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Military Family Housing Economic Analysis Manual

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CONTENTS

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ABSTRACT

The Military Family Housing Economic Analysis Manual provides a methodology for preparing economic analyses of U. S. Air Force military family housing projects, using a series of forms with step-by-step instructions. The purpose of the manual is to enable the Air Force to comprehensively and systematically analyze alternative approaches to meeting its family housing needs. The manual provides direction on determining when to perform an economic analysis, identifying appropriate options for meeting housing needs, and comparing the costs and benefits of the options as input to an informed decision-making process. The methodology of the manual consists of two main components: (1) a life-cycle cost analysis that calculates construction, maintenance and repair, utilities, and other costs over the life of an option discounted to present value and (2) a cost-benefit analysis that combines life-cycle costs with qualitative benefits, such as the effectiveness of a project in meeting housing needs, the quality of the housing provided, the impact of housing options on mission operations, and historic preservation considerations. The manual also provides instructions on documenting the results of an economic analysis in a report that can be forwarded to higher headquarters to support project justification. In addition to forms, instructions, and information needed to conduct an economic analysis for military family housing projects, the manual includes a sample problem that demonstrates how each of the forms is completed and the analysis is documented.

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1. INTRODUCTION

1.1 PURPOSE

The purpose of this manual is to enable the U. S. Air Force (USAF) to comprehensively and systematically analyze alternative approaches to meeting the USAF's military family housing (MFH) needs. The manual is Headquarters USAF/ Housing and Services Division's (HQ USAF/LEEH) implementing document for complying with USAF policy on Economic Analysis and Program Evaluation as specified in AFR 178-1 (OPR: ACMM).

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Recent experience has demonstrated that a businesslike approach to evaluating alternative ways of providing housing to military families can be helpful in acquiring funding needed to meet USAF housing needs. The key to the success of the approach lies in (1) objectively analyzing the alternatives and (2) documenting the results completely. These objectives can be accomplished through the preparation of a defensible economic analysis, which may be a critical factor in acquiring the funding that permits a base to improve the quality of its family housing.

This manual contains the following:

1. instructions for completing an economic analysis for MFH,

2. supplemental information to aid in the analysis (Appendixes A, B, and C),

3. forms to be used to perform and document the economic analysis (Appendix D),

4. an explanation of the methodology (Appendix E), and

5. a sample problem (Appendix F).

Completing the economic analysis requires close coordination between Civil Engineering (DE) and Comptroller (AC) organizations. The initiating Civil Engineering office should contact the local cost division (ACC) office early in the process for guidance in preparing the economic analysis. As specified in AFR 178-1, the completed economic analysis must have the concurrence of both the base and Major Command ACC offices.

1.2 OVERVIEW OF THE METHODOLOGY

The methodology of this manual consists of (1) a life-cycle cost analysis and (2) a cost-benefit analysis that uses a scoring system to compare the life-cycle costs and qualitative benefits of various options available to a base. This approach is designed to provide a consistent and systematic treatment of the costs and benefits of all options over the entire life-cycle of each option. The methodology consists of the following steps:

1. Identification of specific options or alternatives for meeting base MFH needs. One of the options always available is to continue "business as usual" or the status quo. In most cases, this means piece-meal maintenance of existing housing. The status quo, Option A, is the baseline against which other options are compared. The other options may include Option B - renewal of existing housing stock, Option C - construction of new or replacement housing, Option D - leased housing, and Option E - direct compensation through Basic Allowance for Quarters (BAQ) and Variable Housing Allowance (VHA). Additional options are created by combining the basic five options in an overall program that best suits a base's needs.

2. Identification of the assumptions and constraints incorporated in the methodology. The primary constraints are uncertainty regarding the future and limitations in data available about the past. These constraints are overcome

through the use of projections based on historic data, which become assumptions of the methodology.

3. Determination of the disposition of existing housing if it is to be replaced by any of the options being evaluated. Alternative disposition actions include protective storage, conversion to another use, and demolition. Factors that might be considered in determining what to do with existing housing are cost, siting considerations, and impacts to historic properties, if the existing housing is historic.

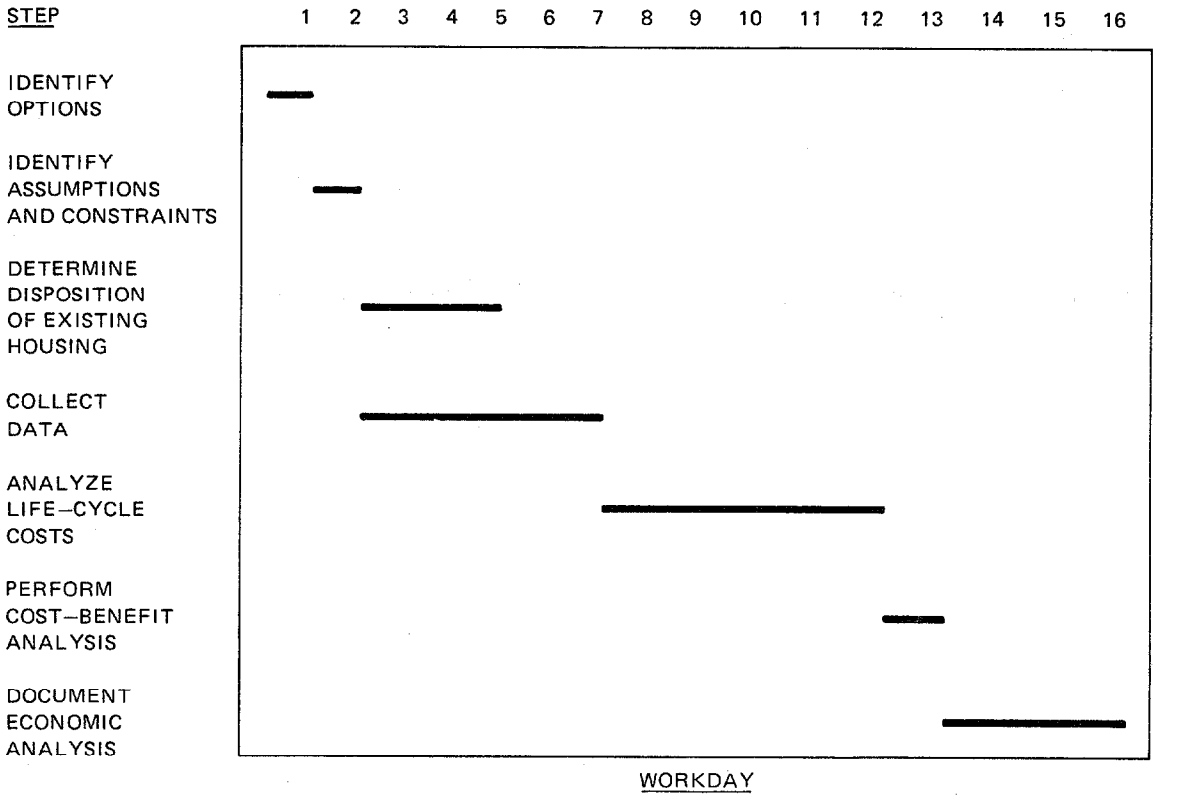
4. Collection of baseline data required to perform the analysis. Because the status quo is also a program option, the information about existing conditions provides a basis for analyzing the status quo option, as well as establishes a baseline against which other options can be measured.

5. Analysis of life-cycle costs, including identifying and quantifying the costs of each option and discounting them to calculate the present values of costs. The life-cycle costing process permits a fair and objective comparison of the costs associated with alternative solutions to a base's housing problems. Present value is a means of comparing dollar amounts expended in different years. Future costs are discounted using an interest rate to account for the fact that in "every investment, a dollar today is worth more than a dollar to be received sometime in the future" (AFP 178-8). Sensitivity analyses can be performed using different interest rates.

6. Performance of a cost-benefit analysis of each option by identifying and applying evaluation criteria. Four evaluation factors are used in this analysis: (1) life-cycle costs; (2) project performance/effectiveness; (3) special considerations addressing quality, affordability, and accessibility of off-base housing, operational effectiveness, security, and socioeconomic impacts on local civilian communities; and (4) preservation of historic properties. Each factor may include one or more criteria that represent the measurable dimensions of that factor. Each criterion has a scale that measures the range of possible performances within that criterion. The criteria are used to convert costs and benefits into a common scoring system, using an ordinal scale that rates each aspect of an option as either better or worse than continuation of the status quo. Thus, the status quo option is, by definition, the basis of the scaling. A summary table presents the results of the analysis of each factor for each option. Factors can be weighted to reflect a given set of priorities. The decision maker may apply any number of weighting schemes desired to test the sensitivity of the evaluation to differing priorities. The selection of a preferred weighting scheme is the option of the decision maker; however, the weighting scheme selected must be thoroughly defined and documented.

7. Documentation of the economic analysis through the preparation of a summary report, to which portions of the analysis are attached. This documentation accompanies a request for funding for a project that was selected through the economic analysis process. The thoroughness, consistency, and defensibility of the documentation are the keys to USAF's success in justifying the project to Congress and ultimately acquiring the funding.

The guidelines provided in subsequent pages implement this methodology by using a series of forms, which is included in Appendix D. Instructions for filling out the forms are identified in the following chapters by the form number and name. All forms must be completed to arrive at a satisfactory economic analysis. Figure 1 provides an estimate of the time required to complete the analysis. It is only a guideline; the economic analysis for a particular base may take more or less time. Figure 2 is a flow diagram summarizing the tasks and products that constitute the economic analysis. Further definitions of options, criteria, procedures, and assumptions are contained in Appendix E and should be referenced as needed.



(DOES NOT INCLUDE TIME REQUIRED FOR COMMAND DECISION MAKING OR APPROVAL.)

Fig. 1. Economic analysis timeline.

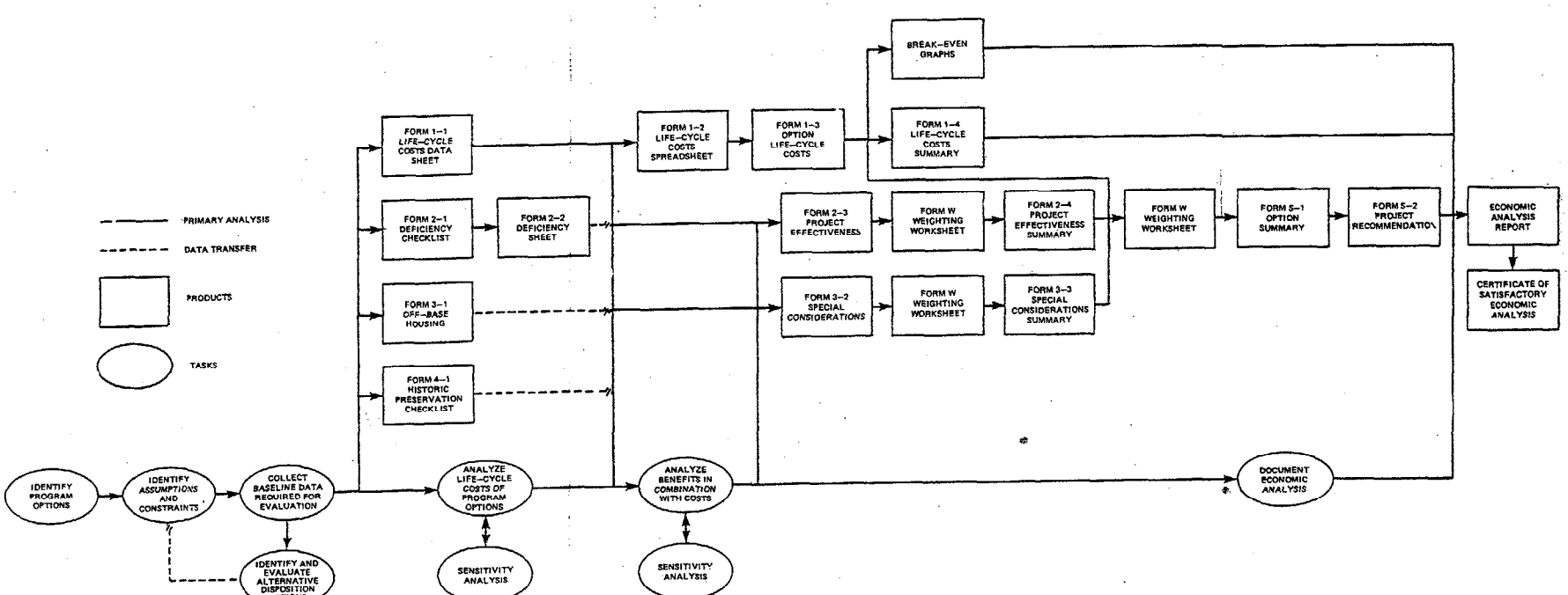


Fig. 2. Economic analysis process.

2. PREPARATION

2.1 DETERMINING WHETHER TO PERFORM AN ECONOMIC ANALYSIS

An economic analysis is recommended any time potential benefits or cost savings can be gained by performing the analysis. "A program is evaluated only if the benefits of the evaluation clearly outweigh the cost of collecting the data and conducting the evaluation" (AFR 178-1).

An economic analysis should be considered for an MFH project if any of the following conditions **exist:**

1. annual costs of maintaining existing General Officers Quarters is expected to exceed the $25,000 Operations and Maintenance (O&M) threshold,

2. shortages in existing housing require correction through a construction project,

3. a mission change or other circumstances will substantially change the number of base personnel housed off base,

4. a renewal project for existing housing is contemplated to reduce O&M costs and the average cost per unit or the highest single cost per unit exceeds the statutory limitations,

5. anticipated costs for a renewal project contemplated for existing housing are 50% of replacement costs or greater,

6. acquisition of housing is contemplated through the MFH Leasing Program or the Military Housing Rental Guarantee Program (Public Law 98-115, Title VIII, Sects. 801 and 802), or

7. construction of replacement housing is contemplated.

2.2 IDENTIFYING DEFICIENCIES

Identifying the deficiencies of existing housing is essential to determining what a base's needs are and evaluating how well various approaches meet those needs. Deficiencies are recorded on Forms 2-1 and 2-2, furnished in Appendix D.

2.2.1 Form 2-1: Deficiency Checklist and Form 2-2: Deficiency Sheet

Form 2-2 is used to record the number and types of deficiencies requiring correction in existing base MFH. The back-up Deficiency Checklist, Form 2-1, is used to establish whether a deficiency exists. The checklist is only a guide to assist in determining what areas need correction and is not intended as a comprehensive list of possible deficiencies. Other problems may exist. A base may also consider using the concerns of current MFH residents as a data source for identifying deficiencies.

The checklist should be completed first. The letters to the left of the items on Form 2-2 correspond to the items on Form 2-1. If a line with an asterisk is

checked on Form 2-1, a mark should be entered on the line with the corresponding letter on Form 2-2. An example is provided below.

EXAMPLE

If Form 2-1 is completed as follows:

2.1 Housing Quantity

Current demand 3,500
Anticipated additional demand 1,000
Current on-base housing supply 2,000
Off-base housing supply 2,000
a Existing shortfall 0 *
b Demand increase due to mission change 500 *

Then, Form 2-2 should be completed as follows:

2.1 Housing Quantity

a _____ Existing shortage
b x New mission/mission change

Both forms are used as fact sheets for the evaluation and should be maintained as part of the record of the economic analysis. Form 2-2: Deficiency Sheet should be forwarded with the project information submitted with a funding request (see Chap. 5). Completing the Deficiency Sheet requires an engineering survey of existing housing similar to what would be accomplished for preparation of a DD Form 1391.

2.3 IDENTIFYING PROGRAM OPTIONS FOR EVALUATION

The following program options may be considered to meet base MFH needs:

2.3.1 Option A: Continuation of Current Maintenance (Status Quo)

This option constitutes the baseline against which all other options are evaluated.

2.3.2 Option B: Renewal of Existing Housing

This option is intended as a "whole house" renewal project for existing MFH units to reduce future maintenance and repair costs and improve overall livability. The option may be redefined, however, to a more limited scope to correct specific deficiencies. If redefined, the actual work to be performed must be explicitly documented.

2.3.3 Option C: Construction of New Housing

New on-base housing may be required to eliminate an existing shortage, satisfy a shortage created by a new mission or mission change, or replace substandard housing. In the last case, this option requires a companion analysis of the disposition of existing housing (see Sect. 2.4). The costs and benefits associated with the disposition of existing housing must be added to the analysis of Option C. If Option C is considered, Option D must also be considered.

2.3.4 Option D: Government Leasing

This option involves direct, long-term leasing or guaranteed rental by USAF of suitable privately developed housing on or off base in compliance with the Military Construction Authorization Act, 1984, Title VIII, Sects. 801 and 802 (Public Law 98-115 - October 11, 1983). Sect. 801 of the act allows for the lease of housing on or near a military installation within the United States to meet a validated deficit in family housing. To meet a housing shortage, Sect. 802 provides for rental guarantee of housing constructed on private or public land by a private developer or state or local housing authority (see Appendix E, Sect. 2.1). These programs provide alternatives to construction of new housing under the same circumstances as described for Option C. If Option D replaces existing on-base housing, an analysis of the disposition of the existing housing must also be performed. Build-to-lease should only be considered as an option if new construction is contemplated.

2.3.5 Option E: Direct Compensation

Option E allows personnel to select their own housing off base and compensates them directly in the form of BAQ and VHA. Compensation payments are limited to 85% of costs (rent plus utilities); the balance is provided by the individual. If the selection of this option includes vacating existing on-base housing, the disposition analysis described in the next section must be performed for this option as well.

2.4 DETERMINING WHAT TO DO WITH EXISTING HOUSING

If any of the options selected for the economic analysis are intended to replace existing housing, a decision must be made on what to do with the housing that will be replaced. The costs and impacts associated with that decision must then be incorporated into the economic analysis. For instance, if existing housing is to be demolished, the costs of demolition would be included among the life-cycle costs of the replacement housing.

The steps involved in deciding what to do with existing housing are essentially the same as those involved in selecting a programming option. To select the optimum approach, alternative disposition actions must be identified, evaluated, and compared. The decision must then be documented as part of the overall documentation of the economic analysis.

Consideration should be given to the following approaches for the disposition of existing housing if one or more of the program options involves replacement housing.

2.4.1 Protective Storage

Protective storage is a term used to describe a facility that is not used, has been closed up, and is given minimal maintenance to preserve its structural integrity. "Mothballing" and "pickling" are colloquial terms for protective storage. This alternative can be used in conjunction with Option C, D, and/or E when new housing is contemplated to replace housing on base. It should be considered whenever the existing housing is historic or when appropriate for other reasons.

2.4.2 Conversion to Other Use

Like protective storage, this addresses the disposition of existing housing when replacement housing is contemplated and is used in conjunction with Options C, D, and/or E; it, however, considers the conversion of existing housing to another use, such as administrative offices. It is normally considered only if there is an existing need that could be met by converting the housing.

2.4.3 Demolition

This also involves replacement of existing housing, but in this case, the existing housing is demolished. Disposition of the site itself (i.e., for future use) need not be part of the evaluation unless the same site is being considered for the new housing.

The procedure for evaluating the disposition of existing housing is less formalized than that used for evaluating programming options. Nevertheless, the alternatives should be examined using a consistent set of evaluation factors. Three factors are recommended: (1) life-cycle costs (of the disposition action), (2) siting considerations, and (3) preservation considerations.

2.4.4 Life-Cycle Costs

These include costs associated with the disposition action only. Any construction costs associated with converting facilities to another use would be considered attributable to the gaining function. The life-cycle costs of the selected disposition option are incorporated into the life-cycle costs of the program option(s) (C, D, or E) affected (see Chap. 3).

Form 1-2, which is discussed in Chap. 3, may be used to calculate life-cycle costs for the disposition options. Use only the cost categories that apply. The costs that should be included for each option are as follows:

Protective storage:
- removal from service
- annual maintenance costs
- annual operating costs (e.g., minimal heating)

Conversion:
- removal from service
- interim maintenance (until conversion project)
- interim operating costs

Demolition:
removal from service
demolition and site restoration

2.4.5 Siting Considerations

Siting considerations address the opportunity costs associated with the site of existing housing that is to be replaced. If, for instance, replacement housing is considered for the same site, retaining the existing housing may be impractical. As another example, if the existing housing is on a site that is adjacent to industrial or other incompatible land uses, retaining the residential use of the site may not be desirable.

2.4.6 Preservation Considerations

This factor addresses existing housing that is on, or eligible for, the National Register of Historic Places. If the existing housing is historic, the disposition of that housing must be included in the Historic Preservation portion of the cost-benefit analysis (see Chap. 4).

No forms are provided for evaluating disposition options; however, the criteria used in the analysis should be identified and the rationale for their use thoroughly documented.

2.5 USING THE FORMS

The evaluation forms for completing the economic analysis are provided in Appendix D. The numbers on the forms correspond with the evaluation factors. Those forms with the primary number 1 are used for the life-cycle cost analysis; those with the number 2 are for evaluating project effectiveness (in correcting deficiencies); forms with the number 3 address special consideration in the evaluation; those with the number 4 address historic preservation. The second digit in the form number denotes its position in sequence. The S forms (S-1 and S-2) are summary forms for comparing options. Form W is a worksheet for calculating the median.

3. LIFE-CYCLE COST ANALYSIS

3.1 COLLECTING BASELINE DATA

This section contains instructions for using the Life-Cycle Costs Data Sheet (Form 1-1) to collect the baseline data for the economic analysis. The evaluation itself is based on relative performance compared with the baseline. Therefore, all baseline data should be collected before the evaluation is begun.

3.1.1 Form 1-1: Life-Cycle Costs Data Sheet

Form 1-1 is used to collect baseline data for all options. Not all items will be used for all options, however. For instance, rents for off-base housing already include most site preparation, construction, and O&M costs. The form indicates what data should be collected for each option. Form 1-1 is used as a fact sheet to complete Forms 1-2 and 1-3. Following are examples of the types of costs included in the categories listed on Form 1-1:

1. Construction costs
   - site preparation
   - demolition
   - construction
   - land acquisition
   - site utilities

2. Maintenance and repair costs
   Maintenance:
   - painting
   - carpet cleaning
   - grounds maintenance
   - reglazing
   - floor refinishing

   Repair:
   - roof repair
   - plumbing
   - structural repairs
   - heating, ventilation, and air conditioning (HVAC)

3. Annual energy costs
   - gas
   - other heating or air conditioning
   - electricity

4. Other utilities
   - water/sewer
   - garbage collection

5. Rent

6. Other costs
   - security
   - moving expenses
   - mitigation (historic housing)
   - communications

All data on Form 1-1 should be expressed in per-housing-unit costs. For a group of like units, average costs may be used. For projects involving different types of units, either divide the project into subprojects and complete a separate form for each type or combine the costs among all the types of housing by using a

weighted average. The latter is accomplished by calculating the percentage of each type of housing in the project, multiplying that percentage by the respective costs for each type, then summing the types of costs into an average per-unit cost for the project (see example below).

EXAMPLE

The project consists of 10 officers' quarters and 40 NCO quarters, which represent 20 and 80% of the project, respectively. If maintenance costs for the officers' quarters average $10,000/year/unit and NCO quarters average $5,000/year/unit, the weighted average maintenance costs for the project would be calculated as

$10,000	x 20%	=	$2,000
$ 5,000	x 80%	=	4,000
			$6,000 /unit

For Option D, a distinction is made between build/lease and government leasing of existing housing. For the build-to-lease option, assume construction and maintenance and repair costs are identical to Option C and convert to an annual rate of return, which represents the annual rate at which a builder would distribute his capital investment over the life of the facilities. A typical rate of return might be obtained from a local builder. For leasing of existing housing, use market rates found in the local community to estimate lease rates.

3.1.2 Housing Cost Information

Information on current construction, maintenance and repair, and utilities costs of base housing is available within the DE organization. Assume recurring maintenance costs will increase 10% every 5 years for new and renewed housing, leveling off after 25 years. Information on off-base rents and utilities can be acquired from the Housing Referral Office. Additional data may be available from the base ACM office or at the local library or university. Other data sources include

1. U. S. Bureau of Labor Statistics (BLS) - recent regional data on home operating, utility, and rental costs can be acquired by calling the regional BLS office;

2. Engineering News Record - construction cost indices;

3. U. S. Department of Commerce Survey of Current Business - construction cost indices;

4. American Chamber of Commerce Researchers Association Intercity Cost of Living Index - off-base utility costs;

5. Economic Report of the President - price information;

6. Data Resources Inc., U. S. Long Term Review, spring issue - construction cost index, home operating cost inflation rates to the year 2010, national utility prices, and national rental cost indexes; and

7. Wall Street Journal - long-term interest rates.

Other forecast data can be obtained from major universities, such as the University of California, Los Angeles, and the University of Michigan; from Brookings Institute and Chase Econometrics; or from the U. S. Department of Commerce, Bureau of Economic Analysis.

All sources used, including date of publications and pages referenced, must be documented.

3.2 CALCULATING LIFE-CYCLE COSTS

3.2.1 Form 1-2: Life-Cycle Costs Spreadsheet

Form 1-2 provides a format for calculating the life-cycle costs and their present value by year. The following is an explanation of the column headings on Form 1-2.

1. Cost Category - the cost categories from Form 1-1.

2. Cur. Costs - current year estimates of various construction, maintenance, and operating costs (including disposition costs). These are also known as "base-year" costs.

3. Infl. - a multiplier derived from the Office of the Secretary of Defense (OSD) inflation indexes and found in AFR 173-13. The multiplier is used to inflate current costs to the program year (see Appendix B).

4. Prog. Costs - program costs, which are current costs inflated to a constant year, the program year being used for the economic analysis. They are derived by multiplying the current cost column by the OSD inflation multiplier in column 2. Program costs are not the same as then-year or inflated dollar costs, which are estimated for the year that a cost is actually expected to occur.

5. Disc. - discounting multiplier, reflecting the discount rate or interest rate used to account for the change in value of money over time (Appendix C).

6. Pres. Value - present value, derived by multiplying the total program costs for each year by the discount rate multiplier for that year (column 4 x column 5).

Using Form 1-2, life-cycle costs are calculated in two basic steps. First, costs are inflated from current year estimates to the program year, using the OSD inflation indexes in Appendix B. The indexes are converted into a multiplier by compounding each of the annual indexes between the current year and the program year. Multiply the index that inflates the current year to next year (e.g., the 1983-1984 index is 1.038) by the index for the next year; then multiply the result by the

index for the following year, and so on, until the program year is reached (see example below).

EXAMPLE

If the current year is 1983 and the program year desired is 1986, the inflation multiplier would be calculated as

1.038 (1983-84) x 1.037 (1984-85) x 1.044 (1985-86)
= 1.124 (rounded from 1.1237678)

Current costs are converted to program-year costs by using the following formula:

current costs x OSD multiplier = program-year costs.

This step converts all costs to a common year and the same year that a DD Form 1391 would be prepared for funding.

Second, the present value of those costs is calculated by using the Discounting Table in Appendix C in the following equation:

program year costs x discount multiplier = present value.

The multipliers in the Discounting Table are based on the formula $1/(1 + d)^n$, in which d is the discount rate and n is the year. The costs are discounted to account for the fact that money is worth less in the future than it is in the present.

Use a section of Form 1-2 for each year of the economic analysis. Complete for 40 years, making as many copies of the Continuation Sheet for Form 1-2 as necessary.

Using current year costs, enter project costs for each year by cost category in the first column of blanks on Form 1-2. These costs are taken from Form 1-1: Life-Cycle Costs Data Sheet. Because Form 1-1 is in per-unit costs, the costs must be multiplied by the number of units under consideration before they are entered in the Current Costs column of Form 1-2. Be sure to account for phasing of construction over multiple years (see the following example).

EXAMPLE

Two hundred units are to be renewed over a 15-month period. One hundred units will be under construction during the first fiscal year; the second 100, during the second fiscal year. During the first year while the first 100 units are under construction, the second 100 will still be occupied. On Form 1-2, construction for each of the first 2 years would be calculated as

100 units x construction cost per unit (for Option B).

Maintenance and repair (M&R) costs for the first year would be

100 units x baseline M&R costs (for Option A)

to account for the 100 occupied units that are not yet under construction. For the second year, (M&R) costs would be

100 units x postrenewal M&R costs (for Option B)

to account for the 100 occupied units that have already been completed.

Perform the calculations using Form 1-2 as follows (see the example of a completed Form 1-2 on the following page):

1. Sum all current costs for each year and enter on the last line of the first column of blanks.

2. Enter the multiplier derived from the OSD inflation indexes provided in Appendix B in the second column of blanks on Form 1-2. The indexes used depend on how many years there are between the current year and the program year (see the example on p. 16). The inflation multiplier will be identical for all years. In the example on the following page, the current year is 1985 and the program year is 1988. The inflation multiplier used is 1.131 (1.044 x 1.042 x 1.040). The multiplier should be rounded to three decimal places.

3. Inflate the summed costs to the program year by multiplying the last line in the first column by the multiplier in the second column and enter in the third column. Note that costs in the third column will always be in program-year dollars, not then-year dollars. Thus, if current-year costs are the same from one year to another, the program-year costs in the third column will also be the same from year to year.

4. Enter the appropriate discounting multiplier from the table in Appendix C in the fourth column of Form 1-2. This figure will be different for each year. For example, for costs with a discount rate of 10% incurred in the first year, the multiplier is 0.909; for the second year it is 0.826, and so on. As a minimum,

a discount rate of 10% must be used. Others can also be used for sensitivity analysis. A separate worksheet must be completed for each discount rate used.

5. Multiply the third column by the fourth column and enter in the last column. This is the present value of all costs for that year. In the example below, note that although the program-year costs for the two years are identical, their present values are different.

6. Sum the present values for all years to obtain the total present value for the option.

7. Repeat for each option.

EXAMPLE

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Option: C

Program year: 1988 Discount rate: 10%

Year 1988

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction	$1,450,000								
2. M & R	30,000								
3. Gas & elec.	20,000								
4. Other util.	-								
5. Rent	-								
6. Other costs	70,000								
Total	1,570,000		1.131		1,775,670[1]		.909[2]		$1,614,080[3]

Year 1989

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction	$1,450,000								
2. M & R	30,000								
3. Gas & elec.	20,000								
4. Other util.	-								
5. Rent	-								
6. Other costs	70,000								
Total	1,570,000		1.131		1,775,670[1]		.826[2]		$1,466,703[3]

3.2.2 Form 1-3: Option Life-Cycle Costs

Form 1-3 is used primarily to summarize the life-cycle costs for each option. This information is taken from Form 1-2. Enter the calendar year (e.g., 1983 or 1984) in column (a) of Form 1-3. Enter total costs for each year (in program-year dollars) in column (b), the discount multiplier used for each year in column (c), and the present value for each year in column (d). Column (e) is used for a running total of cumulative costs. Each line is calculated by adding the present value for that row in column (d) to the cumulative costs from the previous row.

Columns (f) and (g) are used to calculate then-year costs. The then-year costs are not used for the comparative analysis of the options, but they provide a more accurate estimate of actual dollar outlays associated with each option. They are derived by multiplying the program-year costs for each cost category by an inflation multiplier derived from the same OSD indexes in Appendix B used for Form 1-2. In the first year, the then-year costs will be identical to the program-year costs. To calculate the multiplier for the next year, multiply the multiplier used to derive the program-year costs by the index for the following year. Again, the multiplier should be rounded to three decimal places. Repeat this procedure for each subsequent year (see example below). Enter each year's multiplier in column (f) of Form 1-3.

EXAMPLE

If the current year is 1983 and the program year is 1986, the multiplier for calculating program-year costs is 1.124. The multiplier for 1987 would be 1.124 x 1.042 = 1.171. For 1988, it would be 1.171 x 1.040 = 1.218, and so on.

(Note that all multipliers in this example were rounded to the nearest one-thousandth.)

To calculate then-year costs, multiply the program-year costs for each year in column (b) by the inflation multiplier in column (f) and enter the result in column (g).

Sum the program-year costs [column (b)] and the then-year costs [column (g)] and enter the totals at the bottom of their respective columns. Because column (e) is a running cumulative of present values, the last figure in the column is the total present value.

Complete a separate Form 1-3 for each option and each discount rate used. The second page of Form 1-3 is used in the cost-benefit analysis (see Chap. 4).

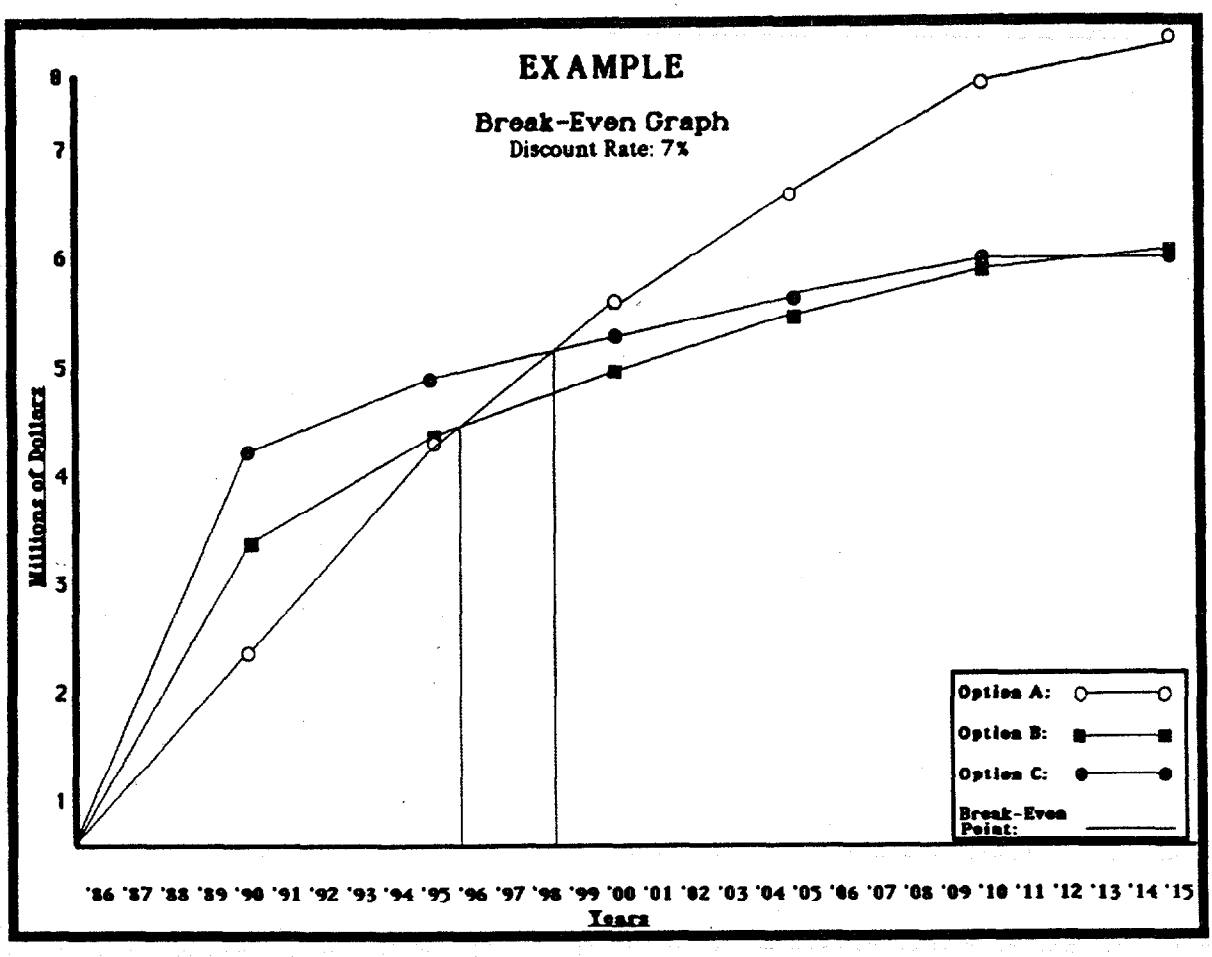
3.3 COMPARING PROGRAM OPTIONS

Life-cycle cost comparisons can be made between program options through the use of a break-even graph and Form 1-4: Life-Cycle Costs Summary.

3.3.1 The Break-Even Graph

The break-even graph is a useful way of summarizing the results of the life-cycle costs analysis and presenting them to decision makers. It allows decision makers to quickly see the relative performance of options with respect to life-cycle costs, and it acts as an excellent "bottom line" briefing chart. Ultimately, decision makers will also take into account the benefits of various options (see Chap. 4), as well as other considerations, such as Major Command and USAF priorities, availability of funds, and special conditions unique to an installation.

To estimate the break-even point between alternatives, plot the cumulative present values from the Option Life-Cycle Costs forms (1-4) for each option on a graph, with time on the X-axis and cost on the Y-axis, and connect them with a line. The intersection between two lines is the break-even point for those two options. The sample below illustrates the process.



In this example, the break-even point between Options A and B occurs in 1997. This means that in 1997 the total discounted costs for Options A and B are equal; after 1997 the total discounted costs for Option B are less than for Option A. Option C becomes less costly than Option A in 2001. Option B remains the least costly option throughout the analysis period.

A minimum of two break-even graphs are required: one using undiscounted program-year costs [column (b) from Form 1-3] and one using cumulative present values [column (c) from Form 1-3] at a 10% discount rate. Additional break-even graphs may be performed using alternate discount rates. The break-even graphs are recommended to include Options A, B, and C. If Option C appears to be the best alternative, an additional graph should be prepared for Options C and D.

3.3.2 Form 1-4: Life-Cycle Costs Summary

To compare the life-cycle costs among options, transfer the total program-year costs, present value, and then-year costs to Form 1-4: Life-Cycle Costs Summary. The form allows for three comparisons, one at the required discount rate of 10% and two sensitivity analyses at the base's option. If desired, additional sensitivity analyses may be performed by reproducing additional copies of the form. Note that although the present values change with different discount rates, the program-year costs and then-year costs remain the same.

3.4 SUMMARY

This section provides a summary of the steps in the life-cycle cost analysis. The illustrations on the following pages demonstrate the flow of cost figures from one form to the next through the analysis.

Step	Form	Action
1	1-1	Collect cost data by housing unit for each option. Use current year dollars. Note when these costs will be incurred.
2	1-2	Multiply the per-unit costs for each year by the number of units being analyzed and enter the result in the current cost column on Form 1-2. Prepare a separate Form 1-2 for each option.
3	1-2	Sum each year's costs and multiply by a multiplier derived from the OSD inflation indexes in Appendix B to convert the current year costs into program-year dollars.
4	1-2	Multiply the program-year costs by the discounting multiplier from Appendix C for the appropriate year and discount rate. Repeat for each year, changing the multiplier as required. Prepare a separate Form 1-2 for each discount rate used.

5	1-3	Transfer the program-year costs from Form 1-2 to column (b) of Form 1-3, the discount multiplier to column (c), and the present values to column (d). Sum the program-year costs in column (b). Run a cumulative total present value in column (c). Prepare a separate Form 1-3 for each option and each discount rate.
6	1-3	Calculate an inflation multiplier for each year to inflate the constant program-year costs into then-year costs, using the indexes in Appendix B. Enter the multiplier in column (f) of Form 1-3. Multiply the program-year costs in column (b) by the inflation multiplier and enter the result in column (g). Sum the then-year costs.
7	1-4	Transfer the <u>total</u> program costs [column (b)], cumulative present value [column (e)], and then-year costs [column (g)] to Form 1-4. Use a different section of Form 1-4 for each discount rate.
8	1-2, 1-3, 1-4	OPTIONAL: Perform sensitivity analyses by using one or more alternate discount rates to calculate life-cycle costs. Calculations would be performed using Forms 1-2 and 1-3 in the manner described for the 10% rate. Results would be recorded on the same Form 1-4 under "Sensitivity Analysis."
9	1-3	Prepare break-even graphs with two or more of the options. As a minimum, prepare one graph using program-year costs and one using present value at a 10% discount rate.
10	1-3	Apply the evaluation scale on the back of Form 1-3 to derive a score for each option (Option A will be 0). Note that a separate Form 1-3 must be prepared for each discount rate and that the scores could change.
11	S-1	Enter each option's score on Form S-1. Prepare a separate Form S-1 for each discount rate used.

Sheet 1 of _____

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Option: A

Program year: 1988 Discount rate: 10%

Year _____

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	180,000								
3. Gas & elec.	45,000								
4. Other util.	30,000								
5. Rent									
6. Other costs									
Total	255,000		1.13		288,150[1]		.909[2]		261,928[3]

Year _____

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	180,000								
3. Gas & elec.	45,000								
4. Other util.	30,000								
5. Rent									
6. Other costs									
Total	255,000		1.13		288,150[1]		.826[2]		238,012[3]

Year _____

Military Family Housing Economic Analysis

FORM 1-1: LIFE-CYCLE COSTS DATA SHEET

All costs are per housing unit. Cost category numbers (1-6) correspond with numbers on Form 1-2. Multiply unit costs by number of housing units to complete Form 1-2.

Option A: Status Quo

1. Construction costs - not applicable
2. Maintenance and Repair
   - Recurring maintenance costs
     - painting $_____
     - ground maintenance _____
     - cleaning _____
     - other (specify)
     - _____ _____
     - _____ _____
     - Total 6,000 x 30 UNITS
   - Anticipated repair
     - roof year:_____ _____
     - plumbing year:_____ _____
     - HVAC equipment year:_____ _____
     - other (specify)
     - _____ year:_____ _____
3. Current annual energy costs
   - electricity _____
   - gas _____
   - other:_____ _____
   - Total _____

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: A

Program Year: 1988 Discount Rate: 10%

(a) Year	(b) Prog. Costs	(c) Disc	(d) Pres. Value	(e) Cumulative Pres. Value	(f) Infl	(g) Then-Year Costs
1988	288,150	.909	261,928	261,928	—	288,150
Totals	12,500,000			6,300,000		35,000,000

Enter totals on line A, B, C, D, or E of Form 1-4.

Military Family Housing Economic Analysis

FORM 1-4: LIFE-CYCLE COSTS SUMMARY

Discount rate: 10%

Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo	12,500,000	6,300,000	35,000,000
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

Sensitivity Analysis:

Discount rate: _____

Option	(b) Total Prog. Costs	(c) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo			
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

4. COST-BENEFIT ANALYSIS

4.1 IDENTIFYING EVALUATION CRITERIA

The cost-benefit analysis relies on four evaluation factors: life-cycle costs, project effectiveness, special considerations, and historic preservation. Each of these factors contains one or more criteria, which are described below. Evaluation scales for the criteria are contained on Forms 1-4, 2-3, 3-2, and 4-2.

4.1.1 Life-Cycle Costs

Relative cost, based on the present value of life-cycle costs, is the criterion used for this factor in the analysis. All options are compared with the status quo, continued piece-meal maintenance, and the evaluation scale is designed for that comparison.

4.1.2 Project Effectiveness

The project effectiveness factor primarily distinguishes among the three on-base options (A, B, and C), comparing their performances relative to USAF standards. The following are criteria to be used to evaluate the effectiveness of each option in meeting base needs or correcting base housing deficiencies. Further explanation of the criteria is provided in Appendix E.

Housing Quantity addresses the number of housing units available or proposed by an option related to a base's housing requirements. It does not address the adequacy or condition of the housing, which are covered by other criteria. This criterion does not affect the status quo option or the option of improving existing housing. It can be a consideration with new construction and leasing.

Housing Condition addresses the structural and environmental conditions of housing, including buildings and grounds. Specific structural deficiencies of existing housing are identified on the Deficiency Sheet (Form 2-2). Health and safety deficiencies should be given special consideration. Energy conservation considerations are addressed separately.

Housing Adequacy addresses the capability of existing or proposed housing to provide the space and room allocations specified by AFR 90-1 for the personnel assigned to a base.

Energy Conservation addresses whether housing meets USAF/Department of Energy energy efficiency standards. The goal, in accordance with Executive Order 12003 (July 20, 1977) and Defense Energy Goals and Objectives (DEPPM 80-6, June 3, 1980), is to achieve a minimum of 20% reduction in BTU/ft^2 over 1975 consumption rates by 1985 and a 25% reduction by 1990.

4.1.3 Special Considerations

The special-considerations factor primarily distinguishes between on- and off-base options. The following are criteria to be used to evaluate each option with respect to the availability, affordability, and accessibility of off-base housing, operational responsiveness, operational security, and socioeconomic impact on the surrounding civilian community. Apply only those criteria that are relevant to a base being evaluated.

Housing Availability, Affordability, and Accessibility includes four concerns that are combined to provide a single indicator of the quality of off-base housing opportunities: housing quality, availability, affordability, and accessibility to a base. The criterion is used when Option E is being considered. Affordable housing is defined as that for which BAQ and VHA cover 85% of total housing costs, including utilities. Accessible housing is that which is located within a 1-h, one-way commute of a base gate. Housing that is within a 15-min commute of the nearest gate is considered comparable to on-base housing.

Operational Responsiveness involves the capability of mission-essential and command personnel to reach their duty stations within a specified time in the event of an emergency. The criterion is employed only for those personnel who have a specific response requirement.

Operational Security addresses the capability of existing or proposed housing to provide required degrees of security for USAF personnel and assets. Security requirements vary according to the rank and responsibilities of the personnel. Costs associated with installing special security requirements, such as communications systems, physical security measures, or additional surveillance, should be included in the life-cycle cost analysis.

Socioeconomic Impact addresses the potential for USAF actions to have an effect on the local civilian community. This factor comes into play when an option involves a significant change in a base's approach to providing MFH, usually as a result of a major mission activation, expansion, beddown, inactivation, or relocation. A socioeconomic impact analysis may be required if (1) the ratio of base housing demand to local housing availability (vacancies) is high or (2) there is an existing imbalance (overcrowding or underutilization) in affected school district(s). If a socioeconomic impact analysis is required and performed, the findings are used to apply the Socioeconomic Impact evaluation scale (note that application of this scale does not in itself constitute a socioeconomic impact analysis).

4.1.4 Historic Preservation

This factor considers impacts on properties that are listed, or are eligible to be listed, on the National Register of Historic Places. If a base has such housing and it is affected by the options being evaluated, the criterion must be employed. It must also be applied if an option is being considered to replace existing historic housing that will be demolished or converted to another use. Department of Interior guidelines concerning historic properties should be consulted when applying the evaluation scale.

4.2 COLLECTING BASELINE DATA

There are three data collection forms used for the cost-benefit analysis (in addition to the life-cycle cost information on Form 1-3). Form 2-2: Deficiency Sheet and its back-up checklist are discussed in Sect. 2.2. Additional forms include Form 3-1: Off-Base Housing and Form 4-1: Historic Preservation Checklist.

4.2.1 Form 3-1: Off-Base Housing

The primary source of data for completing Form 3-1 is the base annual survey and determination of family housing requirements (DD Form 1376). If a survey has been conducted for a base within the past 2 years, the information from the survey can be used. If no survey has been conducted for over 2 years, a new survey needs to be completed. Only rental units should be considered in the analysis. Other sources of rental vacancy and cost information include

1. base housing referral office,

2. local city or county planning department,

3. local newspapers,

4. BLS regional Rental Price Index, and

5. state Department of Finance or statistical division.

4.2.2 Form 4-1: Historic Preservation Checklist

The Historic Preservation Checklist should be completed for all options involving existing housing that may be affected through modification, demolition, conversion, disuse, or continuation of current O&M practices. It should be completed whether or not it is known that the existing housing is historic. The completed form should be maintained in the economic analysis file as part of the record.

If after completing the checklist the user is not certain whether the housing is eligible for the National Register of Historic Places, he/she should assume that it may be historic for the purposes of completing this analysis. Once the entire economic analysis has been completed and an option has been selected for programming, if that option affects the existing housing, the user should coordinate with the Base Historic Preservation Officer and Real Property Officer concerning possible impacts to structures that may be historic. The Base Historic Preservation Officer is responsible for consulting with the State Historic Preservation Officer and other appropriate agencies and soliciting comments on the proposed project.

Adverse impacts to historic housing may be mitigated through various means, such as using an historically sensitive design or recovering important historic data (e.g., making a photographic record of the historic structures before demolition). Costs associated with mitigations must be included as part of the life-cycle cost analysis for an option.

4.3 APPLYING THE EVALUATION CRITERIA

Forms 2-3, 3-2, and 4-2 are evaluation forms used to identify the qualitative benefits of each program option so that the benefits can be weighed against the option's life-cycle costs. Form 2-3 measures the options' effectiveness; Form 3-2 is used to evaluate special considerations. Form 4-2 is used to evaluate historic preservation concerns. Life-cycle costs are also evaluated for the cost-benefit analysis by using the second page of Form 1-3. The evaluation scale on Form 1-3 is applied to the total cumulative present value in column (e) for each option.

If Options C, D, and/or E are contemplated as replacements for existing base housing, factors associated with the disposition of existing housing should be included in the evaluation. For instance, Form 4-2 should reflect impacts to historic housing that is to be replaced by the new housing.

4.3.1 Forms 2-3, 3-2, and 4-2

Form 2-3: Project Effectiveness and Form 3-2: Special Considerations are completed in the same manner. Each criterion includes an evaluation scale for determining how the options perform relative to the baseline on Forms 2-2 and 3-1. Form 4-2 uses the Historic Preservation Checklist (Form 4-1) as its baseline. Note that Option A, as the baseline, scores 0 on all criteria, so Forms 2-3, 3-2, and 4-2 do not have to be completed for Option A.

4.3.2 Forms 2-4 and 3-3

Because both the project effectiveness and the special considerations factors include multiple criteria, these criteria must be aggregated into a single score for each factor before the options can be compared. This is accomplished by finding the median among the criteria scores for each factor, using Form W in combination with Form 2-4 for Project Effectiveness and with Form 3-3 for Special Considerations. The scores for Forms 2-4 and 3-3 are taken from the completed Forms 2-3 and 3-2 for each option.

4.3.3 Form W: Weighting Worksheet

Form W is used to calculate the median, which is a way of aggregating multiple performance scores into a single score. Form W can be used to calculate the medians for Form 2-4: Project Effectiveness Summary (allowing each option's performance on criteria 2.1 - 2.4 to be aggregated into a single Project Effectiveness score) and Form 3-3: Special Considerations Summary (to aggregate criteria 3.1 - 3.5) It can also be used to complete Form 1-4: Option Summary, which aggregates the scores across all factors, including Life-cycle Costs, Project Effectiveness, Special Considerations, and Historic Preservation (see Sect. 4.4).

Form W is completed as follows:

1. Enter the number and name of each criterion to be included in the calculation, for instance, "2.1" (number) and "Housing Quantity" (name).

2. Weight the criteria to reflect their relative importance. Evaluation criteria are defined by subject rather than by importance. This means that some criteria may be more important than others. A simple aggregation of scores in the analysis process treats all criteria the same and assumes they are equally important. To correct this fallacy, weights that reflect their importance are assigned to the criteria. For instance, if housing condition is three times as important as energy conservation, the housing condition criterion may be weighted 3 and the energy conservation criterion weighted 1. Because the scores are ordinal and not cardinal (e.g., +3 is not necessarily three times as good as +1), they cannot be multiplied by the weights. Rather, each score is counted as many times as the criterion is weighted. In the above example, the scores for housing condition would be counted three times and those for energy conservation once.

3. Enter as whole numbers the weights selected for each criterion. These weights are used for all options.

   Weights for completing Form 2-4 are

Housing Quantity	4
Housing Condition	3
Housing Adequacy	2
Energy Conservation	1

   These weights are based on the assumption that providing sufficient housing for base personnel is critical to personnel morale and retention and is, therefore, a primary USAF priority. Housing condition has a high priority because of potential health and safety problems. Once these priorities have been met, the primary concern is for adequate housing that meets standards in AFR 90-1. The weights above must be used in completing Form 2-4; however, additional forms may be completed using alternate weights if the alternate weights are justified and well documented.

   Because the special considerations are base-specific, there are no weights recommended for Form 3-3. The rationale for weights selected by a base should be well documented in the analysis.

4. Under each option column, enter each evaluation score once for each point weighted. For instance, if Life-Cycle Costs are weighted "5," the Life-Cycle Cost score for each option should be entered five times in its corresponding column.

5. Find the median of all scores entered in each column. The median is the point at which one-half the scores are above and one-half are below. The simplest way to establish the median is to lay out scores in numeric order and count through half of them. If there are an odd number of scores, the median is the middle score. If there are an even number of scores, the median is halfway between the middle two scores. Do not average the scores.

6. Enter the median score for each option on Form 2-4 or 3-3, as appropriate. Note that a separate Form W must be used for each.

4.4 COMPARING PROGRAM OPTIONS

The cost-benefit analysis is completed by comparing the performance of the program options across the four evaluation factors -- life-cycle costs, project effectiveness, special considerations, and historic preservation -- using the Option Summary form (Form S-1). Based on different weighting schemes, a number of different comparisons can be made to test the sensitivity of the evaluation to changes in priorities and assumptions. These comparisons provide the decision maker with various perspectives from which to make an informed, effective decision. They are not in themselves the decision; they are, rather, only a set of tools to ensure that the decision-making process is systematic and defensible.

4.4.1 Form S-1: Option Summary

Form S-1 is similar to Forms 2-4 and 3-3. In addition to the medians from Forms 2-4 and 3-3, Form S-1 includes the evaluation scores for life-cycle costs from Form 1-3 and for historic preservation from Form 4-2. Note that those scores may change when different discount rates are used. As a minimum, Form S-1 must be completed using the present values obtained with a discount rate of 10%. Additional comparisons may also be made.

Three weighting schemes are provided for Form S-1. Scheme 1 is mandatory and must be included in the analysis; scheme 2 should be used in place of scheme 1 when the analysis deals with historic housing. Scheme 3 is optional. These are not necessarily the correct weighting, but they do provide different perspectives from which to make a decision. The user may also apply additional scheme(s) to reflect local base priorities. The weighting schemes are

	Scheme 1	Scheme 2	Scheme 3
Life-Cycle Costs	2	5	2
Project Effectiveness	1	2	2
Special Considerations	1	1	1
Historic Preservation	0	2	2

Schemes 1 and 2 give prominence to life-cycle costs as the primary decision factor. An option that does not have the lowest life-cycle cost would have to perform substantially better than the others in the qualitative evaluation to obtain the highest overall score. The third scheme gives prominence to the qualitative factors in the evaluation. Historic preservation is given high visibility in schemes

1 and 2 as a result of the legal implications and potential controversy associated with historic properties. Alternate weights may be used, but the rationale for their selection must be fully documented in the analysis and presented for comparison with scheme 1 (or 2).

4.4.2 Form S-2: Project Recommendation

Form S-2 is used to document, in summary form, the selection of a specific option. It summarizes the rationale for the selection and relates the decision to the economic analysis. If the least-cost option was not selected, the documentation should specify why and define the factors that were considered important in making the decision. Any unresolved issues, qualifications, contingencies, or difficulties in conducting the analysis should be identified in the discussion.

4.5 SUMMARY

This section provides a summary of the steps in the cost-benefit analysis. The illustration on the following pages demonstrates the flow of information from form to form.

Step	Form	Action
1		Collect baseline data as follows:
	2-1, 2-2	- evaluate existing housing by using Forms 2-1 and 2-2;
	3-1	- collect data regarding off-base housing on Form 3-1;
	4-1	- complete Form 4-1.
2	2-3	Complete Form 2-3 for Options B, C, D, and E by comparing those options with the existing housing. A separate Form 2-3 must be used for each option.
3	2-4	Enter each option's score from Form 2-3 on Form 2-4.
4	W	Use the weighting scheme provided on Form W to calculate the median for each option among the scores on Form 2-4.
5	S-1	Enter the median for each option on Form S-1.
6	3-2	Complete Form 3-2 in the same manner as in step 2.
7	3-3, W, S-1	Enter each option's score from Form 3-2 on Form 3-3. Select a weighting scheme and find the median for each option by using Form W. Enter each option's median on Form S-1.

8	4-2, S-1	Complete Form 4-2 for Options B, C, D, and E, if appropriate. Enter each option's score from Form 4-2 on Form S-1. If historic preservation is not an issue, do not enter any score for that factor on Form S-1.
9	S-1, W	Use one of the required weighting schemes provided and find the median of the scores on Form S-1 for each option by using Form W. Note that separate forms must be prepared for each discount rate used.
10	S-1, W	OPTIONAL: Conduct a sensitivity analysis by applying the alternate weighting scheme provided in this manual. Additional sensitivity analyses may also be performed using a different scheme that reflects local base priorities.
11	S-2	Compare the relative performance of each option and select one to be recommended for implementation. Document the selection on Form S-2.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION C

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the reqirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET

Number	Factor/Criterion	Weight
(Option) 2.1	HOUSING QUANTITY	4
(Option) 2.2	HOUSING CONDITION	3
(Option) 2.3	HOUSING ADEQUACY	2
(Option) 2.4	ENERGY CONSERVATION	1
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
				2.1	+2				
					+2				
					+2				
Median		Median		Median		Median		Median	
A		B		C	+2	D		E	

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM 2-4: PROJECT EFFECTIVENESS SUMMARY

		Score	Weight
Option A: Status Quo			
A2.1	Housing Quantity	A2.1	0
A2.2	Housing Condition	A2.2	0
A2.3	Housing Adequacy	A2.3	0
A2.4	Energy Conservation	A2.4	0
Median		A2	0
Option B: Renewal			
B2.1	Housing Quantity	B2.1	
B2.2	Housing Condition	B2.2	
B2.3	Housing Adequacy	B2.3	
B2.4	Energy Conservation	B2.4	
Median		B2	
Enter on line B2 of Form S-1.			
Option C: New Construction			
C2.1	Housing Quantity	C2.1 +2	4
C2.2	Housing Condition	C2.2 +3	3
C2.3	Housing Adequacy	C2.3 +1	2
C2.4	Energy Conservation	C2.4 +2	1
Median		C2	+2
Enter on line C2 of Form S-1.			

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET

Number	Factor/Criterion	Weight
(Option) 1	LIFE-CYCLE COSTS	5
(Option) 2	PROJECT EFFECTIVENESS	2
(Option) 3	SPECIAL CONSIDERATIONS	1
(Option) 4	HISTORIC PRESERVATION	2
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
				2	+2				
					+2				
					+2				

Median	Median	Median	Median	Median
A	B	C +1	D	E

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY

		Score	Weight
Option A: Status Quo			
A1	Life-cycle Costs	A1 0	
A2	Housing Performance	A2 0	
A3	Special Considerations	A3 0	
A4	Historic Preservation	A4 0	
Median		A	0
Option B: Renewal			
B1	Life-cycle Costs	B1	
B2	Project Effectiveness	B2	
B3	Special Considerations	B3	
B4	Historic Preservation	B4	
Median		B	
Option C: New Construction			
C1	Life-cycle Costs	C1 +1	5
C2	Project Effectiveness	C2 +2	2
C3	Special Considerations	C3 0	1
C4	Historic Preservation	C4 -3	2
Median		C	+1

5. DOCUMENTING THE ECONOMIC ANALYSIS

All forms completed for this economic analysis are part of the documentation supporting the program decision. For that reason, it is important that they be completed thoroughly and systematically. The rationale for selecting various parameters, weights, and data sources must be included. The forms and backup information should be filed with programming documents for the selected project. The economic analysis must be of sufficient quality to warrant the issuance of a Certificate of Satisfactory Economic Analysis by the appropriate ACC organization. This certificate serves as important documentation of the project.

Once a base has selected a suitable MFH program and applies for funding to implement its program, portions of the economic analysis must be forwarded to higher headquarters to support the project justification. This information is also used by higher headquarters to prioritize projects throughout the Major Command and USAF. A concise, thorough report should be prepared, using the outline on the following pages. The report should not repeat the basic methodology incorporated in this manual but should concentrate on data used, assumptions, and the conclusions of the analysis. It should include the rationale for all assumptions and explain and justify the decisions that were made. The report typically totals about 25 to 30 pages, includes a narrative discussion of the analysis, and incorporates, as a minimum, the following forms:

DD Form 1391

Form 2-2: Deficiency Sheet

Form 1-1: Life-Cycle Costs Data Sheet

Form 1-3: Option Life-Cycle Costs for each option

Form 1-4: Life-Cycle Costs Summary

Form 2-4: Project Effectiveness Summary

Form 3-3: Special Considerations Summary

Form S-1: Option Summary

Form S-2: Project Recommendation

The Certificate of Satisfactory Economic Analysis

The report of the economic analysis should follow the format provided on the next 2 pages. The page numbers in parentheses represent a typical length for each section.

TABLE OF CONTENTS

INTRODUCTION (1-3 pp.)

Problem: State, in one or two sentences, the problem that has led to the performance of this economic analysis.

Background: Provide a succinct summary of existing housing conditions, including an overview of past O&M costs, and highlight deficiencies that require correction. Attach a Deficiency Sheet (Form 2-2). Indicate whether existing base housing is historic. Summarize off-base housing opportunities. List sources of background data used.

Objectives: Summarize the objectives of the proposed housing project.

OPTIONS (1-2 pp.)

Indicate which options were considered in the analysis. Provide a brief summary of each, indicating the number of units involved, the type of work to be done, life expectancy of the units, and other pertinent information. If any of the options involves replacement housing, indicate what will be done with the existing housing. In the discussion include what disposition alternatives were considered (e.g., demolition, protective storage, or conversion), which alternative was selected and why, and what costs are associated with the selected disposition.

LIFE-CYCLE COST EVALUATION (12-15 pp.)

Assumptions: Discuss the assumptions used in the life-cycle cost analysis.

Analysis: Summarize costs associated with each option evaluated. Discuss the life-cycle cost evaluations and indicate which option was determined to be the least costly. Attach a Life-Cycle Costs Data Sheet (Form 1-1) and Option Life-Cycle Costs evaluation form (Form 1-3) for each option. Also include the Life-Cycle Costs Summary (Form 1-4). List data sources used.

Sensitivity Analysis: Indicate what sensitivity analyses were conducted and which variables were altered (e.g., changes in cost estimates and discount rates). Summarize the effect that changing each of these variables had on the options and on the results of the analysis (see Appendix E, Chap. 6). Attach additional Forms 1-3 used for the sensitivity analysis.

COST-BENEFIT EVALUATION (7-9 pp.)

Criteria: Indicate which criteria were used to evaluate benefits.

Assumptions: Discuss the assumptions used in the cost-benefit analysis.

Analysis: Summarize the results of the qualitative evaluation of each option. Attach Form 2-4: Project Effectiveness Summary and Form 3-3: Special Considerations Summary. List sources of data used. Compare the performance of the options evaluated on Form S-1: Option Summary. Indicate weights used

for each of the evaluation factors and provide the rationale for the weights selected. Attach Form S-1.

Sensitivity Analysis: Indicate what sensitivity analyses were performed for the cost-benefit analysis, including different weights used for the Option Summary. Discuss the effect of these sensitivity analyses on the results of the comparison. Attach additional forms used for the sensitivity analysis.

CONCLUSIONS AND RECOMMENDATION (3-4 pp.)

Indicate which option was selected and why. In particular, justify why the lowest cost alternative was not selected, if it was not, and/or why the highest performer in the cost-benefit analysis was not selected, if it was not. Include break-even graphs. Attach Form S-2: Project Recommendation and the Certificate of Satisfactory Economic Analysis.

For further guidance in preparing the report, refer to the Sample Economic Analysis included in Appendix F.

APPENDIX A
GLOSSARY

Benefit: An objective qualitative or quantitative measure of an action's effectiveness in meeting program objectives or needs.

Build-to-lease: A program for providing Government facilities through private-sector development. The Government contracts with a private developer to have facilities built, with a guarantee that the Government will lease the facilities for a period of time. Sect. 801 of Public Law 98-115 allows military departments to enter into a contract for up to 20 years for the lease of family housing units to be constructed on or near military installations.

Criterion: For this analysis, a performance requirement or measurement to determine the effectiveness of an action in meeting program objectives or needs.

Default value: A quantitative measure, usually a multiplier, that is built into the analysis process. Examples include interest rates, inflation rates, and overhead rates.

Discount rate: The interest rate used to adjust life-cycle costs to reflect the change in the value of capital over time.

Economic analysis: A systematic approach to choosing how to use scarce resources by analyzing and comparing the costs and benefits of alternative approaches to meeting a need.

Factor: An area considered important in evaluating an action's effectiveness. Examples include cost, security, quality, and accessibility. Criteria are the measurable aspects of factors.

Inflation: The increase over time in costs of goods and services.

Life-cycle cost: The total cost of an item over its full useful life. It includes cost of development, procurement, operation, maintenance, and, where applicable, disposal.

M&R: An acronym for maintenance and repair. M&R projects consist of nonrecurring items, such as roof repair, structural repairs, and weather-stripping, as opposed to routine maintenance activities.

Median: A measurement of the central tendency of a group of values, at which one-half of the group is above and one-half below.

National Register of Historic Places: The official national list of properties worthy of preservation for their significance in American history, architecture, archaeology, and culture. The Register is maintained by the Department of Interior. To qualify for the Register, a property must be professionally determined to meet the Criteria of Eligibility set forth in 36 CFR 60. Actions affecting properties on the Register must comply with Sect. 106 of the National Historic

Preservation Act of 1966, as amended. Properties not currently on the Register but that meet the eligibility criteria are considered the same as Register properties.

O&M: An acronym for Operations and Maintenance. O&M actions and costs are routine, recurring aspects of the use of a facility and include, for example, utilities, housekeeping, repainting, and replacing worn-out equipment.

Opportunity cost: The cost associated with expending instead of investing capital resources. If funds are expended (e.g., used for development), the potential income that might be gained from investing them is foregone. In the private sector, opportunity costs are equivalent to interest rates adjusted for inflation (see real interest rate).

Option: Alternative approaches or projects to meet a need, including current practice.

Present value: The sum of life-cycle costs in terms of comparable costs in the present, considering inflation and interest rates. For the economic analysis, "present" means the program year used for the analysis.

Program year: The fiscal year for which funding is being requested. For the economic analysis, life-cycle costs are presented in program-year dollars for all options.

Real interest rate: Interest rate with inflation removed, which is used to determine the real return on investment. For the economic analysis, real interest rate is calculated by subtracting current rates of inflation from current interest rates for long-term U. S. Treasury securities.

Socioeconomic impact analysis: Analysis of the socioeconomic impacts of an action on the local community. Unlike an economic analysis, a socioeconomic impact analysis does not examine the benefits and costs of an action; rather, it is used to identify potential impacts on the local economic and social structure.

State Historic Preservation Officer (SHPO): The state official, appointed by the governor, responsible for monitoring compliance with the National Historic Preservation Act. The SHPO position was established by the Act to perform a variety of functions, including advising federal agencies on actions affecting historic properties.

Useful Life: The period of time over which benefits are derived from a project. A facility's useful life is the period of time over which it is expected to be usable, with routine maintenance, before improvements or major repairs are required.

APPENDIX B
INFLATION TABLE

Office of the Secretary of Defense (OSD) Inflation Indexes*

Fiscal Year	Index
1982-1983+	1.049
1983-1984+	1.038
1984-1985	1.037
1985-1986	1.044
1986-1987	1.042
1987-1988	1.040
1988-1989	1.037
1989-1990 on (annual)	1.034

To use these indexes over more than 1 year, multiply the first applicable index by the next index, then by the following indexes in sequence until the desired year is reached. For example, to calculate inflation between 1983 and 1987, multiply the index for 1983-1984 (1.038) by the index for 1984-1985 (1.037), then by the index for 1985-1986 (1.044), and finally by the index for 1986-1987 (1.042). The equation would be:

$$1.038 \times 1.037 = 1.076 \times 1.044 = 1.124 \times 1.042 = 1.171.$$

*Source: AFR 173-13. Updated indexes may be obtained from Headquarters USAF/LEEH/ACC or the local ACC Office.

+Actual inflation rates as measured by the Department of Commerce, Bureau of Economic Analysis.

APPENDIX C
DISCOUNTING TABLE*

Discount Rates

Year	5.00%	6.00%	7.00%	8.00%	9.00%	10.00%
1	0.952	0.943	0.935	0.926	0.917	**0.909**
2	0.907	0.890	0.873	0.857	0.842	**0.826**
3	0.864	0.840	0.816	0.794	0.772	**0.751**
4	0.823	0.792	0.763	0.735	0.708	**0.683**
5	0.784	0.747	0.713	0.681	0.650	**0.621**
6	0.746	0.705	0.666	0.630	0.596	**0.564**
7	0.711	0.665	0.623	0.583	0.547	**0.513**
8	0.677	0.627	0.582	0.540	0.502	**0.467**
9	0.645	0.592	0.544	0.500	0.460	**0.424**
10	0.614	0.558	0.508	0.463	0.422	**0.386**
11	0.585	0.527	0.475	0.429	0.388	**0.350**
12	0.557	0.497	0.444	0.397	0.356	**0.319**
13	0.530	0.469	0.415	0.368	0.326	**0.290**
14	0.505	0.442	0.388	0.340	0.299	**0.263**
15	0.481	0.417	0.362	0.315	0.275	**0.239**
16	0.458	0.394	0.339	0.292	0.252	**0.218**
17	0.436	0.371	0.317	0.270	0.231	**0.198**
18	0.416	0.350	0.296	0.250	0.212	**0.180**
19	0.396	0.331	0.277	0.232	0.194	**0.164**
20	0.377	0.312	0.258	0.215	0.178	**0.149**
21	0.359	0.294	0.242	0.199	0.164	**0.135**
22	0.342	0.278	0.226	0.184	0.150	**0.123**
23	0.326	0.262	0.211	0.170	0.138	**0.112**
24	0.310	0.247	0.197	0.158	0.126	**0.102**
25	0.295	0.233	0.184	0.146	0.116	**0.092**
26	0.281	0.220	0.172	0.135	0.106	**0.084**
27	0.268	0.207	0.161	0.125	0.098	**0.076**
28	0.255	0.196	0.150	0.116	0.090	**0.069**
29	0.243	0.185	0.141	0.107	0.082	**0.063**
30	0.231	0.174	0.131	0.099	0.075	**0.057**
31	0.220	0.164	0.123	0.092	0.069	**0.052**
32	0.210	0.155	0.115	0.085	0.063	**0.047**
33	0.200	0.146	0.107	0.079	0.058	**0.043**
34	0.190	0.138	0.100	0.073	0.053	**0.039**
35	0.181	0.130	0.094	0.068	0.049	**0.036**
36	0.173	0.123	0.088	0.063	0.045	**0.032**
37	0.164	0.116	0.082	0.058	0.041	**0.029**
38	0.157	0.109	0.076	0.054	0.038	**0.027**
39	0.149	0.103	0.071	0.050	0.035	**0.024**
40	0.142	0.097	0.067	0.046	0.032	**0.022**

Discount Rates

Year	11.00%	12.00%	13.00%	14.00%	15.00%
1	0.901	0.943	0.935	0.926	0.917
2	0.812	0.890	0.873	0.857	0.842
3	0.731	0.840	0.816	0.794	0.772
4	0.659	0.792	0.763	0.735	0.708
5	0.593	0.747	0.713	0.681	0.650
6	0.535	0.705	0.666	0.630	0.596
7	0.482	0.665	0.623	0.583	0.547
8	0.434	0.627	0.582	0.540	0.502
9	0.391	0.592	0.544	0.500	0.460
10	0.352	0.558	0.508	0.463	0.422
11	0.317	0.527	0.475	0.429	0.388
12	0.286	0.497	0.444	0.397	0.356
13	0.258	0.469	0.415	0.368	0.326
14	0.232	0.442	0.388	0.340	0.299
15	0.209	0.417	0.362	0.315	0.275
16	0.188	0.394	0.339	0.292	0.252
17	0.170	0.371	0.317	0.270	0.231
18	0.153	0.350	0.296	0.250	0.212
19	0.138	0.331	0.277	0.232	0.194
20	0.124	0.312	0.258	0.215	0.178
21	0.112	0.294	0.242	0.199	0.164
22	0.101	0.278	0.226	0.184	0.150
23	0.091	0.262	0.211	0.170	0.138
24	0.082	0.247	0.197	0.158	0.126
25	0.074	0.233	0.184	0.146	0.116
26	0.066	0.220	0.172	0.135	0.106
27	0.060	0.207	0.161	0.125	0.098
28	0.054	0.196	0.150	0.116	0.090
29	0.048	0.185	0.141	0.107	0.082
30	0.044	0.174	0.131	0.099	0.075
31	0.039	0.164	0.123	0.092	0.069
32	0.035	0.155	0.115	0.085	0.063
33	0.032	0.146	0.107	0.079	0.058
34	0.029	0.138	0.100	0.073	0.053
35	0.026	0.130	0.094	0.068	0.049
36	0.023	0.123	0.088	0.063	0.045
37	0.021	0.116	0.082	0.058	0.041
38	0.019	0.109	0.076	0.054	0.038
39	0.017	0.103	0.071	0.050	0.035
40	0.015	0.097	0.067	0.046	0.032

* For use in calculating the present value of future costs.
The multipliers have been derived using the formula $\frac{1}{(1+d)^n}$, where d = discount rate and n = year.

APPENDIX D
FORMS

This appendix contains forms to be used for conducting and documenting an economic analysis for military family housing. Instructions for completing the forms are contained in the manual itself. If these forms do not provide sufficient space for performing the calculations or completing the documentation, additional copies may be made, and/or continuation sheets may be used.

Military Family Housing Economic Analysis

FORM 1-1: LIFE-CYCLE COSTS DATA SHEET

All costs are per housing unit. Cost category numbers (1-6) correspond with numbers on Form 1-2. Multiply unit costs by number of housing units to complete Form 1-2.

Option A: Status Quo

1. Construction costs -- not applicable
2. Maintenance and Repair
   - Recurring maintenance costs
     - painting $_____
     - ground maintenance _____
     - cleaning _____
     - other (specify)
     - _____ _____
     - _____ _____
   - Total _____
   - Anticipated repair
     - roof year:_____ _____
     - plumbing year:_____ _____
     - HVAC equipment year:_____ _____
     - other (specify)
     - _____ year:_____ _____
3. Current annual energy costs
   - electricity _____
   - gas _____
   - other:_____ _____
   - Total _____
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
5. Rent -- not applicable
6. Other costs
   - security _____
   - communications _____
   - other (specify)
   - _____ _____
   - _____ _____

FORM 1-1 CONTINUED

Option B: Renewal

1. Construction costs (costs of renovation)
   - programmed amount $_____
   - design _____
   - SIOH _____
   - Total _____
2. Maintenance and Repair
   - Recurring maintenance (postproject)
     - year 1-5 _____
     - year 6-10 _____
     - year 11-15 _____
     - year 16-20 _____
     - year 21 on _____
   - Additional repair (specify)
     - _____ year:_____ _____
     - _____ year:_____ _____
3. Annual energy costs (postproject)
   - electricity _____
   - gas _____
   - other:_____ _____
   - Total _____
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
5. Rent -- not applicable
6. Other costs
   - security:
     - installation _____
     - operation _____
   - communications:
     - installation _____
     - operation _____
   - other (specify)
     - _____ _____
     - _____ _____

FORM 1-1 CONTINUED

Option C: New Construction

1. Construction costs
   - programmed amount (new const.) $_____
   - design _____
   - SIOH _____
   - Total _____
   - demolition (if applicable) _____
2. Maintenance and Repair
   - Recurring maintenance (postproject)
     - initial (protective storage) _____
     - year 1-5 _____
     - year 6-10 _____
     - year 11-15 _____
     - year 16-20 _____
     - year 21 on _____
   - Anticipated repair
     - roof year:_____ _____
     - plumbing year:_____ _____
     - HVAC equipment year:_____ _____
     - other (specify)
       _____ year:_____ _____
3. Annual energy costs
   - electricity _____
   - gas _____
   - other:_____ _____
   - Total _____
4. Other Utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
5. Rent (temporary)
   - duration:_____ _____
6. Other costs
   - security
     - installation _____
     - operation _____
   - communications
     - installation _____
     - operation _____
   - moving expenses _____
   - mitigation (if applicable) _____
   - other (specify)
     _____ _____

Option D: Government Leasing

1. Construction costs (build-to-lease only)
   - land (off base only) $_____
   - construction (local) _____
   - rate of return (annual) _____
   - demolition (if applicable) _____
2. Maintenance and Repair
   - Recurring maintenance
     - initial (protective storage) _____
     - year 1-5 _____
     - year 6-10 _____
     - year 11-15 _____
     - year 16-20 _____
     - year 21 on _____
   - Anticipated repair
     - roof year:_____ _____
     - plumbing year:_____ _____
     - HVAC equipment year:_____ _____
     - other (specify)
       _____ year:_____ _____
3. Annual energy costs
   - Tenant/lessee:
     - electricity _____
     - gas _____
     - other _____
   - Total _____
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total
5. Rent/lease (for existing housing only) _____
6. Other costs
   - security
     - installation _____
     - operation _____
   - communications
     - installation _____
     - operation _____
   - moving expenses _____
   - mitigation _____
   - other (specify)
     _____ _____
     _____ _____

FORM 1-1 CONTINUED

Option E: Direct Compensation

1. Construction costs
   - demolition (if applicable) $_____
2. Maintenance and Repair
   - Protective storage (if applicable)
     - initial costs _____
     - recurring maintenance _____
     - repair (specify)
       - _____ _____
       - _____ _____
       - _____ _____
3. Annual energy costs (tenant)
   - electricity _____
   - gas _____
   - other:_____ _____
   - Total _____
   - BAQ/VHA _____
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
   - BAQ/VHA _____
5. Rent _____
   - BAQ/VHA _____
   - % out-of-pocket expenses _____
6. Other costs
   - security
     - installation _____
     - operation _____
   - communications
     - installation _____
     - operation _____
   - moving expenses _____
   - mitigation _____
   - other (specify)
     - _____ _____
     - _____ _____

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Option: _____

Program year: _____ Discount rate: _____

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Valve
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

1. Enter in column (b), Form 1-3.
2. Enter in column (c), Form 1-3.
3. Enter in column (d), Form 1-3.

Sheet _____ of _____

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: _____ Discount Rate _____

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

Year _____

Cost Category	Cur. Costs	x	Infl.	=	Prog. Costs	x	Disc.	=	Pres. Value
1. Construction									
2. M&R									
3. Gas & elec.									
4. Other util.									
5. Rent									
6. Other costs									
Total					[1]		[2]		[3]

1. Enter in column (b), Form 1-3.
2. Enter in column (c), Form 1-3.
3. Enter in column (d), Form 1-3.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: ________________

Program Year: _____________ Discount Rate: _____________

(a) Year	(b) Prog. Costs	(c) Disc.	(d) Pres. Value	(e) Cumulative Pres. Value	(f) Infl.	(g) Then-Year Costs
Totals						

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option:_____ Discount rate:_____

Circle the score of the most appropriate description:

+3	Life-cycle costs of the option are less than 50% of the cost of continued maintenance.
+2	Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.
+1	Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.
0	Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.
-1	Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.
-2	Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.
-3	Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-4: LIFE-CYCLE COSTS SUMMARY

Discount rate: 10%

Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo			
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

Sensitivity Analysis:

Discount rate: _____

Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo			
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

Discount rate: _____

Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo			
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

Letters in parentheses () correspond to column headings on Form 1-3.

Military Family Housing Economic Analysis

FORM 2-1: DEFICIENCY CHECKLIST

2.1 Housing Quantity

Current demand _____

Anticipated additional demand _____

Current on-base housing supply _____

Off-base housing supply _____

a Existing shortfall _____*

b Demand increase due to mission change _____*

2.2 Housing Condition

Fire Safety:

c Number of smoke detectors _____ locations _____

d Distance to nearest fire hydrant _____* flows _____

Distance from unit to street _____

Structure safety:

e outside windows each BR: yes _____ no _____*

f fire walls between units (1 h): yes _____ no _____*

wooden roof: yes _____* no _____

fire-retardant finishes: yes _____ no _____*

g Ambient noise levels:

is unit in: APZ I _____ APZ II _____

interior noise levels:

less than 35 db _____ greater than 35 db _____*

h Hazardous building materials:

asbestos insulation _____*

toxic paint _____*

other _____*

i Ceiling height: 7 ft or more _____ under 7 ft _____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

j Play areas:

segregated from street:	yes _____	no _____*
visible from units:	yes _____	no _____*
fenced/secure:	yes _____	no _____*

k Structurally sound: yes _____ no _____*

l Unsafe protuberances: yes _____* no _____

Age of housing _____

Exterior materials _____

Items in need of repair:*

m	foundation	_____	n	roof	_____
o	walls	_____	p	windows	_____
q	floors/coverings	_____	r	doors	_____
s	kitchen cabinets, etc.	_____	t	appliances	_____
u	bathroom fixtures	_____	v	plumbing	_____
w	electricity	_____	x	HVAC	_____
y	site utilities	_____	z	streets/drives	_____
aa	garage/carport	_____	bb	gutters/downspouts	_____

cc Does unit have termites? yes _____* no _____

2.3 Housing Adequacy

Type of housing (check appropriate):

single family _____ duplex _____ apartment _____

townhouse (more than 2 units/structure) _____

Pay grade:

O-7 and above _____	O-6 _____
O-4 and O-5 _____	O-1 to O-3 _____
E-7 to E-9 _____	E-1 to E-6 _____

dd Is housing compatible with Base Comprehensive Plan?

yes _____ no _____*

ee Building separation:

greater than 25 ft _____	20 to 24 ft _____
15 to 19 ft _____*	less than 15 ft _____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

ff Net area _____ (Check against authorizations)*

gg Number of bedrooms_____

hh Family room (for 3-BR units or larger):
yes _____ no _____*

ii Dining area (3-BR units or larger):
yes _____ no _____*

jj Kitchen area:
full kitchen _____ kitchenette _____
no kitchen _____*

kk Appliances:

	range:	yes _____	no _____*
	refrigerator:	yes _____	no _____*
	exhaust fan to outside:	yes _____	no _____*
	dishwasher:	yes _____	no _____*
	garbage disposal:	yes _____	no _____*
ll	space for freezer:	yes _____	no _____*
mm	Laundry space:	yes _____	no _____*
	washer:	yes _____	no _____
	dryer:	yes _____	no _____

nn Number of baths (Check against authorizations)*
full baths _____ 3/4 baths _____
1/2 baths _____ master bath _____

oo Private entry: yes _____ no _____*

pp Closets (minimum width):

entry hall:	3 ft _____	less than 3 ft	_____*
BR 1:	6 ft _____	less than 6 ft	_____*
BR 2:	3 ft _____	less than 3 ft	_____*
BR 3:	3 ft _____	less than 3 ft	_____*
BR 4:	3 ft _____	less than 3 ft	_____*
Linen:	2 ft _____	less than 2 ft	_____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

qq Storage:

more than 60 ft^2 _____ 50 to 59 ft^2 _____

40 to 49 ft^2 _____ less than 40 ft^2 _____*

rr Circulation:

Are all bedrooms accessible from hall?

yes _____ no _____*

Is dining area accessible from the kitchen?

yes _____ no _____*

ss Telephone: yes _____ no _____*

tt Outdoor space:

private yard _____ courtyard _____

patio _____ common yard _____

landscaping _____ none _____*

uu Privacy fence: yes _____ no _____*

vv Parking:

garage: yes _____ no _____

carport: yes _____ no _____*

driveway: yes _____ no _____*

on-street: yes _____ no _____*

ww Sidewalks: yes _____ no _____*

2.4. Energy Conservation

xx Insulation:

ceiling: yes _____ no _____* "U" value _____

walls: yes _____ no _____* "U" value _____

floor: yes _____ no _____* "U" value _____

yy Glazing:

single pane _____* double pane _____

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

zz Energy consumption:

Type of heat:

electric _____ natural gas _____

LPG _____ oil _____

central heat plant (coal) _____

Air Conditioning: yes _____ no _____

Type:

standard _____ swamp coolers _____

heat pump: _____

Are individual units metered? yes _____ no _____

If yes, average annual consumption rate for heat:

1. Divide BTU/unit by unit ft^2
2. Sum BTU/ft^2 of all units
3. Divide by number of units

average BTU/ft^2: _____ base year(s): _____

If no, estimated annual consumption rate for all units:

1. Divide total BTU by number of units

average BTU/unit: _____

2. Divide by average unit ft^2

average BTU/ft^2: _____

Energy consumption rate _____ BTU/ft^2

Air Force goal _____ BTU/ft^2

Excessive consumption _____ BTU/ft^2

Percent overconsumption ("Excessive consumption rate" divided by "Air Force goal") _____%

Percent overconsumption greater than 25% _____%*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

FORM 2-2: DEFICIENCY SHEET

Mark appropriate items

2.1 Housing Quantity

a _____ existing shortage
b _____ new mission/mission change

2.2 Housing Condition

c _____ inadequate smoke detectors
d _____ inadequate fire protection to site
e _____ inadequate emergency access
f _____ structural fire hazard
g _____ inadequate sound attenuation
h _____ hazardous building materials
i _____ inadequate ceiling height
j _____ unsafe streets/play areas
k _____ unsound structural elements
l _____ unsafe protuberances
m _____ foundation
n _____ roof
o _____ walls
p _____ windows
q _____ floors/floor coverings
r _____ doors
s _____ kitchen cabinets/counters
t _____ kitchen appliances
u _____ bathroom fixtures
v _____ plumbing
w _____ electricity
x _____ HVAC
y _____ utilities to site
z _____ streets/driveways
aa _____ garage/carport
bb _____ gutters/downspouts
cc _____ pest control

2.3 Housing Adequacy

dd _____ incompatible siting
ee _____ insufficient building separation
ff _____ net area
gg _____ inadequate number of bedrooms
hh _____ inadequate living room/family room
ii _____ inadequate dining area
jj _____ inadequate kitchen space
kk _____ inadequate kitchen appliances
ll _____ no space for freezer
mm _____ no laundry
nn _____ inadequate number of baths
oo _____ no private entry
pp _____ inadequate closets
qq _____ inadequate storage
rr _____ poor functional relationships/circulation
ss _____ no telephone
tt _____ inadequate outdoor space/amenities
uu _____ inadequate privacy
vv _____ inadequate occupant parking
ww _____ no sidewalks

2.4 Energy Conservation

xx _____ inadequate insulation
yy _____ inadequate glazing
zz _____ excessive energy consumption

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION_____

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the requirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing available or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggravates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggravates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:

2.2 Housing Condition

+3 Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

+1 Option corrects some deficiencies.

0 Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments:

FORM 2-3 CONTINUED OPTION_____

2.3 Housing Adequacy

+3 Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

0 Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments:

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

+1 Option improves energy efficiency up to 20%.

0 Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments:

Military Family Housing Economic Analysis

FORM 2-4: PROJECT EFFECTIVENESS SUMMARY

		Score	Weight
Option A: Status Quo			
A2.1	Housing Quantity	A2.1	0
A2.2	Housing Condition	A2.2	0
A2.3	Housing Adequacy	A2.3	0
A2.4	Energy Conservation	A2.4	0
Median		A2	0
Option B: Renewal			
B2.1	Housing Quantity	B2.1 _____	_____
B2.2	Housing Condition	B2.2 _____	_____
B2.3	Housing Adequacy	B2.3 _____	_____
B2.4	Energy Conservation	B2.4 _____	_____
Median		B2	_____
Enter on line B2 of Form S-1.			
Option C: New Construction			
C2.1	Housing Quantity	C2.1 _____	_____
C2.2	Housing Condition	C2.2 _____	_____
C2.3	Housing Adequacy	C2.3 _____	_____
C2.4	Energy Conservation	C2.4 _____	_____
Median		C2	_____
Enter on line C2 of Form S-1.			
Option D: Government Leasing			
D2.1	Housing Quantity	D2.1 _____	_____
D2.2	Housing Condition	D2.2 _____	_____
D2.3	Housing Adequacy	D2.3 _____	_____
D2.4	Energy Conservation	D2.4 _____	_____
Median		D2	_____
Enter on line D2 of Form S-1.			
Option E: Direct Compensation			
E2.1	Housing Quantity	E2.1 _____	_____
E2.2	Housing Condition	E2.2 _____	_____
E2.3	Housing Adequacy	E2.3 _____	_____
E2.4	Energy Conservation	E2.4 _____	_____
Median		E2	_____
Enter on line E2 of Form S-1.			

Military Family Housing Economic Analysis

FORM 3-1: OFF-BASE HOUSING

Total number of military families assigned to base: _____
Number of on-base housing units: _____
Number of personnel residing off base: _____

Average rental costs:
O-6 and above: _____
O-1 to O-5: _____
E-7 to E-9: _____
E-1 to E-6: _____

Local rental vacancy rate: _____ source: _____

	Total	Available
Units within 15 miles of base:	_____	_____
Units within 60 miles of base:	_____	_____

Operational Requirements
Number of personnel with response requirement: _____
Number of personnel with security requirement: _____

Socioeconomic Impact Considerations
Ratio of vacant housing to base housing requirement: _____
School District is (check one):
Overcrowded _____
Underutilized _____
Neither of the above _____

Other considerations (describe): _____
_____
_____
_____

Socioeconomic Impact Analysis is (check one):
Required _____
Not required _____

FORM 3-2: SPECIAL CONSIDERATIONS OPTION_____

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-min commute of the base.

+2 Option increases the availability of housing of adequate quality within a 1-h commute of the base.

+1 Option increases the availability of affordable housing within a 1-h commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within a 1-h commute of the base.

-2 Option does not provide for affordable housing within a 1-h commute of the base.

-3 Option does not provide for housing of adequate quality within a 1-h commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:

3.2 Operational Responsiveness (Check if project involves key personnel:_____)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

0 Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

-2 Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments:

FORM 3-2 CONTINUED OPTION_____

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

0 Option does not change operational security conditions.

-1 Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments:

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required:___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socioeconomic conditions.

-2 Option aggravates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option.

Comments:

Military Family Housing Economic Analysis

FORM 3-3: SPECIAL CONSIDERATIONS SUMMARY

Option A: Status Quo		Score	Weight
A3.1	Avail., Afford., and Accessibility	A3.1	0
A3.2	Operational Responsiveness	A3.2	0
A3.3	Operational Security	A3.3	0
A3.4	Socioeconomic Impacts	A3.4	0
Median		A2	0

Option B: Renewal			
B3.1	Avail., Afford., and Accessibility	B3.1	
B3.2	Operational Responsiveness	B3.2	
B3.3	Operational Security	B3.3	
B3.4	Socioeconomic Impacts	B3.4	
Median		B3	

Enter on line B3 of Form S-1.

Option C: New Construction			
C3.1	Avail., Afford., and Accessibility	C3.1	
C3.2	Operational Responsiveness	C3.2	
C3.3	Operational Security	C3.3	
C3.4	Socioeconomic Impacts	C3.4	
Median		C3	

Enter on line C3 of Form S-1.

Option D: Government Leasing			
D3.1	Avail., Afford., and Accessibility	D3.1	
D3.2	Operational Responsiveness	D3.2	
D3.3	Operational Security	D3.3	
D3.4	Socioeconomic Impacts	D3.4	
Median		D3	

Enter on line D3 of Form S-1.

Option E: Direct Compensation			
E3.1	Avail., Afford., and Accessibility	E3.1	
E3.2	Operational Responsiveness	E3.2	
E3.3	Operational Security	E3.3	
E3.4	Socioeconomic Impacts	E3.4	
Median		E3	

Enter on line E3 of Form S-1.

Military Family Housing Economic Analysis

FORM 4-1: HISTORIC PRESERVATION CHECKLIST

Is the existing housing currently on the National Register of Historic Places (Register)?

_____ yes If yes, complete Form 4-2 for each option.
_____ no If no, go to the next question.

Is the existing housing eligible for the Register?

_____ yes If yes, complete Form 4-2 for each option.
_____ no/? If no/do not know, go on to next question.

Is the existing housing (check appropriate line):

a. 50 years old or older _____
b. architecturally unique _____
c. associated with an historic person or event _____

If a., b., and/or c. are checked, assume that the housing is historic for the purposes of this analysis and complete Form 4-2 for each option.

If none of a., b., or c. is checked, enter "N/A" in items B4, C4, D4, and E4 of Form S-1.

Military Family Housing Economic Analysis

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION _____

Check if project involves historic properties: ___

Circle the score of the most appropriate description:

+3 Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

0 Option preserves the status quo.

-1 Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

-3 Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET

Number	Factor/Criterion	Weight
(Option)		
(Option)		
(Option)		
(Option)		
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
No.	Score	No.	Score	No.	Score	No.	Score	No.	Score

Median	Median	Median	Median	Median
A	B	C	D	E

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY

		Score	Weight
Option A:	Status Quo		
A1	Life-Cycle Costs	A1 0	_____
A2	Housing Performance	A2 0	_____
A3	Special Considerations	A3 0	_____
A4	Historic Preservation	A4 0	_____
Median		A	0
Option B:	Renewal		
B1	Life-Cycle Costs	B1 _____	_____
B2	Project Effectiveness	B2 _____	_____
B3	Special Considerations	B3 _____	_____
B4	Historic Preservation	B4 _____	_____
Median		B	_____
Option C:	New Construction		
C1	Life-Cycle Costs	C1 _____	_____
C2	Project Effectiveness	C2 _____	_____
C3	Special Considerations	C3 _____	_____
C4	Historic Preservation	C4 _____	_____
Median		C	_____
Option D:	Government Leasing		
D1	Life-Cycle Costs	D1 _____	_____
D2	Project Effectiveness	D2 _____	_____
D3	Special Considerations	D3 _____	_____
D4	Historic Preservation	D4 _____	_____
Median		D	_____
Option E:	Direct Compensation		
E1	Life-Cycle Costs	E1 _____	_____
E2	Project Effectiveness	E2 _____	_____
E3	Special Considerations	E3 _____	_____
E4	Historic Preservation	E4 _____	_____
Median		E	_____

Military Family Housing Economic Analysis

FORM S-2: PROJECT RECOMMENDATION

Installation/ MAJCOM:_____

Project Title:_____

Selected Option:_____

Rationale:

Unresolved Issues:

Military Family Housing Economic Analysis

CERTIFICATE OF SATISFACTORY ECONOMIC ANALYSIS

Installation: _____

Major Command: _____

Project Title: _____ Project Number: _____

SECTION I

An economic analysis has been prepared for this project. The following alternatives have been considered:

_____ A. Continuation of current maintenance (Status Quo)

_____ B. Renewal of existing housing

_____ C. Construction of new housing (MCP)

_____ D. Government leasing

_____ E. Direct compensation of personnel (BAQ, VHA)

Summary of analysis results:

Base ACC Evaluator: (signature) _____

Name/Autovon/Date: _____

Concurrence by Base AC: (signature) _____

Name/Autovon/Date: _____

MAJCOM ACC evaluation :

MAJCOM ACC evaluator: (signature) _____

Name/Autovon/Date: _____

SECTION II

An economic analysis was not prepared for this project for the following reason(s):

_____ a. Project cost and/or benefits to be derived do not warrant the level of effort required to prepare a full and complete analysis. The factors supporting this decision are attached.

_____ b. Project was directed by _____ as shown in the attached documentation.

_____ c. Other [list specific reason(s) analysis was not prepared].

Concurrence by Base AC: (signature) _____

Name/Autovon/Date: _____

Concurrence by Wing Commander: (signature) _____

Name/Autovon/Date: _____

Concurrence by MAJCOM AC: (signature) _____

Name/Autovon/Date: _____

APPENDIX E
METHODOLOGY

CONTENTS

1. GENERAL

1.1 INTRODUCTION

The purpose of the Military Family Housing (MFH) Economic Analysis Manual is to enable the U. S. Air Force (USAF) to comprehensively and systematically analyze alternative approaches to meeting the USAF's MFH needs. It ensures that feasible options are evaluated in a thorough, consistent, and objective manner and that comparable analyses are conducted for all projects submitted to the Office of the Secretary of Defense (OSD) and, ultimately, to Congress.

This appendix provides an explanation of the methodology incorporated in the economic analysis and can be referenced if further clarification of the instructions is desired. Completion of the analysis requires no special knowledge of, or training in, economics.

The methodology incorporated in this manual addresses all of the considerations required by AFR 178-1 and summarized in AFR 178-8, Attachment 1. It thereby facilitates preparation of a satisfactory economic analysis. If an analysis is completed in accordance with this manual, no other documentation should be required to comply with AFR 178-1. The quality and completeness of economic analyses are keys to justifying projects submitted for funding and making the USAF MFH program more defensible. The methodology incorporated in this manual enhances the quality of the economic analysis process by

1. standardizing the data and procedures used for analyzing the life-cycle costs of MFH projects,

2. improving the evaluation and selection method for project options, and

3. improving documentation of needs and project benefits.

The manual can be used by personnel at individual bases, Major Commands, or Headquarters. Its primary purpose is to evaluate project options at base level. It should be used for all major MFH projects being contemplated. Completing the economic analysis requires close coordination between civil engineering (DE) and comptroller (AC) organizations. The initiating DE office should contact the local cost division office (ACC) early in the process for guidance in preparing the economic analysis. <u>As specified in AFR 178-1, the completed economic analysis must have the concurrence of both the base and Major Command ACC offices.</u>

1.2 ECONOMIC ANALYSIS PROCESS

The fundamental elements of an economic analysis include

1. defining a <u>specific MFH problem</u> and determining whether an economic analysis should be performed,

2. identifying feasible <u>options</u>,

3. identifying <u>constraints and assumptions</u>,

4. quantifying and comparing costs,

5. developing a set of objectives and evaluation criteria and determining benefits,

6. testing the sensitivity of a decision to major uncertainties, and

7. comparing and ranking options.

This manual standardizes the approach to the economic analysis process for MFH projects. Defining the specific MFH problem at a base is accomplished through a requirements analysis that begins with a Deficiency Sheet (Form 2-2). The requirements analysis addresses housing shortages, the adequacy of housing in meeting the space requirements of base personnel, structural deficiencies, considerations of health and safety, and energy efficiency. The key components for completing the requirements analysis are the annual survey and determination of family housing requirements (DD Form 1376), civil engineering design and performance standards for structures, and the Family Housing Cost Report. If these sources of information are adequate and available, little additional data collection should be required.

The manual also specifies the options (alternatives) to be analyzed. These are built in to ensure a thorough and objective analysis of all feasible approaches. Individually or in combination, they represent the full range of options available to a base. A user must, however, fully define and document the scope of each option as it applies to a particular base.

In any analysis, there are uncertainties and unknowns that must be accounted for in the analysis process. To fully understand the implications of a decision, the constraints and assumptions associated with these uncertainties and unknowns must be clarified. The methodology provided in this manual incorporates certain assumptions, which are defined in Sects. 4 and 5 of this appendix. These include assumptions that are inherent in the methodology, as well as proxy and default values used to estimate conditions when factual data are unavailable.

Calculating the costs of all options in a manner that allows them to be compared on an equal basis requires that the costs over different times be reduced to a common denominator. This can be accomplished by converting all costs to a common year, either a given year or the present. This manual accomplishes the task by converting costs over the life of a project option to a present value. Then the life-cycle costs of all options can be compared. Also included are calculations permitting the evaluator to estimate the cost of deferring implementation of a project option from year to year.

While cost is a major consideration in selecting the best alternative for solving a problem, it is not the only consideration. A project's costs must be weighed against the benefits the project provides. These benefits should be related to the overall objectives for MFH. The objectives of the MFH economic analysis program established by Headquarters USAF Housing and Services Division (HQ USAF/LEEH), as specified in Sect. 1.3 of this appendix, are incorporated in the approach and reflected in the evaluation criteria. The manual does not provide for selection of different objectives, but it does permit the user/decision maker to assign weights to the evaluation criteria to reflect the unique conditions at a base.

Benefits are often qualitative and difficult to quantify. This manual provides a means for measuring the benefits offered by each option and combining this benefit analysis with the life-cycle cost analysis in a common scoring system. Costs and benefits are combined to allow trade-offs. The evaluation of each option incorporates cost and benefits data in a single score, permitting options to be ranked. The factors contributing to an overall score can be weighted to reflect a base's priorities.

Because the evaluation incorporates certain priorities and assumptions, it is important to examine its sensitivity to changes in those priorities and assumptions. The methodology of this manual allows for sensitivity testing of priorities through changes in the weighting of evaluation criteria. Costing indexes and discount rates can also be adjusted, although additional calculations can be extensive and time consuming. Changes in assumptions and priorities should be based on realistic assessments of existing or anticipated conditions in order not to invalidate or prejudice the analysis. The rationale for any changes made must be documented.

Finally, once data have been collected and analyzed and options have been evaluated, it is possible to compare options on a common scale and rank them according to their performance in achieving MFH objectives. This ranking is an important ingredient of any decision concerning the future of MFH at a base, but it is not the decision itself. A responsible decision maker must weigh all the evidence available in making a decision. A quality economic analysis provides the decision maker with the best possible information about the costs and benefits of the options. It also provides good justification and defense for the actions it supports.

There are four basic types of forms used in the analysis process:

Baseline Data Collection Forms, which are used to collect data for the economic analysis. These include Forms 1-1, 2-1, 2-2, 3-1, and 4-1.

Life-Cycle Cost Forms (1-2, 1-3, and 1-4), which facilitate manual calculations of life-cycle costing formulas used in the analysis.

Evaluation Forms, which are used to evaluate the performance of options against each of the evaluation criteria in the cost-benefit portion of the analysis. These include forms 2-3, 3-2, and 4-2. Forms 2-4 and 3-3 are used to aggregate performance scores and facilitate comparison.

Summary Forms, which are used to compare options and document a decision. They include Forms S-1 and S-2.

1.3 ECONOMIC ANALYSIS OBJECTIVES

The overall USAF objectives for MFH provide a common and consistent basis for the development of MFH improvement strategies throughout the USAF at every installation. This serves to communicate the USAF's housing policies as they relate to accomplishing the USAF mission and allows attention to be placed on those needs that are greatest.

USAF objectives for MFH are to

1. reduce and control life-cycle costs;

2. correct deficiencies in the housing currently available to USAF personnel, both in the form of shortages and as inadequacies in the available housing stock;

3. provide a safe and healthy living environment for all USAF personnel;

4. provide a living environment that enhances the efficiency and morale of personnel and contributes to personnel retention by ensuring that secure and affordable housing is available, accessible to the work place, and near services and amenities;

5. ensure that housing provided is responsive to base operational requirements, especially for mission-essential and command personnel;

6. consider the potential impacts of USAF actions on neighboring communities; and

7. consider the unique historical or architectural qualities of existing housing that has special value to the nation's heritage.

2. OPTIONS FOR EVALUATION

2.1 PROGRAM OPTIONS

The following program options should be considered for meeting base MFH needs. If any are not viable for a particular base, the economic analysis documentation should indicate the reason.

2.1.1 Option A: Continuation of Current Maintenance (Status Quo)

This option constitutes a baseline against which all other options are evaluated. It could be the preferable alternative if other options score negatively in comparison.

2.1.2 Option B: Renewal of Existing Housing

This option is intended as a "whole house" renewal project for existing MFH units to reduce future maintenance and repair (M&R) costs and improve overall livability. The option may be redefined, however, to a more limited scope to correct specific deficiencies. Any redefinition must be clearly described and fully documented. The scope and completeness of this option will affect its effectiveness rating in the evaluation process. The more completely it corrects the deficiencies that exist, the better the option will rate. Nevertheless, some deficiencies, such as number and size of bedrooms, may not be practical to correct with a renewal project.

2.1.3 Option C: Construction of New Housing

New on-base housing may be required to eliminate a shortage that exists or one that will be created by a new mission or mission change. It may also replace existing housing that is substandard. In the last case, this option requires a companion analysis of the disposition of existing housing (see Sect. 3). Three alternatives are examined: (1) retention in protective storage ("mothballing"), (2) conversion to another use, and (3) demolition. The costs and benefits associated with the disposition of existing housing must be added to the analysis of Option C for new construction of replacement units. Costs derived for replacement housing must be based on current authorizations rather than on replacement in kind. For example, existing General Officers Quarters that exceed authorized space allowances can only be replaced with new housing that is within the authorized allowances. If Option C is considered, Option D must also be considered.

2.1.4 Option D: Government Leasing

This option involves direct, long-term leasing or guaranteed rental by the USAF of suitable private-sector housing either on or off a base. It may involve leasing of existing off-base housing or private-sector financing of new on-base housing (build/lease). Suitable housing is that which meets all USAF standards for sanitation, health, safety, and structural condition, as well as space allowances authorized for affected base personnel. The analysis must be specific to the type and rank of personnel for which leased housing is being considered. This option provides an alternative to construction of new housing under the same

circumstances described for Option C. If the option replaces existing on-base housing, an analysis of the disposition of that housing must also be performed. The build/lease option should only be considered if construction of new housing is contemplated.

The MFH Leasing Program and Military Housing Rental Guarantee Program were established by Public Law 98-115 (October 11, 1983), Title VIII, Sects. 801 and 802. They allow the Secretary of the USAF to enter into a contract for lease of housing (Sect. 801) or to ensure occupancy of rental housing (Sect. 802) constructed by a private developer or state or local housing authority to meet a validated housing deficit. The programs apply only to new housing that would be constructed specifically for military use (build/lease). The housing may be built on or off base and must be constructed to Department of Defense specifications. The term of a lease is limited to 20 years; the term of a rental guarantee agreement is limited to 15 years. Both programs require for each proposed project an economic analysis that demonstrates that the project is cost-effective when compared with alternate means of furnishing the same housing facilities. Information on successful build/lease projects can be obtained from HQ USAF/LEEH.

The procedure for evaluating life-cycle costs for build/lease projects differs from the standard analysis performed for military construction projects. The build/lease procedure is discussed in Sect. 4.2.

2.1.5 Option E: Direct Compensation

Option E allows personnel to select their own housing off base and compensates them directly in the form of Basic Allowance for Quarters (BAQ) and Variable Housing Allowance (VHA). Compensation payments are limited to 85% of rental and utility costs; the balance is provided by the individual. If the selection of this option includes vacating existing on-base housing, the analysis of the disposition of existing housing must be performed and the results added to the analysis of Option E.

2.2 SELECTING APPROPRIATE OPTIONS

Option A would be used in any economic analysis. Options B, C, and D are likely to be considered to correct deficiencies in existing housing. Options C, D, and E are applicable when there is a housing shortage. It is recommended that Option E also be evaluated as an alternative whenever new construction is contemplated.

These application parameters are only guidelines. The user should examine whatever options may be feasible to meet base needs.

2.3 COMBINATION PROJECTS

The program options listed above are a comprehensive range of feasible alternatives to meeting a base's MFH requirements. They are, however, not necessarily mutually exclusive. The best approach for a particular base may involve a combination of options or multiple projects for different MFH areas. Combination and multiple projects can be evaluated using the economic analysis methodology by dividing them into their component options and evaluating each option.

3. DISPOSITION OF EXISTING HOUSING

If Options C, D, and E are being considered as replacement housing, the disposition of existing housing to be replaced is also evaluated as part of the economic analysis.

3.1 DISPOSITION ALTERNATIVES

The following are the alternatives that should be considered.

3.1.1 Protective Storage

Protective storage is a term used to describe a facility that is not used, has been closed up, and is given minimal maintenance to preserve its structural integrity. "Mothballing" and "pickling" are colloquial terms for protective storage. If this approach is selected, the costs associated with maintenance in protective storage must be added to the program options. These costs usually include initial removal from service, some repairs to stabilize the conditic of the structures, and on-going maintenance to inhibit deterioration.

3.1.2 Conversion to Other Use

Like protective storage, this alternative addresses the disposition of existing housing when replacement housing is contemplated and is used in conjunction with Options C, D, and/or E. It considers the conversion of existing housing to another use, such as administrative offices. It is a valid approach if a bona fide requirement exists that could be adequately met by the housing facility. The viability of the approach depends on whether the facility can meet the functional requirements of the alternate use, is in an appropriate location, and is compatible with the proposed use. The cost of conversion must also be considered and compared with other alternatives, including new construction for the alternate function, although these costs are not included in the MFH economic analysis.

3.1.3 Demolition

This alternative also involves replacement of existing housing through one of the other options. Under this approach, the existing housing is demolished. The site may be used for new construction of housing or for other facilities, or it may be left vacant. What actually happens to the site is not part of the evaluation (unless it is required for new housing); only the disposition of the facility itself is considered.

The disposition alternatives are considered in combination with the program options when they involve replacement housing. Protective storage should be considered whenever the existing housing is historic, as well as when appropriate for other reasons. Conversion is normally considered only if there is an existing need that could be met by converting housing units.

3.2 EVALUATION FACTORS

There are three factors that should be considered in selecting the appropriate disposition alternative: (1) life-cycle costs (of the disposition action), (2) siting considerations, and (3) preservation considerations.

3.2.1 Life-Cycle Costs

Life-cycle costs include costs associated with the disposition action only. For the removal option, these would include demolition and site restoration. For protective storage, they include the cost of closing up the unit, discontinuing utility services, and operations and maintenance (O&M) during the period of storage. Because a converted facility serves a function, the cost of conversion cannot be attributed to the MFH project. Therefore, for the purpose of this analysis, costs of conversion will be limited to discontinuation of service and interim O&M until the conversion project is started. Any construction costs associated with converting facilities to another use will be considered attributable to the gaining function. Other life-cycle costs of the selected disposition option are incorporated in the life-cycle costs of the program option(s) affected.

3.2.2 Siting Considerations

Siting considerations address the opportunity costs associated with the site of existing housing that is to be replaced. The primary siting considerations are competition and compatibility. If, for instance, replacement housing is considered for the same site, retaining the existing housing may be impractical. As another example, if the existing housing is on a site that is adjacent to industrial or other incompatible land uses, retaining the residential use may not be desirable.

3.2.3 Preservation Considerations

Preservation considerations involve existing housing that is, or is eligible to be, listed on the National Register of Historic Places. Demolition of historic housing is considered an adverse effect under the National Historic Preservation Act. Generally, compatible use of historic structures is preferable to protective storage. Thus, the conversion option may be beneficial but only if the proposed use and rehabilitation plans are compatible with the structure's historic qualities. If existing housing that is historic is to be preserved, converted, or demolished, the Historic Preservation criterion must be included in the economic analysis (see Sect. 5.1).

3.3 ANALYSIS

The instructions for analyzing disposition alternatives are not as rigorous as for the program options. For most installations, the clear choice will be demolition if it is decided that the housing should be replaced. The other two alternatives are most attractive if the existing housing is historic. If that is the case, the analysis of its disposition should be conducted more carefully and thoroughly. In addition to life-cycle costs, it should include an honest examination of the facility's conversion potential. Generally, it is preferable to use structures rather than place them in protective storage. A scoring and ranking process similar to that described in Sect. 5.3 may also be used to evaluate disposition alternatives.

The evaluation and comparison of the three disposition alternatives are performed before the evaluation of the options for replacement housing. Once a decision has been made on the disposition of the existing housing, information about the selected alternative is incorporated into the analysis of the options for the replacement housing. For instance, if the option selected is demolition, the demolition costs are included in the life-cycle costs of the new housing. If the housing to be demolished is historic, the Historic Preservation portion of the analysis of the replacement housing options incorporates the project's adverse impact on the historic housing.

4. ANALYZING COSTS

4.1 LIFE-CYCLE COSTING ASSUMPTIONS

There are three basic types of assumptions incorporated into the economic analysis methodology:

1. To estimate the present value of future costs, default values are used in the life-cycle cost analysis to predict future economic conditions.

2. Proxy values are estimators of past performance when specific data are unavailable. For instance, if specific data on the energy consumption of individual units are not available, the number of total units can be divided into an overall consumption rate to yield an average per-unit rate. One of the objectives of this manual is to make maximum use of available data and data already being collected to minimize the extra burden this analysis places on base personnel.

3. Inherent assumptions are built into the criteria and options. These are the most difficult to adjust but can be varied by changing the performance criteria or evaluation scales.

The following are assumptions to be used for calculating life-cycle costs; assumptions related to the benefit analysis are included in Sect. 5.2:

1. Costs for all alternatives should be calculated in constant-year dollars, using the program year desired for funding requests. This assumes that all options could be initiated (but not necessarily completed) at the same time. The year held constant should be the year an option is begun, not the time of beneficial occupancy. If this assumption is inaccurate for a particular base, the fact should be documented in the economic analysis for that base.

2. Unit sizes for new construction are limited to congressionally imposed criteria as set forth in AFR 90-1, DODI 4270.1-M, and the Military Construction Codification Act, 10 USC 2801 (Public Law 97-214 -- July 12, 1982). Renewal projects may not increase the size of existing units beyond the mandated limit but may include renewal of living areas that already exceed the limit.

3. Construction expenditures are spread evenly over each year in the construction period. The user should use an appropriate construction duration for each option in the economic analysis. If new construction involves using the same site for replacement of existing units, the time required for demolition should be added to the construction period for that option. Demolition required for renewal projects, on the other hand, is assumed to be incorporated in the construction period of the renewal option.

4. The life of new or renovated housing units is assumed to be 40 years. This also assumes that normal cyclical O&M will be performed over the facility's life.

5. During the project construction periods for Options B and C, M&R costs are assumed to continue at the status quo (Option A) level for units not yet demolished or under construction if construction is phased over multiple years. For Option B, if construction is not phased, M&R costs are assumed to be 10% of Option A to account for maintenance activities that might be required during construction.

6. The discount rate used to calculate present value is mandated by Office of Management and Budget (OMB) Circular A-94 and is currently 10%. Experience indicates, however, that over the long term (e.g., 20 to 25 years), average annual return on investment is closer to 6 or 7%. OMB Circular A-104 prescribes a real discount rate of 7% for facilities costing $500,000 or more. Sensitivity analyses should, therefore, be performed with a 7% or other user-selected rate.

7. Construction costs for new units are based on the HQ USAF Annual Construction Pricing Guide, using the Area Cost Factor applicable to a base. Cost per square foot should be increased by 15% for supporting facilities. Contingency and Supervision, Inspection, and Overhead (SIOH) are added. MFH projects should also have the following percentage of the Programmed Amount (PA) added for design: 15% if the PA is less than $1 million; 8% if the PA is between $1 million and $5 million; 7% if the PA is greater than $5 million.

8. M&R costs over the life of new or renovated units are assumed to increase 10% in real dollars (adjusted for inflation) every 5 years, up to a plateau of 25 years. Maintenance costs between 26 and 40 years are assumed to be static. Inflation is added onto the increases. These assumptions may be considered a general rule-of-thumb and are based on an analysis of historical data by HQ USAF/LEEH. Alternate values may be substituted, but the rationale for their use must be fully documented in the analysis.

9. Government reimbursement costs for Option E should be calculated at 85% of total rent and utilities.

10. It is assumed that for protective storage of units to be vacated but not demolished, there are no maintenance costs beyond initial removal from service (e.g., boarding-up, disconnecting utilities) unless the units are historic properties. For historic properties, protective storage costs should include maintenance required to preserve structural integrity. Level of maintenance should be based on Secretary of Interior Standards for Historic Preservation Projects and any agreements between a base and the local State Historic Preservation Office.

4.2 CALCULATING LIFE-CYCLE COSTS

Life-cycle cost comparisons are made by calculating all costs anticipated over the life of a facility, including design, construction, maintenance, operation (e.g., utilities), and, if appropriate, financing costs (for leased housing) and then converting those costs into a common denominator -- present value. The present value is all costs over time discounted to the present or to a specific program year.

Discounting is a procedure used to account for the effect of time on the value of money. Money is not worth as much in the future as it is in the present because if it is available today, it can be invested and a return on investment can be earned. Thus, if an investment can be expected to yield a return of 10% per year, a dollar invested today will be worth $1.10 in a year. If, on the other hand, the dollar is spent instead of invested, the opportunity for a return is lost. Thus, the "opportunity cost" of the expenditure is 10%. Another way to look at it is that next year's dollar is comparable to a little over 90 cents today.

At the same time, costs of goods and services increase with inflation. The inflation factor is not the same as the discount rate. Market interest rates include inflation, as well as investment opportunity costs. The market interest minus the inflation factor is known as the "real interest rate" and will be the discount rate used for this analysis.

The life-cycle cost analysis for MFH options involves three main steps. First, all costs over the life of the facility are calculated or estimated in current dollars. This includes demolition, construction, maintenance, repair, and operational costs (e.g., utilities), as well as costs associated with the disposition of existing housing if it is being replaced.

Second, estimates of future costs are inflated to the program year being used for the economic analysis. There are several sources that can be used to estimate inflation. Some are a generalized weighted average (e.g., Gross National Product implicit price inflator); others are more specific (e.g., Consumer Price Index for gas and electricity). The specific indexes are apt to be more accurate, but they are also more cumbersome to use. For this analysis, OSD inflation factors for military construction (provided in Appendix B of the main text) are used. Once all costs have been inflated, they are summed to provide total program year costs for each year.

The third step in the life-cycle cost analysis involves discounting each year's costs to their present value. A discount rate of 10% is mandated. Additional rates can be used in a sensitivity analysis. One alternative is to use current interest rates for long-term investments (e.g., 10- or 20-year U. S. Treasury securities), which reflect current expectations of future interest rates. Market interest rates reflect effects of inflation, as well as the opportunity costs of money. To determine the real opportunity costs associated with an investment, the inflation factor must be removed from the market interest rates; this yields a "real" interest rate. The real interest rate, that is, the interest rate adjusted for inflation, is used to discount future costs to their present value.

Analysis of Sects. 801/802 projects requires the use of inflated then-year dollars, along with a nominal discount rate, defined as the interest rates on Treasury securities whose maturities match the term of the lease plus one-eighth of one percent to cover the charges of the Federal Financing Bank.

The formula for calculating the present value is

$$PV(C) = C_1/(1 + d) + C_2/(1 + d)^2 + \ldots + C_n/(1 + d)^n,$$

where PV(C) is the present value of costs C_1, C_2, C_3, . . . C_n (annual costs of the option); d is the discount rate; and n is the final year in the analysis.

When different discount rates are used, the discount factors $1/(1 + d)$, $1/(1 + d)^2$, . . . , which are multiplied times the annual costs C_1, C_2, . . . , take on different values, as demonstrated by the table in Appendix C of the main text. Using discount rates of 10 and 7%, for instance, the discount factors, or multipliers, for the first 5 years would differ as follows:

Year	Formula	10% Multiplier	7% Multiplier
1	$1/(1 + d)$	0.909	0.935
2	$1/(1 + d)^2$	0.826	0.873
3	$1/(1 + d)^3$	0.751	0.816
4	$1/(1 + d)^4$	0.683	0.763
5	$1/(1 + d)^5$	0.621	0.713

Five years from now, $1 in cost is valued at 71 cents when a 7% discount rate is used, but only 62 cents when a 10% rate is used. The higher the discount rate, the less the value given to costs incurred in the future.

Although the three steps described above are adequate for conducting a comparative analysis, note that they do not provide a realistic estimate of future costs. They also do not account for different rates of inflation among different types of costs. Greater accuracy would be achieved by inflating all costs to then-year dollars (using specific inflation indexes), deflating those costs to the program year (using a generalized index), and, finally, discounting to present value. Whether or not then-year costs are included in the analysis, to provide a more accurate estimate of future expenditures, they should be calculated as an additional item. The table in Appendix B of the main text can be used to inflate constant year costs into then-year costs.

Three additional calculations provide useful information in evaluating the cost-effectiveness of an option. One, the cost of deferment, is calculated by subtracting the discounted annual incremental costs of current operations (the status quo option) from the discounted annual incremental costs of the alternative option, excluding construction costs. For instance, if current O&M costs are $5000/year and anticipated O&M costs for new housing are $2000/year, the cost to USAF of deferring the project is $3000/year. Construction costs are excluded from the calculation because they are a capital investment that is amortized over the life of the facility and because deferring the project postpones, but does not save, those costs.

A second useful calculation, the ratio between savings and investment for Options B and/or C, is calculated by dividing the present value of the savings anticipated from the option (status quo's present value minus the present value of Option B or C) by the capital investment for the option. The equation would be

$$\frac{PV(\text{Option A}) - PV(\text{Option B or C})}{CI(\text{Option B or C})},$$

where PV is present value and CI is capital investment.

A third useful calculation, the break-even point between a selected option and the status quo, illustrates at what point the option begins to benefit USAF. Whether that point is relatively early or late in the project's life may influence the selection process. Because projected costs are educated guesses, the farther into the future the forecast is, the less confidence one can have in its accuracy. Therefore, projects that have a break-even point near the end of their useful life may be considered a higher risk than those that pay off earlier.

It is recommended that, as a minimum, break-even be calculated after all options have been evaluated and compared and a preferred option selected. The break-even point can then be calculated between the selected option and the status quo or, if the preferred option is the status quo, between it and the next preferred option.

The most efficient method for demonstrating the break-even point is a line graph. To minimize the number of calculations required, costs can be aggregated in 5- or 10-year increments. The aggregated incremental costs for each option in the comparison, discounted to their present value, are then plotted on a graph of costs vs time, and lines are drawn connecting the points for each option. The intercept at which the lines cross is an estimate of the break-even point. The manual and the sample problem in Appendix F of the main text illustrate the process.

5. ANALYZING COSTS WITH BENEFITS

5.1 EVALUATION CRITERIA

Several factors are taken into consideration in the evaluation and comparison of program options. For each factor, there is a set of criteria for measuring performance. The performance of program options against these criteria is measured on an ordinal scale ranging from +3 to -3, relative to current practice, which scores 0. This range of seven possible scores was selected to provide sufficient differentiation between options without burdening the evaluator with too many choices. A brief description of each factor is provided below.

5.1.1 Life-Cycle Costs

Life-cycle costs are the common denominator for comparing relative costs of project options. All costs are combined into a single measurement, present value. The present value of an option includes all construction, operation (including utilities), and maintenance costs over the life of the facility (40 years). "Present" is defined as the program year for which the analysis is being performed (e.g., if the economic analysis is being performed in support of an FY 1987 project, costs for all options should be calculated in 1987 dollars).

Relative cost is the only criterion in this factor. All options are compared with the status quo, continued piece-meal maintenance, and the evaluation scale is designed for that comparison. The evaluation scale on Form 1-3 is applied to the total present value of an option's life-cycle costs to convert it into a score that can be aggregated with the qualitative factors. This allows the evaluation to be an integrated cost-benefit analysis.

5.1.2 Project Effectiveness

Project effectiveness encompasses the following criteria: housing quantity, housing condition, housing adequacy, and energy conservation. These criteria should not be treated independently; rather, an integrated approach should be taken to ensure that the housing available is appropriate for a base's needs.

Housing quantity relates the number of housing units available or proposed by an option to a base's housing requirements. It does not address the adequacy or condition of the housing, which are covered by other criteria. This criterion does not affect the status quo option or the option of renewing existing housing. It can come into play with the options of new construction and leased housing. It is particularly important when a base is experiencing a mission change that increases or decreases housing demand.

Housing condition addresses the structural and environmental conditions of housing, including buildings and grounds. It does not include aspects of neighborhood condition. Specific structural deficiencies of existing housing are identified on a Deficiency Sheet. Health and safety hazards are given special consideration. These can include the existence of hazardous materials, such as asbestos insulation or lead paint; inadequate fire protection; or structural

conditions that are unsafe. Energy conservation considerations are addressed separately.

Housing adequacy addresses the capability of existing or proposed housing to provide the space and room allocations authorized by AFR 90-1 for the personnel assigned to a base. It is important to consider the appropriateness of a base's housing stock in planning for new or additional housing. Although a base may have a sufficient number of units, their size, bedroom mix, or other characteristics may not match the authorizations appropriate to the grade mix of base personnel. Before programming new housing, an evaluation of existing assignments should be made and adjusted as necessary.

Energy conservation addresses whether existing or proposed housing meets USAF energy efficiency standards. The goal, achievement of the USAF standard (BTU/ft^2), is based on Executive Order 12003, July 20, 1977, which requires a 20% reduction between 1975 and 1985 in annual average energy use per gross square foot of floor area. Specific DOD goals through 1985 were established by Defense Energy Program Policy Memorandum (DEPPM) 78-2, March 1, 1978. DEPPM 80-6, June 3, 1980, established goals through the year 2000. In addition to the 20% reduction mandated for 1985, a 25% reduction over 1975 consumption was set for 1990, 30% for 1995, and 35% for 2000. The energy conservation criterion for this analysis also addresses energy consumption. It is possible for a project to increase energy efficiency but not have a decrease in consumption, especially if the project results in a larger facility or includes more appliances.

5.1.3 Special Considerations

Special considerations are unique requirements or potential fatal flaws specific to a base and not universally applicable. They are only employed when applicable. The analysis of a base may include none, some, or all of the special considerations, including availability, affordability, and accessibility of off-base housing; operational responsiveness of mission-essential and command personnel; operational security of high-ranking and command personnel vulnerable to security threats; and potential socioeconomic impacts on the local civilian community.

Housing availability, affordability, and accessibility addresses the qualitative aspects of off-base housing, based on the availability of affordable housing accessible to a base. The factor includes four concerns -- housing quality, availability, affordability, and accessibility to a base -- that are combined to provide a single indicator of the quality of off-base housing opportunities. These are combined to better reflect actual decision-making processes in housing selection. Any individual or family faced with making a housing selection will examine the opportunities available and make trade-offs according to family needs, desires, and priorities. Because it is not possible to predict what trade-offs a family will make or the precise location of the off-base housing they will select, this analysis addresses off-base housing opportunities as a whole rather than attempts to measure the performance of specific units. Unless no other opportunities exist, it is unlikely that a family will select housing that performs poorly in all of the concerns incorporated in this criterion, even though some local housing performs poorly in each of the concerns. The criterion measures the availability of housing that is affordable, according to its location relative to a base (place of work and location of many services). Affordable housing is defined

as that for which BAQ and VHA entitlements will cover 85% of total housing costs, including utilities. Accessible housing is that which is located with a 1-h commute of a base gate. Housing that is within a 15-min commute of the nearest gate is considered comparable to on-base housing.

Operational responsiveness involves the capability of mission-essential and command personnel to reach their duty stations within a specified time in the event of an emergency. The criterion is employed only for those personnel who have a specific response requirement. This requirement will vary depending on the mission of a base and the roles and responsibilities of personnel.

Operational security addresses the capability of existing or proposed housing to provide required degrees of security for USAF personnel and assets. Security requirements vary according to the rank and responsibilities of the personnel. For instance, command personnel are generally considered to be more vulnerable to security threats. This criterion can address the structural capabilities of housing to provide the required degree of security, as well as the operational capability of the appropriate law enforcement authority to secure personnel and government assets associated with the housing. Costs associated with installing and operating special security requirements, such as communications systems, additional physical security measures, or additional surveillance requirements for command-level personnel, should be included in the life-cycle cost analysis.

Socioeconomic impact addresses the potential for USAF actions to have an effect on the local civilian community. This factor comes into play when an option involves a significant change in a base's approach to providing MFH. For instance, if a base were to reduce on-base housing and force personnel into a tight off-base housing market, the result could be a rapid and significant increase in housing costs, which could, in turn, pose an economic hardship on local residents. Conversely, if a base were to significantly increase on-base housing, thereby pulling personnel off the private market, the effect could be a flood of vacant housing on the local market and depressed housing values. In addition, changes in the location of USAF personnel can have a serious effect on public services, especially on local school systems. Other considerations unique to a particular base or community, such as social compatibility, can also be incorporated into the analysis. This factor is primarily a consideration in small-population and/or low-housing-vacancy-rate areas that involve multiple school districts, or that are problematic in other respects. The triggers for determining whether a socioeconomic impact analysis is required are (1) a high ratio of base housing demand to local housing availability (vacancies) or (2) an existing imbalance (overcrowding or underutilization) in the affected school district(s). If a socioeconomic impact analysis is required and performed, the findings are used as the data base to apply the criterion. Note that application of this criterion does not in itself constitute a socioeconomic impact analysis.

5.1.4 Historic Preservation

This factor considers impacts on properties that are, or eligible to be, listed on the National Register of Historic Places. If a base has such housing and it is affected by the options being analyzed (including replacement housing), the criterion for this factor must be employed. Evaluation of the impacts of each option on the historic properties considers the current condition and integrity of

those properties. The evaluation scale should be applied only after consulting Department of Interior guidelines concerning historic properties. Once an option has been selected for programming and if the historic housing is affected by it, the proposed project should be coordinated with a base Historic Preservation Officer, who is responsible for consulting with appropriate federal and state agencies.

Historic preservation is included in this analysis because a percentage of military housing on USAF installations was built before World War II. Several bases have structures that are listed on the National Register of Historic Places. If a base proposes to take any action that might adversely affect these structures, there are legal procedures that must be met. Impacts to historic resources can also become controversial public issues.

5.2 ASSUMPTIONS

The following are assumptions incorporated into the benefit analysis.

1. All new construction, including build/lease (Option D), will be in compliance with current USAF standards concerning space allocations, structural adequacy, health, safety, and energy conservation.

2. For determining accessibility, on-base housing is assumed to be within a 15-min commute of personnel duty stations.

3. Off-base housing for Option E is assumed to be accessible to most public and commercial services, including schools, grocery shopping (except commissary), police and fire protection, etc. These are generally prerequisites for residential development.

4. Renewal projects involving historic properties will be compatible with Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings. Projects will not include any historic reconstruction.

5.3 QUALITATIVE ANALYSIS

The qualitative portion of the cost-benefit analysis is conducted by completing a set of forms and descriptors. First, baseline data are collected; these become the evaluation of the status quo option (Option A). By definition, the value of those conditions is 0. Other options are compared with Option A by using the evaluation scales on Forms 2-3, 3-2, and 4-2. They summarize whether the option is better than, the same as, or worse than the existing conditions, using the criteria described in Sect. 5.1. The values of those performances range from +3 to -3. The numeric values are weighted and aggregated to yield a performance score for each option; the baseline data become back-up information and justification.

5.4 WEIGHTING CRITERIA

Evaluation criteria are defined by topic (e.g., energy conservation) rather than by importance. This means that some criteria may be more important than others. If scores on individual criteria are not weighted, the assumption is that all criteria are equally important, which is often not the case. Weights are used to correct this fallacy and permit priorities to be given consideration commensurate with their

importance. For instance, if housing condition is three times as important as energy conservation, the housing condition criterion may be weighted 3 and the energy conservation criterion weighted 1. The user should remember, however, that those weights are in themselves assumptions about the relative importance of criteria. The selection of weights must be thoroughly justified and the justification fully documented in the record of the economic analysis.

The Project Effectiveness criteria are listed in priority order. This means that an option that solves a housing quantity problem can be considered more effective than one that solves a housing adequacy problem. To reflect the priority, a weighting scheme is provided for completing Form 2-4 (see Sect. 4.3 of the basic manual). An alternate scheme can be used if its rationale is fully documented. The Special Considerations criteria are too base-specific to provide a meaningful weighting scheme.

For the Option Summary (Form S-1) two weighting schemes assume costs and benefits are equally important; that is, Life-Cycle Costs is weighted 50%, and Project Effectiveness, Special Considerations, and Historic Preservation (if applicable) combined are weighted 50%. The third weighting scheme for Form S-1 assumes that Life-Cycle Costs, Project Effectiveness, and Historic Preservation are each equally important, with Special Considerations considered less important.

Because the scores are ordinal and not cardinal (e.g., +2 is not necessarily twice as good as +1), they cannot be multiplied by the weights. Rather, each score is counted as many times as the criterion is weighted. In the example in the first paragraph of this section, the scores for housing condition would be counted three times and those for energy conservation once. While the distinction between multiplying the scores by the weights and adding more scores to reflect the weights may not be obvious, it makes a difference when the median of the scores is calculated.

5.5 CALCULATING THE MEDIAN

Overall performance of each option is calculated by taking the option's median score across all criteria. The median is the appropriate measure when dealing with ordinal scales (e.g., worse than, as good as, or better than) when the intervals between values are not necessarily equal. For instance, two "better than"s are not necessarily equal to one "best"; +1 on two criteria is not necessarily equal to a +2 for one criterion. The median measures central tendency when scores can be placed in order but the intervals vary. The median aggregates multiple values, or scores, into a single score. The median is the point at which one-half of the scores are above and one-half are below. If there are an odd number of scores, the median is the middle score. If there are an even number of scores, the median is halfway between the middle two scores. The simplest way to establish the median is to lay out scores in numeric order and count through half of them. Do not average the scores.

Life-Cycle Costs, Project Effectiveness, Special Considerations, and Historic Preservation each have one score entered on Form S-1: Option Summary. Because Project Effectiveness and Special Considerations include several criteria, an aggregated score must be derived by taking the median of the weighted criteria scores, using Form 2-4: Project Effectiveness Summary and Form 3-3: Special

Considerations Summary. In the Option Summary each of the factors is weighted and an overall median selected for the option. This median is the option's performance score, considering life-cycle costs in combination with qualitative factors.

6. SENSITIVITY ANALYSES

Sensitivity analyses are performed to test the effects of changes in conditions, assumptions, and priorities on the evaluation. Values that can be varied include:

1. proxy and default values used in the life-cycle cost analysis and qualitative benefits analysis;

2. baseline conditions, such as mission stability and base population; and

3. weights assigned to each criterion and factor.

The most common sensitivity analysis performed in the life-cycle cost analysis involves changing the discount rate used to calculate present value. The sensitivity of an option to changes in discount rates can be measured by comparing its percent change in present value relative to the percent change in discount rate. For instance, an option's sensitivity to changing from a 10% discount rate to a 7% discount rate would be determined by performing the following four calculations:

1. Calculate the percent difference between the two discount rates as follows:

$$\frac{0.10 - 0.07}{0.10} = 0.30 \text{ (or 30\%)}.$$

2. Subtract the present value of the option by using the 10% discount rate from its present value using the 7% rate.

3. Divide the difference by the option's present value at the 10% discount rate.

4. Divide that number by the percent change in discount rate (0.30). The larger the result, the more sensitive that option is to changes in discount rates.

In summary, the calculations are performed using the following equation:

$$\frac{\dfrac{PV\ (7\%) - PV\ (10\%)}{PV\ (10\%)}}{0.30},$$

where PV (10%) = present value using 10% discount rate, and PV (7%) = present value using 7% discount rate.

The life-cycle cost analysis also allows the user to assess the sensitivity of the evaluation to project deferment or delay (see Sect. 4.2 of this appendix).

Sensitivity analyses are strongly recommended, especially for values that have a high degree of uncertainty. If the results of the option comparison are sensitive to changes in assumptions -- that is, if the scores change significantly when the assumptions are changed -- the assumptions should be carefully scrutinized. If, on the other hand, the results do not change significantly, the confidence level in the

assumptions can be less. The user may elect to vary any assumptions, but, as a minimum, the following sensitivity analyses are recommended:

1. use of at least two discount rates in the life-cycle costing analysis (e.g., 10 and 7%), and

2. use of several weighting schemes in the cost-benefit analysis.

Sensitivity analyses can be performed at interim phases of the economic analysis, not just for the final comparison. For instance, the evaluation of options for the disposition of existing housing might consider alternative mission scenarios. Option E, Direct Compensation, involves numerous uncertainties regarding future costs of off-base housing, local economic conditions, and housing availability. Sensitivity analyses can be performed on variations of those values by using various data sources for vacancy rates, average housing costs, local population projections, etc. Before embarking on extensive additional research, the user should experiment with different weights for those factors; additional sensitivity analyses should only be performed if the factor significantly influences the results of the economic analysis.

7. PROJECT SELECTION

The outcome of the economic analysis is not itself the selection of an option for programming. It is a tool to be used by responsible decision makers in selecting the optimum programs for their bases. The key decision tools of the economic analysis are the Life-Cycle Costs Summary (Form 1-4) and the Option Summary (Form S-1). The Life-Cycle Costs Summary compares the life-cycle costs of all options. The Option Summary lays out all options and indicates how they perform against each of the evaluation factors. The weights reflect the decision maker's priorities. The median of the factor scores is calculated for each option to yield an overall score for the option. These medians can be used to rank the options.

A separate form, Form S-2: Project Recommendation, is used to indicate which option (or combination) is selected and why. A separate form is used to distinguish between the decision tool (the economic analysis) and the decision itself. It allows sensitivity analyses and external factors, such as Congressional priorities and availability of funds, to be considered in the selection of a feasible, effective plan of action. A Certificate of Satisfactory Economic Analysis in accordance with AFR 178-1 must also be completed. The economic analysis is not complete until this certificate is signed by the local and Major Command ACC organizations.

Once a base has selected a suitable MFH program and applies for funding to implement its program, portions of the economic analysis must be forwarded to higher headquarters to support the project justification. This information is also used by higher headquarters to prioritize projects throughout the Major Command/USAF. The factors that determine what priority a base's MFH project is given as it progresses through successive approval levels change from organization to organization, location to location, and year to year. Some are controllable; many are not. For instance, the current priorities of Congress can have a major impact on whether a project is funded, independent of the actual need for, or merits of, the proposed project itself. Differences among the priorities of a base, Major Command, and HQ USAF can also have an impact.

The value of having an objective, consistent, defensible economic analysis is that it can improve the chances of obtaining project approval because it

1. clearly ties the proposed actions to base needs through the systematic identification of existing deficiencies;

2. demonstrates that a thorough, objective analysis of options was performed before funds were requested and that the analysis was based on economic considerations;

3. provides the background and justification that can be used by HQ USAF to defend projects and answer questions from Congress concerning their validity;

4. ensures consistency in the approach, format, and quality of documentation for MFH funding requests; and

5. demonstrates that decisions made on MFH are founded on concrete evidence and clear objectives.

APPENDIX F

SAMPLE ECONOMIC ANALYSIS FOR MILITARY FAMILY HOUSING

This appendix contains a sample problem to provide further guidance in performing an economic analysis for military family housing. It consists of an example of the documentation that might be prepared by the base, following the format provided in Chap. 5 of the manual. A Certificate of Satisfactory Economic Analysis would be completed by the applicable ACC organizations and added to the documentation sent forward. In addition to the forms required to be submitted in Chap. 5, this example includes all backup forms used in the analysis to demonstrate how they are completed.

The installation used in the example, Home AFB, is fictitious. It is not a typical base because it has housing that is historic. It demonstrates how historic preservation concerns might be addressed. For most installations, historic preservation would not be a consideration.

ECONOMIC ANALYSIS FOR MILITARY FAMILY HOUSING
Home AFB

CONTENTS

1. INTRODUCTION

1.1 PROBLEM

Home AFB has 19 units of General and Flag Officer (G/FO) and 13 units of Noncommissioned Officer (NCO) housing that date to the turn of the century. The units are large, brick structures that are listed on the National Register of Historic Places. They have not had any renewal work since the mid-1950s and are in need of modernization to bring kitchens and bathrooms to current standards, increase energy efficiency, and reduce maintenance costs.

1.2 BACKGROUND

The G/FO and NCO housing units at Home AFB are of the following basic types:

1. 18 G/FO units (9 duplex structures) that have 4 bedrooms and 1.5 baths with a total living area of 3199 ft^2/unit plus basements;

2. 1 single-family G/FO unit that is the designated residence for the Commander-in-Chief, with 4 bedrooms, 2.5 baths, and a total living space of 3839 ft^2;

3. 12 NCO units (6 duplexes) with 2 bedrooms, 1 bath, and 835 ft^2/unit of living area, including an enclosed porch, and a basement;

4. 1 single-family NCO residence with 2 bedrooms, 1 bath, and 989 ft^2 of living space.

Existing structures and equipment are unsafe and in need of constant repair. As indicated on the attached Form 2-2, deficiencies exist in critical areas. These include floors; foundations; walls; windows; plumbing; heating, ventilation, and air conditioning (HVAC); electricity; and kitchen fixtures. Also, there are no available laundry facilities. Available NCO living space is inadequate, and both G/FO and NCO units need master bathrooms so that the family members do not have to share the single full bath.

Home AFB has considered a whole-house renewal of the units to bring them up to standard and reduce annual operations and maintenance (O&M) costs. Because of concern about the long-term cost-effectiveness of a renewal project, the option of constructing new replacement housing was also examined. Because new MFH construction was being considered, leased housing was also required to be considered. For that option, the base decided to examine the feasibility of leasing existing housing off base, rather than build/lease.

For those options that involve replacement housing (C, D, and E), the disposition of the existing housing has been examined. Because the new construction being considered is planned for the same site, Option C involves demolishing the existing housing. Under Options D and E, however, the existing housing can be retained and "mothballed" in protective storage. Protective storage was selected over demolition for Options D and E because of the sensitivities involved with National Register properties.

1.3 OBJECTIVES

The objectives of this analysis were to determine the optimum approach for providing G/FO and NCO housing that would

1. minimize the life-cycle costs associated with the construction, disposition, and O&M of housing units;

2. increase the morale of personnel and offer a better overall quality of life by eliminating deficiencies in existing housing;

3. maintain or improve the response capability of key personnel;

4. maintain or improve the operational security of high-risk personnel; and

5. maintain a commitment to the preservation of historic resources.

2. OPTIONS

The options evaluated include the following:

Option A: Status Quo, which involves continuation of current maintenance with no major renewal.

Option B: Renewal of the existing housing to reduce ongoing maintenance and repair costs by upgrading the mechanical, electrical, and heating and cooling systems; interior/exterior finishes; kitchens; and bathrooms. All this would extend the economic life of the facilities 40 years.

Option C: New Construction is evaluated as replacement for the existing housing, which would be demolished.

Option D: Government Leasing would obtain suitable private-sector housing off base through a long-term lease. In this case, because of its historic value, housing would be put in protective storage.

Option E: Direct Compensation, which allows base personnel to select their own housing off base and compensates them with Basic Allowance for Quarters (BAQ) and Variable Housing Allowance (VHA) payments. This would be limited to 85% of the rental and utilities costs. With this option also, existing housing would be placed in protective storage.

3. LIFE-CYCLE COSTS EVALUATION

3.1 ASSUMPTIONS

The following assumptions were used in the life-cycle costs evaluation:

1. Home AFB will retain the requirement to provide 19 G/FO and 13 NCO officers with quarters for the next 40 years.

2. The economic life of the G/FO and NCO quarters will be 40 years with normal cyclical repairs. This is also the period selected for the economic analysis.

3. Baseline costs for all alternatives were calculated in FY 1984 dollars.

4. The program year used for the analysis is FY 1987.

5. Option D consists of Government leasing of existing units off base. Leasing costs are based on current market rates.

6. To account for aging of the facilities and increased effort required to maintain them, for Options A, B, and C, maintenance and repair (M&R) costs would increase 10% every fifth year for the first 25 years. These projected increases are based on an analysis of historical data by Headquarters USAF/Housing and Services Division (HQ USAF/LEEH). After 25 years, M&R costs would remain constant for the economic life of the facilities.

7. Per-unit M&R, energy, management, services, and furnishings costs were calculated using a weighted average in which G/FO housing costs were multiplied by 19/32 and NCO housing costs by 13/32.

8. For Option C, existing housing would be demolished to allow the new housing to be constructed on the same site. For the other replacement options, however, it is the local commander's decision to place the existing housing, because of its historic nature, in protective storage for potential future use.

Baseline costs for the economic analysis were obtained primarily from Base Civil Engineering (BCE) records. A completed Form 1-1: Life-Cycle Costs Data Sheet is attached. All costs are in FY 1984 dollars and rounded to the nearest dollar. The following is a summary of how baseline costs were derived for Form 1-2: Life-Cycle-Costs Spreadsheet.

3.1.1 Option A: Status Quo

Cost categories relevant to continued maintenance of the existing units include M&R; gas and electricity; and management, services, and furnishings. Other utilities are not included because of the difficulty in accurately allocating a portion of the base's water, sewer, and garbage collection costs to the housing in question. Typical maintenance, repair and utility costs were averaged from records of actual costs over 1981, 1982, and 1983.

Some per-unit M&R, energy and management services, and furnishings costs were calculated using a weighted average. For instance, average total G/FO dwelling maintenance costs were found to be $13,000/unit. Average total NCO dwelling maintenance costs were found to be $3,810/unit. The weighted average was calculated as follows:

G/FO	19/32 x $13,000	=	$7,718
NCO	13/32 x 3,810	=	1,548
	Average/unit		$9,266

Annual energy costs were calculated in a similar manner. Electrical costs were comparable for G/FO and NCO housing, but gas costs differed. Average gas costs were calculated as follows:

G/FO	19/32 x $1,718	=	$1,020
NCO	13/32 x 1,613	=	655
	Average/unit		$1,675

For management, services, and furnishings, the weighted average was calculated as follows:

G/FO	19/32 x $1,129	=	$670
NCO	13/32 x 518	=	210
	Average/unit		$880

To derive the total current year costs for Form 1-2, each weighted average was multiplied by 32 units. Thus, M&R costs are $12,888 x 32 = $412,416, gas and electricity costs are $2,233 x 32 = $71,456, and so on. Annual M&R costs would increase to $453,658 ($412,416 x 1.10) in 1992, $499,024 in 1997, $548,926 in 2002, $603,819 in 2007, and $664,201 in 2012, remaining constant thereafter.

3.1.2 Option B: Renewal

The renewal program would be phased over 15 months and involve a total capital investment of $2,272,960. Six units would be renewed in FY 1987, 19 in FY 1988, and seven in FY 1989. The program is expected to reduce annual dwelling maintenance costs by 60%. Therefore, postproject dwelling maintenance costs will be: $9,266 x 0.40 = $3,706. Other maintenance costs are assumed to stay the same at $3,622. Energy costs are anticipated to be reduced by 13%, calculated as $2,233 x 0.87 = $1,943/unit.

To calculate total current year costs for Form 1-2, the phasing of construction is as follows:

1987:	6 units x $71,030	=	$ 426,180
1988:	19 units x $71,030	=	$1,349,570
1989:	7 units x $71,030	=	$ 497,210

M&R and energy costs are also phased. In 1987, 6 units would be under construction, and 26 units would be occupied. The 26 units would have the old baseline M&R and energy costs. As an example, M&R costs for 1987 would be 26 units x $12,888 = $335,088. In 1988 the first 6 units would be completed and

occupied, with postproject M&R and energy costs; 19 units would be under construction. The remaining seven units would still be occupied and operated and maintained at baseline costs. Total M&R costs for 1988 would be

6 units	x	$3,706	=	$22,236
+ 7 units	x	$9,266	=	64,862
+13 units	x	$3,622	=	47,086
				$134,184

For 1989, 25 units would be completed and operated and maintained at the postproject rate; the remaining 7 units would be under construction. For calculating future M&R costs, which are assumed to increase 10% every 5 years, all units are assumed to have come on-line at the same time (1989). Thus, the first increase is in 1994. This assumption reflects the reality of how O&M are likely to be allocated for these units.

Rents are for those families who would be in temporary housing while their units were under construction. Based on a weighted average for rents and utilities shown in the explanation for Option C, total local rental and utility costs are estimated to be $8,854. The total reimbursement would be 85% of the total cost, or $7,526. For 1987, rents total $7,526 x 6 units under construction; for 1988, $7,526 x 19 units, and so on.

Other costs include the same management, services, and furnishings costs as Option A (also phased so that there are no costs for units under construction) and moving costs at $1,000/move. Moving costs in 1988 and 1989 include some personnel moving out and others moving in. For instance, in 1988, 19 families move out and 6 move back in to the renovated units.

3.1.3 Option C: New Construction

Construction phasing for Option C is assumed to follow the same schedule as Option B and involve a total capital investment of $3,285,440. Demolition of all of the existing units is assumed to occur in 1987. For 1987, total construction costs would be as follows:

32 units	x	$ 2,450	=	$ 78,400 (demolition)
+ 6 units	x	$100,220	=	601,320 (construction)
				$679,720

Construction costs for 1988 and 1989 were calculated in a manner similar to Option B.

M&R and energy savings are also phased as in Option B. Postproject dwelling M&R costs are assumed to be $2,740/unit, based on experience with similar, recently built units. Total per unit M&R costs would be $2,740 + $3,622 = $6,362. Energy costs are anticipated to be $1,560/unit. Because the existing units would be demolished in 1987, there would be no M&R costs in 1987. In 1988, M&R costs cover the first six units completed:

6 units x $6,362 = $38,172

M&R costs for 1989 would cover 25 units: the 6 units constructed in 1987 plus 19 units constructed in 1988. Gas and electricity costs follow the same phasing.

Option C would have the same management, services, and furnishings costs as Options A and B. These costs would be eliminated in 1987 and phased back in as new units were completed between 1988 and 1990. Other costs would include costs associated with displacing occupants of the existing housing during demolition and construction of the new housing. This would consist of moving expenses for two moves (one from existing housing to temporary quarters off base and one from the temporary quarters to the new housing) at $1,000/move (total $2,000/unit). All 32 families would be paid for one move in 1987 when the existing units would be demolished. The second move would be phased as new units were completed, so there would be 6 moves in 1988, 19 in 1989, and 7 in 1990. While they were in temporary quarters, occupants would receive BAQ/VHA, which is esimated as 85% of rent and utilities. Again, rental costs would be highest in 1987 and reduced as families moved back into the new housing. Average per-unit rental costs were based on a weighted average:

G/FO	19/32 x $9,000/year	=	$5,344
NCO	13/32 x $4,800/year	=	1,950
	Average/unit/year		$7,294
	Utilities		1,590
			$8,854
BAQ/VHA	= $8,854 x 0.85	=	$7,526

3.1.4 Option D: Government Leasing

The M&R costs associated with this option would be for protective storage of the existing historic units. Initial costs would include draining water lines, disconnecting plumbing, and blacking out windows. During the first 5 years, windows and masonry would be repaired to stabilize the condition of the units and prevent further deterioration. From the sixth year on, M&R costs are assumed to level out at a constant rate of $2,110/unit. To calculate the current costs for Form 1-2, the per-unit costs in these categories were multiplied by 32 units.

Because this option would involve lease of off-base housing, costs were based on local rental and utilities rates. Lease rates were based on local off-base rentals for comparable housing. A weighted average was used:

G/FO	19/32 x $9,000/year	=	$5,344
NCO	13/32 x $4,800/year	=	1,950
	Average/unit/year		$7,294

Annual energy costs are assumed to be comparable to the new construction alternative (Option C).

In addition to the management, services, and furnishings costs used with the previous three options, Option D includes moving expenses and costs for installing and operating security and communications equipment. The security equipment would be installed in command-level units only and is intended to compensate for the lower security levels found off base. The communications equipment would be required to maintain mission-essential communications with command-level

personnel (6 units) and routine direct communications with all G/FO personnel (19 units). All installation costs are assumed to occur in the first year.

Moving expenses are also assumed to occur in the first year. Total other costs for 1987 would be

security:			
installation	6 units x $16,754	=	$100,524
operation	6 units x $109,003	=	654,018
communications:			
installation	6($1,000) + 19 ($150)	=	8,850
operation	6($3,849) + 19 ($1,087)	=	43,747
moving expenses:	32 x $1,000	=	32,000
mgt, services, and furnish:	32 x $880	=	28,160
			$867,299

3.1.5 Option E: Direct Compensation

Most costs for Option E are identical to Option D because they both involve off-base housing. Rental and utility costs are 85% of Option D because BAQ and VHA only compensate personnel for a maximum of 85% of local market rates. Thus, per-unit reimbursement for rent and utilities would be

rent:	$7,294	x 0.85	=	$6,200
utilities:	$1,560	x 0.85	=	$1,326

Each was multiplied by 32 for Form 1-2.

Security and communications costs would be higher than with Option D because new equipment would have to be installed every time command-level personnel rotated from the base or changed their off-base address. Under Option E, personnel would make their own housing selection. Thus, a new commander would not necessarily live in the same house as his/her predecessor. That means that the security and communications equipment would have to be removed from the predecessor's house and reinstalled in the new commander's house. Because the average tour of duty is two years, it is assumed that every year, 50% of the units would have security and communications equipment reinstalled (in the first year, all units would have the equipment installed). Annual costs after the first year were calculated as

security:	3 units	x $16,754	=	$50,262
communications	3 units	x $1,000	=	$3,000
	9 units	x $150	=	1,350
				$4,350

These costs were added to the operations costs:

security:	$50,262	+ $654,018	=	$704,280
communications:	$ 4,350	+ $ 43,747	=	48,097
				$752,377

3.2 ANALYSIS

A discount rate of 10% was used to calculate the present value of life-cycle costs for each option. The Forms 1-3 attached present the results. The following is a summary of the findings:

Option A - With a total present value of $6,371,440, this option performs much better than Options D and E, slightly better than Option C, and nearly as well as Option B. Costs for the first 5 years, though substantial, were the lowest of all options considered, because no initial capital outlays would be required. However, these substantial annual costs would continue throughout the life of the option, ultimately exceeding cumulative present value for Option B in 1998.

Option B - This option's total present value of $6,205,628 was the lowest value observed.

Option C - The total present value of this option would be $6,441,387. Large sums of capital would be required to fund demolition and construction in 1987-1989. After construction, annual costs would drop significantly, because these new facilities would require less annual M&R.

Option D - The large total cumulative present value of $12,443,614 results from costs associated with maintaining operational security and responsiveness by installing security and communications equipment. This project would be the most costly of the five options.

Option E - The total present value of this option would be $12,207,216. This cost would be slightly less than with Option D because compensation for rent and utilities would only be 85% of costs.

3.3 SENSITIVITY ANALYSIS

A sensitivity analysis, using a 7% discount rate, was performed to determine the relative importance of interest rates in the analysis. A 7% rate was selected because it may be a more realistic indicator of the current value of money. Local lending institutions were queried to derive an appropriate rate. The following are the total present values for the options using the 7% discount rate:

Option A - $8,990,082

Option B - $7,921,478

Option C - $7,981,826

Option D - $16,795,861

Option E - $16,496,410

The change in the discount rates resulted in a change in ranking among the options. At a 7% rate, Option B still emerged as the least costly, but Option C outperformed Option A, the status quo.

To measure the sensitivity of each option to the change in discount rate, the percent difference between the present value of each option, using a 10% discount rate, and the present value, using a 7% discount rate, was divided by the percent change between the two discount rates. The larger the resulting number, the higher the sensitivity. The percent difference between a 10% discount rate and a 7% discount rate is

$$\frac{0.10 - 0.07}{0.01} = 0.30.$$

The sensitivity of each option was calculated as

Option A: $\frac{\$8,990,082 - 6,371,440}{\$6,371,440} = 0.41/0.30 = 1.37$

Option B: $\frac{\$7,921,478 - 6,205,628}{\$6,205,628} = 0.28/0.30 = 0.93$

Option C: $\frac{\$7,981,826 - 6,441,387}{\$6,441,387} = 0.24/0.30 = 0.80$

Option D: $\frac{\$16,795,861 - 12,443,614}{\$12,443,614} = 0.35/0.30 = 1.17$

Option E: $\frac{\$16,496,410 - 12,207,216}{\$12,207,216} = 0.35/0.03 = 1.17$

The option least sensitive to changes in the discount rate was Option C, as demonstrated by the fact that it had the lowest number (0.80). The reason for this is that long-term annual costs (those affected most by a discount factor) for Option C are less than those for the other options. The option most sensitive was Option A, because it has the highest long-term costs. As a result, Option A's present value exceeded that of Option C with the 7% discount rate; it had, however, been less with the 10% rate. Attached is Form 1-4, which summarizes relative costs for all options at both discount rates.

4. COST-BENEFIT EVALUATION

4.1 CRITERIA

The following criteria were used in the cost-benefit evaluation:

1. Life-cycle costs

2. Project effectiveness

   a. Housing condition
   b. Housing adequacy
   c. Energy conservation

3. Special considerations

   a. Operational responsiveness
   b. Operational security

4. Historic preservation considerations

Housing quantity was not evaluated because none of the options would involve a change in the number of units available. Housing availability and socioeconomic impact were not included because information collected for Form 3-1: Off-Base Housing indicated that there is ample affordable housing available near the base; therefore, these factors were not at issue.

4.2 ASSUMPTIONS

The assumptions used in the life-cycle cost analysis also affect the benefit analysis. The following additional assumptions were applied:

1. New on-base housing (Option C) would be constructed on the same site as the existing housing, thus requiring that housing be demolished.

2. New construction and the off-base housing options would meet all USAF standards and authorizations.

3. Renewal of the existing housing would be in accordance with historic rehabilitation guidelines.

4.3 ANALYSIS

The following is a summary of each option's performance with respect to project effectiveness.

Option A - The baseline option offers no relative benefits because no change in the quality of housing would result from continued maintenance.

Option B - This option would be superior to Option A for a number of reasons, including (1) repaired foundations, walls, ceilings, windows, plumbing, and

electrical wiring and (2) new insulation and repaired HVAC equipment that would decrease energy consumption by 13%. However, there are no provisions for installing smoke detectors, new carpets, downspouts, or gutters; nor are there plans to expand NCO living space or add master bathrooms. Thus, this option does not score as well as Options C, D, and E with respect to project effectiveness.

Option C - Building new on-base housing facilities would correct all current housing deficiencies and offer improved livability and quality. Intangible benefits, such as improved family morale and better overall quality of living, might result by having more modern amenities available. Additionally, energy consumption would decrease by 13%.

Option D - Government leasing of off-base housing would offer many of the same benefits as Option C. In accordance with AFR 90-1, total living space would not exceed 2310 ft^2. This is much less than the 3100 ft^2 provided G/FO personnel in Options A and B. Energy consumption would decrease by 13%.

Option E - This option would offer basically the same housing quality as Option D. However, because personnel would make their own housing choices, they would be able to optimize their own standards of quality housing in terms of size, type, and design. Energy consumption would decrease by 13%.

The scores for each option are summarized on the attached Form 2-4. The criteria were weighted as follows: housing condition, 3; housing adequacy, 2; and energy conservation, 1. The rationale for this weighting is based on USAF priorities concerning housing. Housing condition has high priority because of potential health and safety problems. The second priority is to provide adequate living space in accordance with Congressional authorizations.

The following is a summary of each option's performance relative to special considerations:

Option A - This option would offer several benefits over off-base options because residing on base ensures high levels of operational security and responsiveness.

Option B - This option would temporarily displace personnel during renewal; however, over the long term, the same levels of operational security and responsiveness attributed to Option A would also apply.

Option C - Option C would offer the same security and operational benefits as Options A and B.

Option D - Although long-term leasing of housing units close to the base is possible, operational responsiveness would suffer. Additionally, the inherent security offered on-base residents would be lost. Administration problems might arise because of jurisdictional constraints and the need to expend public funds to provide security and communications equipment.

Option E - This option would have the same problems as Option D, except the location of the housing and its distance from the base could not be controlled.

The attached Form 3-3 contains the options' scores. Operational responsiveness and operational security were weighted equally in the evaluation.

The following is a summary of each option with regard to historic preservation.

Option A - This option would result in further deterioration of the historic housing units.

Option B - Renewal would improve the condition and structural integrity of the historic units, which would be preferable to continued deterioration under the status quo.

Option C - Option C would require demolition of the historic properties to provide space for construction of the new housing. This action could be controversial and might result in project delays. In addition, it is counter to the objective of maintaining a commitment to preservation of historic resources.

4.4 SENSITIVITY ANALYSIS

Two different weighting schemes were used for Form S-1 to provide varying perspectives from which to make a decision. For this analysis, the following weights were used:

	Scheme 1	Scheme 2
Life-cycle costs	5	2
Project effectiveness	2	2
Special considerations	1	1
Historic preservation	2	2

The difference between the two alternative weighting schemes is the relative importance placed on the life-cycle-costs criterion. The first scheme gives prominence to life-cycle costs, while the second scheme gives more importance to qualitative benefits.

With scheme 1, Options B and C scored equally, regardless of the discount rate. Scheme 2, on the other hand, indicated Option B as the superior option at the 10% discount rate but not at the 7% rate because the present value of both Options B and C were very close to the status quo at the 10% rate. As a result, life-cycle costs influenced their scores less than the qualitative considerations, particularly the substantial difference between the two options with regard to historic preservation considerations.

5. CONCLUSIONS AND RECOMMENDATION

The life-cycle cost evaluation using a 10% discount rate proved Option B the least costly. A second evaluation using a 7% discount rate also indicated Option B the least costly. The results of the life-cycle cost evaluation are summarized in the following table:

Option	Description	Total Cost (FY 1987 dollars) 10% Discount	7% Discount
A	Status quo	$6,371,440	$8,990,082
B	Renewal	6,205,628	7,921,478
C	New construction	6,441,387	7,981,826
D	Government leasing	12,443,614	16,795,861
E	Direct compensation	12,207,216	16,496,410

Break-even graphs were developed with Options A, B, and C for both the 10 and the 7% discount rates; undiscounted program costs were also used. They are attached.

If Option B were implemented, a slight savings of 3% over current maintenance would be achieved, assuming a 10% discount rate. This translates to $165,812 in discounted savings. The break-even point would come in approximately 2014. With a 7% discount rate, the savings would be greater -- 12% or $1,068,604 -- and begin in about 2004. Option B would be 4% less costly than Option C at a 10% discount rate but only 1% less costly at a 7% discount rate.

The cost-benefit analysis showed Options A, B, and C to be very close in terms of overall performance. The table below summarizes the results of the evaluation.

Option	Weighting scheme 1 10%	Weighting scheme 1 7%	Weighting scheme 2 10%	Weighting scheme 2 7%
A	0	0	0	0
B	0	+1	+1	+1
C	0	+1	0	+1
D	-2.25	-1	-2.25	-1
E	-2.25	-1	-2.25	-1

Option B outperformed all others only under the second weighting scheme at a 10% discount rate.

Form S-2: Project Recommendation is attached. Option B, renewal, is recommended for programming because it

1. has the lowest life-cycle costs,
2. would extend the useful life of the existing housing, and
3. provides for preservation of historic resources.

Although Option B emerged as the best overall option by a small margin, it would still leave some deficiencies. Specifically, the NCO units would still provide less space than authorized for their occupants.

Military Family Housing Economic Analysis

FORM 2-2: DEFICIENCY SHEET (G/FO)

Mark appropriate items

2.1 Housing Quantity

a ____ Existing shortage
b ____ New mission/mission change

2.2 Housing Condition

c __X__ inadequate smoke detectors
d ____ inadequate fire protection to site
e ____ inadequate emergency access
f ____ structural fire hazard
g ____ inadequate sound attenuation
h ____ hazardous building materials
i ____ inadequate ceiling height
j ____ unsafe streets/play areas
k ____ unsound structural elements
l ____ unsafe protuberances
m __X__ foundation
n ____ roof
o __X__ walls
p __X__ windows
q __X__ floors/floor coverings
r ____ doors
s __X__ kitchen cabinets/counters
t __X__ kitchen appliances
u __X__ bathroom fixtures
v ____ plumbing
w __X__ electricity
x __X__ HVAC
y ____ utilities to site
z ____ streets/driveways
aa __X__ garage/carport
bb __X__ gutters/downspouts
cc ____ pest control

2.3 Housing Adequacy

dd	____	incompatible siting
ee	____	insufficient building separation
ff	____	net area
gg	____	inadequate number of bedrooms
hh	____	living room/family room inadequate
ii	____	inadequate dining area
jj	____	inadequate kitchen space
kk	X	inadequate kitchen appliances
ll	____	no space for freezer
mm	X	no laundry
nn	X	inadequate number of baths
oo	____	no private entry
pp	____	inadequate closets
qq	____	inadequate storage
rr	____	poor functional relationships/circulation
ss	____	no telephone
tt	____	inadequate outdoor space/amenities
uu	____	inadequate privacy
vv	____	inadequate occupant parking
ww	____	no sidewalks

2.4 Energy Conservation

xx	X	inadquate insulation
yy	X	inadequate glazing
zz	X	excessive energy consumption

Military Family Housing Economic Analysis

FORM 2-2: DEFICIENCY SHEET (NCC)

Mark appropriate items

2.1 Housing Quantity

a	____	Existing shortage
b	____	New mission/mission change

2.2 Housing Condition

c	X	inadequate smoke detectors
d	____	inadequate fire protection to site
e	____	inadequate emergency access
f	X	structural fire hazard
g	____	inadequate sound attenuation
h	____	hazardous building materials
i	____	inadequate ceiling height
j	____	unsafe streets/play areas
k	____	unsound structural elements
l	____	unsafe protuberances
m	X	foundation
n	____	roof
o	X	walls
p	X	windows
q	X	floors/floor coverings
r	____	doors
s	X	kitchen cabinets/counters
t	X	kitchen appliances
u	X	bathroom fixtures
v	X	plumbing
w	X	electricity
x	X	HVAC
y	____	utilities to site
z	____	streets/driveways
aa	X	garage/carport
bb	X	gutters/downspouts
cc	____	pest control

2.3 Housing Adequacy

dd	____	incompatible siting
ee	____	insufficient building separation
ff	X	net area
gg	____	inadequate number of bedrooms
hh	____	living room/family room inadequate
ii	____	inadequate dining area
jj	____	inadequate kitchen space
kk	X	inadequate kitchen appliances
ll	____	no space for freezer
mm	X	no laundry
nn	X	inadequate number of baths
oo	____	no private entry
pp	____	inadequate closets
qq	____	inadequate storage
rr	____	poor functional relationships/circulation
ss	____	no telephone
tt	____	inadequate outdoor space/amenities
uu	____	inadequate privacy
vv	____	inadequate occupant parking
ww	____	no sidewalks

2.4 Energy Conservation

xx	X	inadquate insulation
yy	X	inadequate glazing
zz	X	excessive energy consumption

Military Family Housing Economic Analysis

FORM 1-1: LIFE-CYCLE COSTS DATA SHEET

All costs are per housing unit. Cost category numbers (1-6) correspond with numbers on Form 1-2. Multiply unit costs by number of housing units to complete Form 1-2.

Option A: Status Quo

1. Construction costs - not applicable
2. Maintenance and Repair
   - Recurring maintenance costs
     - painting $ 2,191
     - ground maintenance 1,018
     - cleaning 413
     - other (specify)
       - dwelling maint. 9,266
       - _____
     - Total 12,888
   - Anticipated repair
     - roof year:_____ _____
     - plumbing year:_____ _____
     - HVAC equipment year:_____ _____
     - other (specify)
       - _____ year:_____ _____
3. Current annual energy costs
   - electricity 558
   - gas 1,675
   - other:_____ _____
   - Total 2,233
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
5. Rent - not applicable
6. Other costs
   - security _____
   - communications _____
   - other (specify)
     - mgt, furnish. & services 825
     - _____ _____

Option B: Renewal

1. Construction costs (costs of renovation)	
programmed amount	$ 54,693
design	5,682
SIOH	10,655
Total	71,030
2. Maintenance and Repair	
Recurring maintenance (post project)	
year 1-5	7,328
year 6-10	8,061
year 11-15	8,867
year 16-20	9,754
year 21 on	10,729
Additional repair (specify)	
_____ year:_____	_____
_____ year:_____	_____
3. Annual energy costs (post project)	
electricity	486
gas	1,457
other:_____	_____
Total	1,943
4. Other utilities	
water/sewer	_____
garbage collection	_____
other:_____	_____
Total	_____
5. Rent - not applicable	
6. Other costs	
security:	
installation	_____
operation	_____
communications:	
installation	_____
operation	_____
other (specify)	
mgt. services & furnish.	820
moving expenses (2 eq. unit)	1,000

Option C: New Construction

1. Construction costs		
programmed amount (new const.)		$ 77169
design		8018
SIOH		15,033
Total		100,220
demolition (if applicable)		2,450
2. Maintenance and Repair		
Recurring maintenance (post project)		
initial (protective storage)		—
year 1-5		2,740
year 6-10		3,014
year 11-15		3,315
year 16-20		3,647
year 21 on		4,012
Anticipated repair		
roof	year:_____	
plumbing	year:_____	
HVAC equipment	year:_____	
other (specify)		
_____	year:_____	
3. Annual energy costs		
electricity		390
gas		1,170
other:_____		
Total		1,560
4. Other Utilities		
water/sewer		
garbage collection		
other:_____		
Total		
5. Rent (temporary)		
duration: 1-3 years		7,526
6. Other costs		
security		
installation		
operation		
communications		
installation		
operation		
moving expenses (2 moves ea. unit)		1,000
mitigation (if applicable)		
other (specify)		
mgt., services, & furnishings		880

Option D: Government Leasing

1. Construction costs (build-to-lease only)		
land (off base only)		$
construction (local)		
rate of return (annual)		
demolition (if applicable)		
2. Maintenance and Repair		
Recurring maintenance		
initial (protective storage)		3,319
year 1-5		4,218
year 6-10		2,110
year 11-15		2,110
year 16-20		2,110
year 21 on		2,110
Anticipated repair		
roof	year:	
plumbing	year:	
HVAC equipment	year:	
other (specify)		
_____	year:	
3. Annual energy costs		
Tenant/lessee		
electricity		390
gas		1,170
other		
Total		1,560
4. Other utilities		
water/sewer		
garbage collection		
other:		
Total		
5. Rent/lease (for existing housing only)		7,294
6. Other costs		
security		
installation (6 units)		16,754
operation		109,003
communications		
installation 6 @ $1000 + 19 @ $150		
operation 6 @ $3,849 + 19 @ $1087		
moving expenses (2 ea. unit)		4,000
mitigation		
other (specify)		
mgt. services, & furnishings		880
_____		

Option E: Direct Compensation

1. Construction costs
   - demolition (if applicable) $_____
2. Maintenance and Repair
   - Protective storage (if applicable)
     - initial costs 3,319
     - recurring maintenance 2,110
     - repair (specify)
       - windows yr. 1-5 1,660
       - masonry yr. 1-5 448
       - _____ _____
3. Annual energy costs (tenant)
   - electricity 390
   - gas 1,170
   - other:_____ _____
   - Total 1,530
   - BAQ/VHA 1,326
4. Other utilities
   - water/sewer _____
   - garbage collection _____
   - other:_____ _____
   - Total _____
   - BAQ/VHA
5. Rent
   - BAQ/VHA
   - % out-of-pocket expenses
6. Other costs
   - security
     - installation (6 units)
     - operation
   - communications
     - installation 6@$1,000 + 19@$150 _____
     - operation 6@$3,849 + 19@$1,08[illegible] _____
   - moving expenses (2 ea. unit)
   - mitigation _____
   - other (specify)
     - _____ _____
     - _____ _____

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: A

Program Year: 1987 Discount Rate: 10%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	578,596	.909	525,944	525,944	—	578,596
1988	578,596	.826	477,920	1,003,864	1.04	601,740
1989	578,596	.751	434,526	1,438,390	1.08	624,884
1990	578,596	.683	395,181	1,833,571	1.12	648,028
1991	578,596	.621	359,308	2,192,752	1.15	665,385
1992	625,200	.564	352,613	2,545,365	1.19	743,988
1993	625,200	.513	320,728	2,866,093	1.23	768,996
1994	625,200	.467	291,968	3,158,061	1.27	794,004
1995	625,200	.424	265,085	3,423,146	1.32	825,264
1996	625,200	.386	241,327	3,664,473	1.36	850,272
1997	676,463	.350	236,762	3,901,235	1.41	953,813
1998	676,463	.319	215,792	4,117,027	1.46	987,636
1999	676,463	.290	196,174	4,313,201	1.51	1,021,459
2000	676,463	.263	177,910	4,491,111	1.56	1,056,292
2001	676,463	.239	161,675	4,652,786	1.61	1,089,105
2002	732,852	.218	159,762	4,812,548	1.67	1,223,863
2003	732,852	.198	145,105	4,957,653	1.72	1,260,555
2004	732,852	.180	131,913	5,089,566	1.78	1,304,472
2005	732,852	.164	120,188	5,209,754	1.84	1,348,404
2006	732,852	.149	109,195	5,318,949	1.90	1,392,419
2007	794,882	.135	107,309	5,426,258	1.97	1,565,914
2008	794,882	.123	97,770	5,524,028	2.04	1,621,665
2009	794,882	.112	89,027	5,613,055	2.11	1,677,701
2010	794,882	.102	81,078	5,694,133	2.14	1,732,843
2011	794,882	.092	73,129	5,767,262	2.25	1,788,445
2012	863,113	.084	72,501	5,839,763	2.33	2,011,053
2013	863,113	.076	65,597	5,905,360	2.41	2,080,102
2014	863,113	.069	59,555	5,964,915	2.49	2,149,151
2015	863,113	.063	54,376	6,019,291	2.57	2,218,200
2016	863,113	.057	49,197	6,068,488	2.66	2,295,841
2017	863,113	.052	44,882	6,113,370	2.75	2,373,482
2018	863,113	.047	40,566	6,153,936	2.85	2,459,124
2019	863,113	.043	37,114	6,191,050	2.94	2,537,552
2020	863,113	.039	33,661	6,224,711	3.04	2,623,194
2021	863,113	.036	31,072	6,255,783	3.14	2,710,175
2022	863,113	.032	27,620	6,283,403	3.25	2,805,117
2023	863,113	.029	25,030	6,308,433	3.36	2,900,060
2024	863,113	.027	23,304	6,331,737	3.48	3,003,633
2025	863,113	.025	20,715	6,352,452	3.59	3,099,576
2026	863,113	.022	18,988	6,371,440	3.72	3,210,740
Totals	29,846,660			6,371,440		45,513,616

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: A Discount rate: 10%

Circle the score of the most appropriate description:

+3	Life-cycle costs of the option are less than 50% of the cost of continued maintenance.
+2	Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.
+1	Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.
(0)	Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.
-1	Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.
-2	Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.
-3	Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: B

Program Year: 1987 Discount Rate: 10%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1,009,498	.909	917634	917634	—	1009498
1988	1,910,239	.826	1577851	2495491	1.04	1936649
1989	937,534	.751	704088	3199579	1.08	1012537
1990	367,075	.683	250712	3450291	1.12	411124
1991	367,075	.621	227954	3678245	1.15	422136
1992	367,075	.564	207030	3885275	1.19	436819
1993	367,075	.513	188309	4073584	1.23	451502
1994	393,574	.467	183799	4257383	1.27	499839
1995	393,574	.424	166875	4424258	1.32	519518
1996	393,574	.386	151920	4576178	1.36	535261
1997	393,574	.350	137751	4713929	1.41	554937
1998	393,574	.319	125550	4839479	1.46	574618
1999	422,724	.290	122590	4962069	1.51	638313
2000	422,724	.263	111176	5073245	1.56	659449
2001	422,724	.239	101031	5174276	1.61	680586
2002	422,724	.218	92,154	5266430	1.67	705949
2003	422,724	.198	83,699	5350129	1.72	727085
2004	454,789	.180	81,862	5431991	1.78	809527
2005	454,789	.164	74,585	5506576	1.84	836812
2006	454,789	.149	67,764	5574340	1.90	864079
2007	454,789	.135	61,397	5635737	1.97	895954
2008	454,789	.123	55,939	5691676	2.04	927776
2009	490,060	.112	54,387	5746563	2.11	1034027
2010	490,060	.102	49,986	5796549	2.18	1069321
2011	490,060	.092	45,086	5841635	2.25	1102635
2012	490,060	.084	41,165	5882800	2.33	1141846
2013	490,060	.076	37,245	5920045	2.41	1181645
2014	528,858	.069	36,491	5956536	2.49	1316856
2015	528,858	.063	33,318	5989854	2.57	1359163
2016	528,858	.057	30,145	6019999	2.66	1406763
2017	528,858	.052	27,501	6047500	2.75	1454360
2018	528,858	.047	24,856	6072356	2.84	1501957
2019	528,858	.043	22,741	6095097	2.94	1554843
2020	528,858	.039	20,625	6115722	3.04	1607735
2021	528,858	.036	19,039	6134761	3.14	1660614
2022	528,858	.032	16,923	6151684	3.25	1718589
2023	528,858	.029	15,337	6167021	3.36	1776963
2024	528,858	.027	14,279	6181300	3.48	1840426
2025	528,858	.024	12,693	6193993	3.59	1898600
2026	528,858	.022	11,635	6205628	3.72	1967352
Totals	21006460			6205628		42752254

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: B Discount rate: 10%

Circle the score of the most appropriate description:

+3	Life-cycle costs of the option are less than 50% of the cost of continued maintenance.
+2	Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.
+1	Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.
(0)	Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.
-1	Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.
-2	Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.
-3	Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: C

Program Year: 1987 Discount Rate: 10%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1076380	.909	978429	978429	-	1076380
1988	2430788	.826	2007831	2986260	1.04	2528020
1989	1122396	.751	842919	3829179	1.08	1212188
1990	326190	.683	222788	4051967	1.12	365333
1991	318280	.621	197652	4249619	1.15	366077
1992	318280	.564	179510	4429129	1.19	378753
1993	318280	.513	163278	4592407	1.23	391484
1994	318280	.467	159380	4751787	1.27	404216
1995	341285	.424	144705	4896492	1.32	450496
1996	341285	.386	131736	5028228	1.36	464148
1997	341285	.350	119450	5147678	1.41	481212
1998	341285	.319	108870	5256548	1.46	498276
1999	366590	.290	106311	5362859	1.51	553551
2000	366590	.263	96413	5459272	1.56	571880
2001	366590	.239	87615	5546887	1.61	590210
2002	366590	.218	79917	5626804	1.67	612205
2003	366590	.198	72585	5699389	1.72	630535
2004	394427	.180	70997	5770386	1.78	702080
2005	394427	.164	64686	5835072	1.84	725746
2006	394427	.149	58770	5893842	1.90	749411
2007	394427	.135	53248	5947090	1.97	777021
2008	394427	.123	48515	5995605	2.04	804631
2009	425046	.112	47605	6043210	2.11	896847
2010	425046	.102	43355	6086565	2.18	926600
2011	425046	.092	39104	6125669	2.25	956354
2012	425046	.084	35704	6161373	2.32	990357
2013	425046	.076	32303	6193676	2.41	1024361
2014	458728	.069	31652	6225328	2.49	1142233
2015	458728	.063	28900	6254228	2.57	1178931
2016	458728	.057	26147	6280375	2.66	1220216
2017	458728	.052	23854	6304229	2.75	1261502
2018	458728	.047	21560	6325789	2.84	1302788
2019	458728	.043	19725	6345514	2.94	1348660
2020	458728	.039	17890	6363404	3.04	1394533
2021	458728	.036	16514	6379918	3.14	1440406
2022	458728	.032	14679	6394597	3.25	1490866
2023	458728	.029	13303	6407900	3.36	1541326
2024	458728	.027	12386	6420286	3.48	1596373
2025	458728	.024	11009	6431295	3.59	1646834
2026	458728	.022	10092	6441387	3.72	1706468
Totals	19487793			6441387		30994403

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: C Discount rate: 10%

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

+1 Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

(0) Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

-3 Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: D

Program Year: 1987 Discount Rate: 10%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1572746	.909	1,429,626	1429626	—	1572746
1988	1293479	.826	1,068,001	2497627	1.04	1344698
1989	1292979	.751	971027	3468654	1.08	1396417
1990	1292979	.683	886105	4354759	1.12	1448136
1991	1292979	.621	802940	5157699	1.15	1486926
1992	1216753	.564	686249	5843948	1.19	1447936
1993	1216753	.513	624194	6468142	1.23	1496606
1994	1216753	.467	568224	7036366	1.27	1545276
1995	1216753	.424	515903	7552269	1.32	1606114
1996	1216753	.386	469667	8021936	1.36	1654784
1997	1216753	.350	425864	8447800	1.41	1715622
1998	1216753	.319	388144	8835944	1.46	1776459
1999	1216753	.290	352,858	9188802	1.51	1837297
2000	1216753	.263	320006	9508808	1.56	1898135
2001	1216753	.239	290,804	9799612	1.61	1958972
2002	1216753	.218	265,252	10064864	1.67	2031978
2003	1216753	.198	240,917	10305781	1.72	2092815
2004	1216753	.180	219,016	10524797	1.78	2165830
2005	1216753	.164	199547	10724344	1.84	2238826
2006	1216753	.149	181,296	10905640	1.90	2311831
2007	1216753	.135	164,262	11069902	1.97	2397003
2008	1216753	.123	149,661	11214563	2.04	2482176
2009	1216753	.112	136,276	11355839	2.11	2567349
2010	1216753	.102	124,109	11479948	2.18	26
2011	1216753	.092	111,941	11591889	2.25	2737694
2012	1216753	.084	102,207	11694096	2.33	2835034
2013	1216753	.076	92,473	11786569	2.41	2932375
2014	1216753	.069	83,956	11870525	2.49	3029715
2015	1216753	.063	76,655	11947180	2.57	3127055
2016	1216753	.057	69,355	12016535	2.66	3236563
2017	1216753	.052	63,271	12079806	2.75	3346071
2018	1216753	.047	57,187	12136993	2.84	3455579
2019	1216753	.043	52,320	12189313	2.94	3577254
2020	1216753	.039	47,453	12236766	3.04	3698929
2021	1216753	.036	43,803	12280569	3.14	3820604
2022	1216753	.032	38,936	12319505	3.25	3954447
2023	1216753	.029	35,286	12354791	3.36	4088290
2024	1216753	.027	32,852	12387643	3.48	4234300
2025	1216753	.024	29,202	12416845	3.59	4368143
2026	1216753	.022	26,769	12443614	3.72	4526321
Totals	49,331,017			12443614		10209481

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: D Discount rate: 10 %

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

+1 Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

0 Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

(-3) Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: E

Program Year: 1987 Discount Rate: 10%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1492902	.909	1357048	1357048		1492902
1988	1274846	.826	1053023	2410071	1.04	1325840
1989	1274846	.751	957409	3367480	1.08	1376834
1990	1274846	.683	870720	4238200	1.12	1427828
1991	1274846	.621	791679	5029879	1.15	1466073
1992	1198620	.564	676022	5705901	1.19	1426358
1993	1198620	.513	614892	6320793	1.23	1474303
1994	1198620	.467	559756	6880549	1.27	1522247
1995	1198620	.424	508215	7388764	1.32	1582178
1996	1198620	.386	462667	7851431	1.36	1630123
1997	1198620	.350	419517	8270948	1.41	1690054
1998	1198620	.319	382360	8653308	1.46	1749985
1999	1198620	.290	347600	9000908	1.51	1809916
2000	1198620	.263	315237	9316145	1.56	1869847
2001	1198620	.239	286470	9602615	1.61	1929778
2002	1198620	.218	261299	9863914	1.67	2001695
2003	1198620	.198	237327	10101241	1.72	2061626
2004	1198620	.180	215752	10316993	1.78	2133544
2005	1198620	.164	196574	10513567	1.84	2205461
2006	1198620	.149	178594	10692161	1.90	2277378
2007	1198620	.135	161814	10853975	1.97	2361281
2008	1198620	.123	147430	11001405	2.04	2445185
2009	1198620	.112	134245	11135650	2.11	2529088
2010	1198620	.102	123259	11257909	2.18	2612992
2011	1198620	.092	110273	11368182	2.25	2696895
2012	1198620	.084	100684	11468866	2.33	2792785
2013	1198620	.076	91095	11559961	2.41	2888674
2014	1198620	.069	82705	11642666	2.49	2984564
2015	1198620	.063	75513	11718179	2.57	3080453
2016	1198620	.057	68321	11786500	2.66	3188329
2017	1198620	.052	62328	11848828	2.75	3296205
2018	1198620	.047	56335	11905163	2.84	3404081
2019	1198620	.043	51541	11956704	2.94	3523943
2020	1198620	.039	46746	12003450	3.04	3643805
2021	1198620	.036	43150	12046600	3.14	3763667
2022	1198620	.032	38356	12084956	3.25	3895515
2023	1198620	.029	34760	12119716	3.36	4027363
2024	1198620	.027	32363	12152079	3.48	4171198
2025	1198620	.024	28767	12180846	3.59	4303046
2026	1198620	.022	26370	12207216	3.72	4458866
Totals	48543986			12207216		100521905

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: E Discount rate: 10%

Circle the score of the most appropriate description:

+3	Life-cycle costs of the option are less than 50% of the cost of continued maintenance.
+2	Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.
+1	Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.
0	Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.
-1	Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.
-2	Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.
(-3)	Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: A

Program Year: 1987 Discount Rate: 7%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	578596	.935	540987	540987	—	[illegible]
1988	578596	.873	505114	1046101	1.04	[illegible]
1989	578596	.816	472134	1518235	1.08	[illegible]
1990	578596	.763	441469	1959704	1.12	[illegible]
1991	578596	.713	412539	2372243	1.15	[illegible]
1992	625200	.666	416383	2788626	1.19	[illegible]
1993	625200	.623	389500	3178126	1.23	[illegible]
1994	625200	.582	363866	3541992	1.27	[illegible]
1995	625200	.544	340109	3882101	1.32	[illegible]
1996	625200	.508	317602	4199703	1.36	[illegible]
1997	676463	.475	321320	4521023	1.41	[illegible]
1998	676463	.444	300350	4821373	1.46	[illegible]
1999	676463	.415	280732	5102105	1.51	[illegible]
2000	676463	.388	262468	5364573	1.56	[illegible]
2001	676463	.360	244880	5609453	1.61	1089105
2002	732852	.339	248437	5857890	1.67	1223363
2003	732852	.317	232314	6090204	1.72	1360505
2004	732852	.296	216924	6307128	1.78	1504477
2005	732852	.277	203000	6510128	1.84	1348448
2006	732852	.258	189076	6699204	1.90	1342414
2007	794882	.242	192361	6891565	1.97	1565911
2008	794882	.226	179643	7071208	2.04	1621554
2009	794882	.211	167720	7238928	2.11	1677201
2010	794882	.197	156592	7395520	2.18	1732843
2011	794882	.184	146258	7541778	2.25	1788485
2012	863113	.172	148455	7690233	2.33	2011053
2013	863113	.161	138961	7829194	2.41	2080102
2014	863113	.150	129467	7958661	2.49	2149151
2015	863113	.141	121699	8080360	2.57	2218200
2016	863113	.131	113068	8193428	2.66	2295881
2017	863113	.123	106163	8299591	2.75	2373561
2018	863113	.115	99258	8398849	2.84	2451241
2019	863113	.107	92353	8491202	2.94	2537552
2020	863113	.100	86311	8577513	3.04	2623864
2021	863113	.094	81133	8658646	3.14	2710175
2022	863113	.088	75954	8734600	3.25	2805117
2023	863113	.082	70775	8805375	3.36	2900060
2024	863113	.076	65597	8870972	3.48	3003633
2025	863113	.071	61281	8932253	3.59	3098576
2026	863113	.067	57829	8990082	3.72	3210730
Totals	[illegible]			8990082		65593116

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: A Discount rate: 7%

Circle the score of the most appropriate description:

+3	Life-cycle costs of the option are less than 50% of the cost of continued maintenance.
+2	Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.
+1	Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.
(0)	Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.
-1	Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.
-2	Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.
-3	Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: B

Program Year: 1987 Discount Rate: 7%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1,009,498	.935	943,881	943881	—	1,009,498
1988	1,910,239	.873	1,667,639	2611520	1.04	1986649
1989	937,534	.816	765,028	3376548	1.08	1012537
1990	367,075	.763	280,078	3656626	1.12	411124
1991	367,075	.713	261,724	3918350	1.15	422136
1992	367,075	.666	244,472	4162822	1.19	436819
1993	367,075	.623	228,688	4391510	1.23	451502
1994	393,574	.582	229,060	4620570	1.27	499839
1995	393,574	.544	214,104	4834674	1.32	519518
1996	393,574	.508	199,936	5034610	1.36	535261
1997	393,574	.475	186,948	5221558	1.41	554934
1998	393,574	.444	174,747	5396305	1.46	574618
1999	422,724	.415	175,430	5571735	1.51	638313
2000	422,724	.388	164,017	5735752	1.56	659449
2001	422,724	.362	153,026	5888778	1.61	680586
2002	422,724	.339	143,303	6032081	1.67	705949
2003	422,724	.317	134,004	6166085	1.72	727085
2004	454,789	.296	134,618	6300703	1.78	809524
2005	454,789	.277	125,977	6426680	1.84	836812
2006	454,789	.258	117,336	6544016	1.90	864099
2007	454,789	.242	110,059	6654075	1.97	895934
2008	454,789	.226	102,782	6756857	2.04	927770
2009	490,060	.211	103,403	6860260	2.11	1034027
2010	490,060	.197	96,542	6956802	2.18	1068331
2011	490,060	.184	90,171	7046973	2.25	1102635
2012	490,060	.172	84,290	7131263	2.33	1141840
2013	490,060	.161	78,900	7210163	2.41	1181045
2014	528,858	.150	79,329	7289492	2.49	1316856
2015	528,858	.141	74,569	7364061	2.57	1359115
2016	528,858	.131	69,280	7433341	2.66	1406762
2017	528,858	.123	65,050	7498391	2.75	1454360
2018	528,858	.115	60,819	7559210	2.84	1501957
2019	528,858	.107	56,588	7615798	2.94	1554843
2020	528,858	.100	52,886	7668684	3.04	1607728
2021	528,858	.094	49,713	7718397	3.14	1660614
2022	528,858	.088	46,540	7764937	3.25	1718789
2023	528,858	.082	43,366	7808303	3.36	1776963
2024	528,858	.076	40,193	7848496	3.48	1840426
2025	528,858	.071	37,549	7886045	3.59	1898600
2026	528,858	.067	35,433	7921478	3.72	1967352
Totals	21006460			7921478		42752254

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: B Discount rate: 7%

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

(+1) Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

0 Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

-3 Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: C

Program Year: 1987 Discount Rate: 7%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1,076,380	.935	1,006,415	1,006,415	—	1076380
1988	2,430,788	.873	2,122,078	3,114,493	1.04	2528020
1989	1,122,396	.816	915,875	4,034,368	1.08	1212188
1990	326,190	.763	248,883	4,283,251	1.12	365333
1991	318,280	.713	226,934	4,510,185	1.15	366022
1992	319,280	.666	211,974	4,722,159	1.19	378753
1993	318,260	.623	198,288	4,920,447	1.23	391484
1994	347,285	.582	198,628	5,119,075	1.27	404216
1995	341,285	.544	185,659	5,304,734	1.32	450496
1996	341,285	.508	173,373	5,479,107	1.36	464148
1997	341,285	.475	162,110	5,640,217	1.41	481212
1998	341,285	.444	151,531	5,791,748	1.46	498276
1999	366,590	.415	152,135	5,943,883	1.51	553551
2000	366,590	.388	142,237	6,086,120	1.56	571880
2001	366,590	.362	132,706	6,219,826	1.61	590210
2002	366,590	.339	124,274	6,343,100	1.67	612205
2003	366,590	.317	116,209	6,459,309	1.72	630535
2004	394,427	.296	116,750	6,576,059	1.78	702080
2005	394,427	.277	109,256	6,685,315	1.84	725746
2006	394,427	.258	101,762	6,787,077	1.90	749411
2007	394,427	.242	95,451	6,882,528	1.97	777021
2008	394,427	.226	89,141	6,971,669	2.04	804631
2009	425,046	.211	89,685	7,061,354	2.11	896847
2010	425,046	.197	83,734	7,145,088	2.18	926662
2011	425,046	.184	78,208	7,223,296	2.25	956354
2012	425,046	.172	73,108	7,296,404	2.33	990357
2013	425,046	.161	68,432	7,364,836	2.41	1024361
2014	458,728	.150	68,809	7,433,645	2.49	1142233
2015	458,728	.141	64,681	7,498,326	2.57	1178931
2016	458,728	.131	60,093	7,558,419	2.66	1220216
2017	458,728	.123	56,424	7,614,843	2.75	1261502
2018	458,728	.115	52,754	7,667,597	2.84	1302788
2019	458,728	.107	49,084	7,716,681	2.94	1348662
2020	458,728	.100	45,873	7,762,554	3.04	1394533
2021	458,728	.094	43,120	7,805,674	3.14	1440406
2022	458,728	.088	40,368	7,846,042	3.25	1490866
2023	458,728	.082	37,616	7,883,658	3.36	1541326
2024	458,728	.076	34,863	7,918,521	3.48	1596373
2025	458,728	.071	32,570	7,951,091	3.59	1646834
2026	458,728	.067	30,735	7,981,826	3.72	1706468
Totals	19487,793			7,981,826		38399453

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: C Discount rate: 7%

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

(+1) Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

0 Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

-3 Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: D

Program Year: 1987 Discount Rate: 7%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1572746	.935	1470518	1470518	—	1572746
1988	1292979	.873	1128771	2599289	1.04	1344698
1989	1292979	.816	1055071	3654360	1.08	1396417
1990	1292979	.763	986543	4640903	1.12	1448136
1991	1292979	.713	921894	5562797	1.15	1486926
1992	1216753	.666	810357	6373154	1.19	1447936
1993	1216753	.623	758037	7131191	1.23	1496606
1994	1216753	.582	708150	7839341	1.27	1545276
1995	1216753	.544	661914	8501255	1.32	1606114
1996	1216753	.508	618111	9119366	1.36	1654784
1997	1216753	.475	577958	9697324	1.41	1715622
1998	1216753	.444	540238	10237562	1.46	1776459
1999	1216753	.415	504952	10742514	1.51	1837297
2000	1216753	.388	472100	11214614	1.56	1898135
2001	1216753	.362	440465	11655079	1.61	1958972
2002	1216753	.339	412479	12067558	1.67	2031978
2003	1216753	.317	385711	12453269	1.72	2092015
2004	1216753	.296	360159	12813428	1.78	2165820
2005	1216753	.277	337041	13150469	1.84	2238826
2006	1216753	.258	313922	13464391	1.90	2311831
2007	1216753	.242	294454	13758845	1.97	2397003
2008	1216753	.226	274986	14033831	2.04	2482176
2009	1216753	.211	256735	14290566	2.11	2567349
2010	1216753	.197	239700	14530266	2.18	2652522
2011	1216753	.184	223883	14754149	2.25	2737694
2012	1216753	.172	209282	14963431	2.33	2835034
2013	1216753	.161	195897	15159328	2.41	2932375
2014	1216753	.150	182513	15341841	2.49	3029715
2015	1216753	.141	171562	15513403	2.57	3127055
2016	1216753	.131	159395	15672798	2.66	3236563
2017	1216753	.123	149661	15822459	2.75	3346071
2018	1216753	.115	139927	15962386	2.84	3455579
2019	1216753	.107	130193	16092579	2.94	3577254
2020	1216753	.100	121675	16214254	3.04	3698929
2021	1216753	.094	114375	16328629	3.14	3820604
2022	1216753	.088	107074	16435703	3.25	3954447
2023	1216753	.082	99774	16535477	3.36	4088290
2024	1216753	.076	92473	16627950	3.48	4234300
2025	1216753	.071	86389	16714339	3.59	4368143
2026	1216753	.067	81522	16795861	3.72	4526321
Totals	49331017			16795861		102094818

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: D Discount rate: 7%

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

+1 Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

0 Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

(-3) Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-3: OPTION LIFE-CYCLE COSTS

Option: E

Program Year: 1987 Discount Rate: 7%

(a) Year	(b) Prog.Costs	(c) Disc	(d) Pres.Value	(e) Cumulative Pres.Value	(f) Infl	(g) Then-Year Costs
1987	1492902	.935	1395863	1395863		1492902
1988	1274846	.873	1112941	2508804	1.04	1325840
1989	1274846	.816	1040274	3549078	1.08	1376834
1990	1274846	.763	972707	4521785	1.12	1427828
1991	1274846	.713	908965	5430750	1.15	1466073
1992	1198620	.666	798281	6229031	1.19	1426358
1993	1198620	.623	746740	6975771	1.23	1474303
1994	1198620	.582	697597	7673368	1.27	1522247
1995	1198620	.544	652049	8325417	1.32	1582178
1996	1198620	.508	608899	8934316	1.36	1630123
1997	1198620	.475	569345	9503661	1.41	1690054
1998	1198620	.444	532187	10035848	1.46	1749985
1999	1198620	.415	497427	10533275	1.51	1809916
2000	1198620	.388	465065	10998340	1.56	1869847
2001	1198620	.362	433900	11432240	1.61	1929778
2002	1198620	.339	406332	11838572	1.67	2001695
2003	1198620	.317	379963	12218535	1.72	2061626
2004	1198620	.296	354792	12573327	1.78	2133544
2005	1198620	.277	332018	12905345	1.84	2205461
2006	1198620	.258	309244	13214589	1.90	2277378
2007	1198620	.242	290066	13504655	1.97	2361287
2008	1198620	.226	270888	13775543	2.04	2445185
2009	1198620	.211	252909	14028452	2.11	2529088
2010	1198620	.197	236128	14264580	2.18	2613992
2011	1198620	.184	220546	14485126	2.25	2698895
2012	1198620	.172	206163	14691289	2.33	2792785
2013	1198620	.161	192978	14884267	2.41	2886674
2014	1198620	.150	179793	15064060	2.49	2984564
2015	1198620	.141	169005	15233065	2.57	3080453
2016	1198620	.131	157019	15390084	2.66	3188329
2017	1198620	.123	147430	15537514	2.75	3296205
2018	1198620	.115	137841	15675355	2.84	3404081
2019	1198620	.107	128252	15803607	2.94	3523943
2020	1198620	.100	119862	15923469	3.04	3643805
2021	1198620	.094	112670	16036139	3.14	3763667
2022	1198620	.088	105479	16141618	3.25	3895515
2023	1198620	.082	98287	16239905	3.36	4027363
2024	1198620	.076	91095	16331000	3.48	4171198
2025	1198620	.071	85102	16416102	3.59	4303046
2026	1198620	.067	80308	16496410	3.72	4458866
Totals	48543986			16496410		100521905

Enter totals on line A, B, C, D, or E of Form 1-4.

FORM 1-3 CONTINUED

LIFE-CYCLE COST EVALUATION

Option: E Discount rate: 7%

Circle the score of the most appropriate description:

+3 Life-cycle costs of the option are less than 50% of the cost of continued maintenance.

+2 Life-cycle costs of the option are between 51% and 75% of the cost of continued maintenance.

+1 Life-cycle costs of the option range from 75% to 94% of the cost of continued maintenance.

0 Life-cycle costs of the option are between 95% and 104% of the cost of continued maintenance.

-1 Life-cycle costs of the option are between 105% and 124% of the cost of continued maintenance.

-2 Life-cycle costs of the option are between 125% and 149% of the cost of continued maintenance.

(-3) Life-cycle costs of the option exceed 150% of the cost of continued maintenance.

Enter score on line 1 of Form S-1 for this option.

Military Family Housing Economic Analysis

FORM 1-4: LIFE-CYCLE COSTS SUMMARY

Discount rate: 10%

Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo	$29,986,660	6,371,440	65,593,116
B. Renewal	21,006,460	6,205,628	42,752,254
C. New Construction	19,487,793	6,941,387	38,399,453
D. Government Leasing	49,331,017	12,443,614	102,094,815
E. Direct Compensation	48,543,986	12,207,216	100,521,905

Sensitivity Analysis:

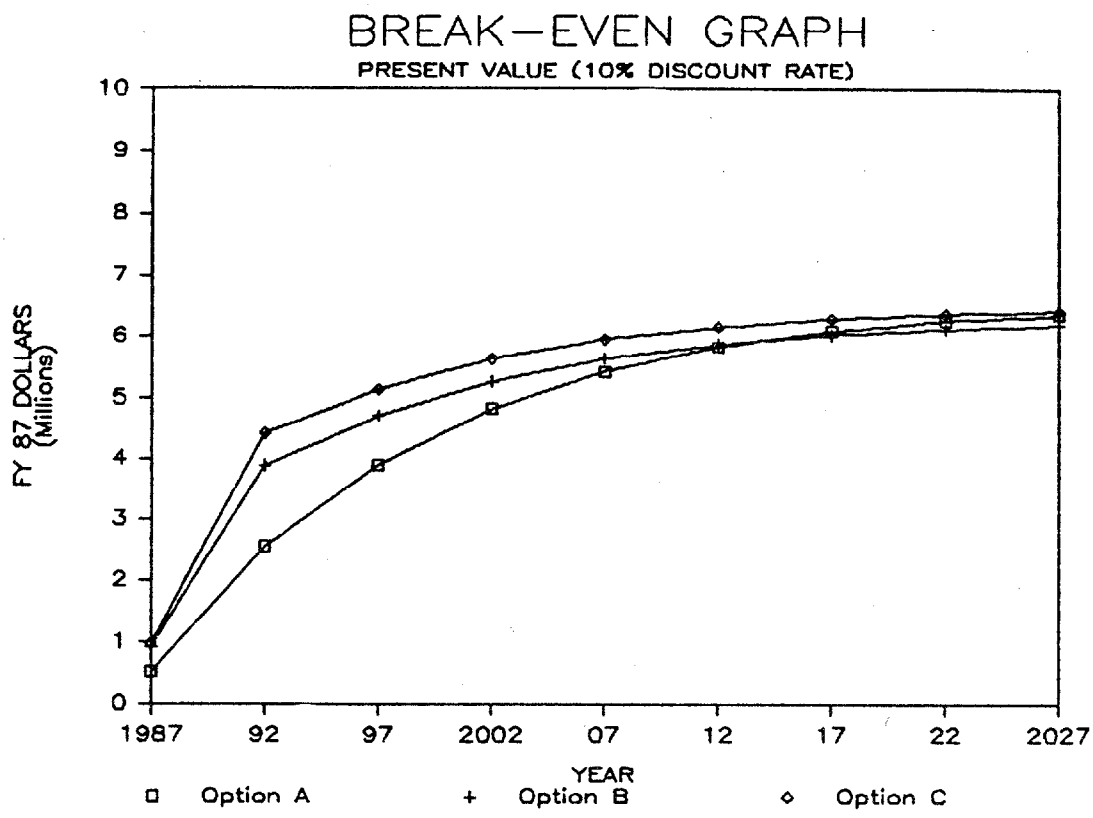
Discount rate: 7%

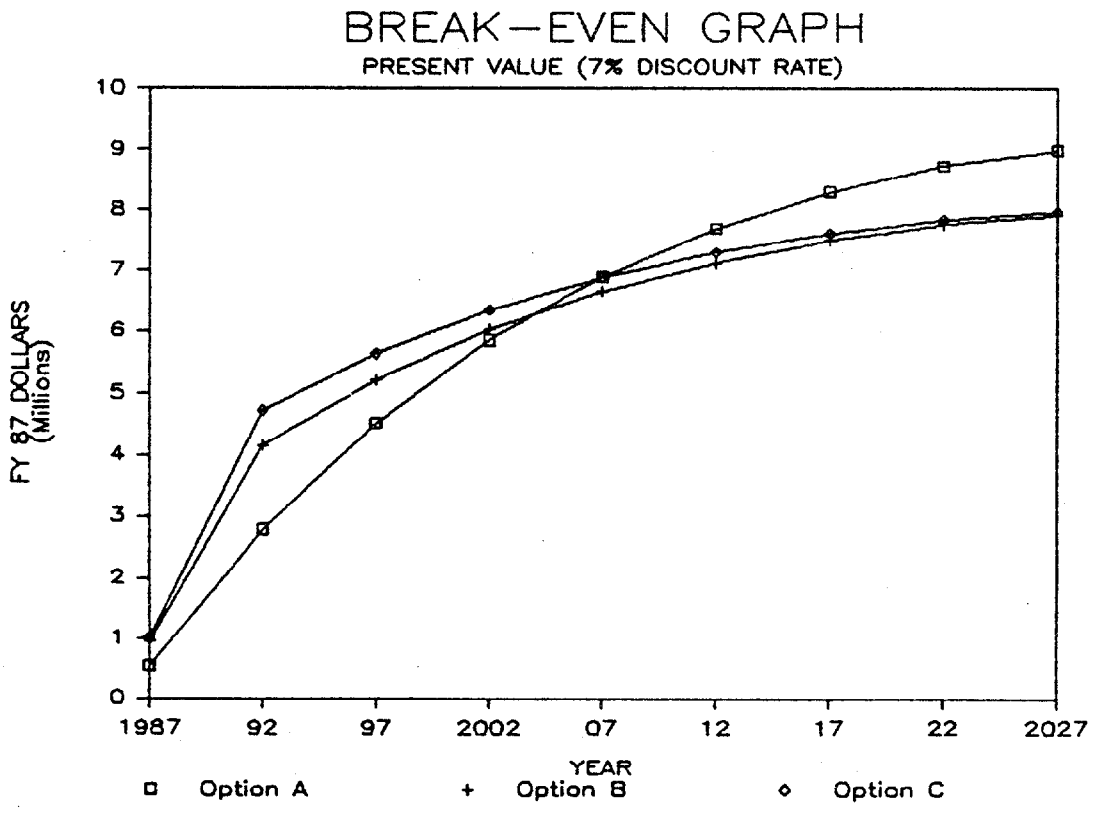
Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo	29,986,660	8,990,082	65,593,116
B. Renewal	21,006,460	7921,478	42,752,254
C. New Construction	19,487,793	7,981,826	38,399,453
D. Government Leasing	49,331,017	16,795,861	102,094,815
E. Direct Compensation	48,543,986	16,496,440	100,521,905

Discount rate: _____

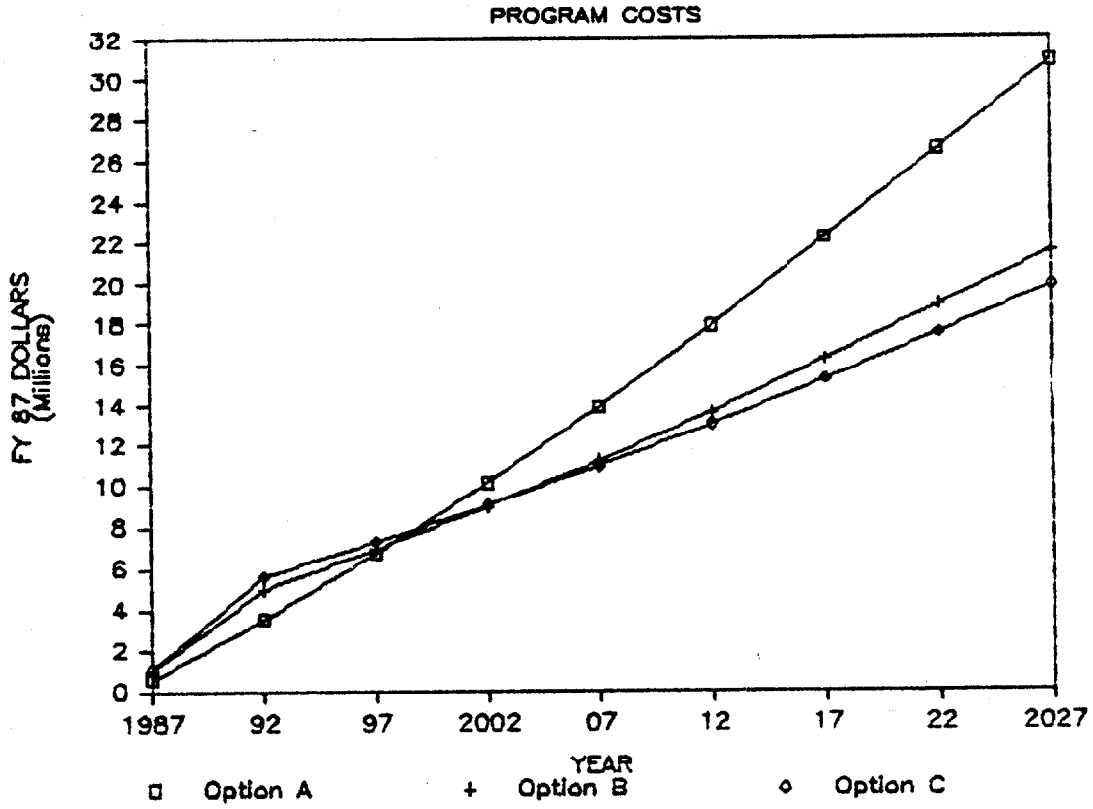
Option	(b) Total Prog. Costs	(e) Cumulative Pres. Value	(g) Total Then-Year Costs
A. Status Quo			
B. Renewal			
C. New Construction			
D. Government Leasing			
E. Direct Compensation			

Letters in parentheses () correspond to column headings on Form 1-3.


BREAK–EVEN GRAPH
PRESENT VALUE (10% DISCOUNT RATE)
FY 87 DOLLARS (Millions)
0
1
2
3
4
5
6
7
8
9
10
1987
92
97
2002
07
12
17
22
2027
YEAR
Option A
Option B
Option C


BREAK–EVEN GRAPH
PRESENT VALUE (7% DISCOUNT RATE)
FY 87 DOLLARS (Millions)
0
1
2
3
4
5
6
7
8
9
10
1987
92
97
2002
07
12
17
22
2027
YEAR
Option A
Option B
Option C

BREAK–EVEN GRAPH



Military Family Housing Economic Analysis

FORM 2-4: PROJECT EFFECTIVENESS SUMMARY

		Score	Weight
Option A: Status Quo			
A2.1	Housing Quantity	A2.1.	0
A2.2	Housing Condition	A2.2.	0
A2.3	Housing Adequacy	A2.3.	0
A2.4	Energy Conservation	A2.4.	0
Median		A2.	0
Option B: Renewal			
B2.1	Housing Quantity	B2.1. ~~0~~	~~0~~
B2.2	Housing Condition	B2.2. +1	3
B2.3	Housing Adequacy	B2.3. 0	2
B2.4	Energy Conservation	B2.4. +1	1
Median		B2.	+1
Enter on line B2 of Form S-1.			
Option C: New Construction			
C2.1	Housing Quantity	C2.1. ~~0~~	~~0~~
C2.2	Housing Condition	C2.2. +3	3
C2.3	Housing Adequacy	C2.3. +3	2
C2.4	Energy Conservation	C2.4. +1	1
Median		C2.	+3
Enter on line C2 of Form S-1.			
Option D: Government Leasing			
D2.1	Housing Quantity	D2.1. ~~0~~	~~0~~
D2.2	Housing Condition	D2.2. +3	3
D2.3	Housing Adequacy	D2.3. +3	2
D2.4	Energy Conservation	D2.4. +1	1
Median		D2.	+3
Enter on line D2 of Form S-1.			
Option E: Direct Compensation			
E2.1	Housing Quantity	E2.1. ~~0~~	~~0~~
E2.2	Housing Condition	E2.2. +3	3
E2.3	Housing Adequacy	E2.3. +3	2
E2.4	Energy Conservation	E2.4. +1	1
Median		E2.	+3
Enter on line E2 of Form S-1.			

Military Family Housing Economic Analysis

FORM 3-3: SPECIAL CONSIDERATIONS SUMMARY

		Score	Weight
Option A: Status Quo			
A3.1	Avail., Afford. & Accessibility	A3.1	0
A3.2	Operational Responsiveness	A3.2	0
A3.3	Operational Security	A3.3	0
A3.4	Socioeconomic Impacts	A3.4	0
Median		A2	0
Option B: Renewal			
B3.1	Avail., Afford. & Accessibility	B3.1	0
B3.2	Operational Responsiveness	B3.2	0
B3.3	Operational Security	B3.3	0
B3.4	Socioeconomic Impacts	B3.4	0
Median Enter on line B3 of Form S-1.		B3	0
Option C: New Construction			
C3.1	Avail., Afford. & Accessibility	C3.1	0
C3.2	Operational Responsiveness	C3.2	0
C3.3	Operational Security	C3.3	0
C3.4	Socioeconomic Impacts	C3.4	0
Median Enter on line C3 of Form S-1.		C3	0
Option D: Government Leasing			
D3.1	Avail., Afford. & Accessibility	D3.1	0
D3.2	Operational Responsiveness	D3.2	-2
D3.3	Operational Security	D3.3	-1
D3.4	Socioeconomic Impacts	D3.4	0
Median Enter on line D3 of Form S-1.		D3	-1.5
Option E: Direct Compensation			
E3.1	Avail., Afford. & Accessibility	E3.1	0
E3.2	Operational Responsiveness	E3.2	-2
E3.3	Operational Security	E3.3	-1
E3.4	Socioeconomic Impacts	E3.4	0
Median Enter on line E3 of Form S-1.		E3	-1.5

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY (10%)

		Score	Weight
Option A: Status Quo			
A1	Life-Cycle Costs	A1 0	5
A2	Housing Performance	A2 0	2
A3	Special Considerations	A3 0	1
A4	Historic Preservation	A4 0	2
Median		A	0
Option B: Renewal			
B1	Life-Cycle Costs	B1 0	5
B2	Project Effectiveness	B2 +1	2
B3	Special Considerations	B3 0	1
B4	Historic Preservation	B4 +3	2
Median		B	0
Option C: New Construction			
C1	Life-Cycle Costs	C1 0	5
C2	Project Effectiveness	C2 +3	2
C3	Special Considerations	C3 0	1
C4	Historic Preservation	C4 -3	2
Median		C	0
Option D: Government Leasing			
D1	Life-Cycle Costs	D1 -3	5
D2	Project Effectiveness	D2 +3	2
D3	Special Considerations	D3 -1.5	1
D4	Historic Preservation	D4 -1	2
Median		D	-2.25
Option E: Direct Compensation			
E1	Life-Cycle Costs	E1 -3	5
E2	Project Effectiveness	E2 +3	2
E3	Special Considerations	E3 -1.5	1
E4	Historic Preservation	E4 -1	2
Median		E	-2.25

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY (7%)

		Score	Weight
Option A: Status Quo			
A1	Life-Cycle Costs	A1 0	5
A2	Housing Performance	A2 0	2
A3	Special Considerations	A3 0	1
A4	Historic Preservation	A4 0	2
Median		A	0
Option B: Renewal			
B1	Life-Cycle Costs	B1 +1	5
B2	Project Effectiveness	B2 +1	2
B3	Special Considerations	B3 0	1
B4	Historic Preservation	B4 +3	2
Median		B	+1
Option C: New Construction			
C1	Life-Cycle Costs	C1 +1	5
C2	Project Effectiveness	C2 +3	2
C3	Special Considerations	C3 0	1
C4	Historic Preservation	C4 -3	2
Median		C	+1
Option D: Government Leasing			
D1	Life-Cycle Costs	D1 -3	5
D2	Project Effectiveness	D2 +3	2
D3	Special Considerations	D3 -1.5	1
D4	Historic Preservation	D4 -1	2
Median		D	-2.25
Option E: Direct Compensation			
E1	Life-Cycle Costs	E1 -3	5
E2	Project Effectiveness	E2 +3	2
E3	Special Considerations	E3 -1.5	1
E4	Historic Preservation	E4 -1	2
Median		E	-2.25

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY (10%)

		Score	Weight
Option A: Status Quo			
A1	Life-Cycle Costs	A1 0	2
A2	Housing Performance	A2 0	2
A3	Special Considerations	A3 0	1
A4	Historic Preservation	A4 0	2
Median		A	0
Option B: Renewal			
B1	Life-Cycle Costs	B1 0	2
B2	Project Effectiveness	B2 +1	2
B3	Special Considerations	B3 0	1
B4	Historic Preservation	B4 +3	2
Median		B	+1
Option C: New Construction			
C1	Life-Cycle Costs	C1 0	2
C2	Project Effectiveness	C2 +3	2
C3	Special Considerations	C3 0	1
C4	Historic Preservation	C4 -3	2
Median		C	0
Option D: Government Leasing			
D1	Life-Cycle Costs	D1 -3	2
D2	Project Effectiveness	D2 +3	2
D3	Special Considerations	D3 -1.5	1
D4	Historic Preservation	D4 -1	2
Median		D	-1
Option E: Direct Compensation			
E1	Life-Cycle Costs	E1 -3	2
E2	Project Effectiveness	E2 +3	2
E3	Special Considerations	E3 -1.5	1
E4	Historic Preservation	E4 -1	2
Median		E	-1

Military Family Housing Economic Analysis

FORM S-1: OPTION SUMMARY (7%)

		Score	Weight
Option A: Status Quo			
A1	Life-Cycle Costs	A1 0	2
A2	Housing Performance	A2 0	2
A3	Special Considerations	A3 0	1
A4	Historic Preservation	A4 0	2
Median		A	0
Option B: Renewal			
B1	Life-Cycle Costs	B1 +1	2
B2	Project Effectiveness	B2 +1	2
B3	Special Considerations	B3 0	1
B4	Historic Preservation	B4 +3	2
Median		B	+1
Option C: New Construction			
C1	Life-Cycle Costs	C1 +1	2
C2	Project Effectiveness	C2 +3	2
C3	Special Considerations	C3 0	1
C4	Historic Preservation	C4 -3	2
Median		C	+1
Option D: Government Leasing			
D1	Life-Cycle Costs	D1 -3	2
D2	Project Effectiveness	D2 +3	2
D3	Special Considerations	D3 -1.5	1
D4	Historic Preservation	D4 -1	2
Median		D	-1
Option E: Direct Compensation			
E1	Life-Cycle Costs	E1 -3	2
E2	Project Effectiveness	E2 +3	2
E3	Special Considerations	E3 -1.5	1
E4	Historic Preservation	E4 -1	2
Median		E	-1

Military Family Housing Economic Analysis

FORM S-2: PROJECT RECOMMENDATION

Installation/ MAJCOM: Home AFB

Project Title: G/FO and NCO Housing

Selected Option: Option B - Renewal

Rationale:

Option B emerged as the least costly option, both with the 10% discount rate used for the primary life cycle cost analysis and with the 7% rate used in the sensitivity analysis. Although Option B performed only marginally better overall than Option A, Status Quo, and Option C, New Construction, it has certain qualitative advantages over those two options. It takes advantage of existing resources in the form of the existing houses, improving their structural integrity and livibility. It also supports national policies and Air Force goals on historic preservation. Since the structures are on the National Register of Historic Places, demolishing them or allowing them to deteriorate could have a negative effect on the Air Force's image in the community. Third, since the construction of the renewal project would be phased, the temporary reduction in operational responsiveness and security would be less than with the new construction option.

Unresolved Issues:

If the existing housing is renewed, the NCO units will continue to have inadequate space, relative to square footages authorized in AFR 90-1.

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: A Discount rate: 10%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512,032		1.13		578596		.909		525944

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.826		477920

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.751		434526

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.683		395181

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 19?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.621		359308

Year 199?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.564		352613

Year 199?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.513		320728

Year 199?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.467		291968

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.424		265085

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.386		241327

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.350		236762

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.319		215792

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 199_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.290		196174

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.263		177910

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.239		161675

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	348,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.218		159762

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10 %

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.198		145105

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.180		131913

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.164		120188

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.149		109195

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.135		107309

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.123		97770

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.112		89027

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.102		81078

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10 %

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.092		73129

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.084		72501

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.076		65597

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.069		59555

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.063		54376

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.057		49197

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.052		44887

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.047		40586

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10%

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.043		37114

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.039		33661

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71436								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.036		31072

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.032		27620

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 10 %

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.029		25030

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.027		23304

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.024		20715

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.022		18988

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: B Discount rate: 10%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction	426,180								
2. M & R	335,088								
3. Gas & elec.	58,058								
4. Other util.									
5. Rent	45,155								
6. Other costs	28,880								
Total	893,361		1.13		1,009,498		.909		917,634

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction	1,349,570								
2. M & R	134,196								
3. Gas & elec.	27,289								
4. Other util.									
5. Rent	142,992								
6. Other costs	36,440								
Total	1,690,477		1.13		1,910,239		.826		1,577,857

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction	497,210								
2. M & R	193,210								
3. Gas & elec.	48,575								
4. Other util.									
5. Rent	52,681								
6. Other costs	48,000								
Total	829,676		1.13		937,534		.751		704,048

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	234,509								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324,845		1.13		367,075		.683		250,712

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	234,509								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324,845		1.13		367,075		.621		227,954

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	234,509								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324,845		1.13		367,075		.564		207,030

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	234,509								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324,845		1.13		367,075		.513		188,309

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	257,960								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	348,296		1.13		393,574		.457		179,899

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 1995

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	257,960				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	348,296	1.13	393,574	.424	166,875

Year 1996

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	257,960				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	348,296	1.13	393,574	.386	151,920

Year 1997

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	257,960				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	348,296	1.13	393,574	.350	137,751

Year 1998

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	257,960				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	348,296	1.13	393,574	.319	125,550

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.290		122,590

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.263		111,176

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.239		101,058

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.218		92,164

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.198		83,699

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.180		81,862

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.164		74,584

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.149		67,764

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.135		61,397

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.123		55,932

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.112		54,887

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.102		49,986

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.092		45,086

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.084		41,165

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.076		37,245

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	469,016		1.13		528,858		.069		36,491

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.063		33,318

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.057		30,145

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.052		27,506

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.047		24,856

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.043		22,741

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.039		20,625

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.036		19,039

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	29,160								
Total	468,016		1.13		528,858		.032		16,923

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 10%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.029		15,337

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.027		14,279

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.024		12,692

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.022		11,635

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: C Discount rate: 10%

Year 1987

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	679,720				
2. M & R					
3. Gas & elec.					
4. Other util.					
5. Rent	240,829				
6. Other costs	32,000				
Total	952549	1.13	1076380	.909	978429

Year 1988

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	1904180				
2. M & R	38,172				
3. Gas & elec.	9,360				
4. Other util.					
5. Rent	188,148				
6. Other costs	11,280				
Total	2151140	1.13	2430788	.826	2007831

Year 1989

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	701,540				
2. M & R	159,050				
3. Gas & elec.	39,000				
4. Other util.					
5. Rent	52,1681				
6. Other costs	41,000				
Total	993271	1.13	1122396	.751	842919

Year 199_

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	203584				
3. Gas & elec.	49920				
4. Other util.					
5. Rent					
6. Other costs	35,160				
Total	288664	1.13	326190	.683	222788

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	281664		1.13		318280		.621		197652

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	2816664		1.13		318280		.564		179510

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	281664		1.13		318280		.513		163278

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.467		159380

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.424		144705

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.386		131736

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.350		119450

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.319		108870

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.290		106311

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.263		96413

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.239		87615

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.218		79917

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.198		72585

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.180		70997

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.164		64686

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.149		58770

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.135		53248

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.123		48515

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425046		.112		47605

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425046		.102		43355

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425,046		.092		39104

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425,046		.084		35704

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425,046		.076		32303

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.069		31652

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.063		28900

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.057		26147

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.052		23854

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.047		21560

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.043		19728

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.039		17890

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.036		16514

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.032		14679

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 10%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.029		13303

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.027		12386

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.024		11009

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.022		10092

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Option: D

Program year: 1987 Discount rate: 10%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	241,184								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	867,299								
Total	1,391,811		1.13		1,572,746		.909		1,429,626

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.826		1,068,001

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.751		971,027

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.683		886,105

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.621		802,940

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.564		686,249

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.513		624,194

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.467		568,224

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.424		515,903

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.386		469,667

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.350		425,864

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.319		388,144

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.290		352,858

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.263		320,006

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.239		290,804

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.218		265,252

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 2003

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.198	240,917

Year 2004

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.180	219,016

Year 2005

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.164	199,547

Year 2006

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.149	181,296

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.135		164,262

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.123		149,661

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.112		136,276

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.102		124,109

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.092		111,941

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.084		102,207

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.076		92,473

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.069		83,956

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10 %

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.063		76,655

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.057		69,355

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.052		63,271

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.047		57,187

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.043		52,320

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.039		47,453

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.036		43,803

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.032		38,936

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 10%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.029		35,286

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.027		32,852

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.024		29,202

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.022		26,769

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: E Discount rate: 10%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	241,184								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	839,139								
Total	1321152		1.13		1492902		.909		1357048

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1128182		1.13		1274846		.826		1053023

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1128182		1.13		1274846		.751		957,409

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	194,397								
6. Other costs	752377								
Total	1128182		1.13		1274846		.683		870,720

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 1991

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	134,976				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1,128,182	1.13	1,274,846	.621	791,679

Year 1992

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.564	676,022

Year 1993

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.513	614,892

Year 1994

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.467	559,756

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.424		508,215

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.386		462,667

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.350		419,517

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.319		382,360

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.290		347,600

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.263		315,237

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.239		286,470

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.218		261,299

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10 %

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.198		237,327

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.180		215,752

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.164		196,574

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	199,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.149		178,594

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.135		161,814

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.123		147,430

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.112		134,245

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.102		122,259

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.092		110,273

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.084		100,684

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.076		91,095

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.069		82,705

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.063		75,513

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.057		68,321

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.052		62,328

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.047		56,335

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 2019

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1198620	.043	51,541

Year 2020

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1198620	.039	46,746

Year 2021

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1198620	.036	43,150

Year 2022

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1198620	.032	38,356

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 10%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.029		34,760

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.027		32,363

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.024		28,767

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.022		26,370

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: A Discount rate: 7%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.935		540987

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.873		505114

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.816		472134

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.763		441469

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	412,416								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	512032		1.13		578596		.713		412539

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.666		416383

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.623		389500

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.582		363866

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.544		340109

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	453,658								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	553274		1.13		625200		.508		317602

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.475		321320

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.444		300350

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.415		280732

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.388		262468

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	499,024								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	598640		1.13		676463		.362		244880

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	348,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.339		248437

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.317		232314

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.296		216924

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.277		203000

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	548,926								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	648542		1.13		732852		.258		189076

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.242		192361

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.226		179643

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.211		167720

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.197		156592

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	603,819								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	703435		1.13		794882		.184		146258

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.172		148455

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.161		138961

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.150		129467

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.141		121699

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.131		113068

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.123		106163

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.115		99258

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.107		92353

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.100		86311

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.094		81133

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.088		75954

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: A Discount Rate 7%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.082		70775

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.076		65597

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.071		61281

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	664,201								
3. Gas & elec.	71,456								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	763817		1.13		863113		.067		57829

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: B Discount rate: 7%

Year 1987

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	426,180				
2. M & R	335,088				
3. Gas & elec.	58,058				
4. Other util.					
5. Rent	45,155				
6. Other costs	28,980				
Total	893,361	1.13	1,009,498	.935	943,881

Year 1988

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	1,349,570				
2. M & R	134,196				
3. Gas & elec.	27,289				
4. Other util.					
5. Rent	142,992				
6. Other costs	36,440				
Total	1,690,477	1.13	1,910,239	.873	1,667,639

Year 1989

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	497,210				
2. M & R	183,210				
3. Gas & elec.	48,575				
4. Other util.					
5. Rent	52,681				
6. Other costs	48,000				
Total	829,676	1.13	937,534	.816	765,029

Year 1990

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	234,509				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	324,845	1.13	367,075	.763	280,078

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 1991

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	234,509				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	324,845	1.13	367,075	.713	261,724

Year 1992

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	234,509				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	324,845	1.13	367,075	.666	244,472

Year 1993

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	234,509				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	324,845	1.13	367,075	.623	228,689

Year 1994

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	257,960				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	348,296	1.13	393,574	.582	229,060

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	257,960								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	348,296		1.13		393,574		.544		214,104

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	257,960								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	348,296		1.13		393,574		.508		199,936

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	257,960								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	348,296		1.13		393,574		.475		186,948

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	257,960								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	348,296		1.13		393,574		.444		174,747

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 199?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.415		175,430

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.388		164,017

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.362		153,026

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.339		143,363

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	283,756								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	374,092		1.13		422,724		.317		134,004

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.296		134,618

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.277		125,977

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.258		117,336

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.242		110,059

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	312,132								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	402,468		1.13		454,789		.226		102,782

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.211		103,403

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.197		96,542

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.184		90,171

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.172		84,290

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	343,345								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	433,681		1.13		490,060		.161		78,930

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.150		79,329

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 2015

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.141	74,569

Year 2016

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.131	69,280

Year 2017

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.123	65,050

Year 2018

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.115	60,819

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 2017

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.107	56,588

Year 2018

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.100	52,886

Year 2021

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	468,016	1.13	528,858	.094	49,713

Year 2022

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	377,680				
3. Gas & elec.	62,176				
4. Other util.					
5. Rent					
6. Other costs	29,160				
Total	468,016	1.13	528,858	.088	46,540

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: B Discount Rate 7%

Year 202_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.082		43,366

Year 202_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.076		40,193

Year 202_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.071		37,519

Year 202_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	377,680								
3. Gas & elec.	62,176								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	468,016		1.13		528,858		.067		35,433

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: C Discount rate: 7%

Year 198

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	679,720				
2. M & R					
3. Gas & elec.					
4. Other util.					
5. Rent	240,829				
6. Other costs	32,000				
Total	952549	1.13	1076380	.935	1006415

Year 198

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	1904180				
2. M & R	38,172				
3. Gas & elec.	9,360				
4. Other util.					
5. Rent	188,148				
6. Other costs	11,280				
Total	2151140	1.13	2430788	.873	2122078

Year 198

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction	701,540				
2. M & R	159,050				
3. Gas & elec.	39,000				
4. Other util.					
5. Rent	52,1681				
6. Other costs	41,000				
Total	993271	1.13	1122396	816	915875

Year 19

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	203584				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent					
6. Other costs	35,160				
Total	288664	1.13	326190	.763	248883

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	281664		1.13		318280		.713		226934

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	281664		1.13		318280		.666		211974

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	203,584								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	281664		1.13		318280		.623		198288

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.582		198628

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 199[illegible]

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.544		185659

Year 199[illegible]

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.508		173373

Year 199[illegible]

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.475		162110

Year 199[illegible]

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	223,942								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	302022		1.13		341285		.444		151531

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 199

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.415		152135

Year

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.388		142237

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.362		132706

Year 200

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.339		124274

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	246,336								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	324416		1.13		366590		.317		116209

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.296		116750

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.277		109256

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.258		101762

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.242		95451

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	270,970								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	349050		1.13		394427		.226		89141

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425046		.211		89685

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	298,067								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	376,147		1.13		425046		.197		83734

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 2011

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	298,067				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	376,147	1.13	425046	.184	78208

Year 2012

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	298,067				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	376,147	1.13	425046	.172	73108

Year 2013

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	298,067				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	376,147	1.13	425,046	.161	68432

Year 2014

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	327,874				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent					
6. Other costs	28,160				
Total	405954	1.13	458728	.150	68809

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 201_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.141		64681

Year 201_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.131		60093

Year 201_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.123		56424

Year 201_

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405 954		1.13		458728		.115		52754

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 201?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.107		49084

Year 20??

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.100		45873

Year 203?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.094		43120

Year 204?

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.088		40368

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: C Discount Rate 7%

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.082		37616

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.076		34863

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.071		32570

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	327,874								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent									
6. Other costs	28,160								
Total	405954		1.13		458728		.067		30735

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: D Discount rate: 7%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	241,184								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	867,299								
Total	1,391,811		1.13		1,572,746		.935		1,470,518

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.873		1,128,77[illegible]

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.816		1,055,07[illegible]

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.763		986,543

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,144,229		1.13		1,292,979		.713		921,994

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.666		810,357

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.623		758,037

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.582		708,150

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 1995

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.544		661,914

Year 1996

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.509		618,111

Year 1997

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.475		577,958

Year 1998

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.444		540,238

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.415		504,952

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.388		472,100

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.362		440,465

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.339		412,479

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2003

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.317	385,711

Year 2004

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.296	360,159

Year 2005

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.277	337,241

Year 2006

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.258	313,922

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2007

Cost Category	Cur.Costs	x Infl =	Prog.Costs	x Disc =	Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.242	294,454

Year 2008

Cost Category	Cur.Costs	x Infl =	Prog.Costs	x Disc =	Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.226	274,996

Year 2009

Cost Category	Cur.Costs	x Infl =	Prog.Costs	x Disc =	Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.211	256,735

Year 2010

Cost Category	Cur.Costs	x Infl =	Prog.Costs	x Disc =	Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	49,920				
4. Other util.					
5. Rent	233,408				
6. Other costs	725,925				
Total	1,076,773	1.13	1,216,753	.197	239,700

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.184		223,883

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.172		209,282

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.161		195,897

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.150		182,513

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2015

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.141		171,562

Year 2016

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.131		159,395

Year 2017

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.123		149,661

Year 2018

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.115		139,927

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2019

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.107		130,193

Year 2020

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.100		121,675

Year 2021

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.094		114,375

Year 2022

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.088		107,074

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: D Discount Rate 7%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.082		99,774

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.076		92,473

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.071		86,388

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	49,920								
4. Other util.									
5. Rent	233,408								
6. Other costs	725,925								
Total	1,076,773		1.13		1,216,753		.067		81,522

Military Family Housing Economic Analysis

FORM 1-2: LIFE-CYCLE COSTS SPREADSHEET

Program year: 1987 Option: E Discount rate: 7%

Year 1987

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	241,184								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	839,139								
Total	1321152		1.13		1492902		.935		1395863

Year 1988

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752377								
Total	1128182		1.13		1274846		.873		1112941

Year 1989

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1128182		1.13		1274846		.816		1040274

Year 1990

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	194,397								
6. Other costs	752,377								
Total	1128182		1.13		1274846		.763		972707

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 1991

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	134,976								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1128182		1.13		1,274,846		.713		908,960

Year 1992

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.666		798,281

Year 1993

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.623		746,740

Year 1994

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.582		697,597

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 1995

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.544	652,049

Year 1996

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.508	609,899

Year 1997

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.475	569,345

Year 1998

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.444	532,187

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 1999

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.415		497,427

Year 2000

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.388		465,065

Year 2001

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.362		433,900

Year 2002

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.339		406,332

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2003

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.317		379,963

Year 2004

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.296		354,792

Year 2005

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.277		332018

Year 2006

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.258		309,244

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2007

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.242		290,066

Year 2008

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.226		270,888

Year 2009

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.211		252,909

Year 2010

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.197		236,128

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2011

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.184		220,546

Year 2012

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.172		206,163

Year 2013

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.161		192,978

Year 2014

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.150		179,793

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2015

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.141	169,005

Year 2016

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.131	157,019

Year 2017

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.123	147,430

Year 2018

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.115	137,841

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2019

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.107	128,252

Year 2020

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.100	119,862

Year 2021

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.094	112,670

Year 2022

Cost Category	Cur.Costs	x Infl	= Prog.Costs	x Disc	= Pres.Value
1. Construction					
2. M & R	67,520				
3. Gas & elec.	42,432				
4. Other util.					
5. Rent	198,397				
6. Other costs	752,377				
Total	1060726	1.13	1,198,620	.088	105,479

LIFE-CYCLE COSTS SPREADSHEET CONTINUATION SHEET

Option: E Discount Rate 7%

Year 2023

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.082		98,287

Year 2024

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.076		91,095

Year 2025

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.071		85,102

Year 2026

Cost Category	Cur.Costs	x	Infl	=	Prog.Costs	x	Disc	=	Pres.Value
1. Construction									
2. M & R	67,520								
3. Gas & elec.	42,432								
4. Other util.									
5. Rent	198,397								
6. Other costs	752,377								
Total	1060726		1.13		1,198,620		.067		80,308

Military Family Housing Economic Analysis

FORM 2-1: DEFICIENCY CHECKLIST (G/FO)

2.1 Housing Quantity N/A

Current demand _____

Anticipated additional demand _____

Current on-base housing supply _____

Off-base housing supply _____

a Existing shortfall _____*

b Demand increase due to mission change _____*

2.2 Housing Condition

Fire Safety:

c Number of smoke detectors NONE locations _____

d Distance to nearest fire hydrant 25' * flows N/A

Distance from unit to street 25'

Structure safety:

e outside windows each BR: yes X no _____*

f fire walls between units (1 hr.): yes X no _____*

wooden roof: yes _____* no X

fire-retardant finishes: yes _____ no X*

g Ambient noise levels: N/A

is unit in: APZ I _____ APZ II _____

interior noise levels:

less than 35 db _____ greater than 35 db _____*

h Hazardous building materials: N/A

asbestos insulation _____*

toxic paint _____*

other _____*

i Ceiling height: 7 ft or more X under 7 ft _____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(G/FO)

j Play areas:
segregated from street: yes X no ____*
visible from units: yes X no ____*
fenced/secure: yes X no ____*
k Structurally sound: yes X no ____*
l Unsafe protuberances: yes ____* no X

Age of housing ~ 90 years
Exterior materials Brick, mortar, stone foundation

Items in need of repair:*

m	foundation	X	n	roof	
o	walls	X	p	windows	X
q	floors/coverings	X	r	doors	
s	kitchen cabinets, etc.	X	t	appliances	X
u	bathroom fixtures	X	v	plumbing	
w	electricity	X	x	HVAC	X
y	site utilities		z	streets/drives	
aa	garage/carport	X	bb	gutters/downspouts	X

cc Does unit have termites? yes ____* no X

2.3 Housing Adequacy

Type of housing (check appropriate):
single family X (1) (CUCSAC) duplex X apartment ____
townhouse (more than 2 units/structure) ____

Pay grade:
O-7 and above ____ O-6 X
O-4 and O-5 X O-1 to O-3 ____
E-7 to E-9 ____ E-1 to E-6 ____

dd Is housing compatible with Base Comprehensive Plan?
yes X no ____*

ee Building separation:
greater than 25 ft ____ 20 to 24 ft X
15 to 19 ft ____* less than 15 ft ____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(6/FC)

ff Net area 3199 ft² (Check against authorizations*)
+ basement (CINCSAC 3839 ft² + basement)

gg Number of bedrooms 4

hh Family room (for 3-BR units or larger):
yes X no _____*

ii Dining area (3-BR units or larger):
yes X no _____*

jj Kitchen area:
full kitchen X kitchenette _____
no kitchen _____*

kk Appliances:

range:	yes X	no _____*
refrigerator:	yes X	no _____*
exhaust fan to outside:	yes _____	no X*
dishwasher:	yes _____	no X*
garbage disposal:	yes _____	no X*
ll space for freezer:	yes X	no _____*
mm Laundry space:	yes _____	no X*
washer:	yes _____	no X
dryer:	yes _____	no X

nn Number of baths (Check against authorizations*)
full baths 1 (CINCSAC 2) 3/4 baths _____
1/2 baths 1 (CINCSAC 1) master bath _____

oo Private entry: yes X no _____*

pp Closets (minimum width): N/A

entry hall:	3 ft _____	less than 3 ft _____*
BR 1:	6 ft _____	less than 6 ft _____*
BR 2:	3 ft _____	less than 3 ft _____*
BR 3:	3 ft _____	less than 3 ft _____*
BR 4:	3 ft _____	less than 3 ft _____*
Linen:	2 ft _____	less than 2 ft _____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(G/FO)

qq Storage: N/A

more than 60 ft² _____ 50 to 59 ft² _____
40 to 49 ft² _____ less than 40 ft² _____*

rr Circulation:

Are all bedrooms accessible from hall?
yes X no _____*

Is dining area accessible from the kitchen?
yes X no _____*

ss Telephone: yes X no _____*

tt Outdoor space:

private yard X courtyard _____
patio _____ common yard _____
landscaping X none _____*

uu Privacy fence: yes _____ no _____*

vv Parking:

garage: yes _____ no _____
carport: yes X no _____*
driveway: yes _____ no _____*
on-street: yes _____ no _____*

ww Sidewalks: yes X no _____*

2.4. Energy Conservation N/A

xx Insulation:

ceiling: yes _____ no _____* "U" value _____
walls: yes _____ no _____* "U" value _____
floor: yes _____ no _____* "U" value _____

yy Glazing:

single pane X* double pane _____

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(G/FO)

zz Energy consumption:

Type of heat: Hot water

electric _____ natural gas _____

LPG _____ oil _____

central heat plant (coal) X

Air Conditioning: yes X no _____

Type:

standard _____ swamp coolers _____

heat pump: _____

Are individual units metered? yes _____ no X

If yes, average annual consumption rate for heat:

1. Divide BTU/unit by unit ft^2
2. Sum BTU/ft^2 of all units
3. Divide by number of units

average BTU/ft^2: _____ base year(s): _____

If no, estimated annual consumption rate for all units:

1. Divide total BTU by number of units
   average BTU/unit: _____
2. Divide by average unit ft^2
   average BTU/ft^2: _____

Energy consumption rate _____ BTU/ft^2

Air Force goal _____ BTU/ft^2

Excessive consumption _____ BTU/ft^2

Percent overconsumption ("Excessive consumption" divided by "Air Force goal") _____%

Percent overconsumption greater than 25% _____%*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

Military Family Housing Economic Analysis

FORM 2-1: DEFICIENCY CHECKLIST (NCO)

2.1 Housing Quantity N/A

Current demand _____
Anticipated additional demand _____
Current on-base housing supply _____
Off-base housing supply _____
a Existing shortfall _____*
b Demand increase due to mission change _____*

2.2 Housing Condition

Fire Safety:
c Number of smoke detectors Ø locations _____
d Distance to nearest fire hydrant 25' * flows _____
Distance from unit to street 25'
Structure safety:
e outside windows each BR: yes X no _____*
f fire walls between units (1 hr.): yes X no _____*
wooden roof: yes _____* no X
fire-retardant finishes: yes _____ no X*

g Ambient noise levels: N/A
is unit in: APZ I _____ APZ II _____
interior noise levels:
less than 35 db _____ greater than 35 db _____*

h Hazardous building materials: N/A
asbestos insulation _____*
toxic paint _____*
other _____*

i Ceiling height: 7 ft or more X under 7 ft _____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(NCO)

j Play areas:
segregated from street: yes X no ____*
visible from units: yes X no ____*
fenced/secure: yes X no ____*

k Structurally sound: yes X no ____*

l Unsafe protuberances: yes ____* no X

Age of housing 80-90 yrs
Exterior materials Brick, mortar, stone foundation

Items in need of repair:*

m	foundation	X	n	roof	
o	walls	X	p	windows	X
q	floors/coverings	X	r	doors	
s	kitchen cabinets, etc.	X	t	appliances	X
u	bathroom fixtures	X	v	plumbing	X
w	electricity	X	x	HVAC	X
y	site utilities		z	streets/drives	
aa	garage/carport	X	bb	gutters/downspouts	X

cc Does unit have termites? yes ____* no X

2.3 Housing Adequacy

Type of housing (check appropriate):
single family X (1) duplex X apartment ____
townhouse (more than 2 units/structure) ____

Pay grade:
O-7 and above ____ O-6 ____
O-4 and O-5 ____ O-1 to O-3 ____
E-7 to E-9 ____ E-1 to E-6 ____

dd Is housing compatible with Base Comprehensive Plan?
yes X no ____*

ee Building separation:
greater than 25 ft ____ 20 to 24 ft X
15 to 19 ft ____* less than 15 ft ____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(NCO)

ff Net area 835 or 935 ft² (Check against authorizations*)
(989 for single family unit)

gg Number of bedrooms 2

hh Family room (for 3-BR units or larger): N/A
yes _____ no _____*

ii Dining area (3-BR units or larger): N/A
yes _____ no _____*

jj Kitchen area:
full kitchen X kitchenette _____
no kitchen _____*

kk Appliances:

	range:	yes X	no _____	*
	refrigerator:	yes X	no _____	*
	exhaust fan to outside:	yes _____	no X	*
	dishwasher:	yes _____	no X	*
	garbage disposal:	yes _____	no X	*
ll	space for freezer:	yes _____	no X	*

mm	Laundry space:	yes _____	no X	*
	washer:	yes _____	no X	
	dryer:	yes _____	no X	

nn Number of baths (Check against authorizations*)
full baths 1 3/4 baths _____
1/2 baths _____ master bath _____

oo Private entry: yes _____ no _____*

pp Closets (minimum width): N/A

entry hall:	3 ft	_____	less than 3 ft	_____*
BR 1:	6 ft	_____	less than 6 ft	_____*
BR 2:	3 ft	_____	less than 3 ft	_____*
BR 3:	3 ft	_____	less than 3 ft	_____*
BR 4:	3 ft	_____	less than 3 ft	_____*
Linen:	2 ft	_____	less than 2 ft	_____*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(NCO)

qq Storage: N/A

more than 60 ft² _____ 50 to 59 ft² _____

40 to 49 ft² _____ less than 40 ft² _____*

rr Circulation:

Are all bedrooms accessible from hall?

yes X no _____*

Is dining area accessible from the kitchen?

yes X no _____*

ss Telephone: yes X no _____*

tt Outdoor space:

private yard X courtyard _____

patio _____ common yard _____

landscaping _____ none _____*

uu Privacy fence: yes X no _____*

vv Parking:

garage: yes _____ no _____

carport: yes X no _____*

driveway: yes _____ no _____*

on-street: yes _____ no _____*

ww Sidewalks: yes X no _____*

2.4. Energy Conservation N/A

xx Insulation:

ceiling: yes _____ no _____* "U" value _____

walls: yes _____ no _____* "U" value _____

floor: yes _____ no _____* "U" value _____

yy Glazing:

single pane X* double pane _____

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

(NLS)

zz Energy consumption:

Type of heat: Hot water

electric _____ natural gas _____

LPG _____ oil _____

central heat plant (coal) X

Air Conditioning: yes X no _____

Type:

standard _____ swamp coolers _____

heat pump: _____

Are individual units metered? yes _____ no X

If yes, average annual consumption rate for heat:

1. Divide BTU/unit by unit ft^2
2. Sum BTU/ft^2 of all units
3. Divide by number of units

average BTU/ft^2: _____ base year(s): _____

If no, estimated annual consumption rate for all units:

1. Divide total BTU by number of units

average BTU/unit: _____

2. Divide by average unit ft^2

average BTU/ft^2: _____

Energy consumption rate _____ BTU/ft^2

Air Force goal _____ BTU/ft^2

Excessive consumption _____ BTU/ft^2

Percent overconsumption ("Excessive consumption" divided by "Air Force goal") _____%

Percent overconsumption greater than 25% _____%*

*If filled in, enter an X on the corresponding line of Form 2-2: Deficiency Sheet.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION A

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the reqirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggrevates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggrevates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:
Not used.

2.2 Housing Condition

+3 Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

+1 Option corrects some deficiencies.

(0) Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments: Both GFO and NCO units exhibit extensive deterioration of foundation, walls, stairways, windows, floors, and electrical wiring. Bathrooms and kitchens are outdated. Carports, gutters and downspouts are in need of repair. There are no laundry facilities available.

FORM 2-3 CONTINUED OPTION A

2.3 Housing Adequacy

+3 Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

(0) Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments: G/FO quarters offer adequate overall living space yet are in need of master bathroom facilities to eliminate sharing of one bathroom. Interior design is not conducive to a modern lifestyle. NCO quarters are cramped and currently assigned on a volunteer basis only.

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

+1 Option improves energy efficiency up to 20%.

(0) Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments:

All heating and cooling units are in need of repair. Attic Insulation is needed in some units as are new energy efficient windows.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION B

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the requirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggrevates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggrevates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:
Not Used

2.2 Housing Condition

+3 Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

(+1) Option corrects some deficiencies.

0 Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments: Planned Renovation will include repairing foundation, walls, b
rooms, kitchens, ceilings, and electrical wiring. Not included in plan is re
of smoke detectors, carports, downspouts and gutters, nor addition of
laundry facilities in G/EO units.

FORM 2-3 CONTINUED OPTION B

2.3 Housing Adequacy

+3 Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

(0) Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments: There is no plan to add master bathrooms to 3, FO units nor to expand NCO quarters living space. More modern interior space is also not planned.

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

(+1) Option improves energy efficiency up to 20%.

0 Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments: Installation of new windows, increased attic insulation, and repair of HVAC equipment will reduce energy consumption by 13% relative to Option A.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION C

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the requirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggrevates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggrevates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:
Not Used.

2.2 Housing Condition

(+3) Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

+1 Option corrects some deficiencies.

0 Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments: New housing would most likely correct all existing deficiencies, offering improved liveability and quality. Although architectural style may not be preferred by the residents, interior designs would likely be more attractive and efficient.

FORM 2-3 CONTINUED OPTION C

2.3 Housing Adequacy

(+3) Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

0 Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments: Existing deficiencies, particularly limited space in NCO quarters would be eliminated. New GFO housing might have less space but would be better designed.

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

(+1) Option improves energy efficiency up to 20%.

0 Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments: Energy Saving appliances and insulation would reduce annual consumption by an estimated 13% relative to Option 4.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION D

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the requirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggrevates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggrevates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:
Not Used.

2.2 Housing Condition

(+3) Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

+1 Option corrects some deficiencies.

0 Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments: Government leased housing would offer contemporary exterior style and liveable interior design. Architecture would be tasteful though not necessarily that preferred by the residents.

FORM 2-3 CONTINUED OPTION D

2.3 Housing Adequacy

(+3) Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

0 Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments: Interior living areas would be similar to Option B. G/FO houses would likely be in single family; duplex units, while VCO housing could be located in apartment or condominium units.

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

(+1) Option improves energy efficiency up to 20%.

0 Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments: There would be a 13% decrease in consumption relative to Option A.

Military Family Housing Economic Analysis

FORM 2-3: PROJECT EFFECTIVENESS OPTION E

Circle the score of the most appropriate description for each section:

2.1 Housing Quantity

+3 Option increases housing available and eliminates a shortage; a recent or anticipated mission change contributes to the requirement.

+2 Option increases housing available and eliminates a shortage; no mission change affecting MFH is expected.

+1 Option increases housing available and reduces a shortage; no mission change affecting MFH is expected.

0 Option does not change housing availability or there is no shortage.

-1 Option reduces housing available and creates a shortage.

-2 Option reduces housing available and aggrevates an existing shortage.

-3 Option reduces housing available; a recent or anticipated mission change aggrevates the shortage.

Enter score on line 2.1 of Form 2-4 for this option.

Comments:
Not Used

2.2 Housing Condition

(+3) Option corrects deficiencies related to the health/safety of occupants.

+2 Option corrects all structural deficiencies; health/safety is not an issue.

+1 Option corrects some deficiencies.

0 Option does not change deficiencies.

-1 Option decreases housing quality with minor deficiencies.

-2 Option involves housing with major deficiencies.

-3 Option involves housing, the condition of which affects health/safety of occupants.

Enter score on line 2.2 of Form 2-4 for this option.

Comments: Renting with direct compensation would offer similar housing quality to that of Option D. However, because personnel would be given a choice, this option would probably offer the highest quality as percieved by the occupant.

FORM 2-3 CONTINUED OPTION E

2.3 Housing Adequacy

(+3) Option eliminates all inadequacies and brings housing supply in line with the base grade/rank distribution.

+2 Option corrects inadequacies in bedroom mix and/or authorized facilities.

+1 Option corrects inadequacies in the size (square feet) of housing units.

0 Option does not affect the adequacy of housing.

-1 Option increases housing with inadequate square footages.

-2 Option increases housing with inadequate bedroom mix and/or other facilities.

-3 Option replaces adequate housing with inadequate housing.

Enter score on line 2.3 of Form 2-4 for this option.

Comments: This alternative would offer personnel preferred housing size, type, design, and enviroment within an affordable range.

2.4 Energy Conservation

+3 Option decreases energy consumption and brings housing in full compliance with Air Force standard.

+2 Option increases energy efficiency 20% or more or brings housing in full compliance with standard.

(+1) Option improves energy efficiency up to 20%.

0 Option does not change energy efficiency or consumption.

-1 Option does not change energy efficiency of housing but increases energy consumption.

-2 Option decreases energy efficiency or increases energy consumption of housing up to 20%.

-3 Option decreases energy efficiency or increases energy consumption of housing 20% or more.

Enter score on line 2.4 of Form 2-4 for this option.

Comments:
A 13% decrease in energy consumption relative to Option A is expected.

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET

Number	Factor/Criterion	Weight
(Option) 2.2	Housing Condition	3
(Option) 2.3	Housing Adequacy	2
(Option) 2.4	Energy Conservation	1
(Option)		
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
2.2	0	2.3	0	2.4	+1	2.4	+1	2.4	+1
	0		0	2.2	+3	2.2	+3	2.2	+3
	0	2.2	+1		+3		+3		+3
2.3	0		+1		+3		+3		+3
	0		+1	2.3	+3	2.3	+3	2.3	+3
2.4	0	2.4	+1		+3		+3		+3

Median A	Median B	Median C	Median D	Median E
0	+1	+3	+3	+3

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM 3-1: OFF-BASE HOUSING

Total number of military families assigned to base: 3,625
Number of on-base housing units: 2,725
Number of personnel residing off-base: 900

Average rental costs:
O-6 and above: $750/mo.
O-1 to O-5: 475
E-7 to E-9: $450/mo.
E-1 to E-6: N/A

Local rental vacancy rate: 6.8% source: Real Estate Bd.

	Total	Available
Units within 15 miles of base:	16,000	1,088
Units within 60 miles of base:	30,000	2,040

Operational Requirements
Number of personnel with response requirement: 5
Number of personnel with security requirement: 6

Socioeconomic Impact Considerations
Ratio of vacant housing to base housing requirement: 2.4:1
School District is (check one):
Overcrowded
Underutilized
Neither of the above X

Other considerations (describe): _____

Socioeconomic Impact Analysis is (check one):
Required
Not required X

FORM 3-2: SPECIAL CONSIDERATIONS OPTION A

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-minute commute of the base.

+2 Option increases the availability of housing of adequate quality within an hour commute of the base.

+1 Option increases the availability of affordable housing within an hour commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within an hour commute of the base.

-2 Option does not provide for affordable housing within an hour commute of the base.

-3 Option does not provide for housing of adequate quality within an hour commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:
Not used.

3.2 Operational Responsiveness (Check if project involves key personnel: ✓)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

(0) Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

-2 Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments:

FORM 3-2 CONTINUED OPTION A

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

(0) Option does not change operational security conditions.

-1 Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments:

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required:___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socio-economic conditions.

-2 Option aggrevates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option

Comments:

Not used.

FORM 3-2: SPECIAL CONSIDERATIONS OPTION B

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-minute commute of the base.

+2 Option increases the availability of housing of adequate quality within an hour commute of the base.

+1 Option increases the availability of affordable housing within an hour commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within an hour commute of the base.

-2 Option does not provide for affordable housing within an hour commute of the base.

-3 Option does not provide for housing of adequate quality within an hour commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:
Not used.

3.2 Operational Responsiveness (Check if project involves key personnel:)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

(0) Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

-2 Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments: Option would require key personnel to live off base until project is complete.

FORM 3-2 CONTINUED OPTION B

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

(0) Option does not change operational security conditions.

-1 Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments: Operational security would be temporarily decreased during construction.

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required:___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socio-economic conditions.

-2 Option aggrevates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option

Comments:

Not used.

FORM 3-2: SPECIAL CONSIDERATIONS OPTION C

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-minute commute of the base.

+2 Option increases the availability of housing of adequate quality within an hour commute of the base.

+1 Option increases the availability of affordable housing within an hour commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within an hour commute of the base.

-2 Option does not provide for affordable housing within an hour commute of the base.

-3 Option does not provide for housing of adequate quality within an hour commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:
Not used.

3.2 Operational Responsiveness (Check if project involves key personnel:)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

(0) Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

-2 Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments: Key personnel would live off base during construction.

FORM 3-2 CONTINUED OPTION C

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

(0) Option does not change operational security conditions.

-1 Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments: Operational security would be temporarily decreased during construction.

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required: ___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socio-economic conditions.

-2 Option aggrevates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option

Comments:
Not used.

FORM 3-2: SPECIAL CONSIDERATIONS OPTION D

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-minute commute of the base.

+2 Option increases the availability of housing of adequate quality within an hour commute of the base.

+1 Option increases the availability of affordable housing within an hour commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within an hour commute of the base.

-2 Option does not provide for affordable housing within an hour commute of the base.

-3 Option does not provide for housing of adequate quality within an hour commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:
Not used.

3.2 Operational Responsiveness (Check if project involves key personnel: ✓)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

0 Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

(-2) Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments: Option would decrease response time, particularly in the winter. Response time could double or triple.

FORM 3-2 CONTINUED OPTION D

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

0 Option does not change operational security conditions.

(-1) Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments: Inherent security on base would not be found off base.

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required:___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socio-economic conditions.

-2 Option aggrevates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option

Comments:
Not used.

FORM 3-2: SPECIAL CONSIDERATIONS OPTION E

Circle the score of the most appropriate description for each section:

3.1 Housing Availability, Affordability and Accessibility

+3 Option increases the availability of affordable, quality housing within a 15-minute commute of the base.

+2 Option increases the availability of housing of adequate quality within an hour commute of the base.

+1 Option increases the availability of affordable housing within an hour commute of the base.

0 Option does not change the availability of affordable, quality housing.

-1 Option decreases the availability of affordable, quality housing within an hour commute of the base.

-2 Option does not provide for affordable housing within an hour commute of the base.

-3 Option does not provide for housing of adequate quality within an hour commute of the base.

Enter score on line 3.1 of Form 3-3 for this option.

Comments:
Not used.

3.2 Operational Responsiveness (Check if project involves key personnel: ✓)

+3 Option rectifies inadequate response capability of key personnel that currently threatens mission integrity.

+2 Option significantly improves response times of key personnel and meets all mission requirements.

+1 Option improves response time of key personnel.

0 Option does not change response time of key personnel.

-1 Option increases response time of key personnel but does not significantly decrease their operational capability.

(-2) Option increases response time of key personnel and appreciably decreases their operational capability.

-3 Option degrades the operational capability of key personnel to the point of threatening the integrity of the mission.

Enter score on line 3.2 of Form 3-3 for this option.

Comments: Option would decrease response time, especially in winter.

FORM 3-2 CONTINUED OPTION E

3.3 Operational Security

+3 Option eliminates existing vulnerability to off-base security threats.

+2 Option improves the operational security of high-risk personnel and their quarters.

+1 Option reduces commitment of resources required to maintain operational security.

0 Option does not change operational security conditions.

(-1) Option increases the commitment of resources required to maintain the operational security of high-risk personnel.

-2 Option degrades the security of high-risk personnel and their quarters.

-3 Option creates a potential threat to personnel and to others (e.g., neighbors).

Enter score on line 3.3 of Form 3-3 for this option.

Comments: Inherent security found on base would not exist off base.

3.4 Socioeconomic Impact

Check here if socioeconomic impact analysis required:___

+3 Option eliminates an existing adverse condition created by the base.

+2 Option improves an existing adverse housing vacancy rate (too high or too low) or school district imbalance.

+1 Option benefits the community economically.

0 Option does not have a socioeconomic impact on the local community.

-1 Option is potentially incompatible with local socio-economic conditions.

-2 Option aggrevates an existing adverse housing vacancy rate (too high or too low) or school district imbalance, but the socioeconomic impact analysis has determined that the impact will not be significant.

-3 Option will have a significant adverse socioeconomic impact.

Enter score on line 3.4 of Form 3-3 for this option

Comments:

Not used

FORM 4-1: HISTORIC PRESERVATION CHECKLIST

Is the existing housing currently on the National Register of Historic Places (Register)?

__✓__ yes If yes, complete Form 4-2 for each option.
_____ no If no, go to the next question.

Is the existing housing eligible for the Register?

_____ yes If yes, complete Form 4-2 for each option.
_____ no/? If no/do not know, go on to next question.

Is the existing housing (check appropriate line):

a) 50 years old or older _____
b) architecturally unique _____
c) associated with an historic person or event _____

If a), b) and/or c) are checked, assume that the housing is historic for the purposes of this analysis and complete Form 4-2 for each option.

If none of a), b) or c) is checked, enter "N/A" in items B4, C4, D4 and E4 of Form S-1.

Military Family Housing Economic Analysis

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION A

Check if project involves historic properties: ✓

Circle the score of the most appropriate description:

+3 Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

(0) Option preserves the status quo.

-1 Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

-3 Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION B

Check if project involves historic properties: ✓

Circle the score of the most appropriate description:

(+3) Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

0 Option preserves the status quo.

-1 Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

-3 Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

Military Family Housing Economic Analysis

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION C

Check if project involves historic properties: ✓

Circle the score of the most appropriate description:

+3 Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

0 Option preserves the status quo.

-1 Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

(-3) Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION D

Check if project involves historic properties: ✓

Circle the score of the most appropriate description:

+3 Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

0 Option preserves the status quo.

(-1) Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

-3 Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

Military Family Housing Economic Analysis

FORM 4-2: OPTION HISTORIC PRESERVATION CONSIDERATIONS

OPTION E

Check if project involves historic properties: ✓

Circle the score of the most appropriate description:

+3 Option incorporates a commitment to historic preservation values, maintains the original use of historic structures, and involves improvements to or increased protection of historic properties.

+2 Option involves compatible rehabilitation of deteriorating historic properties (including for another use).

+1 Option improves the stability or condition of historic properties but does not involve specific restoration or protection actions.

0 Option preserves the status quo.

(-1) Option adversely affects historic properties or results in their gradual decay, beyond what can be expected with the status quo.

-2 Option results in loss of historic properties or degrades their integrity to the point of threatening their eligibility to the National Register of Historic Places (Register).

-3 Option involves the elimination of properties listed on the Register.

Enter score on line 4 of Form S-1 for this option.

Comments:

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET (10%)

Number	Factor/Criterion	Weight
(Option) 1	Life Cycle Costs	5
(Option) 2	Project Effectiveness	2
(Option) 3	Special Considerations	1
(Option) 4	Historic Preservation	2
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
1	0	1	0			1	-3	1	-3
	0		0				-3		-3
	0		0	1	0		-3		-3
	0		0		0		-3		-3
	0		0		0		-3		-3
2	0	3	0		0		-1.5	3	-1.5
	0	2	+1		0	4	-1	4	-1
3	0		+1	3	0		-1		-1
4	0	4	+3	2	+3	2	+3	2	+3
	0		+3		+3		+3		+3

Median		Median		Median		Median		Median	
A	0	B	0	C	0	D	-2.25	E	-2.25

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET (10%)

Number	Factor/Criterion	Weight
(Option) 1	Life-Cycle Costs	2
(Option) 2	Project Effectiveness	2
(Option) 3	Special Considerations	1
(Option) 4	Historic Preservation	2
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
1	0	4	+3	2	+3	2	+3	2	+3
	0		+3		+3		+3		+3
2	0	2	+1	1	0	4	-1	4	-1
	0		+1		0		-1		-1
3	0	3	0	3	0	3	-1.5	3	-1.5
4	0	1	0	4	-3	1	-3	1	-3
	0		0		-3		-3		-3

Median		Median		Median		Median		Median	
A	0	B	+1	C	0	D	-1	E	-1

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET (7%)

Number	Factor/Criterion	Weight
(Option) 1	Life Cycle Costs	5
(Option) 2	Project Effectiveness	2
(Option) 3	Special Considerations	1
(Option) 4	Historic Preservation	2
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
1	0	4	+3	2	+3	2	+3	2	+3
	0		+3		+3		+3		+3
	0	1	+1	1	+1	4	-1	4	-1
	0		+1		+1		-1		-1
	0		+1		+1	3	-1.5	3	-1.5
2	0		+1		+1	1	-3	1	-3
	0		+1		+1		-3		-3
3	0	2	+1	3	0		-3		-3
4	0		+1	4	-3		-3		-3
	0	3	0		-3		-3		-3

Median	Median	Median	Median	Median
A 0	B +1	C +1	D -2.25	E -2.25

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

Military Family Housing Economic Analysis

FORM W: WEIGHTING WORKSHEET (7%)

Number	Factor/Criterion	Weight
(Option) 1	Life cycle costs	2
(Option) 2	Project Effectiveness	2
(Option) 3	Special Considerations	1
(Option) 4	Historic Preservation	2
(Option)		
(Option)		
(Option)		

Option A		Option B		Option C		Option D		Option E	
no.	score	no.	score	no.	score	no.	score	no.	score
1	0	4	+3	2	+3	2	+3	2	+3
	0		+3		+3		+3		+3
2	0	1	+1	1	+1	4	-1	4	-1
	0		+1		+1		-1		-1
3	0	2	+1	3	0	3	-1.5	3	-1.5
4	0		+1	4	-3	1	-3	1	-3
	0	3	0		-3		-3		-3

Median		Median		Median		Median		Median	
A	0	B	+1	C	+1	D	-1	E	-1

Enter medians on corresponding lines of Form 2-4, 3-3, or S-1.

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