

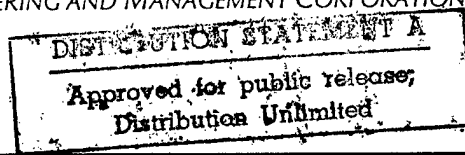
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1 INTRODUCTION AND REPORT REVIEW FORMS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

This document has been prepared to provide a prefinal of the progress made on the project to date. It also provides information required to identify projects for programming and preparation of necessary funding documentation. The projects are formed by grouping energy conservation opportunities (ECOs) for the buildings into packages which meet specific funding criteria. Your timely review and comments on this document are critical to the successful and timely completion of the project. To assist you in expediting this process, we have included in this section several copies of a reviewer's comment form. Use of this form will assure all information needed to properly respond to your comments is available. Please forward your comments to the following address as soon as possible, but no more than twenty-one days after you receive this report:

Savannah District, Corps of Engineers

Attn: CESAS-PM-MP (Mr. Rob Callahan)

100 W. Oglethorpe Avenue

P.O. Box 889

Savannah, GA 31402-0889

Feel free to copy as many comment pages as you wish.

Project Review Comments	Interim ☐	Project:	Limited Energy Study of Hangar Facilities at Simmons Army Airfield Fort Bragg, NC	Reviewer:	Page 1 of ____
	Pre-Final ☐	Location:		Name:	Date: ____
	Final ☐	Year:	P.N.	Organizer:	

Comment No.	Vol.	Sec.	Page	COMMENTS ☐ Struc. ☐ Arch. ☐ Civ. ☐ Mech. ☐ Elec. ☐ San. ☐ Env. ☐ Fire ☐ Other	Action Code	RESOLUTIONS (include location of documents)	Ref.

ACTION CODES: A - Accepted/Concur D - Action Deferred N - Non-concur VE - VE Potential/VEP Attached W - Withdrawn

2 WORK ACCOMPLISHED TO DATE

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

The work which has been accomplished as of the date of this report is summarized as follows:

1. field surveys completed for 12 buildings
2. baseline building energy computer models for 12 buildings
3. evaluation of energy conservation opportunities
4. calculation and reporting of energy conservation opportunities
5. preparation and completion of all field notes
6. completion of interim report.
7. interim review meeting
8. response to interim review comments
9. completion of prefinal report

This section of the report outlines the details of the work accomplished primarily through the use of a database which contains the information obtained in the field and developed from calculations. The data is presented in tables to provide specific information about each segment of the work accomplished to date.

2.1 FIELD SURVEY

The field survey as required in *Section 2, Scope of Work* (refer to *Appendix A* of this document) has been completed.

Twelve buildings were surveyed in the Historic Red Brick Area for lighting, HVAC, building envelope and water system improvements. The buildings represent several functional building types. *Table 2.1.1.1* provides a listing of the surveyed buildings.

2.2 BUILDING ENERGY CONSUMPTION BASELINE

The building energy consumption baselines were established using computer calculation techniques as required by the Scope of Work. The calculation methods are discussed in detail under *Section 3.2, Calculations*. An energy baseline was calculated for each ECO for each building.

TABLE 2.1.1.1
BUILDINGS SURVEYED

BUILDING TYPE	BUILDING NUMBER	BUILDING AREA (FT ²)	HEATED AREA (FT ²)	COOLED AREA (FT ²)
BARRACKS/ADMINISTRATION	1-1242	25,660	20,180	19,030
ADMINISTRATION	1-1326	60,600	57,120	57,120
ADMINISTRATION	1-1333	14,300	13,700	13,120
COMPUTER FACILITY	1-1434	13,500	9,870	12,750
BARRACKS/ADMINISTRATION	2-1105	94,300	90,050	80,800
ADMINISTRATION	2-1120	49,600	49,600	47,300
ADMINISTRATION	2-1127	63,450	62,300	61,090
ADMINISTRATION	2-1133	41,360	39,300	39,300
BARRACKS/ADMINISTRATION	2-1138	72,300	56,100	51,620
SHOP	2-1549	30,150	30,150	4,050
ADMINISTRATION	2-1728	74,600	70,450	66,370
BARRACKS/ADMINISTRATION	2-1731	72,300	61,280	58,040
<u>TOTAL</u>		612,120	560,100	510,590

2 WORK ACCOMPLISHED TO DATE

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2.2.1 Lighting Systems

The baseline energy consumption for the lighting systems surveyed were calculated using computerized techniques. The building baselines were calculated using LOTUS 1-2-3 spreadsheets specifically designed for each energy conservation opportunity and include only lighting energy consumption. The baseline energy consumption for the lighting systems was used for calculating savings associated with ECO-1 only. *Table 2.2.1.1* shows the lighting energy consumption baseline for each building.

2.2.2 Water Systems

The baseline water and energy consumption for ECO-3 was calculated using Lotus 1-2-3 spreadsheets which utilized the data gathered in the field. Baseline consumption figures were established for each building for each of the following: toilets, urinals, lavatory faucets, and showerheads. *Table 2.2.2.1* lists the baseline energy and water consumption for each building under this ECO.

2.2.3 Heating, Cooling, and Building Envelope Systems

The baseline energy consumption for ECOs 2, 4, 5, 6, and 7 was modeled using the Department of Energy's Buildings Energy Performance Program, DOE 2. This building model considers all energy sources within a building and their impact upon each other. Each of the 12 buildings under consideration was modeled separately. The baseline computer model was input so that the model matched the conditions found in each building during the field survey to the extent possible. The baseline energy consumption figures for these ECOs are shown in *Table 2.2.3.1*.

2.3 ENERGY CONSERVATION OPPORTUNITIES

The energy conservation opportunity calculations were performed using computerized techniques. Spreadsheets were developed in LOTUS 1-2-3 for ECOs 1 and 3. For ECOs 2, 4, 5, 6, and 7, DOE computer simulations were used to compare ECO energy usage to baseline energy usage. *Table 2.3.1* lists all the energy conservation opportunities by number with a description of each.

2.3.1 ECO-1: Install High Efficiency Lighting Systems

This energy conservation opportunity was calculated using a LOTUS 1-2-3 spreadsheet for each building. Manufacturers' information and field notes were used in formulating the calculations. The systems evaluated include fluorescent lighting, incandescent lighting, mercury vapor lighting and exit

TABLE 2.2.1.1

**BASELINE ENERGY CONSUMPTION
FOR ECO-1**

ECO NUMBER	BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MWH)
1	1-1242	59.909
1	1-1326	52.868
1	1-1333	66.746
1	1-1434	183.040
1	2-1105	78.165
1	2-1120	265.933
1	2-1127	134.386
1	2-1133	88.296
1	2-1138	141.709
1	2-1549	171.278
1	2-1728	110.894
1	2-1731	162.778

TABLE 2.2.2.1

**BASELINE ENERGY AND WATER CONSUMPTION
FOR ECO-3**

ECO NUMBER	BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MWH)	BASELINE WATER CONSUMPTION KL/YR
3	1-1242	246.6	1,864
3	1-1326	69.1	769
3	1-1333	2.2	157
3	1-1434	2.2	157
3	2-1105	16.0	1,165
3	2-1120	16.8	1,092
3	2-1127	15.1	1,005
3	2-1133	33.9	614
3	2-1138	1,830.6	11,585
3	2-1549	1.1	82
3	2-1728	37.4	787
3	2-1731	15.8	4,651
	TOTALS	2,286.8	23,928

TABLE 2.2.3.1

**BASELINE ENERGY CONSUMPTION
FOR ECOs 2, 4, 5, 6 & 7**

ECO NUMBER	BUILDING NUMBER	BASELINE ENERGY CONSUMPTION (MWH)
2, 4, 5, 6 & 7	1-1242	862.12
2, 4, 5, 6 & 7	1-1326	3,320.57
2, 4, 5, 6 & 7	1-1333	626.80
2, 4, 5, 6 & 7	1-1434	—
2, 4, 5, 6 & 7	2-1105	3,399.03
2, 4, 5, 6 & 7	2-1120	2,526.14
2, 4, 5, 6 & 7	2-1127	2,419.25
2, 4, 5, 6 & 7	2-1133	1,256.11
2, 4, 5, 6 & 7	2-1138	2,710.79
2, 4, 5, 6 & 7	2-1549	1,381.86
2, 4, 5, 6, & 7	2-1728	2,460.85
2, 4, 5, 6 & 7	2-1731	2,278.09

TABLE 2.3.1

**ECOs CONSIDERED
FOR THIS PROJECT**

ECO NUMBER	ECO NAME	ECO DESCRIPTION
1	INSTALL HIGH EFFICIENCY INTERIOR/EXTERIOR LIGHTING SYSTEMS	Lighting efficiency improvements include: T8 fluorescent lamps with electronic ballasts, compact fluorescents, LED exit signs and metal halide HID fixtures.
2	BUILDING ENVELOPE MODIFICATIONS	New high R-Value insulating windows; roof and crawl space insulation addition; weather stripping and caulking improvements.
3	WATER CONSERVATION IMPROVEMENTS	Spring-loaded lavatory faucets, low-flush toilet and urinal flush valves, and low-flow shower heads.
4	INSTALL NEW GAS HEATING SYSTEMS	Gas-fired infrared heaters in Shop 1549 and new natural gas boilers in other buildings.
5	INSTALL NEW OIL HEATING SYSTEMS	Oil-fired infrared heaters in Shop 1549 and new oil-fired boilers in other buildings.
6	RENOVATE HVAC SYSTEMS	HVAC system improvements include: 1 - convert air handlers to variable air volume; 2 - install new two-pipe fan coils; 3 - install more efficient chillers;
7	INSTALL CENTRAL CW PLANT	New central chiller plant to serve all facilities except 1133, 1434 and 1549.

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signs. The barracks and administration buildings currently use T-12, 34-watt, four-foot lamps with magnetic ballasts. These areas were evaluated for a fixture retrofit to T-8 lamps and electronic ballasts. Existing one- and two-lamp fixtures were replaced with one- and two-lamp fixtures, respectively. Three- and four-lamp fixtures were replaced with two- and three-lamp fixtures, respectively, with reflectors.

Incandescent lamps 100-watts and less were replaced with compact fluorescents lamps. Incandescents over 100-watts were replaced with two T-8, four-foot lamps. Every two incandescents were replaced with one two-lamp, T-8 fixture. Mercury vapor fixtures in Shop 1549 were replaced with metal halide fixtures on a lumen-for-lumen basis.

The exit signs currently utilize incandescent lamps. In evaluating this ECO, these signs are to be equipped with a retrofit kit in which existing lamps are replaced with a light-emitting diode (LED) lamp.

Table 2.3.1.1 is a list of the buildings assigned to ECO-1. Each has been individually evaluated.

2.3.2 ECO-2: Building Envelope Modifications

This ECO was the evaluation of several proposed retrofits to improve the energy efficiency of the exterior of 11 buildings. The improvements include: Adding roof and crawlspace insulation, weather stripping and caulking, and replacing existing windows with more energy efficient windows. *Table 2.3.2.1* shows the buildings evaluated for ECO-2.

2.3.3 ECO-3: Water Conservation Improvements

ECO-3 was the evaluation of water-saving retrofit techniques: Water saving toilets and urinals, water-saving showerheads, and spring-loaded faucets for lavatories. *Table 2.3.3.1* lists the buildings considered for ECO-3.

2.3.4 ECO-4: Install New Gas Heating Systems

This ECO was the evaluation of natural gas boilers to replace oil-fired heating boilers in nine buildings and natural gas-fired infrared heaters to replace existing unit heaters in Shop 1549. The boilers in buildings 1105 and 1434 are new and equipped with dual-fuel burners, so no boiler replacement was evaluated in these locations. However, the other buildings under study have self-contained boiler

TABLE 2.3.1.1

**BUILDINGS EVALUATED FOR
ECO-1**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	YES	ECO WAS CALCULATED
2-1105	YES	ECO WAS CALCULATED
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	YES	ECO WAS CALCULATED
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

TABLE 2.3.2.1

**BUILDINGS EVALUATED FOR
ECO-2**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	NO	BUILDING HAS ADEQUATE INSULATION AND HAS NO WINDOWS
2-1105	YES	ECO WAS CALCULATED
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	YES	ECO WAS CALCULATED
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

TABLE 2.3.3.1

**BUILDINGS EVALUATED FOR
ECO-3**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	YES	ECO WAS CALCULATED
2-1105	YES	ECO WAS CALCULATED
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	YES	ECO WAS CALCULATED
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

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systems which require replacing the boilers with new natural gas-fired boilers. See *Table 2.3.4.1* for a listing of buildings evaluated under ECO-4.

2.3.5 ECO-5: Install New Oil Heating Systems

ECO-5 was the same evaluation as ECO-4 except the fuel source for the new systems is fuel oil. *Table 2.3.5.1* lists the buildings evaluated for ECO-5.

2.3.6 ECO-6: Renovate HVAC Systems

This ECO involved several different options. When centralized HVAC systems were less than five years old and/or performing adequately, no changes were proposed. Refer to *Table 2.3.6.1* for a listing of buildings for which ECO-6 was calculated. *Section 5.3.6* provides details of work accomplished under this ECO.

2.3.7 ECO-7: Install Central Chilled Water Plant

This ECO evaluates the installation of a central chilled water plant to serve nine of the buildings under study. Buildings 1133, 1434, and 1549 were not considered for this ECO since the systems currently in these buildings are not chilled water systems. *Table 2.3.7.1* lists the buildings evaluated for ECO-7.

2.4 FIELD NOTES

The field notes which were taken during the site survey are contained in a separately bound volume of this report.

2.4.1 ECO-1: Install High Efficiency Lighting Systems

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as existing lamp and fixture type, ballast volts and amps, and operation hours.

2.4.2 ECO-2: Building Envelope Modifications

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as insulation levels and window types.

TABLE 2.3.4.1

**BUILDINGS EVALUATED FOR
ECO-4**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	NO	BUILDING HAS NEW DUAL-FUEL BOILER
2-1105	NO	BUILDING HAS NEW DUAL-FUEL BOILER
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	YES	ECO WAS CALCULATED
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

TABLE 2.3.5.1

**BUILDINGS EVALUATED FOR
ECO-5**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	NO	BUILDING HAS NEW DUAL-FUEL BOILER
2-1105	NO	BUILDING HAS NEW DUAL-FUEL BOILER
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	YES	ECO WAS CALCULATED
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

TABLE 2.3.6.1

**BUILDINGS EVALUATED FOR
ECO-6**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	NO	BUILDING HAS NEW HVAC SYSTEM
2-1105	YES	ECO WAS CALCULATED
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	NO	BUILDING HAS NEW HVAC SYSTEM
2-1138	YES	ECO WAS CALCULATED
2-1549	YES	ECO WAS CALCULATED
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

TABLE 2.3.7.1

**BUILDINGS EVALUATED FOR
ECO-7**

BUILDING NUMBER	CALCULATED (YES/NO)	JUSTIFICATION FOR NOT CALCULATING
1-1242	YES	ECO WAS CALCULATED
1-1326	YES	ECO WAS CALCULATED
1-1333	YES	ECO WAS CALCULATED
1-1434	NO	HVAC SYSTEMS ARE NOT CHILLED WATER
2-1105	YES	ECO WAS CALCULATED
2-1120	YES	ECO WAS CALCULATED
2-1127	YES	ECO WAS CALCULATED
2-1133	NO	HVAC SYSTEMS ARE NOT CHILLED WATER
2-1138	YES	ECO WAS CALCULATED
2-1549	NO	HVAC SYSTEMS ARE NOT CHILLED WATER
2-1728	YES	ECO WAS CALCULATED
2-1731	YES	ECO WAS CALCULATED

2 *WORK ACCOMPLISHED TO DATE*

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2.4.3 ECO-3: Water Conservation Improvements

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as number of fixtures and current water consumption.

2.4.4 ECO-4: Install New Gas Heating Systems

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as boiler name plate data and unit heater size and location.

2.4.5 ECO-5: Install New Oil Heating Systems

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as boiler name plate data and unit heater size and location.

2.4.6 ECO-6: Renovate HVAC Systems

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as HVAC system type and capacities.

2.4.7 ECO-7: Install Central Chilled Water Plant

The field notes for this ECO are arranged in ascending order by building number. The notes include information required for calculations such as HVAC system type and capacities.

3 ANALYSIS METHODS

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3.1 FIELD SURVEY

The field survey as performed by Systems Corp is designed to provide the data required to complete the Scope of Work for this project. It is also designed to provide residual benefits to the installation by providing an organized and readily available source of information which can be used in future years. The information is transmitted in the form of field notes made on standardized survey forms.

The survey forms were designed to allow notations of all data which could be utilized (not necessarily required) to calculate the energy savings gained by implementing a specific energy conservation opportunity. These forms contain data obtained from as-built drawings and confirmed in the field, as well as data obtained only in the field.

Thorough preparation for the building survey is required to ensure the data required to perform the technical analysis is obtained. The building surveys were performed in a manner which assured the best results. A simple listing of each step of the process best describes our approach to the surveys.

1. The list of ECOs included in the work scope were reviewed in detail.
2. Each ECO was given an identification number which is used consistently throughout this project.
3. An expanded description of each ECO was formulated to outline the possible methods for implementation of the ECO.
4. Survey forms were developed for each ECO to provide space to enter any data which might possibly be used in performing the engineering and economic analysis of the ECO.
5. A list of the types of as-built drawings required for the buildings was prepared based on the information required on the ECO survey forms.

Note:

- A Systems Corp representative assisted during the survey in gathering the necessary as-built drawings.
 - Due to the age of drawings, it was determined that most required information would need to be gathered during the survey at the buildings.
6. The building surveys were then performed, confirming or revising data obtained from the drawings. Additional data was obtained as required.

Note:

- Systems Corp survey teams met with the Post Energy Officer throughout the survey on an as-needed basis.

3 ANALYSIS METHODS

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7. Observations regarding other possible ECOs or code violations were made and reported to the Post Energy Officer.

3.2 CALCULATIONS

Energy calculations were performed using computerized techniques. Due to the large volume of calculations to be performed, standardized procedures were developed for the computer models. This assured consistent results and uniformity of quality in all of the calculations performed.

3.2.1 Baseline Energy Consumption

The following sections describe the method for calculating the baseline energy consumption for each of the ECOs.

3.2.1.1 Baseline Energy Consumption: ECO-1

The baseline energy consumption for this ECO was calculated using a LOTUS 1-2-3 spreadsheet. This spreadsheet modeled the energy consumption of the existing lighting systems by utilizing the following:

1. existing fixture and lamp type (i.e. fluorescent, mercury vapor, etc.)
2. lamp wattage
3. ballast wattage
4. hours of use

The above information was obtained during the field survey. See *Section 6* for calculations of ECO-1.

3.2.1.2 Baseline Energy Consumption: ECOs 2, 4, 5, 6 and 7

The baseline energy consumption for these ECOs was calculated using the DOE 2 computer simulation model. The program simulates a building's total energy consumption and different systems' impacts on each other. Each building was modeled as closely as possible to the conditions found during the field survey. See *Sections 7, 9, 10, 11 and 12* for ECO calculations.

3 ANALYSIS METHODS

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3.2.1.3 Baseline Energy and Water Consumption: ECO-3

The baseline energy and water consumption for this ECO was modeled using a LOTUS 1-2-3 spreadsheet using information as to fixture type and consumption obtained during the field survey. See *Section 8* for ECO calculations.

3.2.2 ECO Energy Consumption

The following sections describe how the energy consumption (or energy savings) for each of the seven ECOs was calculated.

3.2.2.1 ECO Energy Consumption: ECO-1

The energy consumption for this ECO was calculated in the same manner as the baseline for ECO-1 (see *Section 3.2.1.1*). New lamp wattages, number of lamps, and ballast wattages were substituted for the existing lighting systems. For a detailed description of replacement fixtures, please refer to *Section 5.3.1*.

3.2.2.2 ECO Energy Consumption: ECO-2

The energy consumption for this ECO was calculated by modifying the baseline DOE 2 input files for each building. The modifications model the installation of new windows, insulation, weather stripping and caulking as proposed under this ECO.

3.2.2.3 ECO Energy Consumption: ECO-3

The energy consumption for this ECO was calculated by modifying the baseline LOTUS 1-2-3 files for each building. The modifications model the installation of low-flush toilets and urinals, spring-loaded faucets and water-saving showerheads.

3.2.2.4 ECO Energy Consumption: ECO-4

The energy consumption for this ECO was calculated by modifying the baseline DOE 2 input files for each building. The modifications model the replacement of oil heating systems with natural gas heating systems.

3 ANALYSIS METHODS

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3.2.2.5 ECO Energy Consumption: ECO-5

The energy consumption for this ECO was calculated by modifying the baseline DOE 2 input files for each building considered. The modifications model the replacement of existing oil heating systems with new oil heating systems.

3.2.2.6 ECO Energy Consumption: ECO-6

The energy consumption for this ECO was calculated by modifying the baseline DOE 2 input files for each building considered. The modifications model the renovations of HVAC systems in each building as proposed under this ECO.

3.2.2.7 ECO Energy Consumption: ECO-7

The energy consumption for this ECO was calculated by modeling the baseline DOE 2 input files for each building considered. The modifications model the installation of a 1,500 ton central chilled water plant to serve nine of the buildings as proposed under this ECO.

3.3 COST ESTIMATES

The cost estimates for the ECOs were obtained using a variety of sources. This section explains how each part of the cost estimate was determined.

The initial cost for each ECO is the sum of the construction cost and the project cost. The construction cost includes all costs in materials, labor, and contractor's overhead and profit. The project cost includes supervision, inspection and overhead (SIOH), as well as design costs.

3.3.1 Construction Costs

The construction cost for each ECO was estimated using MeansData for Windows Spreadsheets, Version 2.0a, cost estimating software. Prices not available in the accompanying database were obtained using a combination of sources. These sources include the following:

- ▶ local supplier and vendors
- ▶ Systems Corp estimating data

3 ANALYSIS METHODS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

All pricing has been adjusted where applicable to represent the labor costs in the Fort Bragg labor market. The construction cost estimates have been prepared to include a reasonable level of detail for each ECO calculated.

3.3.2 Project Cost

The project cost for each ECO include the cost of supervision, inspection, and overhead required to complete the project. A value of 5.0% of the construction cost has been used for the SIOH. Also included in the project cost is the cost to design each ECO. The design cost has been included at a fixed value of 5.0% of construction cost. This approach assures consistent values have been used for the project costs, and ECOs can be combined into larger projects without adjusting these values.

3.4 ECO LIFE-CYCLE COSTS

The life-cycle cost analyses evaluate energy, investment, maintenance, and replacement costs over the lifetime of each ECO. Each of these components may or may not be significant factors in determining the life-cycle cost of the project. Each of these cost components have been evaluated for each ECO in order to determine their contribution, if any, to the life-cycle cost of the project.

The life-cycle costs were calculated using the computer program Life-Cycle Costing in Design (LCCID) as required by the Scope of Work.

3.4.1 Energy Costs

FY94 energy and consumption data for each fuel type under study was obtained from the installation and through the Defense Energy Information System (DEIS). Average energy costs per unit of electricity, natural gas and fuel oil were calculated. User charges for water and sewage were obtained from Fort Bragg DPWE personnel.

The following costs were used in evaluating ECOs:

ELECTRICITY COST	=	\$ 0.03495/kWh(Energy only, not including demand)
ELECTRIC DEMAND COST	=	\$9.25/kW (Average Monthly demand)
FUEL OIL COST	=	\$5.62/MBtu
NATURAL GAS COST	=	\$3.94/MBtu
WATER COST	=	\$0.5018/kgal
SEWAGE TREATMENT COST	=	\$0.719/kgal

3.4.2 Maintenance and Replacement Costs

The operational and maintenance (O&M) cost/savings are referred to as non-energy, annual recurring costs in the LCCID program. These values are sometimes distorted to produce the desired results for the project economic analysis. Therefore, we typically assume maintenance and operation activities will continue at the same rate as before the project. However, where there are readily identifiable differences, such as increased lamp life for fluorescent lamps as compared to incandescent lamps, or a decrease in the number of lamps per fixture, they have been included. The estimated costs were obtained from the Means Facilities Costs Data, 1994. Other sources included local service companies and in-house data. These costs are shown on each life-cycle summary sheet.

The replacement cost (non-energy non-annual recurring cost) for each ECO has been evaluated in the same manner as non-energy annual recurring cost. Due to the age of most of the lighting systems evaluated, it is estimated the lighting systems will need to be replaced within the ten-year life of this project if this project is not performed. A cost avoidance was taken in year 5 of each LCCA equal to 80 percent of the energy efficient lighting system's cost. This represents the estimated cost of replacing the existing lighting system with a similar one in year five of the project. The only building not evaluated in this manner is Building 1-1333. This building has been recently renovated and will not require a new lighting system within the life of this project.

The cost data for these items was obtained from the same sources as mentioned above. Systems Corp's policy is to make conservative estimates regarding subjective cost components.

Table 3.4.2.1 shows the maintenance and replacement costs used in the analysis for ECO-1. The estimated lighting system replacement cost for year 5 is shown in *Table 3.4.2.2*. FY94 maintenance cost obtained from Fort Bragg DPWE personnel for HVAC systems in each of the 12 buildings is shown in *Table 3.4.2.3*.

TABLE 3.4.2.1

**LIGHTING MAINTENANCE
&
LAMP REPLACEMENT
COSTS**

PRODUCT DESCRIPTION	PRODUCT LIFE (HRS)	MATERIAL & LABOR COSTS
INCANDESCENT < 100 WATTS	750	\$3.50
INCANDESCENT 100-300 WATTS	750	\$5.25
INCANDESCENT > 300 WATTS	1,000	\$26.00
4 FOOT FLUORESCENT TUBES	20,000	\$5.00
FLUORESCENT EXIT SIGNS	20,000	\$8.00
COMPACT FLUORESCENT	10,000	\$2.00
MERCURY VAPOR - 250 WATTS	12,000	\$50.00
MERCURY VAPOR - 400 WATTS	16,000	\$50.00
MERCURY VAPOR - 1,000 WATTS	24,000	\$70.00
METAL HALIDE - 250 WATTS	10,000	\$41.00
METAL HALIDE - 400 WATTS	20,000	\$47.00
HIGH PRESSURE SODIUM ≥ 150 WATTS	24,000	\$38.00

TABLE 3.4.2.2
LIGHTING SYSTEMS REPLACEMENT
INVESTMENT AT YEAR 5

BUILDING NUMBER	AREA OPERATING HOURS	INVESTMENT	DESIGN & SIOH	TOTAL INVESTMENT	ESTIMATED REPLACEMENT
1105	10 HRS/5DYS	\$8,454	\$846	\$9,300	\$7,440
1105	10/7	\$7,030	\$704	\$7,734	\$6,170
1105	24/7	\$7,615	\$760	\$8,375	\$6,680
1105	TOTAL	\$23,099	\$2,310	\$25,409	\$20,290
1120	10/5	\$82,168	\$8,216	\$90,384	\$72,307
1120	10/7	\$16,587	\$1,660	\$18,247	\$14,600
1120	18/7	\$2,483	\$248	\$2,731	\$2,190
1120	24/7	\$2,442	\$244	\$2,686	\$2,160
1120	TOTAL	\$103,680	\$10,368	\$114,048	\$91,257
1127	10/5	\$49,416	\$4,942	\$54,358	\$43,488
1127	24/7	\$161	\$16	\$177	\$142
1127	TOTAL	\$49,577	\$4,958	\$54,535	\$43,630
1133	10/5	\$73,499	\$7,350	\$80,849	\$64,679
1133	24/7	\$1,446	\$144	\$1,590	\$1,270
1133	TOTAL	\$74,945	\$7,494	\$82,439	\$65,949
1138	10/5	\$32,063	\$3,206	\$35,269	\$28,215
1138	10/7	\$29,793	\$2,980	\$32,773	\$26,204
1138	24/7	\$1,928	\$192	\$2,120	\$1,696
1138	TOTAL	\$63,784	\$6,378	\$70,162	\$56,115
1242	10/5	\$6,844	\$684	\$7,528	\$6,022
1242	10/7	\$9,705	\$970	\$10,675	\$8,530
1242	14/7	\$2,010	\$202	\$2,212	\$1,770

TABLE 3.4.2.2
LIGHTING SYSTEMS REPLACEMENT
INVESTMENT AT YEAR 5

BUILDING NUMBER	AREA OPERATING HOURS	INVESTMENT	DESIGN & SIOH	TOTAL INVESTMENT	ESTIMATED REPLACEMENT
1242	24/7	\$4,208	\$420	\$4,628	\$3,700
1242	TOTAL	\$22,767	\$2,276	\$25,043	\$20,022
1326	10/5	\$19,086	\$1,908	\$20,994	\$16,800
1333*	10/5	\$27,002	\$2,700	\$29,702	\$0
1434	24/7	\$24,212	\$2,422	\$26,634	\$21,300
1549	10/5	\$48,811	\$4,882	\$53,693	\$42,950
1728	12/5	\$46,323	\$4,632	\$50,955	\$40,764
1731	10/5	\$31,632	\$3,164	\$34,796	\$27,837
1731	10/7	\$19,677	\$1,968	\$21,645	\$17,300
1731	24/7	\$9,158	\$916	\$10,074	\$8,050
1731	TOTAL	\$60,467	\$6,048	\$66,515	\$53,187
TOTAL		\$563,753	\$56,376	\$620,129	\$472,265

*BUILDING RECENTLY RENOVATED - NO REPLACEMENT INVESTMENT IN YEAR 5

TABLE 3.4.2.3
FY94 HVAC MAINTENANCE
COSTS BY BUILDING

BUILDING NUMBER	COST (\$)
1-1242	\$1,231
1-1326	\$14,433
1-1333	\$1,304
1-1434	\$1,589
2-1105	\$9,024
2-1120	\$4,010
2-1127	\$2,298
2-1133	\$1,124
2-1138	\$2,353
2-1549	\$1,260
2-1728	\$1,867
2-1731	\$5,940

The plan for the remaining work for this project includes the identification of the tasks remaining to be accomplished, assignment of staff and other resources to complete the tasks, and the development of a schedule to complete the work.

4.1 REMAINING PHASES

The remaining phases of work to be accomplished include the following:

- ▶ response to Prefinal Review Comments
- ▶ preparation of Final Report

The required tasks for each phase have been identified, resources and staff assigned, and a schedule prepared.

4.1.1 Response to Prefinal Review Comments

When the Prefinal Review is complete, responses to each comment will be prepared. An action code will be assigned to each comment and a response will be prepared where required by the action code. Responses will be prepared by the project manager in consultation with project staff. Where clarifications are required, discussions will be held with the reviewer upon approval of Mr. Rob Callahan, COE Project Manager. All comments and responses will be typed and returned to Mr. Callahan for distribution. A copy of the comments and responses will be included in the Final Report.

4.1.2 Preparation of Final Report

Any revisions or corrections resulting from comments made during the review of the Prefinal Report will be incorporated by page-for-page replacement or page addition to the Prefinal Report. A separately bound Executive Summary will be prepared and distributed to the appropriate personnel.

4.2 TASK LIST

1. prepare responses to the Prefinal Review Comments
2. perform any necessary corrections
3. prepare Final Report

4 *PLAN FOR REMAINING WORK*

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

4.3 **SCHEDULE FOR THE REMAINING WORK**

- ▶ Final Report Submittal May 1, 1995

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

This section of the report includes a narrative summary of the work accomplished to date. The project is divided into three major tasks: the field survey, the energy baseline, and the energy conservation opportunities. The performance of these tasks is described in the following three sections. The last section is an outline of recommendations and suggestions for implementing the ECOs and combining them into projects.

5.1 FIELD SURVEY

The field survey was performed in two parts. The lighting survey was conducted September 20-23, 1994, while the remaining field data was gathered October 24-28, 1994. All available drawings and data were gathered at these times. Interviews were conducted throughout the week during each survey.

During the interviews, the general results of the field survey were discussed. Each ECO was discussed along with preliminary suggestions about the expected payback of each project. The minutes of these meetings are included in *Appendix B* of this report.

The survey was performed by three survey teams, each with two engineers. The survey was performed between the hours of 7:00 a.m. and 5:00 p.m.

A high level of cooperation and support by DPWE, maintenance personnel and building occupants contributed substantially to the success of the survey.

5.2 ENERGY BASELINE

After completing the field survey, the next task was to establish the baseline energy consumption for each building. The approach taken was to determine the baseline energy consumption for the system analyzed within each building. In ECO-1 baseline calculations, only the lighting energy for a particular system was calculated so that each ECO would stand alone if necessary. Similarly, for ECO-3, only the water and energy associated with the water systems were calculated so that the ECO stands alone, if necessary. For ECOs 2, 4, 5, 6 and 7, each building's baseline was modeled using the DOE 2 Energy Modeling Program so that the baseline calculations included all energy systems within each building.

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

The baselines were determined using data from many sources. These sources include:

1. field survey notes
2. as-built drawings
3. past experience of Systems Corp engineers
4. manufacturers' catalog data
5. manufacturers' performance data
6. past years utility consumption data provided by Mr. Sam Musulin, Fort Bragg Energy Coordinator

Before preparing the energy baseline, each ECO assigned to a building was reviewed with respect to the information now available. A decision was then made on the applicability of each ECO to the particular building. If the ECO was not applicable, the reason for that determination is documented. This procedure was followed for every building and every ECO. These justifications are listed in the tables included in *Section 2.3*.

After completing the energy baseline, the results were reviewed for technical accuracy. When problems were found, the calculations were revised.

The baseline energy consumed by each building is given in *Tables 2.2.1.1, 2.2.2.1, and 2.2.3.1*. The baseline energy consumption totals for each ECO is given in *Table 5.2.1*.

5.3 ENERGY CONSERVATION OPPORTUNITIES

The energy consumption for each of the energy conservation opportunities were prepared after the successful run of the baseline calculations. Calculation of the ECOs requires preparing a conceptual design which would allow implementation of the ECO. It is important to note that an ECO may be implemented in several ways. The designer must carefully consider the options to ensure the chosen design is the most likely to result in a savings that can justify the investment. After completing the conceptual design, the energy results were calculated by computer spreadsheets for ECOs 1 and 3. For ECOs 2, 4, 5, 6 and 7, energy savings were modeled by modifying the baseline DOE 2 input files to simulate the implementation of each of the ECOs. The calculations were then reviewed for accuracy and technical feasibility.

After completing the energy calculations for each ECO, the cost estimates and economic analyses were prepared. A standardized bill of materials has been prepared for each building within each ECO.

TABLE 5.2.1
ENERGY BASELINE FOR ALL ECOs

ECO NUMBER	ECO NAME	BASELINE ENERGY CONSUMPTION (MWH)
1	LIGHTING SYSTEMS	1,516
2	BUILDING ENVELOPE SYSTEMS	13,513
3	WATER SYSTEMS	2,287
4	NATURAL GAS HEATING SYSTEMS	11,448
5	OIL HEATING SYSTEMS	11,448
6	HVAC SYSTEMS	12,406
7	CENTRAL CW PLANT	12,406

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

Material sizes, quantities, and prices were estimated to represent specific conditions of the ECO. Annual and non-annual recurring costs are an important part of the life-cycle cost for a given project. Each ECO is evaluated individually to determine the correct difference in these costs between the current condition and the future condition.

The following is a description of the energy-efficient replacement products used in each ECO.

5.3.1 ECO-1: Install High Efficiency Lighting Systems

Many options are available in lighting efficiency improvements. The goal of this ECO is to increase the efficiency of the interior lighting while still being cost effective.

The following is a list and description of the options implemented. All options are not evaluated in all buildings due to applicability.

1. Two-Foot, Four-Foot, and Eight-Foot Fluorescent Fixtures: Existing T-12 fixtures were replaced one-for-one with T-8 lamps and electronic ballasts. Reflectors were used in some fixtures to reduce the required number of lamps. Please refer to *Section 5.0* for a detailed description of reflector use. Reflectors were only used in four-foot fixtures.
2. Incandescent Lighting: Incandescents with wattages less than 100-watts were replaced with compact fluorescents. Incandescents in office areas with wattages greater than or equal to 100-watts were replaced with a two-lamp, four-foot, T-8 fixture.
3. Exit Signs: Existing incandescent exit lamps were replaced with LED lamps. This is accomplished with a retrofit kit that requires minor wiring revisions within the existing fixture. A two-watt, LED lamp then replaces the incandescent lamps within each existing sign.
4. Mercury Vapor Fixtures: Existing mercury vapor fixtures were replaced with metal halide fixtures. This ECO incorporates a one-for-one fixture changeout with no decrease in lumen levels.

In Option 1 above, the decision to use reflectors and to delamp was based on light level readings taken during the field survey. In areas with three and four lamps per fixture, reflectors were used while

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

reducing the number of lamps by one. *Table 5.3.1.1* lists lighting levels for various areas as recommended by the Illumination Engineering Society of North America (IES). Refer to the separately bound volume of field notes for actual lighting levels within each facility surveyed.

The ECO was subdivided to evaluate each area within a building based on operating hours. Below is a listing of the sub-ECOs:

- 1.1 Area operating 10 hours/day, 5 days/week
- 1.2 Area operating 10 hours/day, 7 days/week
- 1.3 Area operating 12 hours/day, 5 days/week
- 1.4 Area operating 14 hours/day, 5 days/week
- 1.5 Area operating 18 hours/day, 5 days/week
- 1.6 Area operating 24 hours/day, 7 days/week

Life-cycle cost analyses were performed on each sub-ECO on each building. The areas with a pay back greater than ten years or an SIR of less than 1.25 were separated and removed from the total lighting project. All areas with an SIR greater than 1.25 were then grouped together and a life-cycle cost analysis was performed to determine the results of a lighting project for the Red Brick area. The result was a project with an investment of \$419,550, a pay back of 5.62 years, and an SIR of 1.52.

5.3.2 ECO-2: Building Envelope Modifications

ECO-2 is the implementation of three different building envelope improvements:

- ▶ adding roof and crawlspace insulation
- ▶ weatherstripping and caulking exterior entrances
- ▶ installing new double-pane, argon-filled, solar-shaded windows

The insulation addition improves R-Values by 11 for both the roof and crawlspace (3" lay-in batts). Weatherstripping and caulking addition was assumed to reduce infiltration rates by 25%. The new double-pane windows have an overall U-Value of 0.30 and an overall shading coefficient of 0.30. *Table 5.3.2.1* shows the modifications proposed in this ECO for each building. This ECO stands alone from the other six ECOs.

The calculations were performed using the Building Energy Simulation Program, DOE 2.1c. The above parameters for insulation, windows, weatherstripping, and caulking were input into the

TABLE 5.3.1.1
RECOMMENDED LIGHTING LEVELS*

AREA/ACTIVITY	RANGE OF ILLUMINANCE, FOOTCANDLES
GENERAL ADMINISTRATION	20-30-50
CONFERENCE ROOMS	20-30-50
ELECTRONIC SHOP/MAINTENANCE	50-75
GARAGES - REPAIR SERVICE	50-75
STAIRWELLS, CORRIDORS	5 - 7.5 - 10
TOILETS & WASHROOMS	10-15-20

*From *Illumination Engineering Society of North America (IES) Lighting Handbook*, 1987 Application Volume, supplemented by Department of the Army's publication, *Architect and Engineer's Instructions*.

TABLE 5.3.2.1
ECO - 2 MODIFICATIONS

BUILDING	ECO-2 MODIFICATIONS
1-1242	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
1-1326	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
1-1333	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
1-1434	NONE
2-1105	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1120	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1127	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1133	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1138	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1549	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1728	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.
2-1731	Add roof and crawl space insulation, weatherstripping and caulking, replace windows with low-E insulated type windows.

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

previously programmed baseline for each building so as to compare before and after energy usage. The modifications were made concurrently and yielded no projects; therefore, sample runs modeling each of the three building envelope modifications were performed independently. The sample runs were performed on Building 2-1127 and produced no projects as analyzed individually. See *Section 7* for ECO-2 calculations, cost estimates and life-cycle cost analyses. See *Section 13*, Volume 2 for sample DOE 2 input and output files.

5.3.3 ECO-3: Water Conservation Improvements

This ECO incorporates four separate improvements:

1. replacing existing flush valves on toilets with water-saving flush valves (3.5 gal/flush for flush valves)
2. replacing existing flush valves on urinals with water-saving flush valves (1.0 gal/flush)
3. installing spring-loaded faucets on lavatories
4. replacing existing showerheads with water-saving showerheads

For the calculations, four toilet flushes per occupant per day was assumed. Barracks were assumed to be in use 365 days per year while other building types were assumed to be in use 250 days per year. An average hot water temperature of 130°F was assumed based on field observations. Each user was assumed to run the lavatory faucets for 75 seconds each day. Showerhead calculations were based on eight minute, 105°F showers taken daily in the barracks. *Table 5.3.3.1* shows the modifications proposed for each building under ECO-3. This ECO stands alone from modifications made under other ECOs.

Existing toilet and urinal flush valves were observed in operation and nameplate data for each was gathered during the survey. Both the present and proposed water consumption rates were determined by manufacturers' maximum flow rates given for each model. The four water saving improvements yield quick paybacks because they are relatively easy retrofits of valves and faucets which utilize existing fixtures. See *Section 8* for ECO-2 calculations, cost estimates and life-cycle cost analyses.

5.3.4 ECO-4: Install Natural Gas Boilers and Infrared Heaters

This ECO involves installing new natural gas boilers to replace oil-fired boilers in nine buildings. Buildings 1-1434 and 2-1105 are served by new boilers, which already are equipped with dual-fuel

TABLE 5.3.3.1
ECO - 3 MODIFICATIONS

BUILDING	ECO-3 MODIFICATIONS
1-1242	Install 6 water-saving flush valves on toilets, 3 water-saving flush valves on urinals, 6 spring-loaded faucets, and 4 water-saving showerheads.
1-1326	Install 15 water-saving flush valves on toilets, 6 water-saving flush valves on urinals, 17 spring-loaded faucets, and 11 water-saving showerheads.
1-1333	Install 25 water-saving flush valves on toilets, 25 water-saving flush valves on urinals, 3 spring-loaded faucets, and 0 water-saving showerheads.
1-1434	Install 6 water-saving flush valves on toilets, 1 water-saving flush valve on urinals, 3 spring-loaded faucets, and 0 water-saving showerheads.
2-1105	Install 16 water-saving flush valves on toilets, 9 water-saving flush valves on urinals, 20 spring-loaded faucets, and 14 water-saving showerheads.
2-1120	Install 21 water-saving flush valves on toilets, 6 water-saving flush valves on urinals, 25 spring-loaded faucets, and 6 water-saving showerheads.
2-1127	Install 33 water-saving flush valves on toilets, 12 water-saving flush valves on urinals, 33 spring-loaded faucets, and 6 water-saving showerheads.
2-1133	Install 12 water-saving flush valves on toilets, 3 water-saving flush valves on urinals, 12 spring-loaded faucets, and 2 water-saving showerheads.
2-1138	Install 15 water-saving flush valves on toilets, 18 water-saving flush valves on urinals, 43 spring-loaded faucets, and 20 water-saving showerheads.
2-1549	Install 6 water-saving flush valves on toilets, 6 water-saving flush valves on urinals, 7 spring-loaded faucets, and 0 water-saving showerheads.
2-1728	Install 36 water-saving flush valves on toilets, 18 water-saving flush valves on urinals, 45 spring-loaded faucets, and 3 water-saving showerheads.
2-1731	Install 54 water-saving flush valves on toilets, 18 water-saving flush valves on urinals, 54 spring-loaded faucets, and 42 water-saving showerheads.

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burners capable of firing on natural gas so these buildings were not considered for this ECO. The ECO also incorporates the use of natural gas-fired infrared heaters in the high bay areas of Shop 2 - 1549 to replace existing unit heaters. In the calculation of energy savings, the oil-fired boilers were modeled with an efficiency of 77% and the new natural gas boilers were modeled as 83% efficient. The infrared heaters' thermostat setpoint was assumed to be 55°F as recommended by manufacturers.

For implementation of this ECO, an extension must be made to the six-inch gas main located approximately 500 feet from the vicinity. The total cost of the extension was divided equally among the ten buildings requiring gas service and added to the cost estimate for each. Maintenance cost for existing conditions was obtained from DPWE on a building-by-building basis. Maintenance savings for the new boiler and infrared heaters were assumed to be \$500 per year per building. *Table 5.3.4.2* shows the modifications proposed under ECO-4. This ECO stands apart from any modifications made under other ECOs.

The DOE 2 program calculates the annual heating load on each of the oil and gas heating systems based on the efficiency and setpoint parameters mentioned above. The differences in efficiency, thermostat setpoints, and cost of natural gas as compared to oil makes this ECO particularly attractive. See *Section 9* for ECO-4 calculations, cost estimates and life-cycle cost analyses.

5.3.5 ECO-5: Install Fuel Oil Boilers and Infrared Heaters

ECO-5 is similar to ECO-4 except that fuel oil is used instead of natural gas for the nine boiler replacements and one infrared heating installation. *Table 5.3.5.1* lists the modifications proposed for each building under this ECO. This ECO stands apart from any modifications made under other ECOs. See *Section 10* for ECO-5 calculations, cost estimates and life-cycle cost analyses.

5.3.6 ECO-6: HVAC Renovations

This ECO encompassed a number of different modifications to HVAC systems. The evaluation applies only to areas which are both heated and cooled within each building.

Where existing HVAC systems used chilled water, the renovations incorporate chilled water replacement components. Similarly, if the existing system is a direct-expansion (DX) system, the replacement incorporates DX units. Existing air-cooled reciprocating chillers operate at 0.95 kW/ton; new chillers were modeled at 0.75 kW/ton based on available models from several vendors.

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TABLE 5.3.4.2
ECO - 4 MODIFICATIONS

BUILDING	EXISTING HEAT SOURCE	ECO-4 MODIFICATIONS
1-1242	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
1-1326	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
1-1333	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
1-1434	New Dual Fuel HW Boiler In Building	None.
2-1105	New Dual Fuel HW Boiler In Building	None.
2-1120	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
2-1127	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
2-1133	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
2-1138	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
2-1549	Oil-Fired HW Boiler In Building	Replace unit heaters with gas-fired, infrared heaters in high bay areas.
2-1728	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.
2-1731	Oil-Fired HW Boiler In Building	Replace boiler with new gas-fired boiler.

TABLE 5.3.5.1
ECO - 5 MODIFICATIONS

BUILDING	EXISTING HEAT SOURCE	ECO-5 MODIFICATIONS
1-1242	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
1-1326	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
1-1333	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
1-1434	New Dual Fuel HW Boiler In Building	None.
2-1105	New Dual Fuel HW Boiler In Building	None.
2-1120	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
2-1127	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
2-1133	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
2-1138	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
2-1549	Oil-Fired HW Boiler In Building	Replace unit heaters with oil-fired, infrared heaters in high bay areas.
2-1728	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.
2-1731	Oil-Fired HW Boiler In Building	Replace boiler with new oil-fired boiler.

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Table 5.3.6.1 shows existing building HVAC systems and the modifications proposed under ECO-6. This ECO stands alone from modifications made under other ECOs. See *Section 11* for ECO-6 calculations, cost estimates and life-cycle cost analyses.

5.3.7 ECO-7: Install Central Chilled Water Plant

ECO-7 is the installation of a 1,500 ton chilled water plant to serve nine of the twelve buildings under study. Buildings 1-1434, 2-1133 and 2-1549 were not included because they currently have no chilled water equipment in place. *Figure M-1* is the proposed location and piping schematic for the central plant. The plant will have three 750-ton water cooled centrifugal chillers for redundancy and will utilize a variable flow, primary-secondary pumping arrangement with two secondary loops as indicated on the schematic.

Full load efficiency of the new chillers is 0.6 kW/ton. The cost estimate includes all piping, equipment, labor, and structures necessary for the installation. See *Section 12* for ECO-7 calculations, cost estimates and life-cycle cost analyses. This ECO stands alone from the other ECOs under analysis.

5.4 RECOMMENDED PROJECTS AND ORGANIZATION

A considerable amount of data has been generated as a result of this study to date. There is a wide variety of ways to present the data. Systems Corp has presented the data in five tables to provide the installation with different viewpoints. The first table (*Table 5.4.1*) simply lists all of the ECOs in order from highest to lowest savings-to-investment ratio (SIR), in accordance with the Scope of Work. In addition, four other listings are presented to give the installation a clearer choice of project groupings.

The second listing is *Table 5.4.2*. Only those ECOs recommended for consideration are listed. Projects can only be recommended if the SIR is greater than 1.25 and the simple payback is ten years or less.

The third listing is *Table 5.4.3*. Only those ECOs not recommended for implementation are listed. If the simple payback is greater than ten years or the SIR is less than 1.25, the ECO is not recommended.

The fourth listing is *Table 5.4.4*. This table lists the recommended ECOs by building. This presentation indicates the work required in each building if all ECOs are implemented. The listing also totals the investment costs and the first year savings. Only relevant information is purposely provided

TABLE 5.3.6.1
ECO - 6 MODIFICATIONS

BUILDING	EXISTING HVAC SYSTEM	MODIFICATIONS PROPOSED UNDER ECO-6
1-1242	Constant Volume Air Handler, Air Cooled Chiller	Replace air handler with new VAV air handler. Replace chiller with more efficient chiller.
1-1326	7 Constant Volume Air Handlers, Air Cooled Chiller	Replace air handlers with new VAV air handlers. Replace chiller with more efficient chiller.
1-1333	Single-zone DX Air Handler, Oil HW Boiler	Replace existing air handler with DX VAV air handler.
1-1434	DX and Hot Water System	None. Existing systems are new and in good working order.
2-1105	4 Constant Volume Air Handlers, Air Cooled Chiller	Replace air handlers with VAV air handlers. Replace chiller with more efficient chiller.
2-1120	2 Pipe Fan Coils, Water Cooled Chiller	Replace chiller with more efficient chiller.
2-1127	2 Pipe Fan Coils, Water Cooled Chiller	Replace chiller with more efficient chiller.
2-1133	Water Source Heat Pumps	None. Existing centralized systems are new and in good working order.
2-1138	4 Constant Volume Air Handlers, Air Cooled Chiller	Install new VAV air handlers to replace existing air handlers. Replace chiller with more efficient chiller.
2-1549	Window Air Conditioners	Packaged DX variable air volume air handler to replace window units.
2-1728	4 Constant Volume Air Handlers, Air Cooled Chiller	Replace AHU's with VAV air handlers. Replace chiller with more efficient chiller.
2-1731	2 Pipe Fan Coil Units, Water Cooled Chiller	Replace chiller with more efficient chiller.

TABLE 5.4.1
ALL ECOs FROM
HIGHEST TO LOWEST SIR

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
3/WATER	All Bldgs.	\$101,301	\$50,451	2.01	9.01	14.97%
4/NGHTG	1-1326	\$34,171	\$11,074	3.09	5.92	12.58%
4/NGHTG	2-1120	\$34,171	\$10,387	3.29	5.55	12.22%
4/NGHTG	2-1138	\$29,438	\$8,588	3.43	5.31	11.97%
1.6/LIGHT	2-1133	\$1,590	\$882	1.80	4.74	—
1.6/LIGHT	2-1138	\$2,120	\$1,176	1.80	4.74	—
1.6/LIGHT	2-1127	\$177	\$98	1.81	4.72	—
4/NGHTG	2-1127	\$36,117	\$7,852	4.60	3.95	10.32%
4/NGHTG	2-1728	\$34,171	\$7,017	4.87	3.72	9.99%
1.6/LIGHT	2-1120	\$2,686	\$1,020	2.63	3.25	—
4/NGHTG	2-1549	\$96,619	\$14,612	6.48	2.81	8.47%
4/NGHTG	2-1731	\$34,171	\$5,000	6.83	2.64	8.11%
4/NGHTG	1-1333	\$18,537	\$2,767	6.70	2.61	8.05%
4/NGHTG	1-1242	\$26,493	\$3,633	7.29	2.43	7.68%
5/OILHTG	2-1549	\$88,073	\$10,568	8.33	2.19	7.11%
1.6/LIGHT	1-1434	\$26,634	\$6,405	4.16	2.06	—
4/NGHTG	2-1133	\$34,171	\$3,815	8.96	1.98	6.59%
6/HVAC	2-1105	\$277,362	\$30,942	8.96	1.92	6.42%
1.6/LIGHT	2-1105	\$8,377	\$1,826	4.59	1.87	—
6/HVAC	1-1242	\$75,684	\$8,187	9.24	1.79	6.04%
6/HVAC	2-1728	\$268,956	\$28,653	9.39	1.77	5.97%
1.6/LIGHT	1-1242	\$4,628	\$907	5.10	1.68	—
1.6/LIGHT	2-1731	\$10,074	\$1,924	5.24	1.64	—

TABLE 5.4.1
ALL ECOs FROM
HIGHEST TO LOWEST SIR

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
1.1/LIGHT	2-1549	\$53,693	\$10,238	5.24	1.63	—
6/HVAC	1-1326	\$431,912	\$43,769	9.87	1.61	5.50%
1.1/LIGHT	1-1326	\$20,994	\$3,862	5.44	1.58	—
1.1/LIGHT	2-1127	\$54,358	\$9,873	5.51	1.56	—
6/HVAC	2-1127	\$68,037	\$6,905	9.85	1.51	—
1.1/LIGHT	2-1120	\$90,385	\$14,702	6.15	1.39	—
6/HVAC	2-1549	\$30,930	\$2,793	11.07	1.35	—
1.3/LIGHT	2-1728	\$50,955	\$7,750	6.58	1.30	—
1.1/LIGHT	2-1105	\$9,300	\$1,408	6.61	1.30	—
1.1/LIGHT	2-1133	\$80,849	\$12,116	6.67	1.29	—
1.5/LIGHT	2-1120	\$2,731	\$403	6.78	1.27	—
1.2/LIGHT	2-1120	\$18,245	\$2,645	6.90	1.24	—
1.1/LIGHT	2-1731	\$34,796	\$4,981	6.99	1.23	—
1.1/LIGHT	2-1138	\$35,269	\$5,051	6.98	1.23	—
1.4/LIGHT	1-1242	\$2,210	\$307	7.21	1.19	—
1.2/LIGHT	2-1105	\$7,733	\$1,053	7.35	1.17	—
1.2/LIGHT	1-1242	\$10,675	\$1,457	7.33	1.17	—
1.2/LIGHT	2-1731	\$21,645	\$2,906	7.45	1.15	—
5/OILHTG	1-1326	\$41,849	\$2,693	15.54	1.15	3.73%
5/OILHTG	2-1138	\$32,277	\$2,155	15.44	1.15	3.71%
6/HVAC	1-1333	\$77,123	\$5,904	13.06	1.13	—
1.2/LIGHT	2-1138	\$32,773	\$4,298	7.62	1.13	—
6/HVAC	2-1120	\$90,099	\$6,766	13.32	1.12	—

TABLE 5.4.1
ALL ECOs FROM
HIGHEST TO LOWEST SIR

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
6/HVAC	2-1138	\$268,956	\$18,593	14.47	1.10	—
5/OILHTG	2-1120	\$41,849	\$2,547	16.43	1.09	3.43%
6/HVAC	2-1731	\$78,102	\$5,670	13.77	1.09	—
1.1/LIGHT	1-1242	\$7,528	\$906	8.31	1.03	—
2/BLDG ENV	1-1333	\$50,637	\$2,662	19.02	0.90	2.43%
2/BLDG ENV	2-1127	\$184,345	\$9,157	20.13	0.86	2.22%
5/OILHTG	1-1333	\$17,314	\$885	19.56	0.84	—
5/OILHTG	2-1728	\$41,849	\$1,812	23.09	0.76	1.60%
5/OILHTG	2-1127	\$47,849	\$1,995	23.91	0.74	1.45%
2/BLDG ENV	1-1242	\$69,529	\$2,909	23.90	0.74	1.49%
1.1/LIGHT	1-1333	\$29,702	\$2,474	12.01	0.71	—
2/BLDG ENV	2-1133	\$166,318	\$6,522	25.50	0.66	0.88%
5/OILHTG	2-1731	\$41,849	\$1,486	28.16	0.62	—
5/OILHTG	1-1242	\$33,277	\$1,074	30.98	0.54	—
7/CWPLANT	—	\$1,419,763	\$45,543	31.17	0.48	—
5/OILHTG	2-1133	\$41,849	\$1,114	37.57	0.45	—
2/BLDG ENV	1-1326	\$238,899	\$5,496	43.47	0.38	-1.83%
2/BLDG ENV	2-1138	\$287,747	\$5,821	49.43	0.35	-2.33%
2/BLDG ENV	2-1549	\$256,395	\$4,563	56.19	0.33	-2.56%
2/BLDG ENV	2-1731	\$316,902	\$6,293	50.36	0.32	-2.66%
2/BLDG ENV	2-1105	\$411,023	\$7,554	54.41	0.31	-2.90%
2/BLDG ENV	2-1120	\$295,688	\$4,912	60.20	0.29	-3.19%
2/BLDG ENV	2-1728	\$306,474	\$5,280	58.05	0.28	-3.29%

TABLE 5.4.2

**RECOMMENDED ECOs FROM
HIGHEST TO LOWEST SIR**

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
4/OILHTG	1-1326	\$34,171	\$11,074	3.09	5.92	12.58%
4/OILHTG	2-1120	\$34,171	\$10,387	3.29	5.55	12.22%
4/OILHTG	2-1138	\$29,438	\$8,588	3.43	5.31	11.97%
1.6/LIGHT	2-1133	\$1,590	\$882	1.80	4.74	—
1.6/LIGHT	2-1138	\$2,120	\$1,176	1.80	4.74	—
1.6/LIGHT	2-1127	\$177	\$98	1.81	4.72	—
4/OILHTG	2-1127	\$36,117	\$7,852	4.60	3.95	10.32%
4/OILHTG	2-1728	\$34,171	\$7,017	4.87	3.72	9.99%
1.6/LIGHT	2-1120	\$2,686	\$1,020	2.63	3.25	—
4/OILHTG	2-1549	\$96,619	\$14,612	6.48	2.81	8.47%
4/OILHTG	2-1731	\$34,171	\$5,000	6.83	2.64	8.11%
4/OILHTG	1-1333	\$18,537	\$2,767	6.70	2.61	8.05%
4/OILHTG	1-1242	\$26,493	\$3,633	7.29	2.43	7.68%
1.6/LIGHT	1-1434	\$26,634	\$6,405	4.16	2.06	—
4/OILHTG	2-1133	\$34,171	\$3,815	8.96	1.98	6.59%
6/HVAC	2-1105	\$277,362	\$30,942	8.96	1.92	6.42%
1.6/LIGHT	2-1105	\$8,377	\$1,826	4.59	1.87	—
6/HVAC	1-1242	\$75,684	\$8,187	9.24	1.79	6.04%
6/HVAC	2-1728	\$268,956	\$28,653	9.39	1.77	5.97%

TABLE 5.4.2**RECOMMENDED ECOs FROM
HIGHEST TO LOWEST SIR**

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
1.6/LIGHT	1-1242	\$4,628	\$907	5.10	1.68	—
1.6/LIGHT	2-1731	\$10,074	\$1,924	5.24	1.64	—
1.1/LIGHT	2-1549	\$53,693	\$10,238	5.24	1.63	—
6/HVAC	1-1326	\$431,912	\$43,769	9.87	1.61	5.50%
1.1/LIGHT	1-1326	\$20,994	\$3,862	5.44	1.58	—
1.1/LIGHT	2-1127	\$54,358	\$9,873	5.51	1.56	—
6/HVAC	2-1127	\$68,037	\$6,905	9.85	1.51	—
1.1/LIGHT	2-1120	\$90,385	\$14,702	6.15	1.39	—
1.3/LIGHT	2-1728	\$50,955	\$7,750	6.58	1.30	—
1.1/LIGHT	2-1105	\$9,300	\$1,408	6.61	1.30	—
1.1/LIGHT	2-1133	\$80,849	\$12,116	6.67	1.29	—
1.5/LIGHT	2-1120	\$2,731	\$403	6.78	1.27	—
1.2/LIGHT	2-1120	\$18,245	\$2,645	6.90	1.24	—
1.1/LIGHT	2-1138	\$35,269	\$5,051	6.98	1.23	—
1.1/LIGHT	2-1731	\$34,796	\$4,981	6.99	1.23	—

TABLE 5.4.3
NON-RECOMMENDED ECOs
FROM
HIGHEST TO LOWEST SIR

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
5/OILHTG	2-1549	\$88,073	\$10,568	8.33	2.19	7.11%
6/HVAC	1-1242	\$82,981	\$8,187	10.14	1.63	5.55%
6/HVAC	2-1127	\$69,470	\$69,005	10.06	1.48	—
6/HVAC	2-1549	\$30,930	\$2,793	11.07	1.35	—
1.4/LIGHT	1-1242	\$2,210	\$307	7.21	1.19	—
1.2/LIGHT	1-1242	\$10,675	\$1,457	7.33	1.17	—
1.2/LIGHT	2-1105	\$7,733	\$1,053	7.35	1.17	—
1.2/LIGHT	2-1731	\$21,645	\$2,906	7.45	1.15	—
5/OILHTG	1-1326	\$41,849	\$2,693	15.54	1.15	3.73%
5/OILHTG	2-1138	\$32,277	\$2,155	15.44	1.15	3.71%
1.2/LIGHT	2-1138	\$32,773	\$4,298	7.62	1.13	—
6/HVAC	1-1333	\$77,123	\$5,904	13.06	1.13	—
6//HVAC	2-1120	\$90,099	\$6,766	13.32	1.12	—
6/HVAC	2-1138	\$268,956	\$18,593	14.47	1.10	—
5/OILHTG	2-1120	\$41,849	\$2,547	16.43	1.09	3.43%
6/HVAC	2-1731	\$78,102	\$5,670	13.77	1.09	—
1.1/LIGHT	1-1242	\$7,528	\$906	8.31	1.03	—
2/BLDG ENV	1-1333	\$50,637	\$2,662	19.02	0.90	2.43%
2/BLDG ENV	2-1127	\$184,345	\$9,157	20.13	0.86	2.22%
5/OILHTG	1-1333	\$17,314	\$885	19.56	0.84	—
5/OILHTG	2-1728	\$41,849	\$1,812	23.09	0.76	1.60%
5/OILHTG	2-1127	\$47,849	\$1,995	23.91	0.74	1.45%
2/BLDG ENV	1-1242	\$69,529	\$2,909	23.90	0.74	1.49%

TABLE 5.4.3
NON-RECOMMENDED ECOs
FROM
HIGHEST TO LOWEST SIR

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
1.1/LIGHT	2-1333	\$29,702	\$2,474	12.01	0.71	—
2/BLDG ENV	2-1133	\$166,318	\$6,522	25.50	0.66	0.88%
5/OILHTG	2-1731	\$41,849	\$1,486	28.16	0.62	—
5/OILHTG	1-1242	\$33,277	\$1,074	30.98	0.54	—
7/CWPLANT	—	\$1,419,763	\$45,543	31.17	0.48	—
5/OILHTG	2-1133	\$41,849	\$1,114	37.57	0.45	—
2/BLDG ENV	1-1326	\$238,899	\$5,496	43.47	0.38	-1.83%
2/BLDG ENV	2-1138	\$287,747	\$5,821	49.43	0.35	-2.33%
2/BLDG ENV	2-1549	\$256,395	\$4,563	56.19	0.33	-2.56%
2/BLDG ENV	2-1731	\$316,902	\$6,293	50.36	0.32	-2.66%
2/BLDG ENV	2-1105	\$411,023	\$7,554	54.41	0.31	-2.90%
2/BLDG ENV	2-1120	\$295,688	\$4,912	60.20	0.29	-3.19%
2/BLDG ENV	2-1728	\$306,474	\$5,280	58.05	0.28	-3.29%

TABLE 5.4.4

**RECOMMENDED ECOs SORTED
BY BUILDING NUMBER**

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
4/NGHTG	1-1242	\$26,493	\$3,633	7.29	2.43	7.68%
1.6/LIGHT	1-1242	\$4,628	\$907	5.10	1.68	—
6/HVAC	1-1242	\$75,684	\$8,187	9.24	1.79	6.04%
4/NGHTG	1-1326	\$34,171	\$11,074	3.09	5.92	12.58%
6/HVAC	1-1326	\$431,912	\$43,769	9.87	1.61	5.50%
4/NGHTG	1-1333	\$18,537	\$2,767	6.70	2.61	8.05%
1.6/LIGHT	1-1434	\$26,634	\$6,405	4.16	2.06	—
1.1/LIGHT	2-1105	\$9,300	\$1,408	6.61	1.30	—
1.6/LIGHT	2-1105	\$8,377	\$1,826	4.59	1.87	—
6/HVAC	2-1105	\$277,362	\$30,942	8.96	1.92	6.42%
4/NGHTG	2-1120	\$34,171	\$10,387	3.29	5.55	12.22%
1.6/LIGHT	2-1120	\$2,686	\$1,020	2.63	3.25	—
1.5/LIGHT	2-1120	\$2,731	\$403	6.78	1.27	—
1.1/LIGHT	2-1120	\$90,385	\$14,702	6.15	1.39	—
4/NGHTG	2-1127	\$36,117	\$7,852	4.60	3.95	10.32%
6/HVAC	2-1127	\$68,037	\$6,905	9.85	1.51	—
1.6/LIGHT	2-1127	\$177	\$98	1.81	4.72	—
1.1/LIGHT	2-1127	\$54,358	\$9,873	5.51	1.56	—
4/NGHTG	2-1133	\$34,171	\$3,815	8.96	1.98	6.59%
1.1/LIGHT	2-1133	\$80,849	\$12,116	6.67	1.29	—
1.6/LIGHT	2-1133	\$1,590	\$882	1.80	4.74	—
1.6/LIGHT	2-1138	\$2,120	\$1,176	1.80	4.74	—

TABLE 5.4.4**RECOMMENDED ECOs SORTED
BY BUILDING NUMBER**

ECO NUMBER	BUILDING NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
4/NGHTG	2-1138	\$29,438	\$8,588	3.43	5.31	11.97%
1.1/LIGHT	2-1326	\$20,994	\$3,862	5.44	1.58	—
4/NGHTG	2-1549	\$96,619	\$14,612	6.48	2.81	8.47%
1.1/LIGHT	2-1549	\$53,693	\$10,238	5.24	1.63	—
6/HVAC	2-1728	\$268,956	\$28,653	9.39	1.77	5.97%
4/NGHTG	2-1728	\$34,171	\$7,017	4.87	3.72	9.99%
1.3/LIGHT	2-1728	\$50,955	\$7,750	6.58	1.30	—
1.6/LIGHT	2-1731	\$10,074	\$1,924	5.24	1.64	—
4/NGHTG	2-1731	\$34,171	\$5,000	6.83	2.64	8.11%
3/WATER	ALL BLDGS	\$101,301	\$50,451	2.01	9.01	14.97%

5 NARRATIVE SUMMARY OF WORK AND RESULTS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

in these tables, omitting other data which is available in many locations throughout this report.

The fifth listing is *Table 5.4.5*, which presents the total SIR and simple payback if all ECOs evaluated are implemented. A grand total SIR and simple payback was computed totaling all buildings and ECOs.

ECOs 4 and 5 are the only mutually exclusive ECOs analyzed; ECO 4 is recommended over ECO 5 due to the greater savings and environmental benefits associated with natural gas rather than fuel oil.

TABLE 5.4.5
RECOMMENDED PROJECT RESULTS BY ECO

ECO NUMBER	TOTAL INVESTMENT	1st YEAR SAVINGS	SIMPLE PAYBACK	SIR	AIRR
ECO-1	\$419,550	\$74,590	5.62	1.52	7.44%
ECO-3	\$101,301	\$50,451	2.01	9.01	14.97%
ECO-4	\$378,059	\$74,311	5.09	3.57	9.76%
ECO-6	\$1,121,951	\$118,456	9.47	1.77	6.02%

6 *ECO - 1 CALCULATIONS*

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

This section contains the project summary sheet, the life-cycle cost analyses, energy calculations, and cost estimates for ECO-1: Install High Efficiency Interior Lighting Systems. For each building in this ECO, multiple options have been calculated when applicable. These options include fluorescent fixtures with T-8 lamps, electronic ballasts and reflectors, compact fluorescent lamps, LED exit sign retrofit kits and metal halide fixtures. In addition, each building has been divided into sub-ECOs by individual area's operating hours. The following are the sub-ECOs:

<u>ECO</u>	<u>Operation Hours</u>
1.1	10 hours per day, 5 days per week
1.2	10 hours per day, 7 days per week
1.3	12 hours per day, 5 days per week
1.4	14 hours per day, 5 days per week
1.5	18 hours per day, 5 days per week
1.6	24 hours per day, 7 days per week

A single life-cycle cost analysis and cost estimate was performed for each sub-ECO for each building which grouped all applicable options together.

6 ECO - 1 CALCULATIONS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

The following pages contain the analyses for the Historic Red Brick buildings. These buildings contained a variety of fixtures. The following table details the replacement fixtures used.

TABLE 6.1: LIGHTING FIXTURE REPLACEMENTS AND INSTALLATIONS		
EXISTING FIXTURE	REPLACEMENT FIXTURE	NOTES
T-12 Fluorescent	T-8 Fluorescent with electronic ballast	A one-for-one lamp replacement with two-lamp fixtures. Three- and four-lamp fixtures are replaced by two- and three-lamp fixtures respectively, with reflectors added.
Incandescents under 200-watts	Compact Fluorescent	Incandescents under 100-watts are replaced one-for-one with compact fluorescents up to 26-watts.
Incandescents over 200-watts	T-8 Fluorescent with electronic ballast	Incandescents larger than 200-watts in office areas are replaced with two-lamp, 4', T-8 fixtures.
Incandescent Exit Signs	LED Retrofit Kit	Existing fixture remains, incandescent lamps are removed and replaced by LED lamps.
Mercury Vapor	Metal Halide	One-for-one lamp replacement. 1,000-watt mercury vapors are replaced with 400-watt metal halides; 400-watt mercury vapors are replaced with 250-watt metal halides.

6 ECO - 1 CALCULATIONS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

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6 ECO - 1 CALCULATIONS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

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**LIFE CYCLE COST ANALYSIS SUMMARY
FEDERAL ENERGY MANAGEMENT PROGRAM (FEMP)
COVER PAGE**

DISCRETE PORTION NAME:	Fort Bragg, NC
PROJECT NAME:	Lighting Upgrade
TOTAL INVESTMENT:	\$419,550
MWH/YR SAVED:	543
DISCOUNTED ENERGY SAVINGS:	\$162,941
DISCOUNTED DEMAND SAVINGS:	\$155,997
TOTAL ENERGY SAVINGS:	\$318,938
TOTAL NON ENERGY SAVINGS:	\$320,614
FIRST YEAR DOLLAR SAVINGS:	\$74,590
SIMPLE PAYBACK IN YEARS:	5.62
TOTAL NET SAVINGS:	\$639,552
SAVINGS TO INVESTMENT RATIO:	1.52

ECO-1

REQUIREMENT:

This project is required to replace/retrofit the inefficient fluorescent, incandescent lighting and mercury vapor systems currently in use in various sections throughout 11 buildings at Fort Bragg. The lighting project will replace the existing T12 fluorescent lamps with T8 lamps, the magnetic ballasts with electronic ballasts, incandescent exit signs with LED exit signs, incandescent lamps with compact fluorescent lamps and mercury vapor fixtures with metal halide fixtures. The completion of this project will save Fort Bragg 543 MWH of energy and \$74,590 annually to help meet the requirements of the Energy Policy Act of 1992 (PL 102-486). This act states Fort Bragg must achieve a 30 percent reduction in it's energy consumption over the next 10 years, ending in FY 2005 using 1985 as a baseline.

DESCRIPTION OF PROPOSED CONSTRUCTION:

This project consists of replacing /retrofitting inefficient lighting systems with more energy efficient T8 fluorescent lamps, electronic ballasts, LED exit signs, compact fluorescent lamps and metal halide fixtures. The buildings included in this project are 1105, 1120, 1127, 1133, 1138, 1242, 1326, 1434, 1549, 1728 and 1731.

CURRENT CONDITION:

The energy lost due to the current usage of inefficient lighting systems is in excess of 543 MWH per year at a cost of \$74,590 per year. At this rate a more energy efficient lighting system would pay for itself in approximately 5.62 years. Estimated savings and payback were determined by calculations.

IMPACT IF NOT PROVIDED:

If this project is not funded, Fort Bragg will continue to spend in additional utility and operating costs over the next 5.62 years enough to purchase the more efficient and lower maintenance lighting systems. Also if this project is not funded, Fort Bragg will have more difficulty meeting the mandates of the Energy Policy Act of 1992 (PL 102-486).

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1 TOTAL LCCID

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	381410.	
B. SIOH	\$	19070.	
C. DESIGN COST	\$	19070.	
D. TOTAL COST (1A+1B+1C)	\$	419550.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		419550.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	543.	\$ 18967.	12.02	\$ 227987.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 18288.	11.94	\$ 218359.
N. TOTAL		543.	\$ 37255.		\$ 446346.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$ 3748.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 44751.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTOR	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 335632.	5	.86	288644.
d. TOTAL	\$ 335632.			288644.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 333395.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 63379.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.62 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 779740.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.86
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 7.34 %

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1105

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	8454.		
B. SIOH	\$	423.		
C. DESIGN COST	\$	423.		
D. TOTAL COST (1A+1B+1C)	\$	9300.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		9300.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	9.	\$ 315.	12.02	\$ 3781.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 365.	11.94	\$ 4358.
N. TOTAL		9.	\$ 680.		\$ 8139.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+)/ COST(-) (4)
	(1)	(2)	(3)	
1. FUTURE INVESTMENT	\$ 7440.	5	.86	6398.
d. TOTAL	\$ 7440.			6398.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4)\$ 6398.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 1176.

5. SIMPLE PAYBACK PERIOD (1G/4) 7.91 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 14537.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 1.56
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 6.11 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1105-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 41 2 LAMP @ 90 W/FIXT = 3,690 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 23 2 LAMP @ 144 W/FIXT = 3,312 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 64 2 LAMP @ 58 W/FIXT = 3,712 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 18,205 KWH/YR ECO ENERGY CONSUMPTION 9,651 KWH/YR

BASELINE DEMAND 7.00 KW ECO DEMAND 3.71 KW

NET ENERGY SAVINGS	8,554 KWH/YR
NET DEMAND SAVINGS	\$365 /YR
NET DOLLAR SAVINGS	\$664 /YR

MAINTENANCE SAVINGS

0 LAMPS @ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1105 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					41.00 FIXTURE	
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		20.09	\$0	\$547	\$0	\$0	\$547
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					23.00 FIXTURE	
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		11.27	\$0	\$307	\$0	\$0	\$307
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					41.00 FIXTURE	
Unit values		1.51	59.00	41.50	0.00	0.00	100.50
Totals		61.91	\$2,419	\$1,702	\$0	\$0	\$4,121
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					23.00 FIXTURE	
Unit values		1.14	39.00	31.50	0.00	0.00	70.50
Totals		26.22	\$897	\$725	\$0	\$0	\$1,622
U00		120	\$3,316	\$3,281	\$0	\$0	\$6,597

09-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
           Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	120	\$3,316	\$3,281	\$0	\$0	\$6,597
SALES TAX	5.00%	\$166				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$3,482	\$3,281	\$0	\$0	\$6,763
CONTINGENCY	10.00%					\$676
BOND	5.00%					\$338
PROFIT	10.00%					\$676
JOB TOTAL						\$8,454

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1105

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	7615.	
B. SIOH	\$	381.	
C. DESIGN COST	\$	381.	
D. TOTAL COST (1A+1B+1C)	\$	8377.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		8377.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	17.	\$ 594.	12.02	\$ 7142.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 210.	11.94	\$ 2507.
N. TOTAL		17.	\$ 804.		\$ 9649.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$ 368.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 4394.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 6700.	(1) 5	(2) .86	5762.
d. TOTAL	\$ 6700.			5762.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 10156.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 1619.

5. SIMPLE PAYBACK PERIOD (1G/4) 5.17 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 19805.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 2.36
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 9.08 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1105-MP ADMIN & BARRACKS	ELECTRIC COSTS:	\$0.03495	PER KWH
AREA USE:	ENERGY CHARGE	\$9.25	PER KW
HOURS/DAY 24	DEMAND CHARGE		
DAYS/WEEK 7			

EXISTING FIXTURE DATA

2 FOOT	2 LAMP U @	90 W/FIXT =	0 WATTS
4 FOOT	49 2 LAMP @	90 W/FIXT =	4,410 WATTS
	3 LAMP @	138 W/FIXT =	0 WATTS
	4 LAMP @	180 W/FIXT =	0 WATTS
8 FOOT	2 LAMP @	144 W/FIXT =	0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT	0 2 LAMP U @	58 W/FIXT =	0 WATTS
4 FOOT	49 2 LAMP @	58 W/FIXT =	2,842 WATTS
	0 3 LAMP @	87 W/FIXT =	0 WATTS
	0 4 LAMP @	118 W/FIXT =	0 WATTS
8 FOOT	0 2 LAMP @	125 W/FIXT =	0 WATTS

BASELINE ENERGY CONSUMPTION	38,526 KWH/YR	ECO ENERGY CONSUMPTION	24,828 KWH/YR
BASELINE DEMAND	4.41 KW	ECO DEMAND	2.84 KW

NET ENERGY SAVINGS	13,698 KWH/YR
NET DEMAND SAVINGS	\$174 /YR
NET DOLLAR SAVINGS	\$653 /YR

MAINTENANCE SAVINGS

0 LAMPS @	/ 20,000 HOURS *	HR/YR =	\$0 / YEAR	(4' FLUORESCENT LAMPS)
NET MAINTENANCE SAVINGS			\$0 /YEAR	

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1105-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE
DEMAND CHARGE

\$0.03495 PER KWH
\$9.25 PER KW

INCANDESCENT EXIT SIGNS	FLUORESCENT EXIT SIGNS	REPLACEMENT SIGNS
# OF EXIT SIGNS: 12	# OF EXIT SIGNS: 0	# OF EXIT SIGNS: 12
WATTAGE: 30	WATTAGE: 18	WATTAGE: 3
BASELINE ENERGY CONSUMPTION	3,154 KWH/YR	ECO ENERGY CONSUMPTION
BASELINE DEMAND	0.36 KW	ECO DEMAND
		0.04 KW
		315 KWH/YR

NET ENERGY SAVINGS	2,838 KWH/YR	NET DEMAND SAVINGS	\$36 /YR
		NET DOLLAR SAVINGS	\$135 /YR

MAINTENANCE SAVINGS

12 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HR/YR =	\$368 / YEAR	(INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HR/YR =	\$0 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$368 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1105 - 24hr/d Job #:    94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					31.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	15.19	\$0	\$414	\$0	\$0	\$414	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					18.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	8.82	\$0	\$240	\$0	\$0	\$240	
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					7.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00	91.50	
Totals	7.98	\$420	\$221	\$0	\$0	\$641	
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					31.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00	100.50	
Totals	46.81	\$1,829	\$1,287	\$0	\$0	\$3,116	
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					11.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00	70.50	
Totals	12.54	\$429	\$347	\$0	\$0	\$776	
0010700000	LED EXIT SIGN, RETROFIT KIT					12.00	FIXTURE
Unit values	1.00	35.00	27.50	0.00	0.00	62.50	
Totals	12.00	\$420	\$330	\$0	\$0	\$750	
U00	104	\$3,098	\$2,839	\$0	\$0	\$5,937	


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Line #      Description
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      Manhours  Matl    Labor  Equipment  Sub    Total
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ESTIMATE TOTAL	104	\$3,098	\$2,839	\$0	\$0	\$5,937
SALES TAX	5.00%	\$155				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$3,253	\$2,839	\$0	\$0	\$6,092
CONTINGENCY	10.00%					\$609
BOND	5.00%					\$305
PROFIT	10.00%					\$609
JOB TOTAL						\$7,615

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1105 - 24hr/dJob #:    94013.05
Sq. footage:                      City indx:Raleigh, NC
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SUMMARY

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              Manhours   Matl      Labor   Equipment   Sub      Total
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U00              104      $3,098    $2,839         $0         $0      $5,937
TOTAL              104      $3,098    $2,839         $0         $0      $5,937

SALES TAX          5.00%      $155
MATL MARKUP        0.00%        $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC  $3,253    $2,839         $0         $0      $6,092
CONTINGENCY          10.00%          $609
BOND                 5.00%          $305
PROFIT              10.00%          $609

JOB TOTAL                                $7,615
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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1120

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	82168.		
B. SIOH	\$	4108.		
C. DESIGN COST	\$	4108.		
D. TOTAL COST (1A+1B+1C)	\$	90384.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		90384.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	94.	\$ 3285.	12.02	\$ 39489.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 4004.	11.94	\$ 47808.
N. TOTAL		94.	\$ 7289.		\$ 87297.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	190.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	2269.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 72308.	5	.86	62185.
d. TOTAL	\$ 72308.			62185.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 64453.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 12300.

5. SIMPLE PAYBACK PERIOD (1G/4) 7.35 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 151751.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.68
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 6.62 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1120 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 1 2 LAMP @ 48 W/FIXT = 48 WATTS

4 FOOT 275 2 LAMP @ 90 W/FIXT = 24,750 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
293 4 LAMP @ 180 W/FIXT = 52,740 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 1 2 LAMP @ 29 W/FIXT = 29 WATTS

4 FOOT 275 2 LAMP @ 58 W/FIXT = 15,950 WATTS
293 3 LAMP @ 87 W/FIXT = 25,491 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 201,599 KWH/YR ECO ENERGY CONSUMPTION 107,822 KWH/YR

BASELINE DEMAND 77.54 KW ECO DEMAND 41.47 KW

NET ENERGY SAVINGS

93,777 KWH/YR

NET DEMAND SAVINGS

\$4,004 /YR
NET DOLLAR SAVINGS \$7,281 /YR

MAINTENANCE SAVINGS

293 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HRYR = \$190 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$190 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1120 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					347.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	170.03	\$0	\$4,632	\$0	\$0	\$4,632	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					221.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	108.29	\$0	\$2,950	\$0	\$0	\$2,950	
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					54.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00	100.50	
Totals	81.54	\$3,186	\$2,241	\$0	\$0	\$5,427	
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					221.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00	70.50	
Totals	251.94	\$8,619	\$6,962	\$0	\$0	\$15,581	
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					293.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00	120.50	
Totals	442.43	\$23,147	\$12,160	\$0	\$0	\$35,307	
0011600000	1X2 2-18 WATT FLUORESCENT LAMPS, WALL MOUNTED					1.00	FIXTURE
Unit values	1.14	55.00	31.50	0.00	0.00	86.50	
Totals	1.14	\$55	\$32	\$0	\$0	\$87	
U00		1056	\$35,007	\$28,977	\$0	\$0	\$63,984

10-Mar-95

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Line #      Description
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           Manhours   Matl     Labor   Equipment   Sub     Total
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ESTIMATE TOTAL	1056	\$35,007	\$28,977	\$0	\$0	\$63,984
SALES TAX	5.00%	\$1,750				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$36,757	\$28,977	\$0	\$0	\$65,734
CONTINGENCY	10.00%					\$6,573
BOND	5.00%					\$3,287
PROFIT	10.00%					\$6,573
JOB TOTAL						\$82,168

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1120 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl  Labor  Equipment  Sub  Total
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U00        1056  $35,007  $28,977      $0      $0  $63,984
TOTAL      1056  $35,007  $28,977      $0      $0  $63,984

SALES TAX      5.00%    $1,750
MATL MARKUP    0.00%      $0
LABOR MARKUP   0.00%      $0
EQUIPT MARKUP  0.00%      $0
SUB MARKUP     0.00%      $0

TOTAL BEFORE CONTINGENC  $36,757  $28,977      $0      $0  $65,734
CONTINGENCY      10.00%      $6,573
BOND              5.00%      $3,287
PROFIT           10.00%      $6,573

JOB TOTAL                                     $82,168

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.5 BLDG 1120

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	2483.	
B. SIOH	\$	124.	
C. DESIGN COST	\$	124.	
D. TOTAL COST (1A+1B+1C)	\$	2731.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		2731.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	4.	\$ 140.	12.02	\$ 1680.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 60.	11.94	\$ 716.
N. TOTAL		4.	\$ 200.		\$ 2397.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 2185.	5	.86	1879.
d. TOTAL	\$ 2185.			1879.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 1879.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 345.

5. SIMPLE PAYBACK PERIOD (1G/4) 7.91 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 4276.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.57
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 6.12 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1120 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 18
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT
17 2 LAMP @ 90 W/FIXT = 1,530 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT
17 2 LAMP @ 58 W/FIXT = 986 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION

10,025 KWH/YR

ECO ENERGY CONSUMPTION

6,460 KWH/YR

BASELINE DEMAND

1.53 KW

ECO DEMAND

0.99 KW

NET ENERGY SAVINGS

3,564 KWH/YR

NET DEMAND SAVINGS

\$60 /YR

NET DOLLAR SAVINGS

\$185 /YR

MAINTENANCE SAVINGS

0 LAMPS @ _____ / 20,000 HOURS *

HR/YR = _____ \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1120 - 18/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					17.00	FIXTURE
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		8.33	\$0	\$227	\$0	\$0	\$227
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					17.00	FIXTURE
Unit values		1.51	59.00	41.50	0.00	0.00	100.50
Totals		25.67	\$1,003	\$706	\$0	\$0	\$1,709
U00		34	\$1,003	\$933	\$0	\$0	\$1,936

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Line #      Description
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      Manhours  Matl    Labor  Equipment  Sub    Total
=====
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ESTIMATE TOTAL	34	\$1,003	\$933	\$0	\$0	\$1,936
SALES TAX	5.00%	\$50				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$1,053	\$933	\$0	\$0	\$1,986
CONTINGENCY	10.00%					\$199
BOND	5.00%					\$99
PROFIT	10.00%					\$199
JOB TOTAL						\$2,483

```

=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1120 - 18/7   Job #:      94013.05
Sq. footage:                                     City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl  Labor  Equipment  Sub  Total
=====
U00              34    $1,003    $933        $0        $0    $1,936
TOTAL              34    $1,003    $933        $0        $0    $1,936

SALES TAX          5.00%      $50
MATL MARKUP        0.00%      $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC  $1,053    $933    $0        $0    $1,986
CONTINGENCY          10.00%          $199
BOND                  5.00%          $99
PROFIT               10.00%          $199

JOB TOTAL                                     $2,483

```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1120

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	2442.	
B. SIOH	\$	122.	
C. DESIGN COST	\$	122.	
D. TOTAL COST (1A+1B+1C)	\$	2686.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		2686.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	7.	\$ 245.	12.02	\$ 2941.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 84.	11.94	\$ 1003.
N. TOTAL		7.	\$ 329.		\$ 3944.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$ 491.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 5863.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 2149.	5	.86	1848.
d. TOTAL	\$ 2149.			1848.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 7711.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 963.

5. SIMPLE PAYBACK PERIOD (1G/4) 2.79 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 11654.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 4.34
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 13.59 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1120 - ADMINISTRATION
AREA USE: _____
HOURS/DAY: 24
DAYS/WEEK: 7

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS
4 FOOT 10 2 LAMP @ 90 W/FIXT = 900 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS
8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS
4 FOOT 10 2 LAMP @ 58 W/FIXT = 580 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS
8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 7,862 KWH/YR ECO ENERGY CONSUMPTION 5,067 KWH/YR

BASELINE DEMAND 0.90 KW ECO DEMAND 0.58 KW

NET ENERGY SAVINGS 2,796 KWH/YR NET DEMAND SAVINGS \$36 /YR
NET DOLLAR SAVINGS \$133 /YR

MAINTENANCE SAVINGS

0 LAMPS @ _____ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)
NET MAINTENANCE SAVINGS \$0 / YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1120 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

INCANDESCENT EXIT SIGNS	FLUORESCENT EXIT SIGNS	REPLACEMENT SIGNS
# OF EXIT SIGNS: 16	# OF EXIT SIGNS: 0	# OF EXIT SIGNS: 16
WATTAGE: 30	WATTAGE: 18	WATTAGE: 3
BASELINE ENERGY CONSUMPTION	4,205 KWH/YR	ECO ENERGY CONSUMPTION
	0.48 KW	ECO DEMAND
		0.05 KW
		420 KWH/YR

NET ENERGY SAVINGS	3,784 KWH/YR
NET DEMAND SAVINGS	\$48 /YR
NET DOLLAR SAVINGS	\$180 /YR

MAINTENANCE SAVINGS

16 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HR/YR = \$491 / YEAR	(INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HR/YR = \$0 / YEAR	(COMPACT FLUORESCENT)
NET MAINTENANCE SAVINGS		\$491 / YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1120-24 HR/DY Job #:   94013.05
Sq. footage:   City indx: Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					10.00	FIXTURE
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		4.90	\$0	\$134	\$0	\$0	\$134
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					3.00	FIXTURE
Unit values		1.14	60.00	31.50	0.00	0.00	91.50
Totals		3.42	\$180	\$95	\$0	\$0	\$275
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					7.00	FIXTURE
Unit values		1.14	39.00	31.50	0.00	0.00	70.50
Totals		7.98	\$273	\$221	\$0	\$0	\$494
0010700000	LED EXIT SIGN, RETROFIT KIT					16.00	FIXTURE
Unit values		1.00	35.00	27.50	0.00	0.00	62.50
Totals		16.00	\$560	\$440	\$0	\$0	\$1,000
U00		33	\$1,013	\$890	\$0	\$0	\$1,903


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Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	33	\$1,013	\$890	\$0	\$0	\$1,903
SALES TAX	5.00%	\$51				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$1,064	\$890	\$0	\$0	\$1,954
CONTINGENCY	10.00%					\$195
BOND	5.00%					\$98
PROFIT	10.00%					\$195
JOB TOTAL						\$2,442

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1120-24 HR/DY Job #:    94013.05
Sq. footage:   City indx: Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	33	\$1,013	\$890	\$0	\$0	\$1,903
TOTAL	33	\$1,013	\$890	\$0	\$0	\$1,903
SALES TAX	5.00%	\$51				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$1,064	\$890	\$0	\$0	\$1,954
CONTINGENCY	10.00%					\$195
BOND	5.00%					\$98
PROFIT	10.00%					\$195
JOB TOTAL						\$2,442

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1127

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	49416.		
B. SIOH	\$	2471.		
C. DESIGN COST	\$	2471.		
D. TOTAL COST (1A+1B+1C)	\$	54358.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		54358.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	69.	\$ 2412.	12.02	\$ 28987.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 2841.	11.94	\$ 33922.
N. TOTAL		69.	\$ 5253.		\$ 62908.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$ 277.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 3307.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 43486.	5	.86	37398.
d. TOTAL	\$ 43486.			37398.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ 40705.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 8429.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.45 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 103614.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.91
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 7.53 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1127 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP @ 48 W/FIXT = 0 WATTS

4 FOOT 20 2 LAMP @ 90 W/FIXT = 1,800 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
268 4 LAMP @ 180 W/FIXT = 48,240 WATTS

8 FOOT 1 2 LAMP @ 144 W/FIXT = 144 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP @ 29 W/FIXT = 0 WATTS

4 FOOT 22 2 LAMP @ 58 W/FIXT = 1,276 WATTS
268 3 LAMP @ 87 W/FIXT = 23,316 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 130,478 KWH/YR ECO ENERGY CONSUMPTION 63,939 KWH/YR

BASELINE DEMAND 50.18 KW ECO DEMAND 24.59 KW

NET ENERGY SAVINGS

66,539 KWH/YR

NET DEMAND SAVINGS
NET DOLLAR SAVINGS

\$2,841 /YR
\$5,166 /YR

MAINTENANCE SAVINGS

268 LAMPS @ \$5.00 / 20,000 HOURS *

2,600 HR/YR =

\$174 / YEAR

(4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$174 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1127 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 5
PEAK USE 1 (1-YES, 0-NO)

EXISTING INCANDESCENTS

LAMPS @ 52 W/FIXT = 0 WATTS
LAMPS @ 60 W/FIXT = 0 WATTS
LAMPS @ 75 W/FIXT = 0 WATTS
LAMPS @ 90 W/FIXT = 0 WATTS
6 LAMPS @ 200 W/FIXT = 1,200 WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 13 W/FIXT = 0 WATTS
0 LAMPS @ 13 W/FIXT = 0 WATTS
0 LAMPS @ 18 W/FIXT = 0 WATTS
0 LAMPS @ 26 W/FIXT = 0 WATTS
12 LAMPS @ 26 W/FIXT = 312 WATTS

BASELINE ENERGY CONSUMPTION 3,120 KWH/YR

ECO ENERGY CONSUMPTION

811 KWH/YR

BASELINE DEMAND

1.20 KW

ECO DEMAND

0.31 KW

NET ENERGY SAVINGS

2,309 KWH/YR

NET DEMAND SAVINGS

\$0 /YR
\$106 /YR

MAINTENANCE SAVINGS

6 LAMPS @ \$5.25 / 750 HOURS * 2,600 HR/YR = \$109 / YEAR (INCANDESCENT)
12 LAMPS @ \$2.00 / 10,000 HOURS * 2,600 HR/YR = \$6 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS

\$103 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1127 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					268.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	131.32	\$0	\$3,578	\$0	\$0	\$3,578	
0002010000	DEMOLITION, INCANDESCENT FIXTURES/EXIT SIGNS					6.00	FIXTURE
Unit values	0.26	0.00	7.10	0.00	0.00	7.10	
Totals	1.56	\$0	\$43	\$0	\$0	\$43	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					21.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	10.29	\$0	\$280	\$0	\$0	\$280	
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					20.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00	91.50	
Totals	22.80	\$1,200	\$630	\$0	\$0	\$1,830	
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					2.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00	70.50	
Totals	2.28	\$78	\$63	\$0	\$0	\$141	
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					268.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00	120.50	
Totals	404.68	\$21,172	\$11,122	\$0	\$0	\$32,294	
0011700000	2-26 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					6.00	FIXTURE
Unit values	0.13	35.50	3.44	0.00	0.00	38.94	
Totals	0.78	\$213	\$21	\$0	\$0	\$234	
U00		574	\$22,663	\$15,737	\$0	\$0	\$38,400

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	574	\$22,663	\$15,737	\$0	\$0	\$38,400
SALES TAX	5.00%	\$1,133				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$23,796	\$15,737	\$0	\$0	\$39,533
CONTINGENCY	10.00%					\$3,953
BOND	5.00%					\$1,977
PROFIT	10.00%					\$3,953
JOB TOTAL						\$49,416

10-Mar-95

MeansData for Lotus

Page 3

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1127 - 10/5   Job #:      94013.05
Sq. footage:                      City indx:Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	574	\$22,663	\$15,737	\$0	\$0	\$38,400
TOTAL	574	\$22,663	\$15,737	\$0	\$0	\$38,400
SALES TAX	5.00%	\$1,133				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$23,796	\$15,737	\$0	\$0	\$39,533
CONTINGENCY	10.00%					\$3,953
BOND	5.00%					\$1,977
PROFIT	10.00%					\$3,953
JOB TOTAL						\$49,416

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1127

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	161.		
B. SIOH	\$	8.		
C. DESIGN COST	\$	8.		
D. TOTAL COST (1A+1B+1C)	\$	177.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		177.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	1.	\$ 17.	12.02	\$ 210.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 6.	11.94	\$ 72.
N. TOTAL		1.	\$ 23.		\$ 282.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)			
(1) DISCOUNT FACTOR (TABLE A)		11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)			\$ 728.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) / COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+) / COST(-) (4)
	(1)	(2)	(3)	
1. FUTURE INVESTMENT	\$ 142.	5	.86	122.
d. TOTAL	\$ 142.			122.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ 850.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 94.

5. SIMPLE PAYBACK PERIOD (1G/4) 1.88 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 1132.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 6.40
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 16.56 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1127 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

INCANDESCENT EXIT SIGNS	FLUORESCENT EXIT SIGNS	REPLACEMENT SIGNS
# OF EXIT SIGNS: 2	# OF EXIT SIGNS: 0	# OF EXIT SIGNS: 2
WATTAGE: 30	WATTAGE: 18	WATTAGE: 3
BASELINE ENERGY CONSUMPTION	526 KWH/YR	ECO ENERGY CONSUMPTION
BASELINE DEMAND	0.06 KW	ECO DEMAND
		53 KWH/YR
		0.01 KW

NET ENERGY SAVINGS	473 KWH/YR	NET DEMAND SAVINGS	\$6 /YR
		NET DOLLAR SAVINGS	\$23 /YR

MAINTENANCE SAVINGS

2 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HR/YR =	\$61 / YEAR	(INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HR/YR =	\$0 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$61 /YEAR

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1127 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0010700000	LED EXIT SIGN, RETROFIT KIT					2.00	FIXTURE
Unit values		1.00	35.00	27.50	0.00	0.00	62.50
Totals		2.00	\$70	\$55	\$0	\$0	\$125
U00		2	\$70	\$55	\$0	\$0	\$125

```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	2	\$70	\$55	\$0	\$0	\$125
SALES TAX	5.00%	\$4				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$74	\$55	\$0	\$0	\$129
CONTINGENCY	10.00%					\$13
BOND	5.00%					\$6
PROFIT	10.00%					\$13
JOB TOTAL						\$161

```

=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICKBid Date: NOVEMBER 28, 1994
Location:      BLDG 1127 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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SUMMARY

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-----
              Manhours    Matl      Labor    Equipment    Sub      Total
=====
U00              2          $70          $55          $0          $0          $125
TOTAL            2          $70          $55          $0          $0          $125

SALES TAX        5.00%          $4
MATL MARKUP      0.00%          $0
LABOR MARKUP     0.00%          $0
EQUIPT MARKUP    0.00%          $0
SUB MARKUP       0.00%          $0

TOTAL BEFORE CONTINGENC    $74          $55          $0          $0          $129
CONTINGENCY      10.00%          $13
BOND              5.00%          $6
PROFIT           10.00%          $13

JOB TOTAL                                $161

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LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: ECO1
 INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING
 FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1133
 ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	73499.		
B. SIOH	\$	3675.		
C. DESIGN COST	\$	3675.		
D. TOTAL COST (1A+1B+1C)	\$	80849.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		80849.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	71.	\$ 2481.	12.02	\$ 29827.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 3035.	11.94	\$ 36238.
N. TOTAL		71.	\$ 5516.		\$ 66065.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	129.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	1540.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 64679.	5	.86	55624.
d. TOTAL	\$ 64679.			55624.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 57164.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 9957.

5. SIMPLE PAYBACK PERIOD (1G/4) 8.12 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 123229.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 1.52
 (IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 5.94 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1133 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP @ 48 W/FIXT = 0 WATTS

4 FOOT 279 2 LAMP @ 90 W/FIXT = 25,110 WATTS
198 3 LAMP @ 138 W/FIXT = 0 WATTS
198 4 LAMP @ 180 W/FIXT = 35,640 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP @ 29 W/FIXT = 0 WATTS

4 FOOT 279 2 LAMP @ 58 W/FIXT = 16,182 WATTS
198 3 LAMP @ 87 W/FIXT = 17,226 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 157,950 KWH/YR ECO ENERGY CONSUMPTION 86,861 KWH/YR

BASELINE DEMAND 60.75 KW ECO DEMAND 33.41 KW

NET ENERGY SAVINGS 71,089 KWH/YR

NET DEMAND SAVINGS \$3,035 /YR
NET DOLLAR SAVINGS \$5,520 /YR

MAINTENANCE SAVINGS

198 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HR/YR = \$129 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$129 / YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1133 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					451.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	220.99	\$0	\$6,021	\$0	\$0	\$6,021	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					26.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	12.74	\$0	\$347	\$0	\$0	\$347	
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					253.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00	100.50	
Totals	382.03	\$14,927	\$10,500	\$0	\$0	\$25,427	
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					26.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00	91.50	
Totals	29.64	\$1,560	\$819	\$0	\$0	\$2,379	
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED WITH REFLECTOR					80.00	FIXTURE
Unit values	1.51	69.00	41.50	0.00	0.00	110.50	
Totals	120.80	\$5,520	\$3,320	\$0	\$0	\$8,840	
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					118.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00	120.50	
Totals	178.18	\$9,322	\$4,897	\$0	\$0	\$14,219	
U00		945	\$31,329	\$25,904	\$0	\$0	\$57,233

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	945	\$31,329	\$25,904	\$0	\$0	\$57,233
SALES TAX	5.00%	\$1,566				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$32,895	\$25,904	\$0	\$0	\$58,799
CONTINGENCY	10.00%					\$5,880
BOND	5.00%					\$2,940
PROFIT	10.00%					\$5,880
JOB TOTAL						\$73,499

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICKBid Date: NOVEMBER 28, 1994
Location:     BLDG 1133 - 10/5   Job #:      94013.05
Sq. footage:                      City indx:Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	945	\$31,329	\$25,904	\$0	\$0	\$57,233
TOTAL	945	\$31,329	\$25,904	\$0	\$0	\$57,233
SALES TAX	5.00%	\$1,566				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$32,895	\$25,904	\$0	\$0	\$58,799
CONTINGENCY	10.00%					\$5,880
BOND	5.00%					\$2,940
PROFIT	10.00%					\$5,880
JOB TOTAL						\$73,499

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1133

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	1446.	
B. SIOH	\$	72.	
C. DESIGN COST	\$	72.	
D. TOTAL COST (1A+1B+1C)	\$	1590.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		1590.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	4.	\$ 140.	12.02	\$ 1680.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 54.	11.94	\$ 645.
N. TOTAL		4.	\$ 194.		\$ 2325.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$ 552.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 6591.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 1272.	5	.86	1094.
d. TOTAL	\$ 1272.			1094.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 7685.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 831.

5. SIMPLE PAYBACK PERIOD (1G/4) 1.91 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 10010.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 6.30
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 16.44 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1133 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

INCANDESCENT EXIT SIGNS	FLUORESCENT EXIT SIGNS	REPLACEMENT SIGNS
# OF EXIT SIGNS: 18	# OF EXIT SIGNS: 0	# OF EXIT SIGNS: 18
WATTAGE: 30	WATTAGE: 18	WATTAGE: 3
BASELINE ENERGY CONSUMPTION	4,730 KWH/YR	ECO ENERGY CONSUMPTION
	0.54 KW	ECO DEMAND
		0.05 KW
		473 KWH/YR

NET ENERGY SAVINGS	4,257 KWH/YR	NET DEMAND SAVINGS	\$54 /YR
		NET DOLLAR SAVINGS	\$203 /YR

MAINTENANCE SAVINGS

18 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HR/YR =	\$552 / YEAR	(INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HR/YR =	\$0 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$552 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1133 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0010700000	LED EXIT SIGN, RETROFIT KIT					18.00	FIXTURE
Unit values		1.00	35.00	27.50	0.00	0.00	62.50
Totals		18.00	\$630	\$495	\$0	\$0	\$1,125
U00		18	\$630	\$495	\$0	\$0	\$1,125

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
Manhours    Matl      Labor    Equipment    Sub      Total
=====
```

ESTIMATE TOTAL	18	\$630	\$495	\$0	\$0	\$1,125
SALES TAX	5.00%	\$32				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$662	\$495	\$0	\$0	\$1,157
CONTINGENCY	10.00%					\$116
BOND	5.00%					\$58
PROFIT	10.00%					\$116
JOB TOTAL						\$1,446

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1133 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	18	\$630	\$495	\$0	\$0	\$1,125
TOTAL	18	\$630	\$495	\$0	\$0	\$1,125
SALES TAX	5.00%	\$32				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$662	\$495	\$0	\$0	\$1,157
CONTINGENCY	10.00%					\$116
BOND	5.00%					\$58
PROFIT	10.00%					\$116
JOB TOTAL						\$1,446

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1138

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	1928.	
B. SIOH	\$	96.	
C. DESIGN COST	\$	96.	
D. TOTAL COST (1A+1B+1C)	\$	2120.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		2120.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	6.	\$ 210.	12.02	\$ 2521.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 72.	11.94	\$ 860.
N. TOTAL		6.	\$ 282.		\$ 3380.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$ 736.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 8788.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 1696.	(1) 5	(2) .86	1459.
d. TOTAL	\$ 1696.			1459.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 10246.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 1131.

5. SIMPLE PAYBACK PERIOD (1G/4) 1.87 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 13627.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 6.43
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 16.60 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1138 - ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE
DEMAND CHARGE

\$0.03495 PER KWH
\$9.25 PER KW

INCANDESCENT EXIT SIGNS	FLUORESCENT EXIT SIGNS	REPLACEMENT SIGNS
# OF EXIT SIGNS: 24	# OF EXIT SIGNS: 0	# OF EXIT SIGNS: 24
WATTAGE: 30	WATTAGE: 18	WATTAGE: 3
BASELINE ENERGY CONSUMPTION	6,307 KWH/YR	ECO ENERGY CONSUMPTION
BASELINE DEMAND	0.72 KW	ECO DEMAND
		631 KWH/YR
		0.07 KW

NET ENERGY SAVINGS	5,676 KWH/YR
NET DEMAND SAVINGS	\$72 /YR
NET DOLLAR SAVINGS	\$270 /YR

MAINTENANCE SAVINGS

24 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HRY/YR =	\$736 / YEAR (INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HRY/YR =	\$0 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$736 /YEAR

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1138 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0010700000	LED EXIT SIGN, RETROFIT KIT					24.00	FIXTURE
Unit values		1.00	35.00	27.50	0.00	0.00	62.50
Totals		24.00	\$840	\$660	\$0	\$0	\$1,500
U00		24	\$840	\$660	\$0	\$0	\$1,500

```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	24	\$840	\$660	\$0	\$0	\$1,500
SALES TAX	5.00%	\$42				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$882	\$660	\$0	\$0	\$1,542
CONTINGENCY	10.00%					\$154
BOND	5.00%					\$77
PROFIT	10.00%					\$154
JOB TOTAL						\$1,928

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1138 - 24/7   Job #:      94013.05
Sq. footage:  City indx:Raleigh, NC
=====

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SUMMARY

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=====
              Manhours   Matl     Labor   Equipment   Sub       Total
=====
U00              24       $840     $660        $0          $0       $1,500
TOTAL            24       $840     $660        $0          $0       $1,500

SALES TAX        5.00%       $42
MATL MARKUP      0.00%        $0
LABOR MARKUP     0.00%        $0
EQUIPT MARKUP   0.00%        $0
SUB MARKUP      0.00%        $0

TOTAL BEFORE CONTINGENC   $882     $660     $0     $0     $1,542
CONTINGENCY      10.00%           $154
BOND              5.00%           $77
PROFIT           10.00%          $154

JOB TOTAL                                $1,928

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1242

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	4208.		
B. SIOH	\$	210.		
C. DESIGN COST	\$	210.		
D. TOTAL COST (1A+1B+1C)	\$	4628.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$			4628.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	8.	\$ 280.	12.02	\$ 3361.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 102.	11.94	\$ 1218.
N. TOTAL		8.	\$ 382.		\$ 4579.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	153.
(1) DISCOUNT FACTOR (TABLE A)		11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	1827.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 3702.	5	.86	3184.
d. TOTAL	\$ 3702.			3184.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 5011.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 781.

5. SIMPLE PAYBACK PERIOD (1G/4) 5.92 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 9589.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 2.07
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 8.13 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING

20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1242-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 24
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 22 2 LAMP @ 90 W/FIXT = 1,980 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 3 2 LAMP @ 144 W/FIXT = 432 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 28 2 LAMP @ 58 W/FIXT = 1,624 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION	21,071 KWH/YR	ECO ENERGY CONSUMPTION	14,187 KWH/YR
BASELINE DEMAND	2.41 KW	ECO DEMAND	1.62 KW

NET ENERGY SAVINGS	6,884 KWH/YR	NET DEMAND SAVINGS	\$87 /YR
		NET DOLLAR SAVINGS	\$328 /YR

MAINTENANCE SAVINGS

0 LAMPS @ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1242-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE
DEMAND CHARGE

\$0.03495 PER KWH
\$9.25 PER KW

INCANDESCENT EXIT SIGNS		FLUORESCENT EXIT SIGNS		REPLACEMENT SIGNS	
# OF EXIT SIGNS:	5	# OF EXIT SIGNS:	0	# OF EXIT SIGNS:	5
WATTAGE:	30	WATTAGE:	18	WATTAGE:	3
BASELINE ENERGY CONSUMPTION		1,314 KWH/YR	ECO ENERGY CONSUMPTION	131 KWH/YR	
BASELINE DEMAND		0.15 KW	ECO DEMAND	0.02 KW	

NET ENERGY SAVINGS	1,183 KWH/YR	NET DEMAND SAVINGS	\$15 /YR
		NET DOLLAR SAVINGS	\$56 /YR

MAINTENANCE SAVINGS

5 LAMPS @	\$3.50 / 1,000 HOURS *	8,760 HR/YR =	\$153 / YEAR (INCANDESCENT)
0 LAMPS @	\$8.00 / 10,000 HOURS *	8,760 HR/YR =	\$0 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$153 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1242 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					22.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	10.78	\$0	\$294	\$0	\$0	\$294	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					3.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	1.47	\$0	\$40	\$0	\$0	\$40	
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					22.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00	100.50	
Totals	33.22	\$1,298	\$913	\$0	\$0	\$2,211	
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					6.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00	70.50	
Totals	6.84	\$234	\$189	\$0	\$0	\$423	
0010700000	LED EXIT SIGN, RETROFIT KIT					5.00	FIXTURE
Unit values	1.00	35.00	27.50	0.00	0.00	62.50	
Totals	5.00	\$175	\$138	\$0	\$0	\$313	
U00		58	\$1,707	\$1,574	\$0	\$0	\$3,281


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Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
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ESTIMATE TOTAL	58	\$1,707	\$1,574	\$0	\$0	\$3,281
SALES TAX	5.00%	\$85				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$1,792	\$1,574	\$0	\$0	\$3,366
CONTINGENCY	10.00%					\$337
BOND	5.00%					\$168
PROFIT	10.00%					\$337
JOB TOTAL						\$4,208

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICKBid Date: NOVEMBER 28, 1994
Location:     BLDG 1242 - 24/7   Job #:      94013.05
Sq. footage:  City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl  Labor  Equipment  Sub  Total
=====
U00              58    $1,707    $1,574        $0    $0    $3,281
TOTAL              58    $1,707    $1,574        $0    $0    $3,281

SALES TAX          5.00%        $85
MATL MARKUP        0.00%        $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC  $1,792    $1,574        $0    $0    $3,366
CONTINGENCY          10.00%          $337
BOND                 5.00%          $168
PROFIT              10.00%          $337

JOB TOTAL                                $4,208

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1326

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	19086.		
B. SIOH	\$	954.		
C. DESIGN COST	\$	954.		
D. TOTAL COST (1A+1B+1C)	\$	20994.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		20994.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	27.	\$ 944.	12.02	\$ 11343.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1133.	11.94	\$ 13528.
N. TOTAL		27.	\$ 2077.		\$ 24871.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$ 122.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 1457.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 16800.	5	.86	14448.
d. TOTAL	\$ 16800.			14448.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 15905.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 3319.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.33 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 40775.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 1.94
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 7.66 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1326 - POST HEADQUARTERS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP @ 48 W/FIXT = 0 WATTS

4 FOOT 23 2 LAMP @ 90 W/FIXT = 2,070 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
99 4 LAMP @ 180 W/FIXT = 17,820 WATTS

8 FOOT 1 2 LAMP @ 144 W/FIXT = 144 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP @ 29 W/FIXT = 0 WATTS

4 FOOT 25 2 LAMP @ 58 W/FIXT = 1,450 WATTS
99 3 LAMP @ 87 W/FIXT = 8,613 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 52,088 KWH/YR ECO ENERGY CONSUMPTION 26,164 KWH/YR

BASELINE DEMAND 20.03 KW ECO DEMAND 10.06 KW

NET ENERGY SAVINGS 25,925 KWH/YR NET DEMAND SAVINGS \$1,107 /YR
NET DOLLAR SAVINGS \$2,013 /YR

MAINTENANCE SAVINGS

99 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HRYR = \$64 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$64 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1326 - POST HEADQUARTERS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 5
PEAK USE 1 (1-YES, 0-NO)

EXISTING INCANDESCENTS

LAMPS @	52	W/FIXT =	0	WATTS
5 LAMPS @	60	W/FIXT =	300	WATTS
LAMPS @	75	W/FIXT =	0	WATTS
LAMPS @	90	W/FIXT =	0	WATTS
LAMPS @	100	W/FIXT =	0	WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	13	W/FIXT =	0	WATTS
5 LAMPS @	13	W/FIXT =	65	WATTS
0 LAMPS @	18	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS

BASELINE ENERGY CONSUMPTION	780 KWH/YR	ECO ENERGY CONSUMPTION	169 KWH/YR

BASELINE DEMAND	0.30 KW	ECO DEMAND	0.07 KW

NET ENERGY SAVINGS	611 KWH/YR	NET DEMAND SAVINGS	\$26 /YR
		NET DOLLAR SAVINGS	\$47 /YR

MAINTENANCE SAVINGS

5 LAMPS @ \$3.50 / 750 HOURS *	2,600 HR/YR =	\$61 / YEAR	(INCANDESCENT)
5 LAMPS @ \$2.00 / 10,000 HOURS *	2,600 HR/YR =	\$3 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$58 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1326           Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					104.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	50.96	\$0	\$1,388	\$0	\$0		\$1,388
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					19.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	9.31	\$0	\$254	\$0	\$0		\$254
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					5.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	7.55	\$295	\$208	\$0	\$0		\$503
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					18.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	20.52	\$918	\$567	\$0	\$0		\$1,485
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					2.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	2.28	\$78	\$63	\$0	\$0		\$141
0011100000	13 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					5.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	0.65	\$128	\$17	\$0	\$0		\$145
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					99.00	FIXTURE
Unit values	1.51	69.00	41.50	0.00	0.00		110.50
Totals	149.49	\$6,831	\$4,109	\$0	\$0		\$10,940
U00		241	\$8,250	\$6,606	\$0	\$0	\$14,856

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
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ESTIMATE TOTAL	241	\$8,250	\$6,606	\$0	\$0	\$14,856
SALES TAX	5.00%	\$413				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$8,663	\$6,606	\$0	\$0	\$15,269
CONTINGENCY	10.00%					\$1,527
BOND	5.00%					\$763
PROFIT	10.00%					\$1,527
JOB TOTAL						\$19,086

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1326         Job #:    94013.05
Sq. footage:                      City indx:Raleigh, NC
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SUMMARY

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=====
Manhours    Matl    Labor    Equipment    Sub    Total
=====
U00          241    $8,250    $6,606          $0          $0    $14,856
TOTAL        241    $8,250    $6,606          $0          $0    $14,856

SALES TAX    5.00%    $413
MATL MARKUP  0.00%    $0
LABOR MARKUP 0.00%          $0
EQUIPT MARKUP 0.00%          $0
SUB MARKUP   0.00%          $0

TOTAL BEFORE CONTINGENC    $8,663    $6,606    $0          $0    $15,269
CONTINGENCY    10.00%          $1,527
BOND           5.00%          $763
PROFIT         10.00%          $1,527

JOB TOTAL                                $19,086

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1434

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	24212.	
B. SIOH	\$	1211.	
C. DESIGN COST	\$	1211.	
D. TOTAL COST (1A+1B+1C)	\$	26634.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		26634.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	84.	\$ 2936.	12.02	\$ 35288.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1070.	11.94	\$ 12776.
N. TOTAL		84.	\$ 4006.		\$ 48064.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	261.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	3116.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 21300.	5	.86	18318.
d. TOTAL	\$ 21300.			18318.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 21434.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 5687.

5. SIMPLE PAYBACK PERIOD (1G/4) 4.68 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 69498.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 2.61
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 9.80 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1434 - SIGNAL BTN

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 24
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT

12 1 LAMP @	48 W/FIXT =	576 WATTS
67 2 LAMP @	90 W/FIXT =	6,030 WATTS
3 LAMP @	138 W/FIXT =	0 WATTS
75 4 LAMP @	180 W/FIXT =	13,500 WATTS

8 FOOT 4 2 LAMP @ 144 W/FIXT = 576 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT

12 1 LAMP @	29 W/FIXT =	348 WATTS
75 2 LAMP @	58 W/FIXT =	4,350 WATTS
75 3 LAMP @	87 W/FIXT =	6,525 WATTS
0 4 LAMP @	118 W/FIXT =	0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION	180,578 KWH/YR	ECO ENERGY CONSUMPTION	98,044 KWH/YR
BASELINE DEMAND	20.68 KW	ECO DEMAND	11.22 KW

NET ENERGY SAVINGS	82,634 KWH/YR
NET DEMAND SAVINGS	\$1,050 /YR
NET DOLLAR SAVINGS	\$3,938 /YR

MAINTENANCE SAVINGS

75 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HR/YR = \$49 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$49 / YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1434 - SIGNAL BTN	ELECTRIC COSTS:	
AREA USE: _____	ENERGY CHARGE	\$0.03495 PER KWH
HOURS/DAY: 24	DEMAND CHARGE	\$9.25 PER KW
DAYS/WEEK: 7		
PEAK USE: 1 (1-YES, 0-NO)		

EXISTING INCANDESCENTS

LAMPS @	52	W/FIXT =	0	WATTS
1 LAMPS @	60	W/FIXT =	60	WATTS
LAMPS @	75	W/FIXT =	0	WATTS
LAMPS @	90	W/FIXT =	0	WATTS
LAMPS @	100	W/FIXT =	0	WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	13	W/FIXT =	0	WATTS
1 LAMPS @	13	W/FIXT =	13	WATTS
0 LAMPS @	18	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS

BASELINE ENERGY CONSUMPTION	524 KWH/YR	ECO ENERGY CONSUMPTION	114 KWH/YR

BASELINE DEMAND	0.06 KW	ECO DEMAND	0.01 KW

NET ENERGY SAVINGS	411 KWH/YR	NET DEMAND SAVINGS	\$5 /YR
		NET DOLLAR SAVINGS	\$20 /YR

MAINTENANCE SAVINGS

1 LAMPS @ \$5.25 / 750 HOURS *	8,760 HR/YR =	\$61 / YEAR	(INCANDESCENT)
1 LAMPS @ \$2.00 / 10,000 HOURS *	8,760 HR/YR =	\$2 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$59 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1434 - SIGNAL BTN

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

<u>INCANDESCENT EXIT SIGNS</u>		<u>FLUORESCENT EXIT SIGNS</u>		<u>REPLACEMENT SIGNS</u>
# OF EXIT SIGNS: _____	5	# OF EXIT SIGNS: _____	0	# OF EXIT SIGNS: _____
WATTAGE: _____	30	WATTAGE: _____	18	WATTAGE: _____
BASELINE ENERGY CONSUMPTION		1,314 KWH/YR	ECO ENERGY CONSUMPTION	
			131 KWH/YR	
BASELINE DEMAND		0.15 KW	ECO DEMAND	
			0.02 KW	

NET ENERGY SAVINGS	1,183 KWH/YR
NET DEMAND SAVINGS	\$15 /YR
NET DOLLAR SAVINGS	\$56 /YR

MAINTENANCE SAVINGS

5 LAMPS @ \$3.50 / 1,000 HOURS *	8,760 HRYR =	\$153 / YEAR (INCANDESCENT)
0 LAMPS @ \$8.00 / 10,000 HOURS *	8,760 HRYR =	\$0 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS \$153 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1434          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					115.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	56.35	\$0	\$1,535	\$0	\$0		\$1,535
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					43.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	21.07	\$0	\$574	\$0	\$0		\$574
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					40.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	60.40	\$2,360	\$1,660	\$0	\$0		\$4,020
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					35.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	39.90	\$1,365	\$1,103	\$0	\$0		\$2,468
0010700000	LED EXIT SIGN, RETROFIT KIT					5.00	FIXTURE
Unit values	1.00	35.00	27.50	0.00	0.00		62.50
Totals	5.00	\$175	\$138	\$0	\$0		\$313
0011100000	13 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					2.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	0.26	\$51	\$7	\$0	\$0		\$58
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					75.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00		120.50
Totals	113.25	\$5,925	\$3,113	\$0	\$0		\$9,038
0012000000	1X4 1-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					12.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	13.68	\$468	\$378	\$0	\$0		\$846

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MeansData for Lotus

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Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
U00          310    $10,344    $8,508         $0        $0    $18,852

ESTIMATE TOTAL      310    $10,344    $8,508         $0        $0    $18,852

SALES TAX           5.00%      $517
MATL MARKUP         0.00%        $0
LABOR MARKUP        0.00%          $0
EQUIPT MARKUP       0.00%          $0
SUB MARKUP          0.00%          $0

TOTAL BEFORE CONTINGENC $10,861    $8,508         $0        $0    $19,369
CONTINGENCY           10.00%          $1,937
BOND                   5.00%          $968
PROFIT                10.00%          $1,937

JOB TOTAL                                $24,212
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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICKBid Date: NOVEMBER 28, 1994
Location:      BLDG 1434          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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SUMMARY

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=====
              Manhours   Matl     Labor   Equipment   Sub     Total
=====
U00              310     $10,344   $8,508         $0         $0     $18,852
TOTAL              310     $10,344   $8,508         $0         $0     $18,852

SALES TAX          5.00%       $517
MATL MARKUP        0.00%        $0
LABOR MARKUP       0.00%           $0
EQUIPT MARKUP      0.00%           $0
SUB MARKUP         0.00%           $0

TOTAL BEFORE CONTINGENC $10,861   $8,508         $0         $0     $19,369
CONTINGENCY         10.00%           $1,937
BOND                 5.00%           $968
PROFIT              10.00%           $1,937

JOB TOTAL                                     $24,212
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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1549

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	48811.		
B. SIOH	\$	2441.		
C. DESIGN COST	\$	2441.		
D. TOTAL COST (1A+1B+1C)	\$	53693.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$			53693.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	75.	\$ 2621.	12.02	\$ 31507.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 3212.	11.94	\$ 38351.
N. TOTAL		75.	\$ 5833.		\$ 69859.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$ 101.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 1206.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) / COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+) / COST(-) (4)
1. FUTURE INVESTMENT	\$ 42950.	5	.86	36937.
d. TOTAL	\$ 42950.			36937.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ 38143.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 8798.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.10 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 108002.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 2.01
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 7.91 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: LIGHTING REPLACEMENT

BUILDING #: 1549 - HIGH BAY GUN SHOP

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

INCAND @ _____ WATTS = 0 WATTS
QUARTZ @ _____ WATTS = 0 WATTS
QUARTZ @ _____ WATTS = 0 WATTS
32 MV @ 1075 WATTS = 34,400 WATTS
MV @ _____ WATTS = 0 WATTS

REPLACEMENT FIXTURE DATA

0 MH @ _____ WATTS = 0 WATTS
0 MH @ _____ WATTS = 0 WATTS
0 MH @ _____ WATTS = 0 WATTS
32 MH @ 460 WATTS = 14,720 WATTS
0 HPS @ _____ WATTS = 0 WATTS

BASELINE ENERGY CONSUMPTION 89,440 KWH/YR ECO ENERGY CONSUMPTION 38,272 KWH/YR

BASELINE DEMAND 34.40 KW ECO DEMAND 14.72 KW

NET ENERGY SAVINGS 51,168 KWH/YR NET DEMAND SAVINGS \$2,184 /YR
NET DOLLAR SAVINGS \$3,973 /YR

MAINTENANCE SAVINGS

32 LAMPS @ \$70.00 / 24,000 HOURS * 2,600 HR/YR = \$243 / YEAR (MERCURY VAPOR)
32 LAMPS @ \$47.00 / 20,000 HOURS * 2,600 HR/YR = \$196 / YEAR (METAL HALIDE)

NET MAINTENANCE SAVINGS \$47 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1549 - HIGH BAY GUN SHOP

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 24 2 LAMP @ 90 W/FIXT = 2,160 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
47 4 LAMP @ 180 W/FIXT = 8,460 WATTS

8 FOOT 144 2 LAMP @ 144 W/FIXT = 20,736 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 312 2 LAMP @ 58 W/FIXT = 18,096 WATTS
47 3 LAMP @ 87 W/FIXT = 4,089 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 81,526 KWH/YR ECO ENERGY CONSUMPTION 57,881 KWH/YR

BASELINE DEMAND 31.36 KW ECO DEMAND 22.19 KW

NET ENERGY SAVINGS 23,845 KWH/YR NET DEMAND SAVINGS \$1,018 /YR
NET DOLLAR SAVINGS \$1,851 /YR

MAINTENANCE SAVINGS

47 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HRYR = \$31 / YEAR (4' FLUORESCENT LAMPS)
NET MAINTENANCE SAVINGS \$31 / YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1549 - HIGH BAY GUN SHOP

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5
PEAK USE 1 (1-YES, 0-NO)

EXISTING INCANDESCENTS

LAMPS @	52 W/FIXT =	0 WATTS
2 LAMPS @	60 W/FIXT =	120 WATTS
LAMPS @	75 W/FIXT =	0 WATTS
LAMPS @	90 W/FIXT =	0 WATTS
LAMPS @	100 W/FIXT =	0 WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	13 W/FIXT =	0 WATTS
2 LAMPS @	13 W/FIXT =	26 WATTS
0 LAMPS @	18 W/FIXT =	0 WATTS
0 LAMPS @	26 W/FIXT =	0 WATTS
0 LAMPS @	26 W/FIXT =	0 WATTS

BASELINE ENERGY CONSUMPTION

312 KWH/YR

ECO ENERGY CONSUMPTION

68 KWH/YR

BASELINE DEMAND

0.12 KW

ECO DEMAND

0.03 KW

NET ENERGY SAVINGS

244 KWH/YR

NET DEMAND SAVINGS

\$10 /YR

NET DOLLAR SAVINGS

\$19 /YR

MAINTENANCE SAVINGS

2 LAMPS @	\$3.50 / 750 HOURS *	2,600 HRY/YR =	\$24 / YEAR	(INCANDESCENT)
2 LAMPS @	\$2.00 / 10,000 HOURS *	2,600 HRY/YR =	\$1 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS

\$23 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1549           Job #:      94013.05
Sq. footage:  City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					47.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	23.03	\$0	\$627	\$0	\$0		\$627
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					14.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	6.86	\$0	\$187	\$0	\$0		\$187
0002030000	DEMOLITION, HIGH BAY FIXTURES					32.00	FIXTURE
Unit values	1.00	0.00	27.50	0.00	0.00		27.50
Totals	32.00	\$0	\$880	\$0	\$0		\$880
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					14.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	15.96	\$840	\$441	\$0	\$0		\$1,281
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					10.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	15.10	\$590	\$415	\$0	\$0		\$1,005
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					288.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	328.32	\$11,232	\$9,072	\$0	\$0		\$20,304
0011000000	400 WATT METAL HALIDE FIXTURE					32.00	FIXTURE
Unit values	2.00	207.00	55.00	0.00	0.00		262.00
Totals	64.00	\$6,624	\$1,760	\$0	\$0		\$8,384
0011100000	13 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					2.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	0.26	\$51	\$7	\$0	\$0		\$58
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					47.00	FIXTURE

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MeansData for Lotus

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Unit values	1.51	69.00	41.50	0.00	0.00	110.50
Totals	70.97	\$3,243	\$1,951	\$0	\$0	\$5,194
0011500000	2X4 4-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					0.00
Unit values	1.51	82.00	41.50	0.00	0.00	123.50
Totals	0.00	\$0	\$0	\$0	\$0	\$0

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=====
Line #      Description
-----
      Manhours   Matl     Labor   Equipment   Sub     Total
=====
U00          557    $22,580   $15,340         $0         $0    $37,920

ESTIMATE TOTAL      557    $22,580   $15,340         $0         $0    $37,920

SALES TAX          5.00%    $1,129
MATL MARKUP        0.00%         $0
LABOR MARKUP       0.00%         $0
EQUIPT MARKUP     0.00%         $0
SUB MARKUP        0.00%         $0

TOTAL BEFORE CONTINGENC $23,709   $15,340         $0         $0    $39,049
CONTINGENCY         10.00%         $3,905
BOND                5.00%         $1,952
PROFIT              10.00%         $3,905

JOB TOTAL                                     $48,811
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10-Mar-95

MeansData for Lotus

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1549          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	557	\$22,580	\$15,340	\$0	\$0	\$37,920
TOTAL	557	\$22,580	\$15,340	\$0	\$0	\$37,920
SALES TAX	5.00%	\$1,129				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$23,709	\$15,340	\$0	\$0	\$39,049
CONTINGENCY	10.00%					\$3,905
BOND	5.00%					\$1,952
PROFIT	10.00%					\$3,905
JOB TOTAL						\$48,811

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.3 BLDG 1728

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	46323.		
B. SIOH	\$	2316.		
C. DESIGN COST	\$	2316.		
D. TOTAL COST (1A+1B+1C)	\$	50955.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		50955.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	50.	\$ 1748.	12.02	\$ 21005.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1791.	11.94	\$ 21385.
N. TOTAL		50.	\$ 3539.		\$ 42390.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	123.
(1) DISCOUNT FACTOR (TABLE A)		11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	1469.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 40764.	5	.86	35057.
d. TOTAL	\$ 40764.			35057.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 36526.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 6379.

5. SIMPLE PAYBACK PERIOD (1G/4) 7.99 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 78915.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 1.55
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 6.05 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1728 - ADMINISTRATION

AREA USE:

HOURS/DAY 12

DAYS/WEEK 5

ELECTRIC COSTS:

ENERGY CHARGE \$0.03495 PER KWH

DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 17 2 LAMP @ 90 W/FIXT = 1,530 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
131 4 LAMP @ 180 W/FIXT = 23,580 WATTS

8 FOOT 120 2 LAMP @ 144 W/FIXT = 17,280 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 257 2 LAMP @ 58 W/FIXT = 14,906 WATTS
131 3 LAMP @ 87 W/FIXT = 11,397 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 132,257 KWH/YR ECO ENERGY CONSUMPTION 82,065 KWH/YR

BASELINE DEMAND 42.39 KW ECO DEMAND 26.30 KW

NET ENERGY SAVINGS

50,191 KWH/YR

NET DEMAND SAVINGS

\$1,786 /YR

NET DOLLAR SAVINGS

\$3,540 /YR

MAINTENANCE SAVINGS

131 LAMPS @ \$5.00 / 20,000 HOURS * 3,120 HR/YR = \$102 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$102 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1728 - ADMINISTRATION

AREA USE:

HOURS/DAY 12

DAYS/WEEK 5

PEAK USE 1 (1-YES, 0-NO)

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING INCANDESCENTS

LAMPS @	52	W/FIXT =	0	WATTS
1 LAMPS @	60	W/FIXT =	60	WATTS
LAMPS @	75	W/FIXT =	0	WATTS
LAMPS @	90	W/FIXT =	0	WATTS
LAMPS @	100	W/FIXT =	0	WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @	13	W/FIXT =	0	WATTS
1 LAMPS @	13	W/FIXT =	13	WATTS
0 LAMPS @	18	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS
0 LAMPS @	26	W/FIXT =	0	WATTS

BASELINE ENERGY CONSUMPTION

187 KWH/YR

ECO ENERGY CONSUMPTION

41 KWH/YR

BASELINE DEMAND

0.06 KW

ECO DEMAND

0.01 KW

NET ENERGY SAVINGS

147 KWH/YR

NET DEMAND SAVINGS

\$5 /YR

NET DOLLAR SAVINGS

\$10 /YR

MAINTENANCE SAVINGS

1 LAMPS @	\$5.25	/ 750 HOURS *	3,120	HR/YR =	\$22 / YEAR	(INCANDESCENT)
1 LAMPS @	\$2.00	/ 10,000 HOURS *	3,120	HR/YR =	\$1 / YEAR	(COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS

\$21 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1728          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					133.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	65.17	\$0	\$1,776	\$0	\$0		\$1,776
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					15.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	7.35	\$0	\$200	\$0	\$0		\$200
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					2.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	3.02	\$118	\$83	\$0	\$0		\$201
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					3.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	3.42	\$180	\$95	\$0	\$0		\$275
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					252.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	287.28	\$9,828	\$7,938	\$0	\$0		\$17,766
0011100000	13 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					1.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	0.13	\$26	\$3	\$0	\$0		\$29
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					131.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00		120.50
Totals	197.81	\$10,349	\$5,437	\$0	\$0		\$15,786
U00		565	\$20,501	\$15,532	\$0	\$0	\$36,033

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=====
Line #      Description
-----
      Manhours   Matl     Labor   Equipment   Sub     Total
=====
```

ESTIMATE TOTAL	565	\$20,501	\$15,532	\$0	\$0	\$36,033
SALES TAX	5.00%	\$1,025				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$21,526	\$15,532	\$0	\$0	\$37,058
CONTINGENCY	10.00%					\$3,706
BOND	5.00%					\$1,853
PROFIT	10.00%					\$3,706
JOB TOTAL						\$46,323

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1728          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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SUMMARY

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	Manhours	Matl	Labor	Equipment	Sub	Total
U00	565	\$20,501	\$15,532	\$0	\$0	\$36,033
TOTAL	565	\$20,501	\$15,532	\$0	\$0	\$36,033
SALES TAX	5.00%	\$1,025				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$21,526	\$15,532	\$0	\$0	\$37,058
CONTINGENCY	10.00%					\$3,706
BOND	5.00%					\$1,853
PROFIT	10.00%					\$3,706
JOB TOTAL						\$46,323

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.6 BLDG 1731

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	9158.		
B. SIOH	\$	458.		
C. DESIGN COST	\$	458.		
D. TOTAL COST (1A+1B+1C)	\$	10074.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		10074.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	20.	\$ 699.	12.02	\$ 8402.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 249.	11.94	\$ 2973.
N. TOTAL		20.	\$ 948.		\$ 11375.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$ 184.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 2197.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE INVESTMENT	\$ 8059.	5	.86	6931.
d. TOTAL	\$ 8059.			6931.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 9128.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 1669.

5. SIMPLE PAYBACK PERIOD (1G/4) 6.03 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 20503.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 2.04
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 8.00 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1731 - ADMIN & MP BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 24
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 65 2 LAMP @ 90 W/FIXT = 5,850 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 65 2 LAMP @ 58 W/FIXT = 3,770 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 51,106 KWH/YR ECO ENERGY CONSUMPTION 32,935 KWH/YR

BASELINE DEMAND 5.85 KW ECO DEMAND 3.77 KW

NET ENERGY SAVINGS

18,171 KWH/YR

NET DEMAND SAVINGS

\$231 /YR

NET DOLLAR SAVINGS

\$866 /YR

MAINTENANCE SAVINGS

0 LAMPS @ / 20,000 HOURS * HRYR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$0 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: EXIT SIGN REPLACEMENT

BUILDING #: 1731 - ADMIN & MP BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE
DEMAND CHARGE

\$0.03495 PER KWH
\$9.25 PER KW

INCANDESCENT EXIT SIGNS

OF EXIT SIGNS: 6
WATTAGE: 30

FLUORESCENT EXIT SIGNS

OF EXIT SIGNS: 0
WATTAGE: 18

REPLACEMENT SIGNS

OF EXIT SIGNS: 6
WATTAGE: 3

BASELINE ENERGY CONSUMPTION

1,577 KWH/YR

ECO ENERGY CONSUMPTION

158 KWH/YR

BASELINE DEMAND

0.18 KW

ECO DEMAND

0.02 KW

NET ENERGY SAVINGS

1,419 KWH/YR

NET DEMAND SAVINGS

\$18 /YR

NET DOLLAR SAVINGS

\$68 /YR

MAINTENANCE SAVINGS

6 LAMPS @ \$3.50 / 1,000 HOURS *
0 LAMPS @ \$8.00 / 10,000 HOURS *

8,760 HRYR = \$184 / YEAR (INCANDESCENT)
8,760 HRYR = \$0 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS

\$184 / YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1731 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES						
						44.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	21.56	\$0	\$587	\$0	\$0		\$587
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES						
						21.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	10.29	\$0	\$280	\$0	\$0		\$280
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED						
						44.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	66.44	\$2,596	\$1,826	\$0	\$0		\$4,422
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED						
						21.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	23.94	\$819	\$662	\$0	\$0		\$1,481
0010700000	LED EXIT SIGN, RETROFIT KIT						
						6.00	FIXTURE
Unit values	1.00	35.00	27.50	0.00	0.00		62.50
Totals	6.00	\$210	\$165	\$0	\$0		\$375
U00		129	\$3,625	\$3,520	\$0	\$0	\$7,145

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	129	\$3,625	\$3,520	\$0	\$0	\$7,145
SALES TAX	5.00%	\$181				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$3,806	\$3,520	\$0	\$0	\$7,326
CONTINGENCY	10.00%					\$733
BOND	5.00%					\$366
PROFIT	10.00%					\$733
JOB TOTAL						\$9,158

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1731 - 24/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	129	\$3,625	\$3,520	\$0	\$0	\$7,145
TOTAL	129	\$3,625	\$3,520	\$0	\$0	\$7,145
SALES TAX	5.00%	\$181				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$3,806	\$3,520	\$0	\$0	\$7,326
CONTINGENCY	10.00%					\$733
BOND	5.00%					\$366
PROFIT	10.00%					\$733
JOB TOTAL						\$9,158

**The following are sections of buildings
that do not qualify for FEMP
or ECIP funding. They are
included for information only.**

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.2 BLDG 1120

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	16587.		
B. SIOH	\$	829.		
C. DESIGN COST	\$	829.		
D. TOTAL COST (1A+1B+1C)	\$	18245.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		18245.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	18.	\$ 629.	12.02	\$ 7562.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 545.	11.94	\$ 6507.
N. TOTAL		18.	\$ 1174.		\$ 14069.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	16.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	191.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE INVESTMENT	\$ 14596.	5	.86	12553.
d. TOTAL	\$ 14596.			12553.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 12744.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 2163.

5. SIMPLE PAYBACK PERIOD (1G/4) 8.43 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 26813.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 1.47
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 5.68 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1120 - ADMINISTRATION

AREA USE: _____
HOURS/DAY: 10
DAYS/WEEK: 7

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT

101 2 LAMP @ 90 W/FIXT = 9,090 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
18 4 LAMP @ 180 W/FIXT = 3,240 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT

101 2 LAMP @ 58 W/FIXT = 5,858 WATTS
18 3 LAMP @ 87 W/FIXT = 1,566 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 44,881 KWH/YR ECO ENERGY CONSUMPTION 27,023 KWH/YR

BASELINE DEMAND 12.33 KW ECO DEMAND 7.42 KW

NET ENERGY SAVINGS 17,858 KWH/YR NET DEMAND SAVINGS \$545 /YR
NET DOLLAR SAVINGS \$1,169 /YR

MAINTENANCE SAVINGS

18 LAMPS @ \$5.00 / 20,000 HOURS * 3,640 HR/YR = \$16 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$16 / YEAR

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1120 - 10/7   Job #:    94013.05
Sq. footage:                      City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					73.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	35.77	\$0	\$975	\$0	\$0		\$975
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					46.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	22.54	\$0	\$614	\$0	\$0		\$614
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					57.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	86.07	\$3,363	\$2,366	\$0	\$0		\$5,729
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					26.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	29.64	\$1,326	\$819	\$0	\$0		\$2,145
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					6.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	6.84	\$360	\$189	\$0	\$0		\$549
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					14.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	15.96	\$546	\$441	\$0	\$0		\$987
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED WITH REFLECTOR					16.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00		120.50
Totals	24.16	\$1,264	\$664	\$0	\$0		\$1,928
U00		221	\$6,859	\$6,068	\$0	\$0	\$12,927


```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	221	\$6,859	\$6,068	\$0	\$0	\$12,927
SALES TAX	5.00%	\$343				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$7,202	\$6,068	\$0	\$0	\$13,270
CONTINGENCY	10.00%					\$1,327
BOND	5.00%					\$663
PROFIT	10.00%					\$1,327
JOB TOTAL						\$16,587

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1120          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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SUMMARY

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=====
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
U00              221      $6,859    $6,068         $0         $0    $12,927
TOTAL            221      $6,859    $6,068         $0         $0    $12,927

SALES TAX        5.00%      $343
MATL MARKUP      0.00%        $0
LABOR MARKUP     0.00%          $0
EQUIPT MARKUP    0.00%          $0
SUB MARKUP       0.00%          $0

TOTAL BEFORE CONTINGENC  $7,202    $6,068    $0         $0    $13,270
CONTINGENCY        10.00%          $1,327
BOND                5.00%          $663
PROFIT              10.00%          $1,327

JOB TOTAL                                $16,587

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1731

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	31632.		
B. SIOH	\$	1582.		
C. DESIGN COST	\$	1582.		
D. TOTAL COST (1A+1B+1C)	\$	34796.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$			34796.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	28.	\$ 979.	12.02	\$ 11763.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1178.	11.94	\$ 14065.
N. TOTAL		28.	\$ 2157.		\$ 25828.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$	55.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	657.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) / COST(-)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+) / COST(-) (4)
1. FUTURE INVESTMENT	\$ 27837.	5	.86	23940.
d. TOTAL	\$ 27837.			23940.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ 24597.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 4067.

5. SIMPLE PAYBACK PERIOD (1G/4) 8.55 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 50425.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = 1.45$
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1731 - ADMIN & MP BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 92 2 LAMP @ 90 W/FIXT = 8,280 WATTS
61 3 LAMP @ 138 W/FIXT = 8,418 WATTS
24 4 LAMP @ 180 W/FIXT = 4,320 WATTS

8 FOOT 20 2 LAMP @ 144 W/FIXT = 2,880 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 193 2 LAMP @ 58 W/FIXT = 11,194 WATTS
24 3 LAMP @ 87 W/FIXT = 2,088 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 62,135 KWH/YR ECO ENERGY CONSUMPTION 34,533 KWH/YR

BASELINE DEMAND 23.90 KW ECO DEMAND 13.28 KW

NET ENERGY SAVINGS

27,602 KWH/YR

NET DEMAND SAVINGS

\$1,178 /YR
NET DOLLAR SAVINGS \$2,143 /YR

MAINTENANCE SAVINGS

85 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HR/YR = \$55 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$55 /YEAR

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1731 - 10/5   Job #:    94013.05
Sq. footage:                               City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					175.00	175.00
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		85.75	\$0	\$2,336	\$0	\$0	\$2,336
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					22.00	22.00
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		10.78	\$0	\$294	\$0	\$0	\$294
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					90.00	90.00
Unit values		1.51	59.00	41.50	0.00	0.00	100.50
Totals		135.90	\$5,310	\$3,735	\$0	\$0	\$9,045
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					42.00	42.00
Unit values		1.14	39.00	31.50	0.00	0.00	70.50
Totals		47.88	\$1,638	\$1,323	\$0	\$0	\$2,961
0010500000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTORS					61.00	61.00
Unit values		1.51	75.00	41.50	0.00	0.00	116.50
Totals		92.11	\$4,575	\$2,532	\$0	\$0	\$7,107
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					24.00	24.00
Unit values		1.51	79.00	41.50	0.00	0.00	120.50
Totals		36.24	\$1,896	\$996	\$0	\$0	\$2,892
U00		409	\$13,419	\$11,216	\$0	\$0	\$24,635

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Line #      Description
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      Manhours   Matl    Labor   Equipment   Sub    Total
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ESTIMATE TOTAL	409	\$13,419	\$11,216	\$0	\$0	\$24,635
SALES TAX	5.00%	\$671				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$14,090	\$11,216	\$0	\$0	\$25,306
CONTINGENCY	10.00%					\$2,531
BOND	5.00%					\$1,265
PROFIT	10.00%					\$2,531
JOB TOTAL						\$31,632

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1731 - 10/5   Job #:      94013.05
Sq. footage:                      City indx: Raleigh, NC
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SUMMARY

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	Manhours	Matl	Labor	Equipment	Sub	Total
U00	409	\$13,419	\$11,216	\$0	\$0	\$24,635
TOTAL	409	\$13,419	\$11,216	\$0	\$0	\$24,635
SALES TAX	5.00%	\$671				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$14,090	\$11,216	\$0	\$0	\$25,306
CONTINGENCY	10.00%					\$2,531
BOND	5.00%					\$1,265
PROFIT	10.00%					\$2,531
JOB TOTAL						\$31,632

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1138

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	32063.		
B. SIOH	\$	1603.		
C. DESIGN COST	\$	1603.		
D. TOTAL COST (1A+1B+1C)	\$	35269.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		35269.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	27.	\$ 944.	12.02	\$ 11343.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1102.	11.94	\$ 13158.
N. TOTAL		27.	\$ 2046.		\$ 24501.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$ 184.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 2197.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE REPLACEMENT	\$ 28215.	5	.86	24265.
d. TOTAL	\$ 28215.			24265.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 26462.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 4111.

5. SIMPLE PAYBACK PERIOD (1G/4) 8.58 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 50962.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = 1.44$
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1138 - ADMIN & BARRACKS

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 5

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP @ 48 W/FIXT = 0 WATTS

4 FOOT
132 2 LAMP @ 90 W/FIXT = 11,880 WATTS
58 3 LAMP @ 138 W/FIXT = 8,004 WATTS
6 4 LAMP @ 180 W/FIXT = 1,080 WATTS

8 FOOT
18 2 LAMP @ 144 W/FIXT = 2,592 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP @ 29 W/FIXT = 0 WATTS

4 FOOT
226 2 LAMP @ 58 W/FIXT = 13,108 WATTS
6 3 LAMP @ 87 W/FIXT = 522 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT
0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 61,246 KWH/YR ECO ENERGY CONSUMPTION 35,438 KWH/YR

BASELINE DEMAND 23.56 KW ECO DEMAND 13.63 KW

NET ENERGY SAVINGS 25,808 KWH/YR NET DEMAND SAVINGS \$1,102 /YR
NET DOLLAR SAVINGS \$2,004 /YR

MAINTENANCE SAVINGS

64 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HRYR = \$42 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$42 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1138 - ADMIN & BARRACKS
AREA USE: _____
HOURS/DAY: 10
DAYS/WEEK: 5
PEAK USE: 1 (1-YES, 0-NO)

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING INCANDESCENTS

LAMPS @ 52 W/FIXT = 0 WATTS
LAMPS @ 60 W/FIXT = 0 WATTS
8 LAMPS @ 75 W/FIXT = 600 WATTS
LAMPS @ 90 W/FIXT = 0 WATTS
LAMPS @ 200 W/FIXT = 0 WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 13 W/FIXT = 0 WATTS
0 LAMPS @ 13 W/FIXT = 0 WATTS
8 LAMPS @ 18 W/FIXT = 144 WATTS
0 LAMPS @ 26 W/FIXT = 0 WATTS
0 LAMPS @ 26 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 1,560 KWH/YR ECO ENERGY CONSUMPTION 374 KWH/YR
BASELINE DEMAND 0.60 KW ECO DEMAND 0.14 KW

NET ENERGY SAVINGS 1,186 KWH/YR
NET DEMAND SAVINGS \$0 /YR
NET DOLLAR SAVINGS \$65 /YR

MAINTENANCE SAVINGS

8 LAMPS @ \$5.25 / 750 HOURS * 2,600 HR/YR = \$146 / YEAR (INCANDESCENT)
8 LAMPS @ \$2.00 / 10,000 HOURS * 2,600 HR/YR = \$4 / YEAR (COMPACT FLUORESCENT)
NET MAINTENANCE SAVINGS \$142 / YEAR

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1138 - 10/5   Job #:    94013.05
Sq. footage:                      City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					129.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	63.21	\$0	\$1,722	\$0	\$0		\$1,722
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					85.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	41.65	\$0	\$1,135	\$0	\$0		\$1,135
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					65.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	98.15	\$3,835	\$2,698	\$0	\$0		\$6,533
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					51.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	58.14	\$2,601	\$1,607	\$0	\$0		\$4,208
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					52.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	59.28	\$2,028	\$1,638	\$0	\$0		\$3,666
0010500000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTORS					58.00	FIXTURE
Unit values	1.51	75.00	41.50	0.00	0.00		116.50
Totals	87.58	\$4,350	\$2,407	\$0	\$0		\$6,757
0011200000	18 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					8.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	1.04	\$204	\$28	\$0	\$0		\$232
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					6.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00		120.50
Totals	9.06	\$474	\$249	\$0	\$0		\$723

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
U00          419    $13,492   $11,484         $0        $0    $24,976

ESTIMATE TOTAL      419    $13,492   $11,484         $0        $0    $24,976

SALES TAX           5.00%      $675
MATL MARKUP         0.00%        $0
LABOR MARKUP        0.00%          $0
EQUIPT MARKUP       0.00%          $0
SUB MARKUP          0.00%          $0

TOTAL BEFORE CONTINGENC $14,167   $11,484         $0        $0    $25,651
CONTINGENCY           10.00%          $2,565
BOND                  5.00%          $1,283
PROFIT               10.00%          $2,565

JOB TOTAL                                $32,063
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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICKBid Date: NOVEMBER 28, 1994
Location:     BLDG 1138 - 10/5   Job #:      94013.05
Sq. footage:  City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl    Labor  Equipment  Sub      Total
=====
U00              419    $13,492    $11,484          $0          $0    $24,976
TOTAL              419    $13,492    $11,484          $0          $0    $24,976

SALES TAX          5.00%      $675
MATL MARKUP        0.00%      $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC $14,167    $11,484          $0          $0    $25,651
CONTINGENCY         10.00%          $2,565
BOND                5.00%          $1,283
PROFIT              10.00%          $2,565

JOB TOTAL                                $32,063

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.4 BLDG 1242

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	2010.		
B. SIOH	\$	100.		
C. DESIGN COST	\$	100.		
D. TOTAL COST (1A+1B+1C)	\$	2210.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		2210.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	2.	\$ 70.	12.02	\$ 840.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 50.	11.94	\$ 597.
N. TOTAL		2.	\$ 120.		\$ 1437.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)		11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
1. FUTURE REPLACEMENT	\$ 1768.	5	.86	1520.
d. TOTAL	\$ 1768.			1520.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 1520.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 238.

5. SIMPLE PAYBACK PERIOD (1G/4) 9.29 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 2958.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = 1.34$
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING

20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1242-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 14
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT
4 2 LAMP U @ 90 W/FIXT = 360 WATTS

4 FOOT
10 2 LAMP @ 90 W/FIXT = 900 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT
2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT
4 2 LAMP U @ 58 W/FIXT = 232 WATTS

4 FOOT
10 2 LAMP @ 58 W/FIXT = 580 WATTS
3 LAMP @ 87 W/FIXT = 0 WATTS
4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT
0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 6,421 KWH/YR ECO ENERGY CONSUMPTION 4,138 KWH/YR

BASELINE DEMAND 1.26 KW ECO DEMAND 0.81 KW

NET ENERGY SAVINGS 2,283 KWH/YR NET DEMAND SAVINGS \$50 /YR
NET DOLLAR SAVINGS \$130 /YR

MAINTENANCE SAVINGS

0 LAMPS @ _____ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR


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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1242 - 14/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					10.00	FIXTURE
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		4.90	\$0	\$134	\$0	\$0	\$134
0002020000	DEMOLITION, 2X2 FLUORESCENT FIXTURES					4.00	FIXTURE
Unit values		0.49	0.00	13.35	0.00	0.00	13.35
Totals		1.96	\$0	\$53	\$0	\$0	\$53
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					10.00	FIXTURE
Unit values		1.51	59.00	41.50	0.00	0.00	100.50
Totals		15.10	\$590	\$415	\$0	\$0	\$1,005
0011800000	2X2 2-31 WATT FLUORESCENT LAMPS, RECESSED MOUNTED (U-TUBE)					4.00	FIXTURE
Unit values		1.14	62.00	31.50	0.00	0.00	93.50
Totals		4.56	\$248	\$126	\$0	\$0	\$374
U00		27	\$838	\$728	\$0	\$0	\$1,566

10-Mar-95

MeansData for Lotus

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=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment    Sub    Total
=====
```

ESTIMATE TOTAL	27	\$838	\$728	\$0	\$0	\$1,566
SALES TAX	5.00%	\$42				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$880	\$728	\$0	\$0	\$1,608
CONTINGENCY	10.00%					\$161
BOND	5.00%					\$80
PROFIT	10.00%					\$161
JOB TOTAL						\$2,010

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1242 - 14/7   Job #:      94013.05
Sq. footage:                                     City indx:Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	27	\$838	\$728	\$0	\$0	\$1,566
TOTAL	27	\$838	\$728	\$0	\$0	\$1,566
SALES TAX	5.00%	\$42				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$880	\$728	\$0	\$0	\$1,608
CONTINGENCY	10.00%					\$161
BOND	5.00%					\$80
PROFIT	10.00%					\$161
JOB TOTAL						\$2,010

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.2 BLDG 1105

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	7030.		
B. SIOH	\$	352.		
C. DESIGN COST	\$	352.		
D. TOTAL COST (1A+1B+1C)	\$	7734.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$			7734.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	7.	\$ 245.	12.02	\$ 2941.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 202.	11.94	\$ 2412.
N. TOTAL		7.	\$ 447.		\$ 5353.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-)	YR OC	DISCNT FACTOR	DISCOUNTED SAVINGS (+) / COST (-) (4)
	(1)	(2)	(3)	
1. FUTURE REPLACEMENT	\$ 6186.	5	.86	5320.
d. TOTAL	\$ 6186.			5320.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 5320.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 859.

5. SIMPLE PAYBACK PERIOD (1G/4) 9.00 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 10673.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = 1.38$
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1105-MP ADMIN & BARRACKS

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 7

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT
57 2 LAMP @ 90 W/FIXT = 5,130 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT
57 2 LAMP @ 58 W/FIXT = 3,306 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 18,873 KWH/YR ECO ENERGY CONSUMPTION 12,034 KWH/YR

BASELINE DEMAND 5.13 KW ECO DEMAND 3.31 KW

NET ENERGY SAVINGS 6,639 KWH/YR NET DEMAND SAVINGS \$202 /YR
NET DOLLAR SAVINGS \$435 /YR

MAINTENANCE SAVINGS

0 LAMPS @ _____ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1105 - 10/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					8.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	3.92	\$0	\$107	\$0	\$0		\$107
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					49.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	24.01	\$0	\$654	\$0	\$0		\$654
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					2.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	2.28	\$120	\$63	\$0	\$0		\$183
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					8.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	12.08	\$472	\$332	\$0	\$0		\$804
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					28.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	31.92	\$1,428	\$882	\$0	\$0		\$2,310
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					4.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	4.56	\$240	\$126	\$0	\$0		\$366
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					15.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	17.10	\$585	\$473	\$0	\$0		\$1,058
U00		96	\$2,845	\$2,637	\$0	\$0	\$5,482

09-Mar-95

MeansData for Lotus

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=====
Line #      Description
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      Manhours  Matl    Labor  Equipment  Sub    Total
=====
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ESTIMATE TOTAL	96	\$2,845	\$2,637	\$0	\$0	\$5,482
SALES TAX	5.00%	\$142				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$2,987	\$2,637	\$0	\$0	\$5,624
CONTINGENCY	10.00%					\$562
BOND	5.00%					\$281
PROFIT	10.00%					\$562
JOB TOTAL						\$7,030

09-Mar-95

MeansData for Lotus

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1105 - 10/7   Job #:      94013.05
Sq. footage:                      City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl    Labor  Equipment  Sub    Total
=====
U00              96    $2,845    $2,637        $0        $0    $5,482
TOTAL              96    $2,845    $2,637        $0        $0    $5,482

SALES TAX          5.00%    $142
MATL MARKUP        0.00%      $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%        $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC  $2,987    $2,637        $0        $0    $5,624
CONTINGENCY          10.00%          $562
BOND                 5.00%          $281
PROFIT              10.00%          $562

JOB TOTAL                                $7,030

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.2 BLDG 1242

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	9705.	
B. SIOH	\$	485.	
C. DESIGN COST	\$	485.	
D. TOTAL COST (1A+1B+1C)	\$	10675.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		10675.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	9.	\$ 315.	12.02	\$ 3781.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 281.	11.94	\$ 3355.
N. TOTAL		9.	\$ 596.		\$ 7136.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	11.94		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+) COST(-) (4)
	(1)	(2)	(3)	(4)
1. FUTURE REPLACEMENT	\$ 8540.	5	.86	7344.
d. TOTAL	\$ 8540.			7344.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 7344.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 1165.

5. SIMPLE PAYBACK PERIOD (1G/4) 9.16 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 14480.

7. SAVINGS TO INVESTMENT RATIO (SIR)=(6 / 1G)= 1.36

(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING

20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1242-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE: _____
HOURS/DAY 10
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 79 2 LAMP @ 90 W/FIXT = 7,110 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 79 2 LAMP @ 58 W/FIXT = 4,582 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 25,880 KWH/YR ECO ENERGY CONSUMPTION 16,678 KWH/YR

BASELINE DEMAND 7.11 KW ECO DEMAND 4.58 KW

NET ENERGY SAVINGS	9,202 KWH/YR	NET DEMAND SAVINGS	\$281 /YR
		NET DOLLAR SAVINGS	\$602 /YR

MAINTENANCE SAVINGS

0 LAMPS @ _____ / 20,000 HOURS * HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1242 - 10/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					8.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	3.92	\$0	\$107	\$0	\$0		\$107
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					71.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	34.79	\$0	\$948	\$0	\$0		\$948
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					8.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	12.08	\$472	\$332	\$0	\$0		\$804
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					48.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	54.72	\$2,448	\$1,512	\$0	\$0		\$3,960
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					6.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	6.84	\$360	\$189	\$0	\$0		\$549
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					17.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	19.38	\$663	\$536	\$0	\$0		\$1,199
U00		132	\$3,943	\$3,624	\$0	\$0	\$7,567

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	132	\$3,943	\$3,624	\$0	\$0	\$7,567
SALES TAX	5.00%	\$197				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$4,140	\$3,624	\$0	\$0	\$7,764
CONTINGENCY	10.00%					\$776
BOND	5.00%					\$388
PROFIT	10.00%					\$776
JOB TOTAL						\$9,705

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1242 - 10/7   Job #:    94013.05
Sq. footage:                               City indx:Raleigh, NC
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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	132	\$3,943	\$3,624	\$0	\$0	\$7,567
TOTAL	132	\$3,943	\$3,624	\$0	\$0	\$7,567
SALES TAX	5.00%	\$197				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$4,140	\$3,624	\$0	\$0	\$7,764
CONTINGENCY	10.00%					\$776
BOND	5.00%					\$388
PROFIT	10.00%					\$776
JOB TOTAL						\$9,705

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.2 BLDG 1731

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	19677.		
B. SIOH	\$	984.		
C. DESIGN COST	\$	984.		
D. TOTAL COST (1A+1B+1C)	\$	21645.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		21645.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	18.	\$ 629.	12.02	\$ 7562.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 547.	11.94	\$ 6531.
N. TOTAL		18.	\$ 1176.		\$ 14093.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)		11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE REPLACEMENT	\$ 17316.	5	.86	14892.
d. TOTAL	\$ 17316.			14892.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 14892.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 2331.

5. SIMPLE PAYBACK PERIOD (1G/4) 9.29 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 28985.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.34
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING

20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1731 - ADMIN & MP BARRACKS

ELECTRIC COSTS:

ENERGY CHARGE \$0.03495 PER KWH

DEMAND CHARGE \$9.25 PER KW

AREA USE:

HOURS/DAY 10

DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 154 2 LAMP @ 90 W/FIXT = 13,860 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 154 2 LAMP @ 58 W/FIXT = 8,932 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 50,450 KWH/YR ECO ENERGY CONSUMPTION 32,512 KWH/YR

BASELINE DEMAND 13.86 KW ECO DEMAND 8.93 KW

NET ENERGY SAVINGS

17,938 KWH/YR

NET DEMAND SAVINGS

\$547 /YR

NET DOLLAR SAVINGS

\$1,174 /YR

MAINTENANCE SAVINGS

0 LAMPS @ / 20,000 HOURS *

HR/YR = \$0 / YEAR

(4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1731 - 10/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					34.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	16.66	\$0	\$454	\$0	\$0	\$454	
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					120.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00	13.35	
Totals	58.80	\$0	\$1,602	\$0	\$0	\$1,602	
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					34.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00	100.50	
Totals	51.34	\$2,006	\$1,411	\$0	\$0	\$3,417	
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					96.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00	82.50	
Totals	109.44	\$4,896	\$3,024	\$0	\$0	\$7,920	
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					12.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00	91.50	
Totals	13.68	\$720	\$378	\$0	\$0	\$1,098	
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					12.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00	70.50	
Totals	13.68	\$468	\$378	\$0	\$0	\$846	
U00		264	\$8,090	\$7,247	\$0	\$0	\$15,337

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	264	\$8,090	\$7,247	\$0	\$0	\$15,337
SALES TAX	5.00%	\$405				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$8,495	\$7,247	\$0	\$0	\$15,742
CONTINGENCY	10.00%					\$1,574
BOND	5.00%					\$787
PROFIT	10.00%					\$1,574
JOB TOTAL						\$19,677

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1731 - 10/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	264	\$8,090	\$7,247	\$0	\$0	\$15,337
TOTAL	264	\$8,090	\$7,247	\$0	\$0	\$15,337
SALES TAX	5.00%	\$405				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$8,495	\$7,247	\$0	\$0	\$15,742
CONTINGENCY	10.00%					\$1,574
BOND	5.00%					\$787
PROFIT	10.00%					\$1,574
JOB TOTAL						\$19,677

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: ECO1A
 INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING
 FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.2 BLDG 1138
 ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	29793.		
B. SIOH	\$	1490.		
C. DESIGN COST	\$	1490.		
D. TOTAL COST (1A+1B+1C)	\$	32773.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		32773.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	26.	\$ 909.	12.02	\$ 10923.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 781.	11.94	\$ 9325.
N. TOTAL		26.	\$ 1690.		\$ 20248.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	11.94	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTOR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
1. FUTURE REPLACEMENT	\$ 26218.	5	.86	22547.
d. TOTAL	\$ 26218.			22547.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 22547.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 3438.

5. SIMPLE PAYBACK PERIOD (1G/4) 9.53 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 42795.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$ 1.31
 (IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1138 - ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 7

EXISTING FIXTURE DATA

2 FOOT 2 LAMP @ 48 W/FIXT = 0 WATTS

4 FOOT 220 2 LAMP @ 90 W/FIXT = 19,800 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 2 LAMP @ 144 W/FIXT = 0 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP @ 29 W/FIXT = 0 WATTS

4 FOOT 220 2 LAMP @ 58 W/FIXT = 12,760 WATTS
3 LAMP @ 87 W/FIXT = 0 WATTS
4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 72,072 KWH/YR ECO ENERGY CONSUMPTION 46,446 KWH/YR

BASELINE DEMAND 19.80 KW ECO DEMAND 12.76 KW

NET ENERGY SAVINGS 25,626 KWH/YR NET DEMAND SAVINGS \$781 /YR
NET DOLLAR SAVINGS \$1,677 /YR

MAINTENANCE SAVINGS

0 LAMPS @ \$5.00 / 20,000 HOURS * 3,640 HR/YR = \$0 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS \$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1138 - 10/7   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					127.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	62.23	\$0	\$1,695	\$0	\$0		\$1,695
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					93.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	45.57	\$0	\$1,242	\$0	\$0		\$1,242
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					8.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	9.12	\$480	\$252	\$0	\$0		\$732
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					127.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	191.77	\$7,493	\$5,271	\$0	\$0		\$12,764
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					46.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	52.44	\$2,346	\$1,449	\$0	\$0		\$3,795
0010300000	1X4 2-32 WATT FLUORESCENT LAMPS, WALL MOUNTED					12.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	13.68	\$720	\$378	\$0	\$0		\$1,098
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					27.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	30.78	\$1,053	\$851	\$0	\$0		\$1,904
U00		406	\$12,092	\$11,138	\$0	\$0	\$23,230

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Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	406	\$12,092	\$11,138	\$0	\$0	\$23,230
SALES TAX	5.00%	\$605				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$12,697	\$11,138	\$0	\$0	\$23,835
CONTINGENCY	10.00%					\$2,383
BOND	5.00%					\$1,192
PROFIT	10.00%					\$2,383
JOB TOTAL						\$29,793

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Estimate:    LIGHTING UPGRADE   Date:    JANUARY 20, 1995
Description: FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:     FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:    BLDG 1138 - 10/7   Job #:    94013.05
Sq. footage:                      City indx:Raleigh, NC
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SUMMARY

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Manhours  Matl  Labor  Equipment  Sub  Total
=====
U00                406  $12,092  $11,138          $0  $23,230
TOTAL                406  $12,092  $11,138          $0  $23,230

SALES TAX          5.00%    $605
MATL MARKUP        0.00%      $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC  $12,697  $11,138          $0  $23,835
CONTINGENCY          10.00%          $2,383
BOND                  5.00%          $1,192
PROFIT               10.00%          $2,383

JOB TOTAL                                $29,793

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1242

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	6844.		
B. SIOH	\$	342.		
C. DESIGN COST	\$	342.		
D. TOTAL COST (1A+1B+1C)	\$	7528.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		7528.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	4.	\$ 140.	12.02	\$ 1680.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 167.	11.94	\$ 1994.
N. TOTAL		4.	\$ 307.		\$ 3674.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)			
(1) DISCOUNT FACTOR (TABLE A)		11.94	\$ 0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)			\$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-)	YR OC	DISCNT FACTR	DISCOUNTED SAVINGS(+) / COST(-) (4)
	(1)	(2)	(3)	
1. FUTURE REPLACEMENT	\$ 6022.	5	.86	5179.
d. TOTAL	\$ 6022.			5179.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+) / COST(-) (3A2+3Bd4) \$ 5179.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 708.

5. SIMPLE PAYBACK PERIOD (1G/4) 10.63 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 8853.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = 1.18$
(IF < 1 PROJECT DOES NOT QUALIFY)

**** Project does not qualify for ECIP funding; 4,5,6 for information only.

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): N/A

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1242-MP ADMIN & BARRACKS

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT 2 LAMP U @ 90 W/FIXT = 0 WATTS

4 FOOT 40 2 LAMP @ 90 W/FIXT = 3,600 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
4 LAMP @ 180 W/FIXT = 0 WATTS

8 FOOT 8 2 LAMP @ 144 W/FIXT = 1,152 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT 0 2 LAMP U @ 58 W/FIXT = 0 WATTS

4 FOOT 56 2 LAMP @ 58 W/FIXT = 3,248 WATTS
0 3 LAMP @ 87 W/FIXT = 0 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT 0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 12,355 KWH/YR ECO ENERGY CONSUMPTION 8,445 KWH/YR

BASELINE DEMAND 4.75 KW ECO DEMAND 3.25 KW

NET ENERGY SAVINGS

3,910 KWH/YR

NET DEMAND SAVINGS
NET DOLLAR SAVINGS

\$167 /YR
\$304 /YR

MAINTENANCE SAVINGS

0 LAMPS @ / 20,000 HOURS *

HR/YR = \$0. / YEAR

(4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$0 /YEAR

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1242 - 10/5   Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					21.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	10.29	\$0	\$280	\$0	\$0		\$280
0002020000	DEMOLITION, 1X4 FLUORESCENT FIXTURES					27.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	13.23	\$0	\$360	\$0	\$0		\$360
0010000000	1X4 2-32 WATT FLUORESCENT LAMPS, SURFACE MOUNTED					4.00	FIXTURE
Unit values	1.14	60.00	31.50	0.00	0.00		91.50
Totals	4.56	\$240	\$126	\$0	\$0		\$366
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					21.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	31.71	\$1,239	\$872	\$0	\$0		\$2,111
0010200000	1X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					3.00	FIXTURE
Unit values	1.14	51.00	31.50	0.00	0.00		82.50
Totals	3.42	\$153	\$95	\$0	\$0		\$248
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					28.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	31.92	\$1,092	\$882	\$0	\$0		\$1,974
U00		96	\$2,724	\$2,615	\$0	\$0	\$5,339

10-Mar-95

MeansData for Lotus

Page 2

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=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

ESTIMATE TOTAL	96	\$2,724	\$2,615	\$0	\$0	\$5,339
SALES TAX	5.00%	\$136				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$2,860	\$2,615	\$0	\$0	\$5,475
CONTINGENCY	10.00%					\$548
BOND	5.00%					\$274
PROFIT	10.00%					\$548
JOB TOTAL						\$6,844

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1242 - 10/5   Job #:      94013.05
Sq. footage:                                     City indx:Raleigh, NC
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SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	96	\$2,724	\$2,615	\$0	\$0	\$5,339
TOTAL	96	\$2,724	\$2,615	\$0	\$0	\$5,339
SALES TAX	5.00%	\$136				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$2,860	\$2,615	\$0	\$0	\$5,475
CONTINGENCY	10.00%					\$548
BOND	5.00%					\$274
PROFIT	10.00%					\$548
JOB TOTAL						\$6,844

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO1A

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 94013.05 ECO-1 RED BRICK HIGH EFFICIENCY LIGHTING

FISCAL YEAR 95 DISCRETE PORTION NAME: ECO-1.1 BLDG 1333

ANALYSIS DATE: 04-27-95 ECONOMIC LIFE 15 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	27002.		
B. SIOH	\$	1350.		
C. DESIGN COST	\$	1350.		
D. TOTAL COST (1A+1B+1C)	\$	29702.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		29702.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	30.	\$ 1049.	12.02	\$ 12603.
B. DIST	\$.00	0.	\$ 0.	14.23	\$ 0.
C. RESID	\$.00	0.	\$ 0.	15.87	\$ 0.
D. NAT G	\$.00	0.	\$ 0.	14.17	\$ 0.
E. COAL	\$.00	0.	\$ 0.	13.28	\$ 0.
F. PPG	\$.00	0.	\$ 0.	13.49	\$ 0.
M. DEMAND SAVINGS			\$ 1301.	11.94	\$ 15534.
N. TOTAL		30.	\$ 2350.		\$ 28137.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$ 107.
(1) DISCOUNT FACTOR (TABLE A)	11.94	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 1278.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 1278.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 2457.

5. SIMPLE PAYBACK PERIOD (1G/4) 12.09 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 29414.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = .99$
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 2.93 %

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING

20 JANUARY 1994

INTERIOR LIGHTING: FLUORESCENT FIXTURE REPLACEMENT

BUILDING #: 1333 - ADMINISTRATION

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

AREA USE:
HOURS/DAY 10
DAYS/WEEK 5

EXISTING FIXTURE DATA

2 FOOT
9 2 LAMP U @ 90 W/FIXT = 810 WATTS
2 2 LAMP @ 48 W/FIXT = 96 WATTS

4 FOOT
8 2 LAMP @ 90 W/FIXT = 720 WATTS
3 LAMP @ 138 W/FIXT = 0 WATTS
111 4 LAMP @ 180 W/FIXT = 19,980 WATTS

8 FOOT
26 2 LAMP @ 144 W/FIXT = 3,744 WATTS

REPLACEMENT FIXTURE DATA

2 FOOT
9 2 LAMP U @ 58 W/FIXT = 522 WATTS
2 2 LAMP @ 29 W/FIXT = 58 WATTS

4 FOOT
60 2 LAMP @ 58 W/FIXT = 3,480 WATTS
111 3 LAMP @ 87 W/FIXT = 9,657 WATTS
0 4 LAMP @ 118 W/FIXT = 0 WATTS

8 FOOT
0 2 LAMP @ 125 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 65,910 KWH/YR **ECO ENERGY CONSUMPTION** 35,864 KWH/YR

BASELINE DEMAND 25.35 KW **ECO DEMAND** 13.72 KW

NET ENERGY SAVINGS

30,246 KWH/YR

NET DEMAND SAVINGS

\$1,291 /YR
\$2,348 /YR

MAINTENANCE SAVINGS

111 LAMPS @ \$5.00 / 20,000 HOURS * 2,600 HR/YR = \$72 / YEAR (4' FLUORESCENT LAMPS)

NET MAINTENANCE SAVINGS

\$72 /YEAR

FORT BRAGG LIMITED ENERGY STUDY OF HISTORIC, RED BRICK MAIN POST AREA

ECO 1: INTERIOR / EXTERIOR LIGHTING
20 JANUARY 1994

INTERIOR LIGHTING: INCANDESCENT LAMP REPLACEMENT

BUILDING #: 1333 - ADMINISTRATION

AREA USE: _____
HOURS/DAY: 10
DAYS/WEEK: 5
PEAK USE: 1 (1-YES, 0-NO)

ELECTRIC COSTS:
ENERGY CHARGE \$0.03495 PER KWH
DEMAND CHARGE \$9.25 PER KW

EXISTING INCANDESCENTS

LAMPS @ 52 W/FIXT = 0 WATTS
2 LAMPS @ 60 W/FIXT = 120 WATTS
LAMPS @ 75 W/FIXT = 0 WATTS
LAMPS @ 90 W/FIXT = 0 WATTS
LAMPS @ 100 W/FIXT = 0 WATTS

COMPACT FLUORESCENT REPLACEMENT

0 LAMPS @ 13 W/FIXT = 0 WATTS
2 LAMPS @ 13 W/FIXT = 26 WATTS
0 LAMPS @ 18 W/FIXT = 0 WATTS
0 LAMPS @ 26 W/FIXT = 0 WATTS
0 LAMPS @ 26 W/FIXT = 0 WATTS

BASELINE ENERGY CONSUMPTION 312 KWH/YR

ECO ENERGY CONSUMPTION

68 KWH/YR

BASELINE DEMAND 0.12 KW

ECO DEMAND

0.03 KW

NET ENERGY SAVINGS

244 KWH/YR

NET DEMAND SAVINGS

\$10 /YR

NET DOLLAR SAVINGS

\$19 /YR

MAINTENANCE SAVINGS

2 LAMPS @ \$5.25 / 750 HOURS * 2,600 HR/YR = \$36 / YEAR (INCANDESCENT)
2 LAMPS @ \$2.00 / 10,000 HOURS * 2,600 HR/YR = \$1 / YEAR (COMPACT FLUORESCENT)

NET MAINTENANCE SAVINGS

\$35 /YEAR

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=====
Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:       FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:      BLDG 1333          Job #:      94013.05
Sq. footage:   City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0002000000	DEMOLITION, 2X4 FLUORESCENT FIXTURES					119.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	58.31	\$0	\$1,589	\$0	\$0		\$1,589
0002020000	DEMOLITION, 2' AND 8' FLUORESCENT FIXTURES					37.00	FIXTURE
Unit values	0.49	0.00	13.35	0.00	0.00		13.35
Totals	18.13	\$0	\$494	\$0	\$0		\$494
0010100000	2X4 2-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED					8.00	FIXTURE
Unit values	1.51	59.00	41.50	0.00	0.00		100.50
Totals	12.08	\$472	\$332	\$0	\$0		\$804
0010400000	1X4 2-32 WATT FLUORESCENT LAMPS, PENDANT MOUNTED					52.00	FIXTURE
Unit values	1.14	39.00	31.50	0.00	0.00		70.50
Totals	59.28	\$2,028	\$1,638	\$0	\$0		\$3,666
0011100000	13 WATT COMPACT FLUORESCENT FIXTURE GLOBE ASSEMBLY					2.00	FIXTURE
Unit values	0.13	25.50	3.44	0.00	0.00		28.94
Totals	0.26	\$51	\$7	\$0	\$0		\$58
0011400000	2X4 3-32 WATT FLUORESCENT LAMPS, RECESSED MOUNTED WITH REFLECTOR					111.00	FIXTURE
Unit values	1.51	79.00	41.50	0.00	0.00		120.50
Totals	167.61	\$8,769	\$4,607	\$0	\$0		\$13,376
0011800000	2X2 2-31 WATT FLUORESCENT LAMPS, RECESSED MOUNTED (U-TUBE)					9.00	FIXTURE
Unit values	1.14	62.00	31.50	0.00	0.00		93.50
Totals	10.26	\$558	\$284	\$0	\$0		\$842
0011900000	1X2 2-T8 FLUORESCENT LAMPS, WALL MOUNTED					2.00	FIXTURE
Unit values	1.14	55.00	31.50	0.00	0.00		86.50
Totals	2.28	\$110	\$63	\$0	\$0		\$173

10-Mar-95

MeansData for Lotus

Page 2

10-Mar-95

MeansData for Lotus

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```
=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
U00          329    $11,988    $9,014         $0        $0    $21,002

ESTIMATE TOTAL      329    $11,988    $9,014         $0        $0    $21,002

SALES TAX           5.00%      $599
MATL MARKUP         0.00%        $0
LABOR MARKUP        0.00%         $0
EQUIPT MARKUP       0.00%         $0
SUB MARKUP          0.00%         $0

TOTAL BEFORE CONTINGENC    $12,587    $9,014         $0        $0    $21,601
CONTINGENCY           10.00%                $2,160
BOND                  5.00%                $1,080
PROFIT                10.00%                $2,160

JOB TOTAL                                $27,002
=====
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10-Mar-95

MeansData for Lotus

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Estimate:      LIGHTING UPGRADE   Date:      JANUARY 20, 1995
Description:   FT BRAGG HISTORIC RED BRICK LIGHTING UPGRADE
Project:      FT BRAGG RED BRICK Bid Date: NOVEMBER 28, 1994
Location:     BLDG 1333           Job #:      94013.05
Sq. footage:  City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U00	329	\$11,988	\$9,014	\$0	\$0	\$21,002
TOTAL	329	\$11,988	\$9,014	\$0	\$0	\$21,002
SALES TAX	5.00%	\$599				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$12,587	\$9,014	\$0	\$0	\$21,601
CONTINGENCY	10.00%					\$2,160
BOND	5.00%					\$1,080
PROFIT	10.00%					\$2,160
JOB TOTAL						\$27,002

7 ECO - 2 CALCULATIONS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

This section contains the life-cycle cost analyses, energy calculations, and cost estimates for ECO-2: Building Envelope Modifications. For the buildings in this ECO, multiple options have been calculated when applicable. These options include:

1. Adding roof insulation
2. Adding crawl space insulation
3. Adding weatherstripping to exterior doors
4. Adding caulking to windows and doors
5. Replacing existing windows with high R-value, argon-filled, sunshaded windows.

A single life-cycle cost analysis and cost estimate was performed for each building which grouped all applicable options together.

7 ECO - 2 CALCULATIONS

LIMITED ENERGY STUDY OF HISTORIC RED BRICK AREA, FT. BRAGG, NC

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1242ECO2

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	63209.		
B. SIOH	\$	3160.		
C. DESIGN COST	\$	3160.		
D. TOTAL COST (1A+1B+1C)	\$	69529.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		69529.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	19.	\$ 654.	15.08	\$ 9856.
B. DIST	\$ 19.18	118.	\$ 2256.	18.57	\$ 41886.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		136.	\$ 2909.		\$ 51742.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)		14.88	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)

d. TOTAL	\$	0.		0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4)	\$	0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$	\$	2909.

5. SIMPLE PAYBACK PERIOD (1G/4)	23.90 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C)	\$	51742.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) =	.74
(IF < 1 PROJECT DOES NOT QUALIFY)	

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR):	1.49 %

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	68.66	1328.59
SPACE COOL	310.70	0.00
HVAC AUX	369.70	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	622.17	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	242.60	0.00
	-----	-----
TOTAL	1613.84	1328.59

TOTAL SITE ENERGY	3048.69 MBTU	158.5 KBTU/SQFT-YR GROSS-AREA	158.5 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6494.06 MBTU	337.5 KBTU/SQFT-YR GROSS-AREA	337.5 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.0
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	48.01	927.11
SPACE COOL	295.52	0.00
HVAC AUX	341.71	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	622.17	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	242.60	0.00
	-----	-----
TOTAL	1550.01	927.11

TOTAL SITE ENERGY	2583.39 MBTU	134.3 KBTU/SQFT-YR GROSS-AREA	134.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	5900.93 MBTU	306.7 KBTU/SQFT-YR GROSS-AREA	306.7 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.3
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.


```

=====
Estimate:      BLDG 1- 1242      Date:      03-Jan-95
Description:   COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:      LIMITED EEAP(RDBRKBid Date:
Location:     FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:  25660              City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					144.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		205.78	\$3,252	\$2,972	\$0	\$0	\$6,224
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					14400.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		158.40	\$2,214	\$1,748	\$0	\$0	\$3,962
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					1.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$89	\$0	\$0	\$0	\$89
0164600140	BOOM TRUCK					20.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$3,600	\$0	\$3,600
U01 GENL RQMTS		366	\$5,573	\$4,735	\$3,600	\$40	\$13,908

```

=====
Line #      Description
-----
            Manhours  Matl    Labor  Equipment  Sub    Total
=====

0206205000  RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
              TO 8 C.Y. TRUCK                      100.00 C.Y.
Unit values      0.01      0.00      0.12      0.29      0.00      0.41
Totals           0.70      $0        $12      $29      $0        $41

0207340240  DEMOLITION EXISTING WINDOWS
                                1200.00 SF
Unit values      0.04      0.00      0.60      0.14      0.00      0.74
Totals          48.00      $0      $715     $174      $0      $889

U02 SITEWORK      49      $0      $727     $203      $0      $930

```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

Unit values	0.00	5.03	0.00	0.00	10.00 Ea. 30.00	35.03
Totals	0.00	\$50	\$0	\$0	\$300	\$350

U06 WOOD/PLSTC	0	\$50	\$0	\$0	\$300	\$350

```
=====
Line #      Description
-----
              Manhours  Matl    Labor  Equipment  Sub      Total
=====
0721180830  NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING, 3-1/2" THK, 23" WIDE, R11 6881.00 S.F.
Unit values      0.01      0.16      0.06      0.00      0.00      0.22
Totals           34.41    $1,083    $397      $0        $0    $1,480

U07 MOIST PROT      35    $1,083    $397      $0        $0    $1,480
```

```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub      Total
=====
```

0861242500 ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
ARGON FILLED GLASS W/ HEAT MIRROR 66 1200.00 SF

Unit values	1.00	28.00	2.00	0.00	0.00	30.00
Totals	1200.00	\$33,604	\$2,402	\$0	\$0	\$36,006

U08 DOORS/WNDW	1200	\$33,604	\$2,402	\$0	\$0	\$36,006

```
=====
Line #      Description
-----
           Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	1650	\$40,310	\$8,261	\$3,803	\$300	\$52,674
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$40,310	\$8,261	\$3,803	\$300	\$52,674
CONTINGENCY	10.00%					\$5,267
BOND	0.00%					\$0
PROFIT	10.00%					\$5,267
JOB TOTAL						\$63,209

```

=====
Estimate:      BLDG 1- 1242      Date:      03-Jan-95
Description:   COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:      LIMITED EEAP(RDBRKBid Date:
Location:     FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:  25660              City indx:Raleigh, NC
=====

```

SUMMARY

```

-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS      366    $5,573    $4,735    $3,600      $0    $13,908
U02 SITEWORK        49         $0        $727        $203      $0     $930
U06 WOOD/PLSTC       0         $50         $0         $0      $300    $350
U07 MOIST PROT       35    $1,083    $397         $0      $0    $1,480
U08 DOORS/WNDW     1200   $33,604   $2,402         $0      $0   $36,006

TOTAL              1650   $40,310   $8,261   $3,803   $300   $52,674

SALES TAX          0.00%         $0
MATL MARKUP        0.00%         $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC $40,310   $8,261   $3,803   $300   $52,674
CONTINGENCY         10.00%          $0
BOND                0.00%          $0
PROFIT              10.00%          $0

JOB TOTAL                                     $63,209

```

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: 1326ECO2
 INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS CENSUS: 3
 FISCAL YEAR 1995 DISCRETE PORTION NAME:
 ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	224513.	
B. SIOH	\$	11226.	
C. DESIGN COST	\$	3160.	
D. TOTAL COST (1A+1B+1C)	\$	238899.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		238899.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	87.	\$ 3032.	15.08	\$ 45716.
B. DIST	\$ 19.18	129.	\$ 2465.	18.57	\$ 45768.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		215.	\$ 5496.		\$ 91484.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		
(1) DISCOUNT FACTOR (TABLE A)	14.88	\$ 0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 5496.

5. SIMPLE PAYBACK PERIOD (1G/4) 43.47 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 91484.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .38
 (IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -1.83 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	285.53	5085.34
SPACE COOL	1748.59	0.00
HVAC AUX	1223.96	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1903.50	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	1087.17	0.00
	-----	-----
TOTAL	6248.75	5085.34

TOTAL SITE ENERGY 11333.96 MBTU 192.0 KBTU/SQFT-YR GROSS-AREA 192.0 KBTU/SQFT-YR NET-AREA
 TOTAL SOURCE ENERGY 23849.96 MBTU 404.0 KBTU/SQFT-YR GROSS-AREA 404.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 36.3
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	272.12	4645.75
SPACE COOL	1604.44	0.00
HVAC AUX	1085.48	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1903.50	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	1087.17	0.00
	-----	-----
TOTAL	5952.71	4645.75

TOTAL SITE ENERGY	10598.30 MBTU	179.5 KBTU/SQFT-YR GROSS-AREA	179.5 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	22521.27 MBTU	381.5 KBTU/SQFT-YR GROSS-AREA	381.5 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 36.0

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 1-1326      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    60600           City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					461.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		658.77	\$10,411	\$9,514	\$0	\$0	\$19,925
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					46100.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		507.10	\$7,088	\$5,597	\$0	\$0	\$12,685
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					35.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$6,300	\$0	\$6,300
U01 GENL RQMTS		1168	\$17,696	\$15,126	\$6,300	\$40	\$39,122

```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 200.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	1.40	\$0	\$24	\$58	\$0	\$82

0207340240 DEMOLITION EXISTING WINDOWS 4676.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	187.04	\$0	\$2,785	\$676	\$0	\$3,461

U02 SITEWORK 189 \$0 \$2,809 \$734 \$0 \$3,543

```
=====
Line #      Description
-----
      Manhours  Matl    Labor  Equipment  Sub    Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

Unit values	0.00	5.03	0.00	0.00	20.00 Ea. 30.00	35.03
Totals	0.00	\$101	\$0	\$0	\$600	\$701

U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701

```
=====
Line #      Description
-----
              Manhours   Matl     Labor   Equipment   Sub     Total
=====
0721180830   NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING,    3-1/2" THK, 23" WIDE, R11 15928.00 S.F.
Unit values      0.01      0.16      0.06      0.00      0.00      0.22
Totals          79.64    $2,507    $919      $0        $0      $3,426

U07 MOIST PROT      80    $2,507    $919      $0        $0      $3,426
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====

0861242500   ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
              ARGON   FILLED GLASS W/ HEAT MIRROR 66   4676.00 SF
Unit values          1.00      28.00        2.00        0.00        0.00      30.00
Totals          4676.00  $130,943    $9,359          $0          $0  $140,302

U08 DOORS/WNDW    4676  $130,943    $9,359          $0          $0  $140,302
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	6113	\$151,247	\$28,213	\$7,034	\$600	\$187,094
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$151,247	\$28,213	\$7,034	\$600	\$187,094
CONTINGENCY	10.00%					\$18,709
BOND	0.00%					\$0
PROFIT	10.00%					\$18,709
JOB TOTAL						\$224,513


```

=====
Estimate:      BLDG 1-1326      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    60600          City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U01 GENL RQMTS	1168	\$17,696	\$15,126	\$6,300	\$0	\$39,122
U02 SITEWORK	189	\$0	\$2,809	\$734	\$0	\$3,543
U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701
U07 MOIST PROT	80	\$2,507	\$919	\$0	\$0	\$3,426
U08 DOORS/WNDW	4676	\$130,943	\$9,359	\$0	\$0	\$140,302
TOTAL	6113	\$151,247	\$28,213	\$7,034	\$600	\$187,094
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$151,247	\$28,213	\$7,034	\$600	\$187,094
CONTINGENCY	10.00%					\$18,709
BOND	0.00%					\$0
PROFIT	10.00%					\$18,709
JOB TOTAL						\$224,513

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: 1333ECO2
 INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS CENSUS: 3
 FISCAL YEAR 1995 DISCRETE PORTION NAME:
 ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	46033.	
B. SIOH	\$	2302.	
C. DESIGN COST	\$	2302.	
D. TOTAL COST (1A+1B+1C)	\$	50637.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		50637.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	34.	\$ 1178.	15.08	\$ 17761.
B. DIST	\$ 19.18	77.	\$ 1485.	18.57	\$ 27568.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		111.	\$ 2662.		\$ 45329.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		
(1) DISCOUNT FACTOR (TABLE A)	14.88	\$ 0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 2662.

5. SIMPLE PAYBACK PERIOD (1G/4) 19.02 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 45329.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .90
 (IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 2.43 %

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	79.52	891.42
SPACE COOL	347.65	0.00
HVAC AUX	192.92	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	303.25	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	324.51	0.00
	-----	-----
TOTAL	1247.85	891.42

TOTAL SITE ENERGY	2139.24 MBTU	162.3 KBTU/SQFT-YR GROSS-AREA	162.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	4638.62 MBTU	351.9 KBTU/SQFT-YR GROSS-AREA	351.9 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 4.5

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	54.01	627.13
SPACE COOL	288.03	0.00
HVAC AUX	162.96	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	303.25	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	324.51	0.00
	-----	-----
TOTAL	1132.76	627.13

TOTAL SITE ENERGY	1759.87 MBTU	133.5 KBTU/SQFT-YR GROSS-AREA	133.5 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	4028.75 MBTU	305.7 KBTU/SQFT-YR GROSS-AREA	305.7 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 5.0
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 1-1333      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRKBid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    14304          City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					104.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		148.62	\$2,349	\$2,146	\$0	\$0	\$4,495
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					10400.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		114.40	\$1,599	\$1,263	\$0	\$0	\$2,862
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					1.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$89	\$0	\$0	\$0	\$89
0164600140	BOOM TRUCK					20.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$3,600	\$0	\$3,600
U01 GENL RQMTS		265	\$4,055	\$3,424	\$3,600	\$40	\$11,079

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 100.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	0.70	\$0	\$12	\$29	\$0	\$41

0207340240 DEMOLITION EXISTING WINDOWS 840.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	33.60	\$0	\$500	\$122	\$0	\$622

U02 SITEWORK 35 \$0 \$512 \$151 \$0 \$663

```
=====
Line #      Description
-----
            Manhours  Matl    Labor  Equipment  Sub      Total
=====

0611103540  SCAFFOLD PLANKING, 2"X10" X 16' , RENT
Unit values      0.00      5.03      0.00      0.00      10.00 Ea. 35.03
Totals           0.00      $50      $0      $0      $300      $350

U06 WOOD/PLSTC      0      $50      $0      $0      $300      $350
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0721180830  NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING,    3-1/2" THK, 23" WIDE, R11    4950.00 S.F.
Unit values          0.01      0.16      0.06      0.00      0.00      0.22
Totals             24.75     $779     $286      $0      $0     $1,065

U07 MOIST PROT      25      $779     $286      $0      $0     $1,065
```



```
=====
Line #      Description
-----
            Manhours  Matl    Labor   Equipment   Sub      Total
=====
0861242500  ALUMINUM CLAD, DOUBLE HUNG WINDOWS, W/ HURD LOW-EMISSIVITY,
              ARGON  FILLED GLASS W/ HEAT MIRROR 66      840.00 SF
Unit values      1.00    28.00      2.00      0.00      0.00    30.00
Totals          840.00   $23,523   $1,681      $0      $0    $25,204

U08 DOORS/WNDW      840   $23,523   $1,681      $0      $0    $25,204
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====

ESTIMATE TOTAL    1165    $28,407    $5,903    $3,751        $300    $38,361
SALES TAX          0.00%           $0
MATL MARKUP        0.00%           $0
LABOR MARKUP       0.00%           $0
EQUIPT MARKUP      0.00%           $0
SUB MARKUP         0.00%           $0
TOTAL BEFORE CONTINGENC  $28,407    $5,903    $3,751        $300    $38,361
CONTINGENCY        10.00%           $3,836
BOND               0.00%           $0
PROFIT            10.00%           $3,836
JOB TOTAL                                     $46,033
```

```

=====
Estimate:      BLDG  1-1333      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRKBid Date:
Location:       FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:    14304           City indx:Raleigh, NC
=====

```

SUMMARY

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-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS      265    $4,055    $3,424    $3,600      $0    $11,079
U02 SITEWORK        35         $0      $512      $151      $0      $663
U06 WOOD/PLSTC       0        $50         $0         $0      $300      $350
U07 MOIST PROT       25       $779      $286         $0      $0      $1,065
U08 DOORS/WNDW      840    $23,523    $1,681         $0      $0    $25,204

TOTAL              1165    $28,407    $5,903    $3,751    $300    $38,361

SALES TAX          0.00%         $0
MATL MARKUP        0.00%         $0
LABOR MARKUP        0.00%          $0
EQUIPT MARKUP       0.00%          $0
SUB MARKUP          0.00%          $0

TOTAL BEFORE CONTINGENC $28,407    $5,903    $3,751    $300    $38,361
CONTINGENCY          10.00%          $0
BOND                  0.00%          $0
PROFIT                10.00%          $0

JOB TOTAL                                          $46,033

```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1105ECO2

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	373657.		
B. SIOH	\$	18683.		
C. DESIGN COST	\$	18683.		
D. TOTAL COST (1A+1B+1C)	\$	411023.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		411023.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	114.	\$ 3977.	15.08	\$ 59978.
B. DIST	\$ 19.18	187.	\$ 3577.	18.57	\$ 66426.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		300.	\$ 7554.		\$ 126404.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	14.88		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 7554.

5. SIMPLE PAYBACK PERIOD (1G/4) 54.41 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 126404.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .31
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -2.90 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	230.21	4552.14
SPACE COOL	1267.76	0.00
HVAC AUX	1808.60	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	3329.45	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	412.70	0.00
	-----	-----
TOTAL	7048.73	4552.14

TOTAL SITE ENERGY	11601.09 MBTU	157.0 KBTU/SQFT-YR GROSS-AREA	157.0 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	25720.15 MBTU	348.0 KBTU/SQFT-YR GROSS-AREA	348.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 1.1

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	207.14	3915.72
SPACE COOL	1137.87	0.00
HVAC AUX	1573.20	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	3329.47	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	412.70	0.00
	-----	-----
TOTAL	6660.38	3915.72

TOTAL SITE ENERGY	10576.12 MBTU	143.1 KBTU/SQFT-YR GROSS-AREA	143.1 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	23916.92 MBTU	323.6 KBTU/SQFT-YR GROSS-AREA	323.6 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 0.0
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.1

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 2-1105      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRKBid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    95326          City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					995.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		1421.86	\$22,471	\$20,535	\$0	\$0	\$43,006
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					99500.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		1094.50	\$15,299	\$12,079	\$0	\$0	\$27,378
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					40.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$7,200	\$0	\$7,200
U01 GENL RQMTS		2518	\$37,967	\$32,629	\$7,200	\$40	\$77,796

```
=====
Line #      Description
-----
      Manhours  Matl    Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 180.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	1.26	\$0	\$21	\$52	\$0	\$73

0207340240 DEMOLITION EXISTING WINDOWS 7396.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	295.84	\$0	\$4,406	\$1,070	\$0	\$5,476

U02 SITEWORK 298 \$0 \$4,427 \$1,122 \$0 \$5,549


```
=====
Line #      Description
-----
           Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

Unit values	0.00	5.03	0.00	0.00	20.00 Ea. 30.00	35.03
Totals	0.00	\$101	\$0	\$0	\$600	\$701

U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0721180830   NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING,    3-1/2" THK, 23" WIDE, R11    25194.00 S.F.
Unit values      0.01      0.16      0.06      0.00      0.00      0.22
Totals          125.97    $3,966    $1,454      $0        $0      $5,420

U07 MOIST PROT    126      $3,966    $1,454      $0        $0      $5,420
```

```
=====
Line #      Description
-----
            Manhours   Matl      Labor   Equipment   Sub      Total
=====
0861242500  ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
            ARGON  FILLED GLASS W/ HEAT MIRROR 66  7396.00 SF
Unit values      1.00      28.00      2.00      0.00      0.00      30.00
Totals          7396.00  $207,112  $14,803      $0      $0  $221,915

U08 DOORS/WNDW      7396  $207,112  $14,803      $0      $0  $221,915
```

```
=====
Line #      Description
-----
      Manhours   Matl     Labor   Equipment   Sub     Total
=====
```

ESTIMATE TOTAL	10338	\$249,146	\$53,313	\$8,322	\$600	\$311,381
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$249,146	\$53,313	\$8,322	\$600	\$311,381
CONTINGENCY	10.00%					\$31,138
BOND	0.00%					\$0
PROFIT	10.00%					\$31,138
JOB TOTAL						\$373,657

```

=====
Estimate:      BLDG 2-1105      Date:      03-Jan-95
Description:   COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:      LIMITED EEAP(RDBRKBid Date:
Location:     FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:  95326           City indx:Raleigh, NC
=====

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SUMMARY

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-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS      2518    $37,967    $32,629    $7,200      $0    $77,796
U02 SITEWORK        298         $0      $4,427    $1,122      $0    $5,549
U06 WOOD/PLSTC        0      $101         $0         $0    $600    $701
U07 MOIST PROT       126    $3,966    $1,454         $0      $0    $5,420
U08 DOORS/WNDW      7396   $207,112   $14,803         $0      $0   $221,915

TOTAL              10338   $249,146   $53,313    $8,322    $600   $311,381

SALES TAX           0.00%         $0
MATL MARKUP         0.00%         $0
LABOR MARKUP        0.00%          $0
EQUIPT MARKUP       0.00%          $0
SUB MARKUP          0.00%          $0

TOTAL BEFORE CONTINGENC $249,146   $53,313    $8,322    $600   $311,381
CONTINGENCY          10.00%          $0
BOND                  0.00%          $0
PROFIT               10.00%          $0

JOB TOTAL                                     $373,657

```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1120ECO2

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	268808.	
B. SIOH	\$	13440.	
C. DESIGN COST	\$	13440.	
D. TOTAL COST (1A+1B+1C)	\$	295688.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		295688.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	46.	\$ 1615.	15.08	\$ 24350.
B. DIST	\$ 19.18	172.	\$ 3297.	18.57	\$ 61226.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		218.	\$ 4912.		\$ 85576.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 4912.

5. SIMPLE PAYBACK PERIOD (1G/4) 60.20 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 85576.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .29
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -3.19 %

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	181.42	4735.99
SPACE COOL	984.55	0.00
HVAC AUX	337.24	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1706.99	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	675.53	0.00
	-----	-----
TOTAL	3885.73	4735.99

TOTAL SITE ENERGY	8621.56 MBTU	116.2 KBTU/SQFT-YR GROSS-AREA	116.2 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	16404.38 MBTU	221.1 KBTU/SQFT-YR GROSS-AREA	221.1 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.8
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	171.73	4149.34
SPACE COOL	889.78	0.00
HVAC AUX	284.08	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1706.94	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	675.51	0.00
	-----	-----
TOTAL	3728.05	4149.34

TOTAL SITE ENERGY	7877.37 MBTU	106.2 KBTU/SQFT-YR GROSS-AREA	106.2 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	15344.63 MBTU	206.8 KBTU/SQFT-YR GROSS-AREA	206.8 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.5
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.


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=====
Estimate:      BLDG 2-1120      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:       LIMITED EEAP(RDBRKBid Date:
Location:      FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:   49627           City indx:Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					458.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		654.48	\$10,343	\$9,452	\$0	\$0	\$19,795
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					45800.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		503.80	\$7,042	\$5,560	\$0	\$0	\$12,602
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					30.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$5,400	\$0	\$5,400
U01 GENL RQMTS		1160	\$17,582	\$15,027	\$5,400	\$40	\$38,009

```

=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0206205000  RUBBISH, HAUL BY TRUCK,PER MI OVER 2 MILES,UP
              TO 8 C.Y. TRUCK              150.00 C.Y.
Unit values      0.01      0.00      0.12      0.29      0.00      0.41
Totals           1.05      $0      $18      $43      $0      $61

0207340240  DEMOLITION EXISTING WINDOWS
              5900.00 SF
Unit values      0.04      0.00      0.60      0.14      0.00      0.74
Totals          236.00      $0      $3,515      $854      $0      $4,369

U02 SITEWORK      238      $0      $3,533      $897      $0      $4,430

```

```
=====
Line #      Description
-----
           Manhours  Matl    Labor  Equipment  Sub    Total
=====

0611103540  SCAFFOLD PLANKING, 2"X10" X 16' , RENT
Unit values      0.00      5.03      0.00      0.00      15.00 Ea. 35.03
Totals           0.00      $75      $0      $0      $450      $525

U06 WOOD/PLSTC      0      $75      $0      $0      $450      $525
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0721180830   NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING,    3-1/2" THK, 23" WIDE, R11    18661.00 S.F.
Unit values      0.01      0.16      0.06      0.00      0.00      0.22
Totals          93.31    $2,938    $1,077      $0        $0      $4,015

U07 MOIST PROT      94      $2,938    $1,077      $0        $0      $4,015
```

```
=====
Line #      Description
-----
            Manhours   Matl      Labor   Equipment   Sub      Total
=====
0861242500  ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
            ARGON FILLED GLASS W/ HEAT MIRROR 66  5900.00 SF
Unit values      1.00      28.00      2.00      0.00      0.00      30.00
Totals          5900.00  $165,219  $11,809      $0      $0  $177,028

U08 DOORS/WNDW      5900  $165,219  $11,809      $0      $0  $177,028
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	7392	\$185,814	\$31,446	\$6,297	\$450	\$224,007
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$185,814	\$31,446	\$6,297	\$450	\$224,007
CONTINGENCY	10.00%					\$22,401
BOND	0.00%					\$0
PROFIT	10.00%					\$22,401
JOB TOTAL						\$268,808

```

=====
Estimate:      BLDG  2-1120      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRKBid Date:
Location:       FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:    49627           City indx:Raleigh, NC
=====

```

SUMMARY

```

-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS  1160  $17,582  $15,027  $5,400  $0  $38,009
U02 SITEWORK    238      $0  $3,533  $897  $0  $4,430
U06 WOOD/PLSTC   0      $75  $0  $0  $450  $525
U07 MOIST PROT   94  $2,938  $1,077  $0  $0  $4,015
U08 DOORS/WNDW  5900  $165,219  $11,809  $0  $0  $177,028
TOTAL          7392  $185,814  $31,446  $6,297  $450  $224,007

SALES TAX        0.00%      $0
MATL MARKUP      0.00%      $0
LABOR MARKUP     0.00%      $0
EQUIPT MARKUP    0.00%      $0
SUB MARKUP       0.00%      $0

TOTAL BEFORE CONTINGENC  $185,814  $31,446  $6,297  $450  $224,007
CONTINGENCY        10.00%      $22,401
BOND                0.00%      $0
PROFIT             10.00%      $22,401

JOB TOTAL                                     $268,808

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LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1127ECO2

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	167587.	
B. SIOH	\$	8379.	
C. DESIGN COST	\$	8379.	
D. TOTAL COST (1A+1B+1C)	\$	184345.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		184345.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	97.	\$ 3394.	15.08	\$ 51176.
B. DIST	\$ 19.18	301.	\$ 5764.	18.57	\$ 107030.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		398.	\$ 9157.		\$ 158206.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		
(1) DISCOUNT FACTOR (TABLE A)	14.88	\$ 0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$ 0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)

d. TOTAL	\$	0.		0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4)	\$	0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$	\$	9157.

5. SIMPLE PAYBACK PERIOD (1G/4)	20.13 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C)	\$	158206.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) =	.86
(IF < 1 PROJECT DOES NOT QUALIFY)	

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR):	2.22 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	178.99	3457.19
SPACE COOL	1433.37	0.00
HVAC AUX	1108.49	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1512.83	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	566.01	0.00
	-----	-----
TOTAL	4799.69	3457.19

TOTAL SITE ENERGY	8256.87 MBTU	142.9 KBTU/SQFT-YR GROSS-AREA	142.9 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	17870.65 MBTU	309.2 KBTU/SQFT-YR GROSS-AREA	309.2 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 48.6

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 1.3

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	125.90	2431.48
SPACE COOL	1298.94	0.00
HVAC AUX	964.62	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1512.83	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	566.01	0.00
	-----	-----
TOTAL	4468.30	2431.48

TOTAL SITE ENERGY	6899.65 MBTU	119.4 KBTU/SQFT-YR GROSS-AREA	119.4 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	15849.40 MBTU	274.2 KBTU/SQFT-YR GROSS-AREA	274.2 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 50.1
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 2-1127      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    63448          City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					261.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		372.97	\$5,894	\$5,387	\$0	\$0	\$11,281
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					26100.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		287.10	\$4,013	\$3,169	\$0	\$0	\$7,182
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					30.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$5,400	\$0	\$5,400
U01 GENL RQMTS		662	\$10,104	\$8,571	\$5,400	\$40	\$24,075

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 130.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	0.91	\$0	\$15	\$38	\$0	\$53

0207340240 DEMOLITION EXISTING WINDOWS 3636.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	145.44	\$0	\$2,166	\$526	\$0	\$2,692

U02 SITEWORK 147 \$0 \$2,181 \$564 \$0 \$2,745

```
=====
Line #      Description
-----
              Manhours   Matl    Labor   Equipment   Sub    Total
=====

0611103540   SCAFFOLD PLANKING, 2"X10" X 16' , RENT
Unit values           0.00      5.03      0.00      0.00      10.00 Ea. 35.03
Totals              0.00      $50      $0      $0      $300      $350

U06 WOOD/PLSTC      0      $50      $0      $0      $300      $350
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0721180830   NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
              CEILING,    3-1/2" THK, 23" WIDE, R11  15750.00 S.F.
Unit values      0.01      0.16      0.06      0.00      0.00      0.22
Totals          78.75    $2,479    $909      $0        $0      $3,388

U07 MOIST PROT      79      $2,479    $909      $0        $0      $3,388
```

```
=====
Line #      Description
-----
            Manhours   Matl      Labor   Equipment   Sub      Total
=====

0861242500  ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
            ARGON  FILLED GLASS W/ HEAT MIRROR 66  3636.00 SF
Unit values      1.00      28.00      2.00      0.00      0.00      30.00
Totals          3636.00  $101,820  $7,278      $0      $0  $109,098

U08 DOORS/WNDW  3636  $101,820  $7,278      $0      $0  $109,098
```

```
=====
Line #      Description
-----
            Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	4524	\$114,453	\$18,939	\$5,964	\$300	\$139,656
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$114,453	\$18,939	\$5,964	\$300	\$139,656
CONTINGENCY	10.00%					\$13,966
BOND	0.00%					\$0
PROFIT	10.00%					\$13,966
JOB TOTAL						\$167,587


```

=====
Estimate:      BLDG 2-1127      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    63448          City indx:Raleigh, NC
=====

```

SUMMARY

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-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS      662   $10,104   $8,571   $5,400       $0   $24,075
U02 SITEWORK       147       $0     $2,181     $564       $0   $2,745
U06 WOOD/PLSTC        0       $50       $0       $0     $300   $350
U07 MOIST PROT       79   $2,479     $909       $0       $0   $3,388
U08 DOORS/WNDW    3636  $101,820   $7,278       $0       $0  $109,098

TOTAL              4524  $114,453   $18,939   $5,964     $300  $139,656

SALES TAX          0.00%       $0
MATL MARKUP        0.00%       $0
LABOR MARKUP       0.00%       $0
EQUIPT MARKUP      0.00%       $0
SUB MARKUP         0.00%       $0

TOTAL BEFORE CONTINGENC $114,453   $18,939   $5,964     $300  $139,656
CONTINGENCY         10.00%                $13,966
BOND                 0.00%                $0
PROFIT               10.00%                $13,966

JOB TOTAL                                              $167,587

```

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: 1133ECO2
 INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3
 PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS
 FISCAL YEAR 1995 DISCRETE PORTION NAME:
 ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	151198.	
B. SIOH	\$	7560.	
C. DESIGN COST	\$	7560.	
D. TOTAL COST (1A+1B+1C)	\$	166318.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		166318.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	94.	\$ 3292.	15.08	\$ 49648.
B. DIST	\$ 19.18	168.	\$ 3230.	18.57	\$ 59979.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		263.	\$ 6522.		\$ 109627.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)		14.88	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4)\$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 6522.

5. SIMPLE PAYBACK PERIOD (1G/4) 25.50 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 109627.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$.66
 (IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): .88 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	425.53	1420.44
SPACE COOL	947.02	0.00
HVAC AUX	103.49	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1011.38	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	379.22	0.00
	-----	-----
TOTAL	2866.64	1420.44

TOTAL SITE ENERGY	4286.99 MBTU	115.9 KBTU/SQFT-YR GROSS-AREA	115.9 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	10028.71 MBTU	271.2 KBTU/SQFT-YR GROSS-AREA	271.2 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.0

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	275.50	845.60
SPACE COOL	798.32	0.00
HVAC AUX	80.66	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1011.37	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	379.21	0.00
	-----	-----
TOTAL	2545.07	845.60

TOTAL SITE ENERGY	3390.60 MBTU	91.7 KBTU/SQFT-YR GROSS-AREA	91.7 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	8488.25 MBTU	229.6 KBTU/SQFT-YR GROSS-AREA	229.6 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.0

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG  2-1133      Date:      03-Jan-95
Description:   COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:      LIMITED EEAP(RDBRKBid Date:
Location:     FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:  41360             City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					280.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		400.12	\$6,323	\$5,779	\$0	\$0	\$12,102
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					28000.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		308.00	\$4,305	\$3,399	\$0	\$0	\$7,704
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					1.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$89	\$0	\$0	\$0	\$89
0164600140	BOOM TRUCK					20.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$3,600	\$0	\$3,600
U01 GENL RQMTS		710	\$10,735	\$9,193	\$3,600	\$0	\$23,528

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 100.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	0.70	\$0	\$12	\$29	\$0	\$41

0207340240 DEMOLITION EXISTING WINDOWS 3260.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	130.40	\$0	\$1,942	\$472	\$0	\$2,414

U02 SITEWORK 132 \$0 \$1,954 \$501 \$0 \$2,455

```
=====
Line #      Description
-----
            Manhours  Matl    Labor  Equipment  Sub      Total
=====

0611103540   SCAFFOLD PLANKING, 2"X10" X 16' , RENT
                                20.00 Ea.
Unit values      0.00      5.03      0.00      0.00      0.00      5.03
Totals           0.00     $101      $0       $0       $0     $101

U06 WOOD/PLSTC      0     $101      $0       $0       $0     $101
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0721180830 NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
CEILING, 3-1/2" THK, 23" WIDE, R11 9760.00 S.F.

Unit values	0.01	0.16	0.06	0.00	0.00	0.22
Totals	48.80	\$1,536	\$563	\$0	\$0	\$2,099

U07 MOIST PROT	49	\$1,536	\$563	\$0	\$0	\$2,099


```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
0861242500   ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
              ARGON   FILLED GLASS W/ HEAT MIRROR 66   3260.00 SF
Unit values          1.00      28.00      2.00      0.00      0.00      30.00
Totals          3260.00    $91,290    $6,525      $0      $0    $97,815

U08 DOORS/WNDW    3260    $91,290    $6,525      $0      $0    $97,815
```

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	4151	\$103,662	\$18,235	\$4,101	\$0	\$125,998
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$103,662	\$18,235	\$4,101	\$0	\$125,998
CONTINGENCY	10.00%					\$12,600
BOND	0.00%					\$0
PROFIT	10.00%					\$12,600
JOB TOTAL						\$151,198

```

=====
Estimate:      BLDG  2-1133      Date:      03-Jan-95
Description:   COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:      LIMITED EEAP(RDBRK Bid Date:
Location:     FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:  41360             City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U01 GENL RQMTS	710	\$10,735	\$9,193	\$3,600	\$0	\$23,528
U02 SITEWORK	132	\$0	\$1,954	\$501	\$0	\$2,455
U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$0	\$101
U07 MOIST PROT	49	\$1,536	\$563	\$0	\$0	\$2,099
U08 DOORS/WNDW	3260	\$91,290	\$6,525	\$0	\$0	\$97,815
TOTAL	4151	\$103,662	\$18,235	\$4,101	\$0	\$125,998
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$103,662	\$18,235	\$4,101	\$0	\$125,998
CONTINGENCY	10.00%					\$12,600
BOND	0.00%					\$0
PROFIT	10.00%					\$12,600
JOB TOTAL						\$151,198

LIFE CYCLE COST ANALYSIS SUMMARY

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) STUDY: 1138ECO2
 INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 LCCID FY95 (92)
 PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS CENSUS: 3
 FISCAL YEAR 1995 DISCRETE PORTION NAME:
 ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	261589.	
B. SIOH	\$	13079.	
C. DESIGN COST	\$	13079.	
D. TOTAL COST (1A+1B+1C)	\$	287747.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)			\$ 287747.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	71.	\$ 2495.	15.08	\$ 37631.
B. DIST	\$ 19.18	173.	\$ 3326.	18.57	\$ 61760.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		245.	\$ 5821.		\$ 99391.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)		14.88	
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 5821.

5. SIMPLE PAYBACK PERIOD (1G/4) 49.43 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 99391.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$.35
 (IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -2.33 %

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	398.05	1053.81
SPACE COOL	344.03	0.00
HVAC AUX	373.27	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	466.41	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	325.45	0.00
	-----	-----
TOTAL	1907.21	1053.81

TOTAL SITE ENERGY	2961.09 MBTU	91.3 KBTU/SQFT-YR GROSS-AREA	91.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6781.38 MBTU	209.1 KBTU/SQFT-YR GROSS-AREA	209.1 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 8.1
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -		
	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	40.62	873.22
SPACE COOL	489.12	0.00
HVAC AUX	399.71	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	664.40	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	669.36	0.00
	-----	-----
TOTAL	2263.21	873.22

TOTAL SITE ENERGY	3136.42 MBTU	165.3 KBTU/SQFT-YR GROSS-AREA	165.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	7669.62 MBTU	404.1 KBTU/SQFT-YR GROSS-AREA	404.1 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.3
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	63.02	1901.29
SPACE COOL	324.06	0.00
HVAC AUX	453.90	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	664.37	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	669.34	0.00
	-----	-----
TOTAL	2174.70	1901.29

TOTAL SITE ENERGY 4076.03 MBTU 214.8 KBTU/SQFT-YR GROSS-AREA 214.8 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY 8432.04 MBTU 444.3 KBTU/SQFT-YR GROSS-AREA 444.3 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.6
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -		
	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	389.67	882.45
SPACE COOL	300.54	0.00
HVAC AUX	319.96	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	466.41	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	325.45	0.00
	-----	-----
TOTAL	1802.04	882.45

TOTAL SITE ENERGY	2684.55 MBTU	82.8 KBTU/SQFT-YR GROSS-AREA	82.8 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6294.17 MBTU	194.0 KBTU/SQFT-YR GROSS-AREA	194.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 7.9
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -		
	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	33.57	684.34
SPACE COOL	464.20	0.00
HVAC AUX	354.96	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	664.39	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	669.36	0.00
	-----	-----
TOTAL	2186.49	684.34

TOTAL SITE ENERGY	2870.81 MBTU	151.3 KBTU/SQFT-YR GROSS-AREA	151.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	7250.30 MBTU	382.0 KBTU/SQFT-YR GROSS-AREA	382.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.4
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

FT BRAGG ENERGY STUDY

HISTORIC RED BRICK BLDG AREA

DOE-2.1C 1/ 9/1995 14:32:42 PDL RUN 1

BUILDING 1-1138

ECO-2 PART C (THIRD FLOOR)

BUILDING ENVELOPE MODIFICATIONS

REPORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

WEATHER FILE- RALEIGH, NC

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	61.04	1705.61
SPACE COOL	298.26	0.00
HVAC AUX	419.78	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	664.38	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	669.35	0.00
	-----	-----
TOTAL	2112.81	1705.61

TOTAL SITE ENERGY	3818.42 MBTU	201.2 KBTU/SQFT-YR GROSS-AREA	201.2 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	8050.38 MBTU	424.2 KBTU/SQFT-YR GROSS-AREA	424.2 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 1.3

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 2-1138      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRKBid Date:
Location:      FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:   72344           City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					604.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		863.12	\$13,640	\$12,465	\$0	\$0	\$26,105
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					60400.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		664.40	\$9,287	\$7,333	\$0	\$0	\$16,620
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					30.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$5,400	\$0	\$5,400
U01 GENL RQMTS		1529	\$23,124	\$19,813	\$5,400	\$40	\$48,337

```
=====
Line #      Description
-----
            Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 130.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	0.91	\$0	\$15	\$38	\$0	\$53

0207340240 DEMOLITION EXISTING WINDOWS 5500.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	220.00	\$0	\$3,276	\$796	\$0	\$4,072

U02 SITEWORK 221 \$0 \$3,291 \$834 \$0 \$4,125

```
=====
Line #      Description
-----
              Manhours  Matl    Labor  Equipment  Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

					10.00 Ea.	
Unit values	0.00	5.03	0.00	0.00	30.00	35.03
Totals	0.00	\$50	\$0	\$0	\$300	\$350

U06 WOOD/PLSTC	0	\$50	\$0	\$0	\$300	\$350

```
=====
Line #      Description
-----
              Manhours   Matl     Labor   Equipment   Sub       Total
=====
```

0721180830 NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
CEILING, 3-1/2" THK, 23" WIDE, R11 713.00 S.F.

Unit values	0.01	0.16	0.06	0.00	0.00	0.22
Totals	3.57	\$112	\$41	\$0	\$0	\$153

U07 MOIST PROT	4	\$112	\$41	\$0	\$0	\$153

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0861242500 ALUMINUM CLAD, DOUBLE HUNG WINDOWS, W/ HURD LOW-EMISSION, ARGON FILLED GLASS W/ HEAT MIRROR 66 5500.00 SF

Unit values	1.00	28.00	2.00	0.00	0.00	30.00
Totals	5500.00	\$154,018	\$11,008	\$0	\$0	\$165,026

U08 DOORS/WNDW	5500	\$154,018	\$11,008	\$0	\$0	\$165,026

```
=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	7254	\$177,304	\$34,153	\$6,234	\$300	\$217,991
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$177,304	\$34,153	\$6,234	\$300	\$217,991
CONTINGENCY	10.00%					\$21,799
BOND	0.00%					\$0
PROFIT	10.00%					\$21,799
JOB TOTAL						\$261,589


```

=====
Estimate:      BLDG 2-1138      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:       LIMITED EEAP(RDBRKBid Date:
Location:      FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:   72344           City indx:Raleigh, NC
=====

```

SUMMARY

```

-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS  1529  $23,124  $19,813  $5,400  $0  $48,337
U02 SITEWORK   221    $0      $3,291  $834    $0  $4,125
U06 WOOD/PLSTC    0    $50      $0      $0    $300  $350
U07 MOIST PROT    4   $112      $41      $0    $0  $153
U08 DOORS/WNDW  5500  $154,018  $11,008  $0    $0  $165,026

TOTAL          7254  $177,304  $34,153  $6,234  $300  $217,991

SALES TAX      0.00%    $0
MATL MARKUP    0.00%    $0
LABOR MARKUP   0.00%    $0
EQUIPT MARKUP  0.00%    $0
SUB MARKUP     0.00%    $0

TOTAL BEFORE CONTINGENC  $177,304  $34,153  $6,234  $300  $217,991
CONTINGENCY      10.00%    $21,799
BOND              0.00%    $0
PROFIT           10.00%    $21,799

JOB TOTAL                                     $261,589

```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1549ECO2
LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	233087.	
B. SIOH	\$	11654.	
C. DESIGN COST	\$	11654.	
D. TOTAL COST (1A+1B+1C)	\$	256395.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		256395.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	2.	\$ 64.	15.08	\$ 959.
B. DIST	\$ 19.18	235.	\$ 4500.	18.57	\$ 83558.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		236.	\$ 4563.		\$ 84517.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)

d. TOTAL \$ 0. 0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS \text{ ECONOMIC LIFE}))$ \$ 4563.

5. SIMPLE PAYBACK PERIOD (1G/4) 56.19 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 84517.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .33
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -2.56 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	102.49	3805.53
SPACE COOL	0.00	0.00
HVAC AUX	52.17	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	661.50	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	94.60	0.00
	-----	-----
TOTAL	910.77	3805.53

TOTAL SITE ENERGY	4716.32 MBTU	205.1 KBTU/SQFT-YR GROSS-AREA	205.1 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6540.62 MBTU	284.4 KBTU/SQFT-YR GROSS-AREA	284.4 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 43.5
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -		
	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	99.58	3004.82
SPACE COOL	0.00	0.00
HVAC AUX	48.89	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	661.50	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	94.60	0.00
	-----	-----
TOTAL	904.56	3004.82

TOTAL SITE ENERGY	3909.41 MBTU	170.0 KBTU/SQFT-YR GROSS-AREA	170.0 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	5721.28 MBTU	248.8 KBTU/SQFT-YR GROSS-AREA	248.8 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 37.1
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

```

=====
Estimate:      BLDG 2-1549      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    30145          City indx: Raleigh, NC
=====

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Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					250.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		357.25	\$5,646	\$5,160	\$0	\$0	\$10,806
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					25000.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		275.00	\$3,844	\$3,035	\$0	\$0	\$6,879
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					1.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$89	\$0	\$0	\$0	\$89
0164600140	BOOM TRUCK					20.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$3,600	\$0	\$3,600
U01 GENL RQMTS		634	\$9,597	\$8,210	\$3,600	\$0	\$21,407

```
=====
Line #      Description
-----
              Manhours  Matl      Labor   Equipment   Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 100.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	0.70	\$0	\$12	\$29	\$0	\$41

0207340240 DEMOLITION EXISTING WINDOWS 5240.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	209.60	\$0	\$3,121	\$758	\$0	\$3,879

U02 SITEWORK 211 \$0 \$3,133 \$787 \$0 \$3,920

```
=====
Line #      Description
-----
      Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT 20.00 Ea.

Unit values	0.00	5.03	0.00	0.00	0.00	5.03
Totals	0.00	\$101	\$0	\$0	\$0	\$101

U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$0	\$101

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====

0722031715   ROOF DECK INSULATION, POLYISOCYANURATE 2#/CF
              DENSITY, 1 1/2" THICK R10.87      25920.00 S.F.
Unit values      0.01      0.38      0.07      0.00      0.00      0.45
Totals          155.52    $9,841    $1,745      $0        $0    $11,586

U07 MOIST PROT      156    $9,841    $1,745      $0        $0    $11,586
```



```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0861242500 ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
 ARGON FILLED GLASS W/ HEAT MIRROR 66 5240.00 SF

Unit values	1.00	28.00	2.00	0.00	0.00	30.00
Totals	5240.00	\$146,737	\$10,488	\$0	\$0	\$157,225

U08 DOORS/WNDW	5240	\$146,737	\$10,488	\$0	\$0	\$157,225

```
=====
Line #      Description
-----
      Manhours   Matl    Labor   Equipment   Sub    Total
=====
```

ESTIMATE TOTAL	6241	\$166,276	\$23,576	\$4,387	\$0	\$194,239
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$166,276	\$23,576	\$4,387	\$0	\$194,239
CONTINGENCY	10.00%					\$19,424
BOND	0.00%					\$0
PROFIT	10.00%					\$19,424
JOB TOTAL						\$233,087

```

=====
Estimate:      BLDG 2-1549      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:      FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:   30145           City indx:Raleigh, NC
=====

```

SUMMARY

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-----
Manhours  Matl  Labor  Equipment  Sub  Total
=====
U01 GENL RQMTS      634    $9,597    $8,210    $3,600    $0    $21,407
U02 SITEWORK       211         $0    $3,133    $787    $0    $3,920
U06 WOOD/PLSTC        0    $101         $0         $0    $0    $101
U07 MOIST PROT      156    $9,841    $1,745         $0    $0    $11,586
U08 DOORS/WNDW     5240   $146,737   $10,488         $0    $0    $157,225

TOTAL              6241   $166,276   $23,576    $4,387    $0    $194,239

SALES TAX          0.00%         $0
MATL MARKUP        0.00%         $0
LABOR MARKUP       0.00%          $0
EQUIPT MARKUP      0.00%          $0
SUB MARKUP         0.00%          $0

TOTAL BEFORE CONTINGENC $166,276   $23,576    $4,387    $0    $194,239
CONTINGENCY         10.00%          $19,424
BOND                 0.00%          $0
PROFIT              10.00%          $19,424

JOB TOTAL                                     $233,087

```

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1728ECO2
LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	278612.		
B. SIOH	\$	13931.		
C. DESIGN COST	\$	13931.		
D. TOTAL COST (1A+1B+1C)	\$	306474.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$		0.	
F. PUBLIC UTILITY COMPANY REBATE	\$		0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)				\$ 306474.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	91.	\$ 3170.	15.08	\$ 47803.
B. DIST	\$ 19.18	110.	\$ 2110.	18.57	\$ 39179.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		201.	\$ 5280.		\$ 86982.

3. NON ENERGY SAVINGS(+) / COST(-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	14.88		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS(+) / COSTS(-)

ITEM	SAVINGS(+) COST(-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS(+)/ COST(-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS(+)/COST(-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 5280.

5. SIMPLE PAYBACK PERIOD (1G/4) 58.05 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 86982.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = .28
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -3.29 %

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	133.98	3035.71
SPACE COOL	1096.12	0.00
HVAC AUX	1466.37	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1672.31	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	994.36	0.00
	-----	-----
TOTAL	5363.14	3035.71

TOTAL SITE ENERGY	8398.77 MBTU	112.3 KBTU/SQFT-YR GROSS-AREA	112.3 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	19140.97 MBTU	255.8 KBTU/SQFT-YR GROSS-AREA	255.8 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.4
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	123.86	2660.34
SPACE COOL	988.92	0.00
HVAC AUX	1274.28	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1672.29	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	994.36	0.00
	-----	-----
TOTAL	5053.71	2660.34

TOTAL SITE ENERGY	7713.84 MBTU	103.1 KBTU/SQFT-YR GROSS-AREA	103.1 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	17836.02 MBTU	238.4 KBTU/SQFT-YR GROSS-AREA	238.4 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 2.4
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

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=====
Estimate:      BLDG 2-1728      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    75680          City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					600.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		857.40	\$13,550	\$12,383	\$0	\$0	\$25,933
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					10000.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		110.00	\$1,538	\$1,214	\$0	\$0	\$2,752
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					30.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$5,400	\$0	\$5,400
U01 GENL RQMTS		969	\$15,285	\$13,612	\$5,400	\$40	\$34,297

```
=====
Line #      Description
-----
            Manhours  Matl    Labor  Equipment  Sub      Total
=====
```

0206205000 RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
TO 8 C.Y. TRUCK 180.00 C.Y.

Unit values	0.01	0.00	0.12	0.29	0.00	0.41
Totals	1.26	\$0	\$21	\$52	\$0	\$73

0207340240 DEMOLITION EXISTING WINDOWS 6250.00 SF

Unit values	0.04	0.00	0.60	0.14	0.00	0.74
Totals	250.00	\$0	\$3,723	\$904	\$0	\$4,627

U02 SITEWORK 252 \$0 \$3,744 \$956 \$0 \$4,700

13-Jan-95

MeansData for Lotus

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```
=====
Line #      Description
-----
           Manhours  Matl    Labor  Equipment  Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

					20.00 Ea.	
Unit values	0.00	5.03	0.00	0.00	30.00	35.03
Totals	0.00	\$101	\$0	\$0	\$600	\$701

U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701

13-Jan-95

MeansData for Lotus

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=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

0721180830 NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
CEILING, 3-1/2" THK, 23" WIDE, R11 23000.00 S.F.

Unit values	0.01	0.16	0.06	0.00	0.00	0.22
Totals	115.00	\$3,621	\$1,328	\$0	\$0	\$4,949

U07 MOIST PROT	115	\$3,621	\$1,328	\$0	\$0	\$4,949

```
=====
Line #      Description
-----
              Manhours   Matl      Labor   Equipment   Sub      Total
=====
```

0861242500 ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
 ARGON FILLED GLASS W/ HEAT MIRROR 66 6250.00 SF

Unit values	1.00	28.00	2.00	0.00	0.00	30.00
Totals	6250.00	\$175,020	\$12,510	\$0	\$0	\$187,530

U08 DOORS/WNDW	6250	\$175,020	\$12,510	\$0	\$0	\$187,530

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

ESTIMATE TOTAL	7586	\$194,027	\$31,194	\$6,356	\$600	\$232,177
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$194,027	\$31,194	\$6,356	\$600	\$232,177
CONTINGENCY	10.00%					\$23,218
BOND	0.00%					\$0
PROFIT	10.00%					\$23,218
JOB TOTAL						\$278,612

13-Jan-95

MeansData for Lotus

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```

=====
Estimate:      BLDG  2-1728      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:    75680           City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U01 GENL RQMTS	969	\$15,285	\$13,612	\$5,400	\$0	\$34,297
U02 SITEWORK	252	\$0	\$3,744	\$956	\$0	\$4,700
U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701
U07 MOIST PROT	115	\$3,621	\$1,328	\$0	\$0	\$4,949
U08 DOORS/WNDW	6250	\$175,020	\$12,510	\$0	\$0	\$187,530
TOTAL	7586	\$194,027	\$31,194	\$6,356	\$600	\$232,177
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$194,027	\$31,194	\$6,356	\$600	\$232,177
CONTINGENCY	10.00%					\$23,218
BOND	0.00%					\$0
PROFIT	10.00%					\$23,218
JOB TOTAL						\$278,612

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: 1731ECO2
LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: ECO2 BUILDING ENVELOPE MODIFICATIONS

FISCAL YEAR 1995 DISCRETE PORTION NAME:

ANALYSIS DATE: 01-13-95 ECONOMIC LIFE 20 YEARS PREPARED BY: LOFLIN

1. INVESTMENT

A. CONSTRUCTION COST	\$	288092.		
B. SIOH	\$	14405.		
C. DESIGN COST	\$	14405.		
D. TOTAL COST (1A+1B+1C)	\$	316902.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$		0.	
F. PUBLIC UTILITY COMPANY REBATE	\$		0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)				\$ 316902.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	120.	\$ 4184.	15.08	\$ 63087.
B. DIST	\$ 19.18	110.	\$ 2110.	18.57	\$ 39179.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		230.	\$ 6293.		\$ 102266.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)
d. TOTAL	\$ 0.			0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 6293.

5. SIMPLE PAYBACK PERIOD (1G/4) 50.36 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 102266.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) = .32$
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): -2.66 %

ENERGY TYPE IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	40.00	764.80
SPACE COOL	597.47	0.00
HVAC AUX	159.66	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	737.12	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	430.90	0.00
	-----	-----
TOTAL	1965.15	764.80

TOTAL SITE ENERGY	2729.95 MBTU	123.9 KBTU/SQFT-YR GROSS-AREA	123.9 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6666.15 MBTU	302.5 KBTU/SQFT-YR GROSS-AREA	302.5 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 9.7
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE
IN SITE MBTU - ELECTRICITY FUEL-OIL

CATEGORY OF USE

SPACE HEAT	31.12	601.04
SPACE COOL	598.57	0.00
HVAC AUX	399.31	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	569.71	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	312.40	0.00
	-----	-----
TOTAL	1911.12	601.04

TOTAL SITE ENERGY	2512.19 MBTU	109.8 KBTU/SQFT-YR GROSS-AREA	109.8 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6340.23 MBTU	277.0 KBTU/SQFT-YR GROSS-AREA	277.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 8.4
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	32.17	621.20
SPACE COOL	601.67	0.00
HVAC AUX	402.21	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	569.72	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	306.02	0.00
	-----	-----
TOTAL	1911.79	621.20

TOTAL SITE ENERGY	2532.99 MBTU	110.7 KBTU/SQFT-YR GROSS-AREA	110.7 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6362.32 MBTU	278.0 KBTU/SQFT-YR GROSS-AREA	278.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 8.3
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	22.05	425.00
SPACE COOL	547.68	0.00
HVAC AUX	139.04	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	737.11	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	430.90	0.00
	-----	-----
TOTAL	1876.78	425.00

TOTAL SITE ENERGY	2301.80 MBTU	104.4 KBTU/SQFT-YR GROSS-AREA	104.4 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	6061.04 MBTU	275.0 KBTU/SQFT-YR GROSS-AREA	275.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 3.3
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU - ELECTRICITY FUEL-OIL		
CATEGORY OF USE		
SPACE HEAT	17.16	331.36
SPACE COOL	535.07	0.00
HVAC AUX	316.65	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	569.72	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	312.41	0.00
	-----	-----
TOTAL	1750.99	331.36

TOTAL SITE ENERGY	2082.36 MBTU	91.0 KBTU/SQFT-YR GROSS-AREA	91.0 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	5589.63 MBTU	244.2 KBTU/SQFT-YR GROSS-AREA	244.2 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 10.5
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	16.80	324.38
SPACE COOL	534.61	0.00
HVAC AUX	324.57	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	569.71	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	306.02	0.00
	-----	-----
TOTAL	1751.70	324.38

TOTAL SITE ENERGY	2076.10 MBTU	90.7 KBTU/SQFT-YR GROSS-AREA	90.7 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	5584.78 MBTU	244.0 KBTU/SQFT-YR GROSS-AREA	244.0 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 10.4
 PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
 ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

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=====
Estimate:      BLDG 2-1731      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C. Job #:      94013.05
Sq. footage:    73500          City indx:Raleigh, NC
=====

```

Line #	Description	Manhours	Matl	Labor	Equipment	Sub	Total
0152540090	SCAFFOLDING, STEEL TUBULAR; 1 USE/MONTH, NO PLANK, BUILDING EXT 1-5 STORIES					600.00 C.S.F.	
Unit values		1.43	22.58	20.64	0.00	0.00	43.22
Totals		857.40	\$13,550	\$12,383	\$0	\$0	\$25,933
0153060100	WINTER PROT, PLASTIC ON WOOD FRAME TO CLOSE OPENINGS					60.00 S.F.	
Unit values		0.02	0.30	0.25	0.00	0.00	0.55
Totals		1.26	\$18	\$15	\$0	\$0	\$33
0153060200	WINTER PROT, TARP OVER SCAFFOLD, 8 USE, NOT INCL SCAFFOLD					10000.00 S.F.	
Unit values		0.01	0.15	0.12	0.00	0.00	0.28
Totals		110.00	\$1,538	\$1,214	\$0	\$0	\$2,752
0159041350	TEMP STORAGE VANS, TRAILER MOUNTED, 28'X10', RENT PER MONTH					2.00 Ea.	
Unit values		0.00	89.37	0.00	0.00	0.00	89.37
Totals		0.00	\$179	\$0	\$0	\$0	\$179
0164600140	BOOM TRUCK					30.00 DAY	
Unit values		0.00	0.00	0.00	180.00	0.00	180.00
Totals		0.00	\$0	\$0	\$5,400	\$0	\$5,400
U01 GENL RQMTS		969	\$15,285	\$13,612	\$5,400	\$40	\$34,297

```

=====
Line #      Description
-----
            Manhours  Matl    Labor   Equipment   Sub      Total
=====
0206205000  RUBBISH, HAUL BY TRUCK, PER MI OVER 2 MILES, UP
              TO 8 C.Y. TRUCK                      180.00 C.Y.
Unit values      0.01      0.00      0.12      0.29      0.00      0.41
Totals           1.26      $0       $21      $52      $0       $73

0207340240  DEMOLITION EXISTING WINDOWS
                                6500.00 SF
Unit values      0.04      0.00      0.60      0.14      0.00      0.74
Totals          260.00      $0     $3,872     $940      $0     $4,812

U02 SITEWORK      262      $0     $3,893     $992      $0     $4,885

```

13-Jan-95

MeansData for Lotus

Page 3

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=====
Line #      Description
-----
            Manhours  Matl    Labor  Equipment  Sub      Total
=====
```

0611103540 SCAFFOLD PLANKING, 2"X10" X 16' , RENT

					20.00 Ea.	
Unit values	0.00	5.03	0.00	0.00	30.00	35.03
Totals	0.00	\$101	\$0	\$0	\$600	\$701

U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701

```
=====
Line #      Description
-----
              Manhours   Matl      Labor    Equipment   Sub      Total
=====
```

0721180830 NON-RIGID INSULATION, FIBERGLASS, UNFACED, ABOVE DROPPED
CEILING, 3-1/2" THK, 23" WIDE, R11 24000.00 S.F.

Unit values	0.01	0.16	0.06	0.00	0.00	0.22
Totals	120.00	\$3,778	\$1,385	\$0	\$0	\$5,163

U07 MOIST PROT	120	\$3,778	\$1,385	\$0	\$0	\$5,163


```
=====
Line #      Description
-----
            Manhours   Matl     Labor   Equipment   Sub      Total
=====
0861242500  ALUMINUM CLAD, DOUBLE HUNG WINDOWS,W/ HURD LOW-EMISSIVITY,
            ARGON  FILLED GLASS W/ HEAT MIRROR 66  6500.00 SF
Unit values      1.00      28.00      2.00      0.00      0.00      30.00
Totals          6500.00  $182,021  $13,010      $0      $0  $195,031

U08 DOORS/WNDW      6500  $182,021  $13,010      $0      $0  $195,031
```

```
=====
Line #      Description
-----
            Manhours   Matl     Labor   Equipment   Sub     Total
=====
```

ESTIMATE TOTAL	7851	\$201,185	\$31,900	\$6,392	\$600	\$240,077
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$201,185	\$31,900	\$6,392	\$600	\$240,077
CONTINGENCY	10.00%					\$24,008
BOND	0.00%					\$0
PROFIT	10.00%					\$24,008
JOB TOTAL						\$288,092

```

=====
Estimate:      BLDG  2-1731      Date:      03-Jan-95
Description:    COST ESTIMATE, UPGRADE BUILDING ENVELOPE
Project:        LIMITED EEAP(RDBRK Bid Date:
Location:       FORT BRAGG, N.C.  Job #:      94013.05
Sq. footage:    73500           City indx:Raleigh, NC
=====

```

SUMMARY

	Manhours	Matl	Labor	Equipment	Sub	Total
U01 GENL RQMTS	969	\$15,285	\$13,612	\$5,400	\$0	\$34,297
U02 SITEWORK	262	\$0	\$3,893	\$992	\$0	\$4,885
U06 WOOD/PLSTC	0	\$101	\$0	\$0	\$600	\$701
U07 MOIST PROT	120	\$3,778	\$1,385	\$0	\$0	\$5,163
U08 DOORS/WNDW	6500	\$182,021	\$13,010	\$0	\$0	\$195,031
TOTAL	7851	\$201,185	\$31,900	\$6,392	\$600	\$240,077
SALES TAX	0.00%	\$0				
MATL MARKUP	0.00%	\$0				
LABOR MARKUP	0.00%		\$0			
EQUIPT MARKUP	0.00%			\$0		
SUB MARKUP	0.00%				\$0	
TOTAL BEFORE CONTINGENC		\$201,185	\$31,900	\$6,392	\$600	\$240,077
CONTINGENCY	10.00%					\$24,008
BOND	0.00%					\$0
PROFIT	10.00%					\$24,008
JOB TOTAL						\$288,092

**BREAKOUT OF
ECO 2
FOR
BUILDING 2-1127**

BUILDING 2 - 1127
ECO 2A:
INSULATION
ADDITION

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO2A

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 1 ECO2-A BLDG ENVELOPE MOD: INSULATION

FISCAL YEAR 1995 DISCRETE PORTION NAME: BLDG 1127

ANALYSIS DATE: 03-16-95 ECONOMIC LIFE 20 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	4065.		
B. SIOH	\$	203.		
C. DESIGN COST	\$	203.		
D. TOTAL COST (1A+1B+1C)	\$	4471.		
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.		
F. PUBLIC UTILITY COMPANY REBATE	\$	0.		
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		4471.	

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	4.	\$ 140.	15.08	\$ 2108.
B. DIST	\$ 19.18	10.	\$ 192.	18.57	\$ 3562.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		14.	\$ 332.		\$ 5670.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)		\$	0.
(1) DISCOUNT FACTOR (TABLE A)	14.88		
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTOR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)

d. TOTAL	\$	0.		0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4)	\$	0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$	\$	332.

5. SIMPLE PAYBACK PERIOD (1G/4)	13.48 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C)	\$	5670.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) =	1.27
(IF < 1 PROJECT DOES NOT QUALIFY)	

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR):	4.23 %

FT BRAGG ENERGY STUDY
BUILDING 2-1127HISTORIC RED BRICK BUILDING AREA
INSULATIONDOE-2.1C 3/13/1995 15:12:47 PDL RUN 1
ECO-2A

PORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

WEATHER FILE- RALEIGH, NC

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	176.67	3422.56
SPACE COOL	1424.81	0.00
HVAC AUX	1107.12	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1512.83	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	566.01	0.00
	-----	-----
TOTAL	4787.44	3422.56

TOTAL SITE ENERGY	8210.01 MBTU	137.8 KBTU/SQFT-YR GROSS-AREA	137.8 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	17789.87 MBTU	301.5 KBTU/SQFT-YR GROSS-AREA	301.5 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 49.2
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 1.2

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

BUILDING 2 - 1127
ECO 2B:
WINDOW
REPLACEMENT

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO2B

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP) LCCID FY95 (92)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 1 ECO2-B BLDG ENVELOPE MOD: WINDOWS

FISCAL YEAR 1995 DISCRETE PORTION NAME: BLDG 1127

ANALYSIS DATE: 03-16-95 ECONOMIC LIFE 20 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	160972.	
B. SIOH	\$	8049.	
C. DESIGN COST	\$	8049.	
D. TOTAL COST (1A+1B+1C)	\$	177070.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		177070.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH(1)	SAVINGS MWH/YR(2)	ANNUAL \$ SAVINGS(3)	DISCOUNT FACTOR(4)	DISCOUNTED SAVINGS(5)
A. ELECT	\$ 34.95	91.	\$ 3180.	15.08	\$ 47961.
B. DIST	\$ 19.18	286.	\$ 5485.	18.57	\$ 101865.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		377.	\$ 8666.		\$ 149827.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)

d. TOTAL \$ 0. 0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 8666.

5. SIMPLE PAYBACK PERIOD (1G/4) 20.43 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 149827.

7. SAVINGS TO INVESTMENT RATIO (SIR) = $(6 / 1G) =$.85
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 2.14 %

FT BRAGG ENERGY STUDY
BUILDING 2-1127HISTORIC RED BRICK BUILDING AREA
WINDOWSDOE-2.1C 3/13/1995 15:41:09 PDL RUN 1
ECO-2B

PORT- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

WEATHER FILE- RALEIGH, NC

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	150.26	2480.78
SPACE COOL	1203.18	0.00
HVAC AUX	1068.32	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1512.83	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	566.01	0.00
	-----	-----
TOTAL	4500.60	2480.78

TOTAL SITE ENERGY	6981.38 MBTU	123.8 KBTU/SQFT-YR GROSS-AREA	123.8 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	16130.58 MBTU	279.9 KBTU/SQFT-YR GROSS-AREA	279.9 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 49.7

PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.2

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.

BUILDING 2 - 1127
ECO 2C:
WEATHERSTRIP
AND CAULK

LIFE CYCLE COST ANALYSIS SUMMARY

STUDY: ECO2C

LCCID FY95 (92)

ENERGY CONSERVATION INVESTMENT PROGRAM (ECIP)

INSTALLATION & LOCATION: FORT BRAGG REGION NOS. 4 CENSUS: 3

PROJECT NO. & TITLE: 1 ECO2-C BLDG ENV MOD: WTHR STRIP/CAULK

FISCAL YEAR 1995 DISCRETE PORTION NAME: BLDG 1127

ANALYSIS DATE: 03-16-95 ECONOMIC LIFE 20 YEARS PREPARED BY: GREEN

1. INVESTMENT

A. CONSTRUCTION COST	\$	2550.	
B. SIOH	\$	128.	
C. DESIGN COST	\$	128.	
D. TOTAL COST (1A+1B+1C)	\$	2806.	
E. SALVAGE VALUE OF EXISTING EQUIPMENT	\$	0.	
F. PUBLIC UTILITY COMPANY REBATE	\$	0.	
G. TOTAL INVESTMENT (1D - 1E - 1F)	\$		2806.

2. ENERGY SAVINGS (+) / COST (-)

DATE OF NISTIR 85-3273-X USED FOR DISCOUNT FACTORS OCT 1994

FUEL	UNIT COST \$/ MWH (1)	SAVINGS MWH/YR (2)	ANNUAL \$ SAVINGS (3)	DISCOUNT FACTOR (4)	DISCOUNTED SAVINGS (5)
A. ELECT	\$ 34.95	2.	\$ 70.	15.08	\$ 1054.
B. DIST	\$ 19.18	5.	\$ 96.	18.57	\$ 1781.
C. RESID	\$.00	0.	\$ 0.	21.02	\$ 0.
D. NAT G	\$ 13.45	0.	\$ 0.	18.58	\$ 0.
E. COAL	\$.00	0.	\$ 0.	16.83	\$ 0.
F. PPG	\$.00	0.	\$ 0.	17.38	\$ 0.
M. DEMAND SAVINGS			\$ 0.	14.88	\$ 0.
N. TOTAL		7.	\$ 166.		\$ 2835.

3. NON ENERGY SAVINGS (+) / COST (-)

A. ANNUAL RECURRING (+/-)

(1) DISCOUNT FACTOR (TABLE A)	14.88	\$	0.
(2) DISCOUNTED SAVING/COST (3A X 3A1)		\$	0.

B. NON RECURRING SAVINGS (+) / COSTS (-)

ITEM	SAVINGS (+) COST (-) (1)	YR OC (2)	DISCNT FACTOR (3)	DISCOUNTED SAVINGS (+) / COST (-) (4)

d. TOTAL \$ 0. 0.

C. TOTAL NON ENERGY DISCOUNTED SAVINGS (+) / COST (-) (3A2+3Bd4) \$ 0.

4. FIRST YEAR DOLLAR SAVINGS $2N3+3A+(3Bd1/(YRS\ ECONOMIC\ LIFE))$ \$ 166.

5. SIMPLE PAYBACK PERIOD (1G/4) 16.92 YEARS

6. TOTAL NET DISCOUNTED SAVINGS (2N5+3C) \$ 2835.

7. SAVINGS TO INVESTMENT RATIO (SIR) = (6 / 1G) = 1.01
(IF < 1 PROJECT DOES NOT QUALIFY)

8. ADJUSTED INTERNAL RATE OF RETURN (AIRR): 3.05 %

FT BRAGG ENERGY STUDY
BUILDING 2-1127

HISTORIC RED BRICK BUILDING AREA
WEATHERSTRIP AND CAULK
PART- BEPS ESTIMATED BUILDING ENERGY PERFORMANCE

DOE-2.1C 3/13/1995 16:43:15 PDL RUN 1
ECO-2C
WEATHER FILE- RALEIGH, NC

ENERGY TYPE		
IN SITE MBTU -	ELECTRICITY	FUEL-OIL
CATEGORY OF USE		
SPACE HEAT	177.49	3440.13
SPACE COOL	1429.62	0.00
HVAC AUX	1108.21	0.00
DOM HOT WTR	0.00	0.00
AUX SOLAR	0.00	0.00
LIGHTS	1512.83	0.00
VERT TRANS	0.00	0.00
MISC EQUIP	566.01	0.00
	-----	-----
TOTAL	4794.16	3440.13

TOTAL SITE ENERGY	8234.29 MBTU	142.5 KBTU/SQFT-YR GROSS-AREA	142.5 KBTU/SQFT-YR NET-AREA
TOTAL SOURCE ENERGY	17830.49 MBTU	308.3 KBTU/SQFT-YR GROSS-AREA	308.3 KBTU/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = 50.1
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 1.6

NOTE ELECTRICITY AND/OR FUEL USED TO GENERATE ELECTRICITY IS APPORTIONED BASED
ON THE YEARLY DEMAND. ALL OTHER ENERGY TYPES ARE APPORTIONED HOURLY.



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