom addition. Corrective action is not required.</p> <p>A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.</p> <p>A required sprinkler system is not provided for the stage. Corrective action is required.</p> <p>The kitchen hood is make-up air type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in fair condition. Corrective action is not required.</p> <p>A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is not required.</p> <p>Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.</p>
		3.7.2 Alarm Systems
X		<p>The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.</p> <p>A fire alarm panel is provided. A required smoke detector is not provided in front of the panel. Corrective action is required.</p> <p>Required pull stations are provided at emergency egress doors. Corrective action is not required.</p>

I	LT	Reference
		3.7.3 Corridor and Separation Walls
X		Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights appear to have fire resistive construction. Corrective action is required.
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards except in the classroom addition. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
X		<p>Corridor emergency egress lighting is provided. Fixtures are selected light fixtures without required testing devices. Corrective action is required.</p> <p>Emergency egress lighting is provided in required windowless rooms. Fixtures are wall mounted fixtures with required testing devices. Corrective action is not required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>

I	LT	Reference
		3.8 Asbestos Concerns
	X	<p>According to the AHERA Report, this facility does have asbestos-containing material (ACM). Remaining ACM is non-friable, not damaged, inaccessible and is not currently hazardous to building occupants. This material consists of window caulking, sheet gaskets, fire door lining and some ceiling adhesive in some corridors. The AHERA Report recommends managing all remaining ACM in place. Corrective action is required long-term.</p> <p>The facility also has lead-based paint on exterior window frames. This paint should be monitored to ensure it does not become a health hazard.</p>

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Lincoln Elementary)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 603,000
Intermediate	\$ 107,000
Long-term	<u>\$ 1,108,000</u>
Total Remediation Costs	\$ 1,818,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$10,092,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$143.10/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Lincoln is a combination of several additions and the original building, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Lincoln Elementary School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*34.5	*32.5	10,092,000	150,600	1,818,000	55,900	.37	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Lucas Elementary School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 80,000 square foot, one story single building originally constructed in 1996.</p> <p>This facility serves 529 students in grades pre-kindergarten through five. Total student capacity is 698.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p>
		3.2.2 Paving, Curbing and Parking
		<p>Parking area paving is asphaltic concrete in good condition. Corrective action is not required.</p> <p>Parking areas appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
		Concrete walkways are in good condition. Corrective action is not required.
		3.2.4 Recreational Facilities and Title IX Compliance
		<p>The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>A cafeteria/gymnasium and gymnasium provide indoor court sport recreational and assembly space. Corrective action is not required.</p> <p>Play areas are provided with various types of equipment in good condition. Corrective action is not required.</p>

I	LT	Reference
		Play surfaces are in fair condition. Play surfaces in some areas do not appear to comply with the U.S. Consumer Safety Commission "Handbook for Public Playground Safety" requirements. Corrective action is required and costs are shown in Section 3.6.9.
		3.2.5 Utilities
		3.2.5.1 Water
X		Domestic water main service does appear to be adequate, without metering, but is in poor condition. Corrective action is not required. A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.
		3.2.5.2 Natural Gas
		Gas service is single service, does appear to be adequate and in is in good condition. Corrective action is not required, although further investigation at the kitchen hood should be conducted.
		3.2.5.3 Sanitary Sewer
X		The sanitary sewer service does appear to be adequate and is in fair condition. Corrective action is required on the west side near the playground. A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in good condition. Corrective action is not required.
		3.2.5.4 Special Utility Systems
		Not applicable.
		3.2.5.5 Electrical Service and Metering
		Electrical service is single service with metering, is underground and feeds a pad mount transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
		The foundation is assumed to be concrete grade beams, supported by continuous spread and spot footings with concrete slab-on-grade floor in good condition. Corrective action is not required.

I	LT	Reference
		3.3.2 Building Frame
		Building frame is structural steel columns and beams with steel joists. Roof decking is structural metal. The structural system is in good condition. Corrective action is not required.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
		Building exterior is face brick masonry veneer and exterior insulation and finish system (EIFS) in good condition. Corrective action is not required.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required. Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required.
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing in good condition. Corrective action is not required.
		3.3.3.4 Soffits
		Soffits at main entrance/exit and auxiliary exit/entrances are stucco in good condition. Corrective action is not required.
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with metal coping in good condition. Corrective action is not required.
		3.3.4 Roofing
X		Low slope modified bitumen roofing is located on the main building and is in good condition. There has been a history of minor leaks. The flashings were recently replaced as the original flashings had not been adhered to the adjoining wall. Corrective action is anticipated long-term at the edge flashing. Sloped pre-finished standing seam metal roofing is located on the center area of the main building and is in good condition. Corrective action is not required.

I	LT	Reference
		Flashing, coping, fascia, gutters and downspouts are pre-finished metal in good condition. Corrective action is not required.
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile or carpet in good condition. Walls are concrete masonry units or gypsum board in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Public, Private and Classroom Toilets:</p> <p>Flooring is ceramic tile in good condition. Walls are ceramic tile wainscot and concrete masonry units in good condition. Solid ceilings are gypsum board in good condition.</p> <p>Administrative Areas, Media Center, Auditorium and Classrooms:</p> <p>Flooring is vinyl tile and carpet in good condition. Walls are concrete masonry units in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Cafeteria:</p> <p>Flooring is vinyl tile in good condition. Walls are concrete masonry units in good condition. Solid ceilings and furring are gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Gymnasium:</p> <p>Flooring is poured rubber surface in good condition. Walls are concrete masonry units in good condition. Solid ceilings are exposed structure and decking in good condition.</p> <p>Gymnasium Toilets:</p> <p>Flooring is ceramic tile in good condition. Walls are ceramic tile wainscot and concrete masonry units in good condition. Solid ceilings are plaster in good condition.</p>

I	LT	Reference
		<p>Stage:</p> <p>Flooring is poured rubber surface in good condition. Walls are concrete masonry units in good condition. Solid ceilings are gypsum board in good condition.</p> <p>Kitchen:</p> <p>Flooring is ceramic tile in good condition. Walls are ceramic tile in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Kitchen equipment is in good condition. Corrective action is not required.</p>
		3.5 Mechanical, Plumbing and Electrical Systems
		3.5.1 HVAC System
		The HVAC system is a four-pipe system with boiler and chiller distributed to central station air handlers through a VAV (variable air volume) controls system. Controls on air-conditioning are pneumatic. The HVAC system is in good to fair condition. No corrective action is required.
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
X		Domestic water supply piping within the facility does appear to be adequate and is in poor condition. Leaks are constant. Problems have been cited at the walk-in bath, mechanical room and kitchen. Demolition into each chase wall will be required to fix the problems. Corrective action is required. Waste supply piping is in good condition.
		3.5.2.2 Domestic Hot Water Production
		Domestic hot water is provided by a natural gas boiler and storage tank in good condition. Corrective action is not required.
		3.5.2.3 Fixtures
		Plumbing fixtures and connections appear to be adequate and are in good condition. Corrective action is not required.
		3.5.2.4 Fuel Piping
		Not applicable.

I	LT	Reference
		3.5.3 Electrical System
		3.5.3.1 Main Service
		The main electrical distribution panel for the building is a 1,600-amp, 277/480-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in good condition. Distribution and dry type step down transformers provide power. Corrective action is not required.
		3.5.3.3 Interior Lighting
		<p>Administrative area, media center and classroom lighting is parabolic fluorescent fixtures in good condition. Fluorescent lamps are T-12. Light levels appear to be adequate. Corrective action is not required.</p> <p>Corridor lighting is recessed troffer fixtures with fluorescent lamps in good condition. Fluorescent lamps are T-12. Light levels appear to be adequate. Corrective action is not required.</p> <p>Cafeteria/gymnasium lighting is ceiling mounted metal halide fixtures with in good condition. Light levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.4 Exterior Lighting
		<p>Exterior lighting is provided and is surface mounted high-pressure sodium fixtures in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p> <p>Soffit and entrance lighting is provided and is recessed high-pressure sodium fixtures in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p> <p>Parking lot lighting is not provided and is pole mounted high-pressure sodium fixtures in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.5 Security System
		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is not required.

I	LT	Reference
		3.5.3.6 Intercom System
		Intercom system does allow communication to individual classrooms. The system is in good condition. Corrective action is not required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.
		3.5.3.8 Computer Network
		A computer network system provides approximately 6 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		<p>A required adequately marked accessible route from parking is provided and does not appear to comply with accessibility guidelines. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.</p> <p>Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is not required.</p> <p>The walkway approach to main entrance doors does appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.</p>
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.

I	LT	Reference
		3.6.3 Entrances/Exits
		<p>Main entrance/exit approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.</p> <p>Some auxiliary exit/entrance doors exit to porches that appear to provide accessible exiting. Corrective action is not required.</p> <p>Interior doors along the accessible route are inset or flush with corridor walls and appear to allow clearance and approach accessibility. Corrective action is not required.</p> <p>Door assemblies appear to meet accessibility guidelines. Corrective action is not required.</p>
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
		<p>Public toilet rooms are provided along the accessible route and appear to comply with accessibility guidelines. Corrective action is not required.</p> <p>Administrative staff and nurse's toilet rooms appear to meet accessibility guidelines. Corrective action is not required.</p> <p>Classroom toilet rooms appear to meet accessibility guidelines. Corrective action is not required.</p>
		3.6.6 Drinking Fountains
		Drinking fountains are provided along the accessible route and appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is not required.
		3.6.7 Telephones
		Not applicable.

I	LT	Reference
		3.6.8 Elevators/Lifts
		Elevators are not required. Platform/wheelchair lifts are not required.
		3.6.9 Recreational Facilities
X		Required accessible routes to play areas are provided. Accessible play areas, equipment and surfacing do not appear to be available in individual play area groups. ADA guidelines require a minimum of one play area with an accessible route, equipment and accessible surfacing material for each play area group. Corrective action is required.
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
		A sprinkler system is provided for the entire facility. Corrective action is not required. The kitchen hood is compensating type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in good condition. Corrective action is not required. A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is not required. Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.
		3.7.2 Alarm Systems
		The visual alarm system does appear to comply with ADA guidelines or life safety standards. Corrective action is not required. A fire alarm panel is provided. A required smoke detector is provided in front of the panel. Corrective action is not required. Required pull stations are provided at emergency egress doors and are mounted at heights complying with ADA guidelines. Corrective action is not required.

I	LT	Reference
		3.7.3 Corridor and Separation Walls
		Exit corridor and area separation walls appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights appear to have fire resistive construction. Ductwork penetrations appear to have required fire/smoke dampers. Corrective action is not required.
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies appear to comply with life safety fire resistance rating standards. Corrective action is not required.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
		<p>Corridor emergency egress lighting is provided. Fixtures are selected light fixtures with required testing devices. Corrective action is not required.</p> <p>Emergency egress lighting is provided in required windowless rooms. Fixtures are selected light fixtures with required testing devices. Corrective action is not required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>
		3.8 Asbestos Concerns
		According to the AHERA Report, this facility does not have asbestos-containing material (ACM).

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Lucas Elementary)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate and Long-term Remediation items are as follows:

Immediate	\$ 768,000
Long-term	<u>\$ 79,000</u>
Total Remediation Costs	\$ 847,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$11,448,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$143.10/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Lucas Elementary School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	6	61	11,448,000	170,900	847,000	13,900	.08	Renovate

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Mahaffey Middle School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 74,100 square foot, one story single building originally constructed in 1968. Subsequent additions were:</p> <p>? Classroom addition in 1997</p> <p>This facility serves 352 students in grades six through eight. Total student capacity is 571.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p>
		3.2.2 Paving, Curbing and Parking
X		<p>Parking area paving is asphaltic concrete in fair condition. There are areas with potholes that need repair. Corrective action is required to patch areas with potholes.</p> <p>Parking areas appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
		Concrete walkways and ramps are in fair condition. Corrective action is not required.
		3.2.4 Recreational Facilities and Title IX Compliance
		<p>The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>Play fields for boys' and girls' field sports are available on-site and are in good condition. Corrective action is not required.</p>

I	LT	Reference
	X	<p>Tennis courts are provided and are in poor condition. Corrective action is required.</p> <p>A gymnasium provides indoor court sport recreational and assembly space. Equal toilet and locker facilities are available for boys and girls indoor team sports. Corrective action is not required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
	X	<p>Domestic water main service does not appear to be adequate, is without metering and is in poor condition. Corrective action is required.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is multiple service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
X		The sanitary sewer service does not appear to be adequate and is in poor condition, particularly outside the boys' bathroom/locker. Corrective action is required.
X		A single-compartment grease trap is provided for kitchen waste piping, does not appear to be adequate and is in fair condition. Replacement with a two-compartment grease trap is required. Corrective action is required.
		3.2.5.4 Special Utility Systems
		Not applicable.
		3.2.5.5 Electrical Service and Metering
		Electrical service is multiple service with metering and is underground feeding a transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.

I	LT	Reference
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
	X	The foundation is assumed to be concrete grade beams, supported by spread and spot footings with concrete slab-on-grade floor in good overall condition. Corrective action is not required, except at two entrances where the slab-on-grade should be replaced where it has cracked and deteriorated.
		3.3.2 Building Frame
X		Building frame is concrete masonry unit walls with steel joists. Roof decking is structural metal. The structural system is in good overall condition. There is an area in the gym where a portion of the CMU wall has cracked. This cracking occurs over a height of approximately 14 courses. Corrective action is not required, except to repair the cracks in the gym wall. There were also two canopies over locker room exits that were potentially unsafe. When brought to the school's attention, these canopies were replaced immediately.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
		Building exterior is face brick masonry veneer with pre-cast concrete fascia in good condition. Corrective action is not required.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required. Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing in fair condition. Corrective action is not required.
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels in fair condition. Corrective action is not required.
		3.3.3.4 Soffits
		Soffits at main entrance/exit and auxiliary exit/entrances are stucco in fair condition. Corrective action is not required.

I	LT	Reference
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with cast stone coping in fair condition. Corrective action is not required.
		3.3.4 Roofing
X	X	Low slope modified bitumen roofing is located on some of the building and is in poor condition. Major leaks are evident. Because of these leaks, some of the gypsum roof deck may require replacement when the roof is replaced. Corrective action is required.
	X	Low slope fully adhered EPDM roofing is located on some of the building and is in poor condition. Major leaks are evident. Corrective action is required.
	X	Flashing, coping, fascia, gutters and downspouts are pre-finished metal in poor condition. Corrective action is required with roofing replacement.
X		Corrective action is required immediately to patch current roof leaks to try and prevent moisture intrusion.
		3.4 Interior Elements
		3.4.1 Common Areas
	X	<p>Lobbies and Corridors:</p> <p>Flooring is terrazzo, vinyl tile or carpet in fair condition. Walls are concrete masonry units, gypsum board, face brick masonry veneer or vinyl wall covering in fair condition. Solid ceilings and furring are gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Public and Private Toilets:</p> <p>Flooring is ceramic tile in fair condition. Walls are ceramic tile wainscot and concrete masonry units or ceramic tile in fair condition. Solid ceilings are plaster in poor condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is carpet in poor condition. Walls are concrete masonry units, gypsum board or face brick masonry veneer in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition. Replacement of both the carpet and ceilings is required with the HVAC replacement.</p>

I	LT	Reference
		<p>Cafeteria:</p> <p>Flooring is terrazzo in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Gymnasium:</p> <p>Flooring is finished wood in poor condition. Walls are concrete masonry units in fair condition. Solid ceilings are exposed structure and decking in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Gymnasium Toilets and Locker Rooms:</p> <p>Flooring is ceramic tile and carpet in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Stage:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units in fair condition. Solid ceilings are exposed structure and decking in fair condition.</p> <p>Kitchen:</p> <p>Flooring is terrazzo in fair condition. Walls are ceramic tile in good condition. Solid ceilings are plaster in poor condition.</p> <p>Kitchen equipment is in poor condition. No costs are included in this report as it is outside our project scope.</p>
		3.5 Mechanical, Plumbing and Electrical Systems
		3.5.1 HVAC System
X		<p>HVAC systems include heating, cooling and control equipment.</p> <p>Two areas have 2-pipe fan coil units with a boiler and chiller. The system and controls are in poor condition. Corrective action is required. An indoor air quality study is recommended in the short term to help address problems until the HVAC replacement funding can be secured. It is strongly recommended that the HVAC system be replaced as soon as possible.</p>
X		<p>Some of the building has rooftop units, with controls, in poor condition. Corrective action is required.</p>

I	LT	Reference
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
X		Domestic water supply and waste piping within the facility does not appear to be adequate and is in poor condition. Corrective action is required.
		3.5.2.2 Domestic Hot Water Production
X		Domestic hot water is provided by boiler and hot water storage tank in poor condition. Hot water piping from the boiler is in poor condition. Numerous leaks were observed in the piping of the mechanical room. These pipes are a constant maintenance repair item for the staff. Corrective action is required.
		3.5.2.3 Fixtures
X		Plumbing fixtures and connections do not appear to be adequate and are in poor condition. Corrective action is required.
		3.5.2.4 Fuel Piping
		Natural gas piping does appear to be adequate and in is in good condition. Corrective action is not required.
		3.5.3 Electrical System
		3.5.3.1 Main Service
X		The main electrical distribution panel for the new kitchen and some HVAC is an 806-amp, 277/480-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required. The main electrical distribution panel for the original building is a 1,600-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does not appear to be adequate and is in poor condition. Corrective action is required.
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in fair condition. Corrective action is not required.

I	LT	Reference
		3.5.3.3 Interior Lighting
X		Administrative area, media center and classroom lighting is recessed troffer fixtures with fluorescent lamps in poor condition. Fluorescent lamps are T-12. Light levels do not appear to be adequate. Corrective action is required.
X		Corridor lighting is recessed troffer fixtures with fluorescent lamps in poor condition. Fluorescent lamps are T-12. Light levels do not appear to be adequate. Corrective action is required.
		Gymnasium lighting is pendant mounted fixtures with metal halide lamps in good condition. Light levels appear to be adequate. Corrective action is not required.
		3.5.3.4 Exterior Lighting
X		Exterior lighting is provided and is surface mounted wall pack fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.
X		Soffit and entrance lighting is provided and is surface mounted fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.
X		Parking lot lighting is provided and is pole mounted fixtures with high-pressure sodium lamps in fair condition. Lighting levels do not appear to be adequate. Corrective action is required to add additional lighting so that both sides of parking lot are lit effectively.
		3.5.3.5 Security System
		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is not required.
		3.5.3.6 Intercom System
X		Intercom system does allow communication to individual classrooms. The system is in poor condition. Corrective action is required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.

I	LT	Reference
		3.5.3.8 Computer Network
		A computer network system provides approximately 8 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.
X		Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required. The walkway approach to main entrance doors does appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.
X		Ramps along the on-site accessible route are required and are provided. Ramps do not appear to comply with accessibility guidelines. Required handrails are provided and do not appear to comply with height and extension requirements. Corrective action is required.
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.
		3.6.3 Entrances/Exits
		Main entrance/exit and auxiliary exit/entrance approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.
X		Some auxiliary exit/entrance doors exit to porches and ramps that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required.

I	LT	Reference
X		Interior doors along the accessible route are inset or flush with corridor walls and some do not appear to allow clearance and approach accessibility. At least one door is required for each accessible space with adequate maneuvering, width and opening clearances from both sides. Corrective action is required.
X		Door assemblies do not appear to meet accessibility guidelines. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.
	X	Administrative staff, nurse's, toilet rooms and locker room showers do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.

I	LT	Reference
		3.6.8 Elevators/Lifts
	X	Elevators are not required. Required platform/wheelchair lifts are not provided at the stage. Corrective action is required.
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided. Corrective action is not required.
3.7 Life Safety and Fire Protection		
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.
X		A required sprinkler system is not provided for the stage. Corrective action is required.
X		The kitchen hood is make-up air type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in poor condition. Corrective action is required.
X		A required fire suppression system is provided in the kitchen hood. Cooking equipment does not have required shut down capability upon suppression system activation. Corrective action is required with hood replacement. Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.
		3.7.2 Alarm Systems
X		The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.
X		A fire alarm panel is provided. Fire alarm system is not functioning properly. A required smoke detector is not provided in front of the panel. Corrective action is required to replace the fire alarm system.

I	LT	Reference
X		Required pull stations are not provided at emergency egress doors. Corrective action is required.
		3.7.3 Corridor and Separation Walls
X		Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations in the older portion of the building. Borrowed lights and transoms appear to have fire resistive construction. Ductwork penetrations do not appear to have required fire/smoke dampers. Corrective action is required.
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
X		Corridor emergency egress lighting is provided. Fixtures are selected light fixtures without required testing devices. Corrective action is required to add testing devices.
X		<p>Emergency egress lighting is not provided in required windowless rooms. Corrective action is required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>

I	LT	Reference
		3.8 Asbestos Concerns
	X	According to the AHERA Report, this facility does have asbestos-containing material (ACM). Remaining ACM is non-friable, not damaged, inaccessible and is not hazardous to building occupants. Remaining asbestos consists primarily of vinyl floor tile mastic. The AHERA Report currently recommends managing all remaining ACM in place. Corrective action is required to remove asbestos long-term.

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Mahaffey Middle School)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 3,771,000
Long-term	<u>\$ 1,344,000</u>
Total Remediation Costs	\$ 5,115,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$10,852,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$146.36/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Mahaffey is a combination of several additions and the original building, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Mahaffey Middle School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*23.5	*43.5	10,852,000	162,000	5,115,000	117,600	.73	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Marshall Elementary School and Fort Campbell Schools Administrative Offices

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is an 82,400 square foot, one story multi-building complex originally constructed in 1961.</p> <p>This facility serves 581 students in grades pre-kindergarten through five. Total student capacity is 588.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Roof downspouts connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p>
		3.2.2 Paving, Curbing and Parking
	X	<p>Parking area paving is asphaltic concrete in fair to poor condition. Corrective action is required in the parking lot in front of the District Superintendent's Office.</p> <p>Parking areas do not appear to provide adequate parking spaces. Corrective action is not required.</p>
		3.2.3 Flatwork
		<p>Concrete walkways and ramps are in fair condition. Corrective action is not required.</p> <p>Walkways from drop off areas and between main building and freestanding buildings are protected by covered structures in fair condition. Corrective action is not required.</p>

I	LT	Reference
		3.2.4 Recreational Facilities and Title IX Compliance
X		<p>The school does not sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is required.</p> <p>A cafeteria/gymnasium and gymnasium provide indoor court sport recreational and assembly space. Corrective action is not required.</p> <p>Play areas are provided with various types of equipment in fair condition. Corrective action is not required.</p> <p>Play surfaces are in poor condition. Play surfaces in all areas do not appear to comply with the U.S. Consumer Safety Commission “Handbook for Public Playground Safety” requirements. Corrective action is required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
		<p>Domestic water main service does appear to be adequate, without metering, and is in good condition. Corrective action is not required.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is multiple service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
		<p>The sanitary sewer service does appear to be adequate and is in fair condition. Corrective action is not required.</p> <p>A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in good condition. Corrective action is not required.</p>
		3.2.5.4 Special Utility Systems
		Not applicable.

I	LT	Reference
		3.2.5.5 Electrical Service and Metering
		Electrical service is single service with metering, is underground and feeds a transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
		The foundation is assumed to be concrete grade beams, supported by spread and spot footings with concrete slab-on-grade floor in good condition. Corrective action is not required.
		3.3.2 Building Frame
		Building frame for the main building and classroom buildings is concrete masonry unit walls or structural steel columns and beams with steel joists. Roof decking is bulb tees and gypsum deck. The structural system is in good condition. Corrective action is not required.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
		Building exterior is face brick masonry veneer and stucco in fair condition. Corrective action is not required.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required. Auxiliary exit/entrances are pre-finished anodized aluminum doors and framing with glazing or hollow metal doors and frames with glazing in fair condition. Corrective action is not required.
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels in good condition. Corrective action is not required.

I	LT	Reference
		3.3.3.4 Soffits
		Soffits at main entrance/exit, auxiliary exit/entrances and roof overhangs are stucco in fair condition. Corrective action is not required.
		3.3.3.5 Parapets
		Areas with parapets are extensions of the indicated wall systems and are protected with metal coping in fair condition. Corrective action is not required.
		3.3.4 Roofing
X	X	<p>Low slope gravel surface built-up roofing is located on some of the main building and is in poor condition. Major leaks are evident. Corrective action is required.</p> <p>Low slope modified bitumen roofing is located on some of the main building and is in poor condition. Major leaks are evident. Corrective action is required.</p> <p>Low slope fully adhered EPDM roofing is located on the classroom buildings and is in poor condition. Major leaks are evident. Corrective action is required.</p> <p>Low slope ballasted EPDM roofing is located on the classroom addition and is in good condition. Corrective action is not required.</p> <p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal in poor condition. Corrective action is required with roofing replacement.</p> <p>Some patching of the current roof leaks will be required immediately until a roof replacement project is completed.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile or carpet in fair condition. Walls are concrete masonry units, gypsum board or face brick masonry veneer in fair condition. Suspended acoustical lay-in panel ceilings are in poor condition.</p> <p>Public, Private and Classroom Toilets:</p> <p>Flooring is ceramic tile or vinyl tile in good condition. Walls are concrete masonry units or ceramic tile wainscot and concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p>

I	LT	Reference
X		<p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is vinyl tile or carpet in fair condition. Walls are concrete masonry units, gypsum board, vinyl wall covering or wood paneling in fair condition. Solid ceilings and furring are gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition. Ceilings will be replaced in conjunction with lighting replacement.</p> <p>Cafeteria/Gymnasium:</p> <p>Flooring is poured rubber surface in poor condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Gymnasium:</p> <p>X Flooring is carpet or rubber flooring in poor condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition. Corrective action is required in the gym/cafeteria room.</p> <p>Stage:</p> <p>Flooring is vinyl tile in fair condition. Walls are concrete masonry units in fair condition. Solid ceilings are gypsum board in fair condition. Gypsum board ceilings are in fair condition.</p> <p>Kitchen:</p> <p>Flooring is terrazzo in good condition. Walls are glazed concrete masonry unit wainscot and concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Kitchen equipment is in good condition. Corrective action is not required.</p>
X		3.5 Mechanical, Plumbing and Electrical Systems
		3.5.1 HVAC System
X		<p>The system for the original building is two individual 2-pipe fan coil units with a boiler and chiller. The system and controls are in poor condition. Corrective action is required. (This project was recently awarded for construction.)</p> <p>The classroom additions and pod buildings are rooftop units. The units and controls have recently been replaced and are in good condition. Corrective action is not required.</p>

I	LT	Reference
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
		Domestic water supply and waste piping within the facility does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.2.2 Domestic Hot Water Production
		Domestic hot water is provided by gas water heaters in good condition. Corrective action is not required.
		3.5.2.3 Fixtures
		Plumbing fixtures and connections appear to be adequate and are in fair condition. Corrective action is not required.
		3.5.2.4 Fuel Piping
		Natural gas piping does appear to be adequate and in is in good condition. Corrective action is not required.
		3.5.3 Electrical System
		3.5.3.1 Main Service
		The main electrical distribution panel for the entire facility is a 1,200-amp, 277/480-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required.
X		Additional service and wiring must be added with the HVAC replacement in the original building to handle the increased electrical load. (This project was recently awarded for construction.)
		3.5.3.2 Distribution and Panels
		Electrical distribution and branch panels appear to be adequately sized and are in fair condition. Distribution and dry type step down transformers provide power. Corrective action is not required.
		3.5.3.3 Interior Lighting
X		Administrative area, media center and classroom lighting is recessed troffer fixtures with fluorescent lamps in poor condition in all areas except the classroom addition and classroom buildings. Fluorescent lamps are T-8. Light levels do not appear to be adequate. Corrective action is required.

I	LT	Reference
X		<p>Corridor lighting is recessed troffer fixtures with fluorescent lamps in poor condition. Fluorescent lamps are T-8. Light levels do not appear to be adequate. Corrective action is required. (This project was recently awarded for construction.)</p> <p>Gymnasium and cafeteria/gymnasium lighting is pendant mounted fixtures with metal halide (in the gymnasium) and incandescent lamps (in the cafeteria/gymnasium) in good condition. Light levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.4 Exterior Lighting
	X	<p>Exterior lighting is provided and is surface mounted wall pack fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Soffit and entrance lighting is not provided. Corrective action is not required.</p>
	X	<p>Covered walkway lighting is provided and is surface mounted fixtures with high-pressure sodium lamps in poor condition. Lighting levels do not appear to be adequate. Corrective action is required.</p> <p>Parking lot lighting is provided and is pole mounted fixtures with high-pressure sodium lamps in good condition. Lighting levels appear to be adequate. Corrective action is not required.</p>
		3.5.3.5 Security System
		<p>A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is not required.</p>
		3.5.3.6 Intercom System
		<p>Intercom system does not allow communication to individual classrooms. The system is in good condition. Corrective action is not required.</p>
		3.5.3.7 Educational Television
		<p>Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.</p>

I	LT	Reference
		3.5.3.7 Computer Network
		A computer network system provides approximately 8 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.
X		Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required.
		The walkway approach to main entrance doors does appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.
X		Ramps along the on-site accessible route are required and are provided, except at entrance/exit doors in classroom buildings. Ramps do not appear to comply with accessibility guidelines. Required handrails are provided and do not appear to comply with height and extension requirements. Corrective action is required.
X		Ramps along the interior accessible route are required and are not provided in the administrative offices. Corrective action is required.
X		Steps are provided in corridors along the interior accessible route at elevation changes and at some exits to the exterior. Steps do not appear to comply with accessibility guidelines. Required handrails are not provided. Corrective action is required.
X		Some interior exits have steps without ramps and do not appear to meet accessibility guidelines. Signage designating the exit as “NOT HANDICAPPED ACCESSIBLE” is not provided. Corrective action is required.

I	LT	Reference
		3.6.2 Parking
X		Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.
		3.6.3 Entrances/Exits
	X	Main entrance/exit and auxiliary exit/entrance approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required. Some auxiliary exit/entrance doors exit to porches and ramps that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required. Interior doors along the accessible route are inset or flush with corridor walls and appear to allow clearance and approach accessibility. At least one door is required for each accessible space with adequate maneuvering, width and opening clearances from both sides. Corrective action is not required.
X		Door assemblies do not appear to meet accessibility guidelines, except in the classroom addition. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.
	X	Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.

I	LT	Reference
	X	Classroom toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. At least one classroom on each wing or grade level should have an accessible toilet. Corrective action is required.
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and some do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.
		3.6.8 Elevators/Lifts
	X	Elevators are not required. Required platform/wheelchair lifts are not provided at the stage or corridor changes in elevation. Corrective action is required.
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided. Accessible play areas, equipment and surfacing do not appear to be available in individual play area groups. ADA guidelines require a minimum of one play area with an accessible route, equipment and accessible surfacing material for each play area group. Corrective action is required and pricing is shown in Section 3.2.4.
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.
X		A required sprinkler system is not provided for the stage. Corrective action is required.
X		The kitchen hood is make-up air type. Distance from cooking surfaces and edge of kitchen hood do not appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The hood was not included in the project to replace kitchen equipment. The kitchen hood system is in fair condition. Corrective action is required.

I	LT	Reference
		<p>A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is required with hood replacement.</p> <p>Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.</p>
		3.7.2 Alarm Systems
X		The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.
X		A fire alarm panel is provided and does not include multiple buildings. A required smoke detector is not provided in front of the panel. Corrective action is required.
X		Required pull stations are not provided at emergency egress doors. Corrective action is required.
		3.7.3 Corridor and Separation Walls
X		Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights appear to have fire resistive construction. Ductwork penetrations do not appear to have required fire/smoke dampers. Corrective action is required.
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>

I	LT	Reference
		3.7.5 Classroom Emergency Exiting
		Operable window units and exit doors to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
X		Corridor emergency egress lighting is provided. Fixtures are selected light fixtures without required testing devices. Corrective action is required.
X		Emergency egress lighting is not provided in required windowless rooms. Corrective action is required.
X		Illuminated directional emergency exit signs are not provided at every required location and are not clearly visible. Corrective action is required.
		3.8 Asbestos Concerns
	X	According to the AHERA Report, this facility does have asbestos-containing material (ACM). Remaining ACM is non-friable, not damaged, inaccessible and is not hazardous to building occupants. The school recently had some friable insulation removed. Remaining ACM includes floor tile and mastic, caulk, pipe insulation and plaster. The AHERA Report currently recommends managing all remaining ACM in place. Corrective action is required long-term to remove all asbestos.

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Marshall Elementary / Administrative Offices)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 540,000
Intermediate	\$ 82,000
Long-term	<u>\$ 1,491,000</u>
Total Remediation Costs	\$ 2,113,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$11,792,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$143.10/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Marshall is a combination of numerous additions and the original pods, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Marshall Elementary School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*31.5	*35.5	11,792,000	176,000	2,113,000	59,500	.34	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

3.0 System Description and Observations: Wassom Middle School

I	LT	Reference
		3.1 Overall General Description
		<p>This facility is a 68,400 square foot, one story single building originally constructed in 1957. Subsequent additions were:</p> <ul style="list-style-type: none"> ? Classroom and Corridor Enclosure in 1962 ? Classroom Addition in 1988 ? Classroom Addition in 1989 ? Enlarge Media Center in 1990 ? Kitchen Enlargement in 1992 <p>This facility serves 437 students in grades six through eight. Total student capacity is 726.</p>
		3.2 Site
		3.2.1 Topography and Storm Water Drainage
X		<p>Slopes away from building appear to provide adequate surface runoff drainage in all areas and the site does not appear to exhibit water-retaining problems. Corrective action is not required.</p> <p>Site storm water drainage is area drains and storm water drainage system. Some roof downspouts do not connect to the storm water drainage system. The system does appear to be adequate for storm water control. Corrective action is not required.</p> <p>Staff reports tripping hazards near four diseased oak trees. We recommend these trees for immediate removal.</p>
		3.2.2 Paving, Curbing and Parking
X		<p>Parking area paving is asphaltic concrete in fair condition. Concrete curbing is in poor condition. Corrective action is required.</p> <p>Parking areas do not appear to provide adequate parking spaces. However, corrective action is not required as part of the scope of this report.</p>
		3.2.3 Flatwork
		Concrete walkways and ramps are in fair condition. Corrective action is not required.

I	LT	Reference
		Walkways at drop off areas are protected by covered structures in fair condition. Corrective action is not required, except for structural remediation referenced in Section 3.3.2.
		3.2.4 Recreational Facilities and Title IX Compliance
		<p>The school does sponsor specific team sport programs and does appear to be in compliance with Title IX regulations. Corrective action is not required.</p> <p>Play fields for boys' and girls' field sports are available on-site and are in good condition. Corrective action is not required.</p> <p>Tennis courts are provided and are in fair condition. Corrective action is not required.</p> <p>Play field lighting is not available and is not required for Title IX compliance. Corrective action is not required.</p> <p>A gymnasium provides indoor court sport recreational and assembly space. Equal toilet and locker facilities are available for boys and girls indoor team sports. Corrective action is not required.</p>
		3.2.5 Utilities
		3.2.5.1 Water
	X	<p>Domestic water main service does appear to be adequate, without metering and is in fair condition. Corrective action will be required in the next ten years due to the age of the plumbing.</p> <p>A required backflow preventer on the main water service line is provided. The backflow preventer is in good condition. Corrective action is not required.</p>
		3.2.5.2 Natural Gas
		Gas service is single service, does appear to be adequate and in is in good condition. Corrective action is not required.
		3.2.5.3 Sanitary Sewer
	X	<p>The sanitary sewer service does appear to be adequate and is in fair condition. Corrective action is required long-term due to its age. Corrective action is needed on the main base line as well, although that cost is not part of this report.</p> <p>A two-compartment grease trap is provided for kitchen waste piping, does appear to be adequate and is in fair condition. Corrective action is not required.</p>

I	LT	Reference
		3.2.5.4 Special Utility Systems
		Not applicable.
		3.2.5.5 Electrical Service and Metering
		Electrical service is single service with metering, is underground feeding a pad mounted transclosure. It does appear to be adequate and is in good condition. Corrective action is not required.
		3.3 Structural Frame and Building Envelope
		3.3.1 Foundation
		The foundation is assumed to be concrete grade beams, supported by continuous spread and spot footings with concrete slab-on-grade floor in good condition. Corrective action is not required.
		3.3.2 Building Frame
X		Building frame is concrete masonry unit walls or structural steel columns and beams with steel joists. Roof decking is structural metal or bulb tees and gypsum. The structural system is in good condition. Corrective action is not required. There is one location at the west end of the entrance canopy that requires immediate action to reattach two steel beams.
		3.3.3 Facades or Curtainwall
		3.3.3.1 Sidewall System
X		Building exterior is face brick masonry veneer with some cast stone panels at the front of the building in fair condition. Corrective action is required to replace and repaint some brick veneer that has deteriorated.
		3.3.3.2 Entrances/Exits
		Main entrance/exit is pre-finished anodized aluminum doors and framing with glazing in good condition. Corrective action is not required. Auxiliary exit/entrances are painted hollow metal doors and frames with glazing in fair condition. Corrective action is not required.
		3.3.3.3 Fenestration System
		Fenestration system is pre-finished anodized aluminum framing with double glazing and pre-finished metal spandrel panels in good condition. Corrective action is not required.

I	LT	Reference
		3.3.3.4 Soffits
		Soffits at main entrance/exit, auxiliary exit/entrances and roof overhangs are stucco in fair condition. Corrective action is not required.
		3.3.3.5 Parapets
		Not applicable.
		3.3.4 Roofing
X		<p>Low slope modified bitumen roofing is located on the entire building, except over one area of the Media Center, and is in good condition. Minor leaks are evident. There are four areas near RTU's 38, 57, 56 and 55 that hold water when it rains and have started to show signs of deterioration. There also appears to be a flashing connection problem at the termination strip at the wall between RTU's 41 and 40. Corrective action is required to patch roof leaks and replace any damaged areas.</p> <p>Low slope fully adhered EPDM roofing is located on the high area of the Media Center and is in good condition. Minor leaks are evident. Corrective action is not required.</p> <p>Flashing, coping, fascia, gutters and downspouts are pre-finished metal in fair condition. Corrective action is not required.</p>
		3.4 Interior Elements
		3.4.1 Common Areas
		<p>Lobbies and Corridors:</p> <p>Flooring is vinyl tile in good condition. Walls are painted concrete masonry units and face brick masonry veneer with glass transoms above in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Public and Private Toilets:</p> <p>Flooring is ceramic tile or poured resinous material in fair condition. Walls are painted concrete masonry units or ceramic tile wainscot and concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are new and in good condition.</p>

I	LT	Reference
		<p>Administrative Areas, Media Center and Classrooms:</p> <p>Flooring is vinyl tile in good condition. This flooring is new and was put in when the old carpet was removed for indoor air quality reasons according to the report attached in the appendix. Walls are concrete masonry units or painted gypsum board in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Cafeteria:</p> <p>Flooring is vinyl in good condition. Walls are concrete masonry units in good condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Gymnasium:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Gymnasium Toilets and Locker Rooms:</p> <p>Flooring is terrazzo in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Stage:</p> <p>Flooring is finished wood in fair condition. Walls are concrete masonry units and painted gypsum board in fair condition. Suspended acoustical lay-in panel ceilings are in good condition.</p> <p>Kitchen:</p> <p>Flooring is ceramic tile in fair condition. Walls are concrete masonry units in fair condition. Suspended acoustical lay-in panel ceilings are in fair condition.</p> <p>Kitchen equipment is in poor condition. Corrective action is not required as part of the scope of this study.</p>
		<p>3.5 Mechanical, Plumbing and Electrical Systems</p>
		<p>3.5.1 HVAC System</p>
		<p>HVAC systems are gas-fired roof top units, relatively new and in good condition. The control system is a new DDC (direct digital control) system installed with the roof top units. No action is required.</p>

I	LT	Reference
		3.5.2 Plumbing System
		3.5.2.1 Plumbing Supply and Waste Piping
	X	Domestic water supply and waste piping within the facility does appear to be adequate and is in fair condition. Corrective action is required long-term to replace approximately thirty percent.
		3.5.2.2 Domestic Hot Water Production
		Domestic hot water is provided by natural gas water heaters in good condition. Corrective action is not required.
		3.5.2.3 Fixtures
	X	Plumbing fixtures and connections appear to be adequate and are in fair condition. Corrective action is required long-term to replace approximately twenty percent of the total fixtures in the building.
		3.5.2.4 Fuel Piping
		Not applicable.
		3.5.3 Electrical System
		3.5.3.1 Main Service
		The main electrical distribution panel for the building is a 3,000-amp, 120/208-volt, 3-phase, 4-wire panel. The panel does appear to be adequate and is in good condition. Corrective action is not required.
		3.5.3.2 Distribution and Panels
	X	Electrical distribution and branch panels appear to be adequately sized and are in good condition. Corrective action is not required, except to add receptacles in the Home Economics Room.
		3.5.3.3 Interior Lighting
		<p>Administrative area, media center and classroom lighting is recessed troffer fluorescent fixtures in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.</p> <p>Corridor lighting is recessed troffer fluorescent fixtures in good condition. Fluorescent lamps are T-8. Light levels appear to be adequate. Corrective action is not required.</p>

I	LT	Reference
		Gymnasium lighting is ceiling mounted metal halide fixtures in good condition. Light levels appear to be adequate. Corrective action is not required.
		3.5.3.4 Exterior Lighting
	X	Exterior lighting is provided and is surface mounted high-pressure sodium fixtures in fair condition. Lighting levels appear to be adequate. Corrective action is required to improve lighting in dark areas, particularly near the band hall. Soffit and entrance lighting is provided. Corrective action is not required.
	X	Parking lot lighting is provided and is pole mounted high-pressure sodium fixtures in fair condition. Lighting levels appear to be adequate. Corrective action is required long-term to replace worn-out fixtures.
		3.5.3.5 Security System
		A security system is provided and is monitored by a central agency. The security system does appear to provide adequate security or monitoring and is in good condition. Corrective action is not required.
		3.5.3.6 Intercom System
		Intercom system does allow communication to individual classrooms. The system is in fair condition. Corrective action is not required.
		3.5.3.7 Educational Television
		Educational television is provided and does not allow internal broadcasting. The system is in good condition. Corrective action is not required.
		3.5.3.8 Computer Network
		A computer network system provides approximately 6 LAN outlets for each classroom. The computer network system does appear to be adequate and is in good condition. Corrective action is not required.
		3.6 ADA Tier I: Visual Accessibility Survey
		3.6.1 Path of Travel
X		A required adequately marked accessible route from parking is not provided. One accessible route is required from the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones, public streets or walkways to an accessible building entrance. Corrective action is required.

I	LT	Reference
X		<p>Curb ramps on approaches to the facility from student drop off areas and parking are provided and do not appear to comply with accessibility guidelines. Curb ramps along the accessible route are required to have compliant slopes and detectable warnings. Corrective action is required.</p> <p>The walkway approach to main entrance doors does appear to provide accessible slopes without threshold entry restrictions. Corrective action is not required.</p>
X		<p>Ramps along the on-site accessible route are required and are provided. Ramps do not appear to comply with accessibility guidelines. Required handrails are provided. Handrails do not appear to comply with height and extension requirements. Corrective action is required.</p>
X		<p>Ramps along the interior accessible route are required and are provided. Ramps do not appear to comply with accessibility guidelines. Required handrails are not provided. Corrective action is required.</p>
		3.6.2 Parking
X		<p>Required accessible parking for cars and vans is not provided. Parking areas require marked spaces based on 1 accessible space for each 25 spaces, a minimum of one van accessible space for each 8 accessible spaces with slopes not exceeding 1:50 (2%) in all directions, access aisles, signage and marked accessible route. Corrective action is required.</p>
		3.6.3 Entrances/Exits
X		<p>Main entrance/exit approach, doors and hardware appear to comply with accessibility guidelines. Corrective action is not required.</p> <p>Some auxiliary exit/entrance doors exit to porches that do not appear to provide accessible exiting. Exit/entrances are required to be accessible by construction of porches, ramps, handrails or site regrading. Corrective action is required.</p> <p>Interior doors along the accessible route are inset or flush with corridor walls and appear to allow clearance and approach accessibility. Corrective action is not required.</p>
X		<p>Door assemblies do not appear to meet accessibility guidelines. All doors to accessible spaces are required to have non-restrictive hardware and closers. Corrective action is required.</p>

I	LT	Reference
		3.6.4 Signage
	X	Signage along the accessible route does not appear to comply with accessibility guidelines. Signage is required at all designated parking spaces, along the marked accessible route and building interior. Signage with raised Braille characters is required at all doors designating permanent rooms or spaces. Corrective action is required.
		3.6.5 Public Toilet Rooms
X		Public toilet rooms are provided along the accessible route and do not appear to comply with accessibility guidelines. Public toilets are required to provide accessible entry, maneuverability, clear floor space and accessible fixtures, accessories, controls, partitioned stalls and recessed insulated lavatory piping. Corrective action is required.
	X	Administrative staff and nurse's toilet rooms do not appear to meet accessibility guidelines. Toilets are required to comply with guidelines similar to public toilets. Corrective action is required.
		3.6.6 Drinking Fountains
X		Drinking fountains are provided along the accessible route and do not appear to comply with accessibility guidelines. Drinking fountains are required to be accessible with adequate clearances and corridor protrusion protection. Corrective action is required.
		3.6.7 Telephones
		Not applicable.
		3.6.8 Elevators/Lifts
		Elevators are not required.
	X	Required platform/wheelchair lifts are not provided at the stage. Corrective action is required.
		3.6.9 Recreational Facilities
		Required accessible routes to play areas are provided and appear to comply with accessibility guidelines. Corrective action is not required.

I	LT	Reference
		3.7 Life Safety and Fire Protection
		3.7.1 Sprinklers, Standpipes and Fire Suppression Systems
X		A required sprinkler system is not provided for janitor and custodial spaces. Corrective action is required.
X		<p>A required sprinkler system is not provided for the stage. Corrective action is required.</p> <p>The kitchen hood is compensating type. Distance from cooking surfaces and edge of kitchen hood appear to comply with distance requirements. Kitchen hood duct protection is fire resistive construction. The kitchen hood system is in fair condition. Corrective action is not required.</p> <p>A required fire suppression system is provided in the kitchen hood. Cooking equipment does have required shut down capability upon suppression system activation. Corrective action is not required.</p> <p>Provision of fire extinguishers within required travel distances appear to comply with life safety standards. Corrective action is not required.</p>
		3.7.2 Alarm Systems
X		The visual alarm system does not appear to comply with ADA guidelines or life safety standards. Visual alarms located 80 inches above the floor to the bottom of the lens are required in all corridors, common use spaces and rooms with more than one occupant. Corrective action is required.
X		<p>A fire alarm panel is provided. A required smoke detector is not provided in front of the panel. Corrective action is required.</p> <p>Required pull stations are provided at emergency egress doors and are mounted at heights complying with ADA guidelines. Corrective action is not required.</p>
		3.7.3 Corridor and Separation Walls
X		Exit corridor and area separation walls do not appear to have required firestopping sealing between wall and structural surfaces and framing or around wall penetrations. Borrowed lights and transoms do not appear to have fire resistive construction. Ductwork penetrations do not appear to have required fire/smoke dampers. Corrective action is required.

I	LT	Reference
		3.7.4 Doors
		<p>Corridor doors, frames, hardware and assemblies do not appear to comply with life safety fire resistance rating standards. Corridor doors are required to have fire resistance rated construction and hardware assemblies. Corrective action is required. Refer to Section 3.6 for Opinions of Probable Costs of remediation.</p> <p>Area separation doors, frames, hardware and assemblies appear to comply with fire resistance rated construction requirements. Corrective action is not required.</p> <p>Emergency exit doors, frames, hardware and assemblies appear to comply with emergency exiting requirements. Corrective action is not required.</p>
		3.7.5 Classroom Emergency Exiting
		Operable window units to building exterior provide classroom emergency exiting and appear to comply with emergency exiting requirements. Corrective action is not required.
		3.7.6 Emergency Egress Lighting
		<p>Corridor emergency egress lighting is provided. Fixtures are selected light fixtures with required testing devices. Corrective action is not required.</p> <p>Illuminated directional emergency exit signs are provided at every required location and are clearly visible. Corrective action is not required.</p>
		3.8 Asbestos Concerns
		According to the AHERA Report, this facility does not have asbestos-containing material (ACM). The last remaining asbestos was removed in July of 2002.

4.0 Opinions of Probable Costs to Remedy Physical Deficiencies (Wassom Middle School)

4.1 General

Opinions of probable cost are provided to address physical deficiencies in the facility. Physical deficiencies are divided into three categories: Immediate, Intermediate, and Long-term Remediation items as requested in the scope of work. The costs shown are based on visual observations from the walk-through survey. Quantities used in performing the estimate are approximate; no measurements were taken on site. Unit costs are parametric based on gross square footage for major building systems and components.

4.2 Parametric Costs

The appendix of each report contains the parametric opinions of probable costs. Each major physical deficiency is listed with the report section number. The unit prices shown were derived from RS Means Building Construction Costs Data, 60th Edition, 2002 and from prior experience at the Military Base. Immediate, Intermediate, and Long-term Remediation Costs are based on Fiscal Year 2004 (FY04) values. Each item is marked up for general contractor overhead and profit and escalated for two years at 2.87% per year. It is assumed that these costs will be escalated beyond 2004 by the user. Each cost is also adjusted by a location adjustment factor based on the average nationwide statistical labor costs as established by the office of the Under Secretary of Defense, June 3, 2002. An estimate contingency is applied to all costs to cover costs for unforeseen conditions and unknown quantities. The contingency amount is contingent upon the level of scope and detail. Typically, budgetary opinions of probable costs provided at a “pre-concept” phase include a 15% contingency. Opinions of probable costs for “construction document” phase projects include 5 - 10% contingencies. A 15% contingency for the opinions of costs, based on the US Army Technical Manual TM 5-800-4 - Programming Cost Estimates for Military Construction, is included in this study due to the broad nature of the survey.

4.3 Overall Cost Summary

The total cost summary for remediation of physical deficiencies follows in this section. The summary indicates the distribution of Immediate Remediation costs for the three primary standards used for evaluation: life safety, ADA, and major building system guidelines. Intermediate remediation items fall into categories of Title IX, force protection, play surfacing, and additional sitework for safe traffic flow. Long-term Remediation costs are indicated for additional ADA work and deferred maintenance items. Deferred maintenance is work that cannot be performed by routine maintenance and requires capital improvements. Examples of deferred maintenance include new roofing and asbestos abatement of non-friable materials.

4.4 Detailed Cost Summary

A detailed cost summary is included at the end of this section for Immediate Remediation work recommended for completion within 1 year, and Long-term Remediation recommended for completion within 1–10 years. Detailed distributions are not given for intermediate costs as they apply to individual line items, in general. Intermediate costs are a lower priority item than immediate costs. Cost distributions for each building system are indicated in tabular form for all items requiring remediation.

4.5 Discussion of Results

Section 3.0 of the report lists the physical deficiencies and associated opinions of probable costs of remediation for each building system. Total costs for Immediate, Intermediate, and Long-term Remediation items are as follows:

Immediate	\$ 723,000
Long-term	<u>\$ 313,000</u>
Total Remediation Costs	\$ 1,036,000

A calculation of Plant Replacement Value (PRV) was also performed for this facility. Plant replacement value represents the cost of a new building and associated sitework for FY04 pricing. The PRV for this school is approximately \$10,013,000. This cost was determined based on the following square foot cost escalated from TM 5-800-4:

\$146.36/sf

These costs were then multiplied by the building square footage and applicable cost escalation and contingency factors. PRV is often used as a comparison to renovation and repair costs for economic feasibility studies.

Before a comparison of remediation costs and Plant Replacement Value (PRV) can be performed, it is important to consider the age of the building. According to the Department of Defense's "Facilities Recapitalization Front End Assessment, August 2002," the government's goal is a 67 year recapitalization rate. Sixty-seven years is the expected service life for a building in the DOD inventory and we have carried that assumption to this analysis. For the purpose of our study, we are utilizing relative useful life of a building, defined as the 67 year expected service life minus the age of the building. In facilities with additions, we have compiled a composite facility age using the areas and ages of each component making up the whole facility.

The above DOD reference calculates recapitalization rate as the plant replacement value divided by the planned annual sustainment costs to determine the number of years of expected life. A number greater than 67 is considered good because it exceeds the government goal. Sustainment in this model is the cost of annual maintenance and improvements. Because our study is based on a large, one-time investment and not

annual maintenance dollars, it does not transfer directly to our study. However, the logic of the method is easily transformed into a Modified Recapitalization Metric (MRM).

For the purpose of this study, the modified recapitalization metric (MRM) is computed considering the following factors:

- Expected Service Life (ESL): 67 years per DOD
- Relative Useful Life (RUL): Expected service life minus the age of the building. Because Wassom is a combination of several additions and the original building, a composite relative useful life has been used.
- Target Sustainment: The annual investment required to keep the building in good working order to achieve an ESL of 67 years. It is calculated by dividing the plant replacement value by the ESL.
- Plant Replacement Value (PRV): The cost to replace the school building, sitework, furniture and associated assets. It is presented in FY 2004 dollars for this study.
- Remediation Costs: These are the total construction costs associated with correcting deficiencies noted in this study.
- Required Investment: The level of investment required to correct the current deficiencies spread out over the remaining useful life. It is calculated by dividing remediation costs by the RUL.

The MRM is the ratio of required investment to target sustainment (investment). A ratio less than one indicates it may be more cost effective to renovate a facility rather than replacing it. Conversely, an MRM greater than one indicates replacement may be the better option because the government could spend less sustaining a new facility rather than investing in an older, less modern facility.

The following table summarizes the MRM calculation for Wassom Middle School.

ESL (yrs)	AGE (yrs)	RUL (yrs)	PRV (\$)	TARGET SUSTAIN (Annual \$)	REMED. COSTS (\$)	REQ'D INVEST. (Annual \$)	MRM	RECOMMEND
67	*38.2	*38.8	10,013,000	149,400	1,036,000	36,000	.24	Renovate

*Represents Composite Number.

Based on our analysis of the remediation costs, it is our opinion that this school should be renovated to bring it into compliance with applicable codes and repair problems with major building systems.

Refer Appendix for Total Cost Summary

Refer Appendix for Immediate Remediation Item Detail Table

Refer Appendix for Long-Term Remediation Item Detail Table

BARKLEY ELEMENTARY SCHOOL



Photo 1: Sign



Photo 2: Roof Ponding



Photo 3: Paving in Poor Condition



Photo 4: Brick Crack



Photo 5: Non-compliant Vertical Circulation



Photo 6: Non-compliant Door and Hardware

FORT CAMPBELL HIGH SCHOOL



Photo 1: Sign



Photo 2: Roof Leak at Flashing



Photo 3: Access thru Drive Lane



Photo 4: Non-compliant Door



Photo 5: Non-compliant Fixture



Photo 6: Structural Support Needed

JACKSON ELEMENTARY SCHOOL



Photo 1: Jackson Elementary Sign



Photo 2: Pavement in Poor Condition



Photo 3: Provide Strobe with the Horn, Life Safety



Photo 4: ADA Non-compliant Door and Signage

JACKSON ELEMENTARY SCHOOL



Photo 5: ADA Non-compliant Toilet and Door

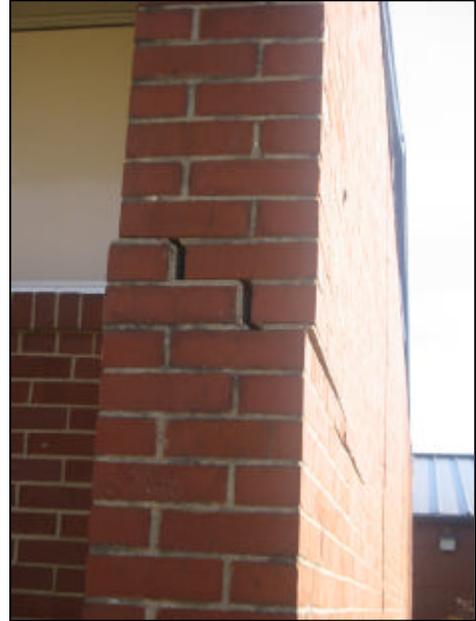


Photo 6: Cracked Masonry from Foundation Shift



Photo 7: ADA Non-compliant Play Area



Photo 8: Broken Water Pipe, Damage to Grade Beam

LINCOLN ELEMENTARY SCHOOL



Photo 1: Lincoln Elementary School Sign



Photo 2: Damaged Walkway and Pavement



Photo 3: Damaged Face Brick Masonry



Photo 4: Damaged Face Brick Masonry

LINCOLN ELEMENTARY SCHOOL



Photo 5: ADA Non-compliant Entrance



Photo 6: ADA Non-compliant Toilet



Photo 7: Roof Ponding



Photo 8: ADA Non-compliant Play Areas

LUCAS ELEMENTARY SCHOOL



Photo 1: Sign



Photo 2: Non-compliant Play Area



Photo 3: Compliant Fixtures



Photo 4: History of Roof Leak Here

MAHAFFEY MIDDLE SCHOOL



Photo 1: Sign



Photo 2: Damaged Roofing



Photo 3: Ceiling Damage from Roof Leak



Photo 4: Crack in Wall at Gym

MAHAFFEY MIDDLE SCHOOL



Photo 5: ADA Non-compliant Exit/Entrance



Photo 6: Old Rooftop Unit



Photo 7: ADA Non-compliant Toilet



Photo 8: Bad Lighting and Ceiling

**MARSHALL ELEMENTARY SCHOOL
FORT CAMPBELL SCHOOLS ADMINISTRATIVE OFFICES**



Photo 1: Sign and Damaged Pavement



Photo 2: Roof Ponding and Deterioration



Photo 3: ADA Non-compliant Entrance



Photo 4: ADA Non-compliant Exit/Entrance

**MARSHALL ELEMENTARY SCHOOL
FORT CAMPBELL SCHOOLS ADMINISTRATIVE OFFICES**



Photo 5: Non-compliant Kitchen Hood Coverage



Photo 6: ADA Non-compliant Toilet



Photo 7: Needs New HVAC Unit



Photo 8: ADA Non-compliant Play Areas

WASSOM MIDDLE SCHOOL



Photo 1: Sign



Photo 2: Damaged Brick Veneer



Photo 3: Canopy Beam Connection



Photo 4: Corridor Walls not to Deck



Photo 5: Unprotected Corridor Glass



Photo 6: Roof Ponding