BUILDING DESIGN AND ENERGY CONSUMPTION OF A SELECTED GROUP OF EARTH SHELTERED HOUSES IN AN EIGHT STATE AREA

By

LANNY MAURICE SEALS

Bachelor of Architectural Studies

Oklahoma State University

Stillwater, Oklahoma

1981

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF ARCHITECTURAL ENGINEERING
December, 1983

BUILDING DESIGN AND ENERGY CONSUMPTION OF A SELECTED GROUP OF EARTH SHELTERED HOUSES IN AN EIGHT STATE AREA

Thesis Approved:

Thesis Adviser

Dean of Graduate College

PREFACE

Energy consumption for a selected group of earth sheltered houses in the south central United States was studied and compared to typical above ground houses in the same area. A Building Design Index was developed to assist designers and potential earth sheltered housing owners in the design of earth sheltered houses, with specific reference to energy consumption.

Earth sheltered homes investigated consumed less overall energy than did typical above ground home studied. The Building Design Index could not be sufficiently validated in this study; however, as a proposed tool it has significant potential.

I wish to express my sincere gratitude to all of the people who assisted me in this work at Oklahoma State University, especially my principal adviser, Dr. Lester Boyer, and one of my committee members and instructor, Prof. Walter Grondzik. Their contributions to this paper were most appreciated, as was their guidance and diligence. I am also thankful to my other committee member, Dr. Jerald Parker, for his contributions and patience.

The determination and motivation required to complete this thesis came in part from friendly competition. To Joe Hackney I owe a special thanks for his friendship, and for

the opportunity to work side-by-side with someone experiencing the same joys and difficulties encountered in the preparation of this thesis.

To Barbara Thompson of Tri-County Tech in Bartlesville, Oklahoma, I am deeply grateful for her patience and assistance in the presentation of this paper in legible form.

Lastly, I owe immeasurable gratitude to my mother and father, and to my brothers, Marc and Patrick, for their encouragement, moral support, and understanding.

TABLE OF CONTENTS

Chapter		Page
I.	INTRODUCTION	1
	Background	1
	U.S. Residential Energy Consumption	1
	Earth Sheltering as a Solution	2
	Increase in Interest	2
	Purpose of the Study	5
	Information Needed	5
	Goals and Objectives	5
	Limitations of Study	6
	Data Sources	8
	Survey	8
	Utility Companies	9
	Regional Division by Climate	9
	Climatic Regions	9
	Regional Divisions	10
II.	BUILDING DESIGN INDEX	15
	Definition	15
	Previous Work	16
	Building Design Index vs. Plan Design Index: A Comparison	17
	Thermal Mass Factor	19
	Thermal Wick Factor	24
	Effective Resistance	26
	Earth Contact Factors	27
	Ventilation Potential Factor	28
	Solar Gain Control Factor	29
	Solar Gain Potential Factor and Solar Access Factor	31
	Calculations of Building Design Index	34
	Building Design Index Example Calculation	36
III.	ENERGY CONSUMPTION ANALYSIS PROCEDURE	41
	Basis for Analysis	41
	Division of Analysis Process	42
	Data Input	44
	Monthly Values	44

Chapter Page

Average Monthly Values 45
Regional Values 46
Space Conditioning: Baseline Consumption 48
Heating Season 50
Cooling Season 51
Regional Space Conditioning Values . . . 52
Owner Estimated Consumption 52

IV. ENERGY CONSUMPTION ANALYSIS AND RESULTS . . . 58

Earth Shelter Energy Consumption 58
Space Conditioning Consumption 60
Earth Sheltered vs. Above Ground Homes 62

V. BUILDING DESIGN INDEX ANALYSIS AND RESULTS . . 66

Building Design Index 66
Building Design Index vs. Energy Consumption 66
Energy Consumption vs. Climate 78

VI. CONCLUSIONS AND RECOMMENDATIONS 85

Conclusions 85
Recommendations 86

BIBLIOGRAPHY 88

APPENDIXES 91

APPENDIX A - NINE-STATE EARTH SHELTERED HOUSING SURVEY 93

APPENDIX B - BUILDING DESIGN INDEX INPUT FORM 111

APPENDIX C - ENERGY ANALYSIS COMPUTER PROGRAM 113

APPENDIX D - BUILDING DESIGN INDEX - EXAMPLE CALCULATION FORM 146

APPENDIX E - EARTH SHELTERED HOUSING ENERGY CONSUMPTION 148

APPENDIX F - REGIONAL EARTH SHELTERED HOUSING ENERGY CONSUMPTION 206

APPENDIX G - BUILDING DESIGN INDEX VALUES 211

LIST OF TABLES

Table		Page
I.	Regional Division by Climate	12
II.	Regional Division of Earth Sheltered Homes	12
III.	Selected Soil Types, Densities, and Conductivities	20
IV.	Selected Insulation Types, Densities, and R-values	21
V.	Selected Wall and Roof Assemblies, Densities, and R-values	22
VI.	Building Design Index Components	34
VII.	Heating and Cooling Season Space Conditioning Energy Consumption	60
VIII.	Regional Building Design Indices	67
IX.	Pearson Correlation Coefficients for Figures 19 - 30	76

LIST OF FIGURES

Figure		Page
1.	Location of U.S. Earth Shelters, 1982	4
2.	Thermal Wick	25
3.	Ventilation Potential Factor	29
4.	Solar Gain Control Factor	30
5.	Solar Gain Potential Factor	33
6.	Solar Access Factor	33
7.	Individual Dwelling Calculation Flow Chart	43
8.	Individual Monthly Average Energy Consumption Process	47
9.	Regional Calculations Flow Chart	49
10.	Estimated Contribution to Space Conditioning Needs from Selected Earth Sheltered Housing Owners	54
11.	Average Total Monthly Energy Consumption Curves.	59
12.	Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption - Northern Region	64
13.	Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption - Southern Region	64
14.	Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption - Study Area	65
15.	Building Design Index and Utility-Based Heating Consumption Scatter Plot	68
16.	Building Design Index and Utility-Based Cooling Consumption Scatter Plot	68
17.	Building Design Index and Owner Estimated Heating Consumption Scatter Plot	69

Figure Page

18. Building Design Index and Owner Estimated Cooling Consumption Scatter Plot 69

19. Building Design Index and Utility-Based Heating Consumption Scatter Plot - Northern Region 70

20. Building Design Index and Utility-Based Heating Consumption Scatter Plot - Central Region 70

21. Building Design Index and Utility-Based Heating Consumption Scatter Plot - Southern Region 71

22. Building Design Index and Utility-Based Cooling Consumption Scatter Plot - Northern Region 71

23. Building Design Index and Utility-Based Cooling Consumption Scatter Plot - Central Region 72

24. Building Design Index and Utility-Based Cooling Consumption Scatter Plot - Southern Region 72

25. Building Design Index and Estimated Heating Consumption Scatter Plot - Northern Region 73

26. Building Design Index and Estimated Heating Consumption Scatter Plot - Central Region 73

27. Building Design Index and Estimated Heating Consumption Scatter Plot - Southern Region 74

28. Building Design Index and Estimated Cooling Consumption Scatter Plot - Northern Region 74

29. Building Design Index and Estimated Cooling Consumption Scatter Plot - Central Region 75

30. Building Design Index and Estimated Cooling Consumption Scatter Plot - Southern Region 75

31. Space Heating Consumption and Heating Degree Days - Northern Region 80

32. Space Heating Consumption and Heating Degree Days - Central Region 80

33. Space Heating Consumption and Heating Degree Days - Southern Region 81

34. Space Heating Consumption and Cooling Degree Days - Northern Region 81

Figure Page

35. Space Heating Consumption and Cooling Degree Days - Central Region 82

36. Space Heating Consumption and Cooling Degree Days - Southern Region 82

NOMENCLATURE

BDI	Building Design Index
BDIc	Building Design Index, cooling season
BDIh	Building Design Index, heating season
Btu	British thermal unit
C	Ceiling thermal factor
CDD	Cooling degree day
COP	Coefficient of performance
d	Depth of soil
E	Earth cooling potential factor
Ec	Earth contact factor, cooling season
Eh	Earth contact factor, heating season
Er	Effective resistance
F	Front or exposed wall modification factor
°F	Degree Fahrenheit
ft	Feet
h	Hour
HDD	Heating degree day
in	Inch
k	Soil thermal conductivity
kWh	Kilowatt-hour
PDI	Plan Design Index
R	Pearson Correlation Coefficient
Reff	Effective thermal resistance of soil

S	Solar gain control factor
SAF	Solar access factor
SGF	Solar gain potential factor
TMF	Thermal mass factor
TWF	Thermal wick factor
V	Ventilation potential factor
W	Wall thermal factor

CONVERSION FACTORS

To Convert From	To	Multiply By
Btu	J	1.055 E + 03
$Btu.in/h.ft^2.F$	W/m.K	1.135 E + 04
°F	°C	T°C=(t°F-32)/1.8
foot	m	2.540 E-01
ft^2	m^2	9.290 E-02
inch	m	2.540 E-02
kWh	J	3.600 E+06
lb/ft^3	kg/m^3	1.601 E+01
pound	kg	4.535 E-01

CHAPTER I

INTRODUCTION

Background

U.S. Residential Energy Consumption

Homeowners and expectant homeowners in the United States today are faced with constantly increasing constraints in home building, especially with regard to first costs and operational costs. To combat these often despairing conditions, the populace is armed with more information and knowledge of the energy situation than at any previous time. The increase in knowledge began in 1973 with the 'energy crisis', when consumers were confronted with long lines to the gas pump and a shortage of home heating fuel. When faced with this situation, consumers responded with an increased interest in fuel-efficient automobiles and alternate sources of energy.

As the crisis continued, increased awareness of other conservation techniques began to emerge. One important area of concern was energy conservation in the home. When confronted with the facts of residential energy consumption, it is clear that the concern for conservation in this area is justified. Space heating and cooling needs account

for almost 25 percent of the total U.S. energy consumption.[1] Space heating and cooling account for 70 percent of the energy consumed in the residential sector alone. Considering that 40 percent of the buildings in use in 1985 will have been constructed between 1975 and 1985, and that a large number of these will be residential, it is clear that a significant increase in overall energy conservation can be made by reducing energy consumption in new residential buildings.[2]

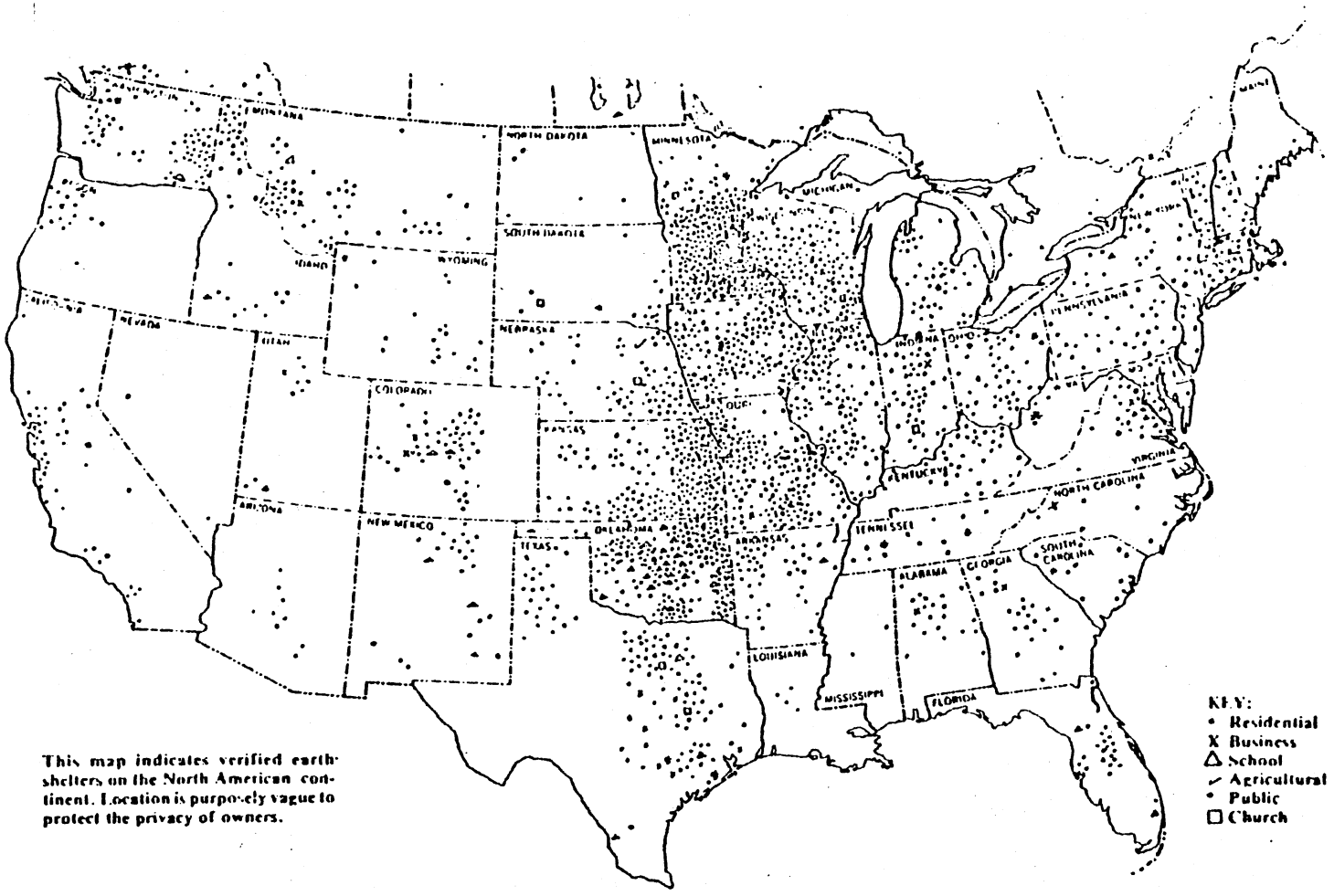
Earth Sheltering as a Solution

Earth sheltering is a design solution which responds to the need for reduced energy consumption for residential space heating and cooling. Earth shelters reduce infiltration loads, heat loss and heat gain, if properly designed. Many papers have been written describing the thermal characteristics of underground buildings.[3-10] The main thermal benefit of earth sheltering is that of moderating temperature swings. The temperature of the soil surrounding an underground building does fluctuate, but not as drastically as does the atmospheric temperature. Significant energy savings can be realized due to reduced demands for space heating and cooling.

Increase in Interest

Increasing numbers of people are attracted to earth sheltering by the prospect of reduced operating costs. In

1976 there were probably fewer than 50 earth sheltered structures in the U.S.,[11] with the number increasing to approximately 6,000 by 1982,[12] as indicated in Figure 1. The greatest proliferation of earth sheltered structures in the U.S. is in an area extending from Oklahoma to Minnesota. In conjunction with this growth, studies have been conducted concerning habitability and performance of earth sheltered housing in this region.[13-14] In addition, a number of papers specifically dealing with earth sheltered housing in Oklahoma are available.[15-18] To supplement this basic work, more detailed information is currently needed to adequately define the actual energy performance of this type of construction. Considering the wealth of material available on earth sheltering, very little of this information pertains to actual, measured performance of individual earth sheltered dwellings. Many of the references cited in this thesis present design strategies or concepts concerning earth sheltered dwellings which are purported to reduce the energy consumption in these dwellings. Actual measurement of the energy use in earth sheltered houses is the best method of determining whether or not the concepts and strategies actually reduce energy consumption. Therefore, information which describes the actual energy performance of earth sheltered dwellings would be of benefit to both designers and potential owners of earth sheltered dwellings.



Source: 14

Figure 1. Locations of U.S. Earth Shelters, 1982

Purpose of the Study

Information Needed

As mentioned in the introduction, numerous published accounts discuss the thermal characteristics of earth sheltered structures. In addition, considerable research is being conducted to develop methods of simulating earth sheltered environments, by which the thermal behavior of an underground design may be predicted. But as Sterling notes in his evaluation of current research being conducted in the U.S.,[19] there is a need for "the documentation of energy requirements to properly assess the option" of earth sheltered housing.

The purpose of the present study is to collect and assess information pertaining to the actual energy consumption characteristics and building design characteristics of earth sheltered dwellings in various climates. The study is concerned with earth sheltered housing in an eight-state region, from Texas to Iowa, which is coincident (with the exception of Minnesota) to the area of the U.S. with the largest concentration of earth sheltered dwellings. A Building Design Index is developed, which determines the appropriateness of an earth sheltered building's design, given the climatic region.

Goals and Objectives

The secondary goal of this study is the development of

a Building Design Index for earth sheltered houses. The primary goal is to determine the energy performance of a selected group of earth sheltered dwellings. Energy consumption data will be used to validate the Building Design Index by comparing the energy consumption of a particular earth sheltered house to the Building Design Index of the same house. In addition, the earth sheltered housing energy consumption information will be compared to energy consumption of selected above ground houses in the same region. To achieve these goals, the following specific objectives have been established.

1. Obtain energy consumption information pertaining to selected earth sheltered homes, and selected above ground homes.

2. Compare energy performance of earth sheltered housing to energy performance of above ground homes and to climatic conditions.

3. Calculate a proposed Building Design Index for each selected earth sheltered house and correlate with actual energy performance.

Limitations of Study

The accuracy of the findings in this study is limited by the amount and quality of available information

concerning both above ground and earth sheltered dwellings. Locating a sufficient number of earth sheltered houses was a problem encountered early in the study. Obtaining information from owners and occupants through the use of interviews and questionnaires proved quite successful. However, many of the earth sheltered housing occupants were reluctant to provide information pertaining to metered utility consumption.

Of the 162 earth sheltered housing owners providing information pertaining to building design and occupant lifestyle, only 57 agreed to supply information concerning utility consumption. Of the two earth sheltered housing owners surveyed in New Mexico, neither agreed to include information pertaining to utility consumption. Therefore, New Mexico data are not included in the study. The states for which data are available include Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, Oklahoma, and Texas.

To determine the usage of alternate forms of energy in earth sheltered dwellings, information was supplied by the occupant; this information and the resulting estimates of energy consumption from these sources are of limited accuracy. For example, the contribution of passive solar systems to space heating is based only on rough estimates from the owners. The accuracy of the information pertaining to energy consumption in above ground dwellings is limited by a lack of detailed information such as accurate floor areas and alternate heating systems. In addition,

utility companies in general were unwilling to provide energy consumption data for "typical" above ground homes.

Another limitation to the accuracy of the findings in this thesis is the ability to determine the lifestyle of the earth sheltered housing occupants, and to utilize this information to determine the internal loads for use in the energy consumption analysis.

Data Sources

Survey

The information in this thesis concerning building types, construction, alternate sources of energy, and lifestyles of earth shelter occupants was compiled from responses of earth sheltered housing owners to two questionnaires which were administered by the Center for Natural Energy Design, in the College of Engineering at Oklahoma State University.[20] The first questionnaire was sent to known earth sheltered housing owners in Oklahoma, and the second was sent to earth sheltered housing owners in an eight-state area, which included Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, New Mexico, and Texas. The questionnaires were similar in content and were largely concerned with the energy performance and habitability aspects of occupied earth sheltered dwellings. Approximately 170 owners responded to these questionnaires. An example of the eight-state questionnaire is included in Appendix A.

Utility Companies

As a part of the above mentioned questionnaires, occupants were asked to complete a release form to utility companies which serve their home. By signing this release form, the occupant granted the Center for Natural Energy Design access to energy consumption data gathered by the utility companies which service the house. The Center for Natural Energy Design used these forms to obtain information concerning utility billings for a two-year period. More recent efforts have expanded this period of availability to four years. Of the 170 earth sheltered housing owners who responded to the questionnaire, 57 consented to the release of utility information. The majority of the homes were all-electric, and as a result, electrical consumption on a monthly basis was the normal method of billing by the utilities. From this information, and that furnished by the owners pertaining to house size and alternate forms of energy use, various normalizations could be made to determine a record of energy consumption in earth sheltered housing which is consistent for all houses within the study group.

Regional Division by Climate

Climatic Regions

This thesis is concerned with the energy performance of a selected group of earth sheltered houses and, as a

result, is concerned with the temperature-related climatic conditions under which these houses perform. A readily available value which describes these climatic conditions for an area is called the degree day. Heating degree days is an indication of the temperature during a specific period of time, as is cooling degree days. The National Oceanic and Atmospheric Administration (N.O.A.A.) has weather recording stations located throughout the U.S. which record heating and cooling degree days.[21] Each of the earth sheltered houses studied in this thesis was within 30 to 100 miles of a station recording heating and cooling degree days. Observed values for degree days are listed in climatological data sources compiled by N.O.A.A. on a monthly and yearly basis, and yearly averages are also listed.

Regional Divisions

By averaging the yearly heating and cooling degree day values for the earth sheltered homes in each state, "average" yearly heating and cooling degree day values for each state can be determined. While these values do not actually represent the average for the entire state, this method is sufficient for state groupings in this study. If these yearly average heating and cooling degree day values for the eight states under consideration in this thesis are ranked in order of warmest climate to coldest climate, as shown in Table I, then a grouping of states into three

climatological regions seems appropriate. As indicated in Table II, the division of the eight states into northern, central, and southern regions provides for approximately the same sample size in each region. This grouping of states into regions better represents the sample group than does state-by-state grouping, due to the small sample size for several of the states.

TABLE I

REGIONAL DIVISION BY CLIMATE

State	COOLING DEGREE DAYS (Base 65° F)	State	HEATING DEGREE DAYS (Base 65° F)
Texas	2727	Texas	2057
Arkansas	1973	Arkansas	3259
Oklahoma	1912	Oklahoma	3687
Missouri	1349	Missouri	5039
Kansas	1334	Kansas	5343
Nebraska	894	Colorado	6419
Iowa	827	Nebraska	6635
Colorado	659	Iowa	6900

TABLE II

REGIONAL DIVISION OF EARTH SHELTERED HOUSES

Region	State	Sample Houses/State	Sample Houses/Region
Southern	Texas	3	20
	Arkansas	2	
	Oklahoma	15	
Central	Missouri	6	17
	Kansas	11	
Northern	Colorado	2	20
	Nebraska	6	
	Iowa	12	

END NOTES

[1]Bligh, T. "Energy Conservation by Building Underground." Underground Space, Vol. 1, No. 1, pp 19-33.

[2]Fairhurst, C. "Energy, Conservation, and the Underground." Underground Space, Vol. 1, No. 2, pp iii-v.

[3]Bircher, T. "Thermal Performance of Earth Covered Buildings in Hot, Arid Regions." Proc. 5th National Passive Solar Conf., Amherst, AS/ISES, Oct 1980, pp 332-336.

[4]Bligh, T. "A Comparison of Energy Consumption in Earth-Covered vs. Non-Earth-Covered Buildings." Proc. Alternatives in Energy Conservation, F. Moreland (ed.), Arlington, TX, July 1975, pp 85-105.

[5]Davies, G. "Thermal Analysis of Earth Covered Buildings." Proc. 4th National Passive Solar Conf., Kansas City, AS/ISES, Oct 1979, pp 744-748.

[6]Meixel, G. "Energy Use of Non-Residential Earth Sheltered Buildings in Five Different Climates." Proc. Underground Space Conference and Exposition, Kansas City: Pergamon, June 1981, pp 227-257.

[7]Newman, J. "Seasonal Variation in Heat Transfer through Earth Embanked Walls." Proc. 4th National Passive Solar Conf., Kansas City, AS/ISES, Oct 1979, pp 739-743.

[8]Shipp, P. "Analysis and Measurement of the Thermal Behavior of the Walls and Surrounding Soil for a Large Underground Building." Underground Space, Vol. 5, No. 2, pp 121-125.

[9]Shipp, P., E. Pfender, and T. Bligh. "Thermal Characteristics of a Large Earth Sheltered Building (Parts I and II)." Underground Space, Vol. 6, No. 1, 1981, pp 53-64.

[10]Speltz, J., and P. Haves. "The Thermal Benefits and Cost Effectiveness of Earth Berming." Proc. 5th National Passive Solar Conf., Amherst, AS/ISES, Oct 1980, pp 337-341.

[11]Sterling, R. "Current Research Into the Effectiveness and Acceptability of Earth Sheltered Buildings as a Passive Energy Conservation Technique." Proc. 4th National Passive Solar Conf., Kansas City, AS/ISES, Oct 1979, pp 425-428.

[12]Rawlings, R. "Why Build Below?" New Shelter, Vol.III, No. 1, Jan 1982, pp 18-22.

[13]Boyer, L. "Earth Sheltered Structures." Annual Review of Energy. J. Hollander (ed.), Palo Alto, CA: Annual Reviews, Inc., Vol. 7, 1982, pp 201-219.

[14]Grondzik, W., L. Boyer, and J. Zang. "Analysis of Utility Billings for 55 Earth Sheltered Projects. "Proc. Earth Shelter Performance and Evaluation Conf., L. Boyer (ed.), Stillwater, OK: Oklahoma State University, Oct 1981, pp 177-184.

[15]Boyer, L., W. Grondzik, and T. Bice. "Energy Usage in Earth-Covered Dwellings in Oklahoma." Underground Space, Vol. 5, No. 4, pp 227-236.

[16]Boyer, L., W. Grondzik, and M. Weber. "Passive Energy Design and Habitability Aspects of Earth Sheltered Housing in Oklahoma." Underground Space, Vol. 4, No. 6, pp 333-339.

[17]Grondzik, W., and L. Boyer. "Oklahoma Earth Shelters: A State-of-the-Art Review." Collected Papers Presented at Earth Sheltered Housing Conference and Exhibition, Minneapolis, April 1980, pp 43-54.

[18]Weber, M., L. Boyer, and W. Grondzik. "Implications for Habitability Design and Energy Savings in Earth Sheltered Housing." Proc. Earth Sheltered Building Design Innovations Conf., L. Boyer (ed.), Stillwater, OK: Oklahoma State University, April 1980, pp VI-21-27.

[19]Sterling, p 425.

[20]"Nine-State Earth Sheltered Housing Survey-Detailed Questionnaire for Earth Sheltered Housing Owners." (Survey conducted by Center for Natural Energy Design, College of Engineering, Oklahoma State University, Stillwater, Oklahoma, 1979.)

[21]Climatological Data; National Summaries, National Climatic Center, Environmental Data and Information Service, National Oceanic and Atmospheric Administration, Asheville, NC, 1976-1983.

CHAPTER II

BUILDING DESIGN INDEX

Definition

The secondary goal of this thesis is the development of an index utilizing a numerical rating system which will indicate the appropriateness of an earth sheltered house design from an energy standpoint. This design rating system will have a two-fold purpose. The first purpose is to permit the comparison of the rating of the house with its respective energy consumption. Since the development of this rating system is based upon accepted design criteria, the energy consumption of the house should directly reflect the rating of the house. In this way, design criteria can be tested and validated.

The second purpose of this rating system is to permit the comparison of regional ratings to determine if there is any significant difference in earth sheltered housing design between the three regions in this study. The rating system for earth sheltered houses which is presented in this thesis is the Building Design Index, which is composed of the following factors: thermal mass factor, thermal wick factor, total effective resistance, earth contact factor, ventilation potential factor, solar gain control factor,

solar gain potential factor, and solar access factor. Each of these factors will be discussed separately.

Previous Work

Much of the work presented in this chapter is based upon the concepts developed in the Plan Design Index, which is the result of an investigation by Boyer and associates at Oklahoma State University.[1] The Plan Design Index is a proposed method for determining the effective cooling potential of an earth sheltered house, and uses as its data base the earth sheltered housing survey conducted by Oklahoma State University.[2] The Plan Design Index has a range of values from zero to one, with a value of one indicating an excellent earth sheltered house design with respect to cooling potential. The Plan Design Index, its parameters, and weighting factors are based on both an evaluation of the existing survey data and on available "classical" quantitative assessments derived from technical literature. The Building Design Index is a tentative attempt to expand and improve several aspects of the Plan Design Index. All parameters and weighting factors developed in the Plan Design Index and utilized in the Building Design Index will be used without change, except in those cases in which the development of the Building Design Index expands or alters portions of the Plan Design Index.

Building Design Index vs Plan Design Index: A Comparison

The Plan Design Index is composed of several factors, some of which are used directly in the Building Design Index. Other factors have been altered or expanded for use in the Building Design Index. The factors utilized in the Building Design Index are listed at the beginning of this chapter. The following are factors utilized in the calculation of the Plan Design Index: wall thermal factor, ceiling thermal factor, front or exposed wall modification, earth cooling potential factor, ventilation potential factor, and solar gain potential factor.

The wall and ceiling thermal factors of the Plan Design Index are based upon the amount and placement of insulation in an earth sheltered house, as well as interior finish treatments. It is assumed that substantial earth cover exists on the roof of the dwelling, and that moderate watering of this earth cover occurs. The thermal mass factor and the total effective resistance of the Building Design Index are closely related to the wall and ceiling thermal factors of the Plan Design Index, and in fact utilize the same weighting factors in the final index calculation. The thermal mass factor is a function of the mass of the earth in contact with the building (the limits of this statement are explained in the following section), the mass of the structural components of the building, and the mass of the insulation utilized in the building design, even

though the insulation mass may appear insignificant. The total effective resistance is a function of the resistance to heat flow of the soil in contact with the building, and the thermal resistance of the insulation used.

In the Plan Design Index, the front or exposed wall modification factor indicates whether or not the exposed wall of an earth sheltered house under consideration is insulated. In the Building Design Index, the composition of an exposed wall, including its insulative properties, is included in the calculation of the thermal mass factor and the total effective resistance of the dwelling. The thermal wick factor affects the Building Design Index in a manner similar to that in which the exposed wall modification factor affects the Plan Design Index; that being to reduce the insulative effectiveness of the dwelling due to heat loss and/or heat gain from thermal wicks.

The earth cooling potential factor of the Plan Design Index indicates the amount of earth in contact with an earth sheltered house, based upon the floor area of the house, the number of walls in contact with the earth, and the plan configuration of the house. The earth contact factor of the Building Design Index is similar in concept to the earth cooling potential factor, except the earth contact factor is based upon the surface area of the house in direct contact with the earth. The amount of surface area directly in contact with the earth is dependent upon the placement of insulation.

The ventilation potential factor and the solar gain control factor of the Plan Design Index are both utilized, without change, in the Building Design Index. Both of these factors, as well as the entire Plan Design Index, are used to determine the effective cooling potential of an earth sheltered house. In the development of the Building Design Index, the process of determining an index value is expanded to include the calculation of a second index value. This value is designed to rate an earth sheltered house according to its effective heating potential during the heating season. The process of determining the heating season index is the same as the process for the cooling season, except that the ventilation potential factor and the solar gain control factor are replaced with the solar gain potential factor and the solar access factor. Based upon these two processes, there are actually two indices calculated: the Building Design Index for the cooling season, (BDIc), and the Building Design Index for the heating season, (BDIh).

Thermal Mass Factor

A significant advantage earth sheltered houses have over conventional above ground homes is the increased mass of the dwelling due to the earth contact. This mass serves two purposes: it reduces the effect of the exterior ambient temperature on earth contact walls and roofs, and in a majority of locations it acts as a heat sink to remove

heat from the dwelling. The mass of the earth in contact with an earth sheltered dwelling is calculated by multiplying the density of the earth by the volume of the earth in contact with the structure. In the case of earth contact walls, the thickness used to calculate the mass is six feet.[3] For roofs with earth cover, the actual depth of cover is used. If no acknowledged depth of covering was given, a depth of two feet was assumed, this value being the average of the known depths from this study. Values of density and thermal conductivity for selected types of soils are given in Table III.

TABLE III

SELECTED SOIL TYPES, DENSITIES, AND CONDUCTIVITIES

Type	Density (lb/ft^3)	Conductivity ($Btu.in/h.ft^2.F$)
Wet sand	123	12.0
Silty clay	100	9.1
Organic soil	35	8.4
Clay	120	7.2
Sandy clay	108	6.0
Wet, marshy soil	82	6.0
Dry sand	97	1.2

Source: 4, 21

TABLE IV

SELECTED INSULATION TYPES, DENSITIES, AND R-VALUES

Type		Density (lb/ft^3)	R-value (ft^2F h/Btu)
2"	Fiberglass Batt	1.15	7
4"	Fiberglass Batt	1.15	11
6"	Fiberglass Batt	1.15	19
8"	Fiberglass Batt	1.15	22
10"	Fiberglass Batt	1.15	30
12"	Blown Fiberglass	1.3	30
1/2"	Beadboard	2.0	3
3/4"	Beadboard	2.0	4
1"	Beadboard	2.0	5
1 1/2"	Beadboard	2.0	8
1 3/4"	Beadboard	2.0	9
2"	Beadboard	2.0	11
4"	Beadboard	2.0	22
1"	Polyurethane Film	2.5	6
3"	Polyurethane Film	2.5	19
1 1/2"	Coated Fiberboard	17.0	4
3/4"	Foamboard	2.15	6
1 1/2"	Foamboard	2.15	13
2"	Foamboard	2.15	17
1"	Urethane Film	2.0	6
1 1/2"	Urethane Film	2.0	9
2"	Urethane Film	2.0	12
2"	Straw	2.0	6
6"	Rock Wool	16.0	21
12"	Rock Wool	16.0	41
1"	Polystyrene	2.7	5
3"	Polystyrene	2.7	15
6"	Polystyrene	2.7	30
6"	Blown Paper	2.75	2
12"	Blown Paper	2.75	3
10"	Cellulose	2.75	3
12"	Cellulose	2.75	3

Source: 3, 4

TABLE V

SELECTED WALL AND ROOF ASSEMBLIES, DENSITIES, AND R-VALUES

Type	Density (lb/ft^3)	R-Value (ft^2 F h/Btu)
Wall assemblies:		
Concrete block, filled	97.0	3.0
Wood frame, wood siding	6.0	7.2
Wood frame, brick veneer	36.9	6.7
Roof assemblies:		
Steel joist, conc. deck	39.5	4.7
Wood joist, wood shingles	5.7	7.8
Wood joist, asphalt sh.	7.3	7.3

Source: 3

The second component of the thermal mass factor is a function of the insulation used in the composition of the walls and the roof of the dwelling. The mass of the insulation is calculated in the same manner as the mass of the earth. Insulation is indicated in terms of type and thickness, and these values, as well as insulation densities are listed in Table IV.

The third component of the thermal mass factor is a function of the structural design of the walls and roof, of the dwelling, excluding insulation. The mass of these components is dependent upon the type of materials utilized. For walls, selected types of wall assemblies and their corresponding densities are listed in Table V. Roof assemblies are also listed in Table V. All wall and roof assemblies listed have assumed thicknesses, based on owners' descriptions, with the exception of those composed of concrete. In the case of concrete, thicknesses are given by the occupants, and the mass is calculated using this thickness.

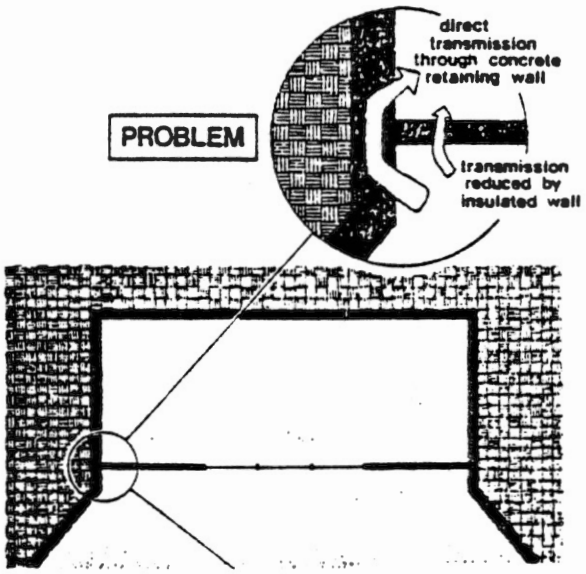
The mass of the structure can have a significant effect upon the space conditioning performance of the house. If the walls, as structural components, are massive, they will tend to store heat and then release this heat to the earth or re-radiate the heat into the conditioned space, depending upon exterior insulation design. If the insulation is on the interior side of the walls, then heat is deterred from entering the walls from the

occupied space, and is likewise deterred from re-radiating back into the conditioned space.[4] Therefore, if the insulation is located on the interior side of the structural component, the thermal mass of this component is not included in the calculation of the overall thermal mass factor. The values of thermal mass for each wall and the roof are calculated, and these values are summed to determine the overall thermal mass of the building. This overall thermal mass value is then divided by the total interior surface area of the dwelling, excluding partitions, to determine the thermal mass factor. The floor area is excluded from the calculation of the thermal mass factor and the total effective resistance due to the fact that all of the earth sheltered houses under investigation have identical floor constructions. Therefore, the inclusion of the floor system in the index would not alter the ratings of the investigated earth sheltered houses relative to each other.

Thermal Wick Factor

A design detail which affects the energy performance of earth sheltered houses is the treatment of thermal wicks or thermal 'nosebleeds'. These occur in exposed walls, parapets, and roof openings which are not insulated by a thermal break from earth contact walls and roof, as illustrated in Figure 2. Heat which is gained or lost through these wicks is assumed to be approximately 5 percent of the

energy required for space conditioning in the building. This is a tentative assumption used in this study, and is based upon the judgment of the investigator, as no information is currently available which accurately quantifies this phenomenon. The assumed value is an average for both heating and cooling seasons, recognizing the fact that the heating season value should be larger than the cooling season value, due to the larger temperature difference in the heating season. If an earth sheltered housing owner indicates that thermal wicks are not treated, then the thermal mass factor and the total effective resistance for that house are reduced by 5 percent, which will likewise reduce the overall Building Design Indices.



Source: 11

Figure 2. Thermal Wick

Effective Resistance

Thermal resistance has the same basic role in earth sheltered houses as it does in above ground homes: that being to retard heat flow. The total effective resistance is the combination of the resistances of the building components, including: soil, insulation, and structure. The effective resistance of the soil in contact with the building is determined by utilizing the effective soil resistance equation from Blick:[5]

$$R_{eff} = \frac{d}{k}$$

where d is the depth of the soil and k is the thermal conductivity of the soil. Soil types and their corresponding thermal conductivities are listed in Table III. As in the determination of thermal mass, the effective thickness of the soil against earth contact walls is assumed to be 6 feet, with roof thicknesses assumed to be 2 feet, if not given.

The resistances of the insulation components utilized in the earth sheltered dwellings under investigation in this study are listed in Table IV. The resistances of the structural components are dependent, as in the thermal mass situation, upon the type of construction assembly. Values of resistance of selected wall and roof assemblies are indicated in Table V. As in the thermal mass calculation, concrete wall and roof assemblies are dependent upon the

actual reported thickness of concrete, whereas the other assemblies have assumed typical thicknesses.

Earth Contact Factors

The earth contact factor is a component of the Building Design Index which is an indication of the amount of surface area of a building having direct earth contact and of insulation placement on exterior walls. In developing the earth contact factor, it was discovered that there are two principles concerning the placement of exterior insulation. The first principle is concerned with heat loss during the heating season, and recommends insulation over the full height of the earth contact walls to decrease the amount of heat loss from the conditioned space.[6]

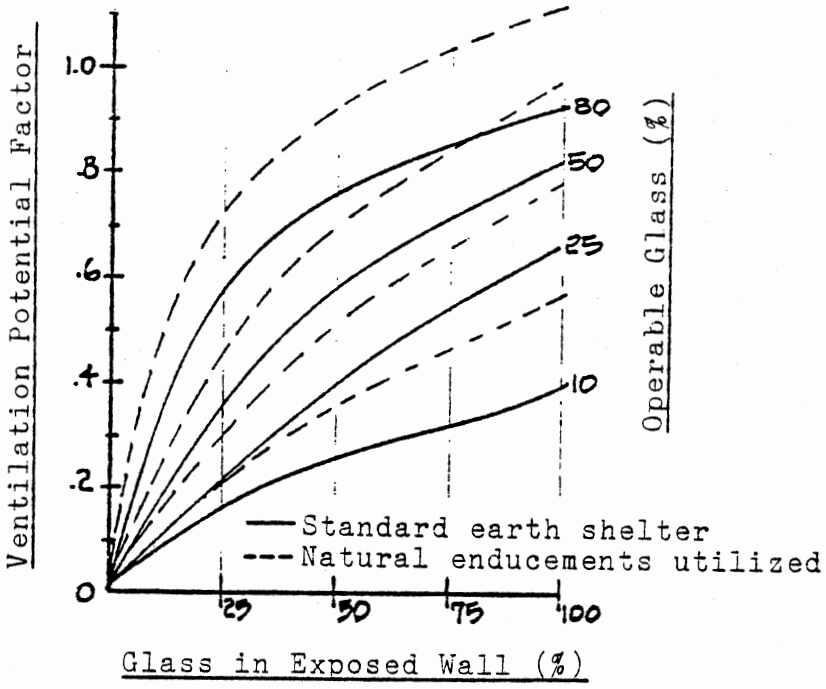
The second principle states that during the cooling season, with the earth acting as a heat sink, the extent of insulation on earth contact walls should be dependent upon the climatic region.[7, 8] This will allow heat to flow easily from the conditioned space into the earth, thereby reducing cooling needs in the conditioned space. In both cases, the roof should be insulated, while the floor typically has no insulation present.

Since these two principles are slightly different, two earth contact factors will be calculated for each dwelling: one which determines the effectiveness of insulation placement for space heating and one which determines the effectiveness of insulation placement for space cooling. The

vertical distance from the surface of the earth to the lowest extent of insulation placement was indicated by earth sheltered housing occupants, and was compared to the lowest extent possible, assumed to be eight feet for the wall height plus the depth of earth covering on the roof. This determines the earth contact factor for the heating mode. For the cooling mode, the earth contact factor is based upon a suggested insulation depth of six feet below the surface.[9] Actual depths are compared to this value to determine the earth contact factor for the cooling mode.

Ventilation Potential Factor

The Building Design Index described in this thesis is similar in concept to the Plan Design Index developed by Boyer et al[10] and one of the factors developed in the Plan Design Index which is incorporated into the Building Design Index is the ventilation potential factor. This factor is a function of the amount of glass in the exposed wall and the percent of this exposed glass which is operable, and is presented in Figure 3. The ventilation potential factor is an indication of the natural ventilation potential of an earth sheltered house, based on a beneficial orientation of SW to SE. Natural enducements such as opposing window areas and fans are included in the determination of the ventilation potential factor.



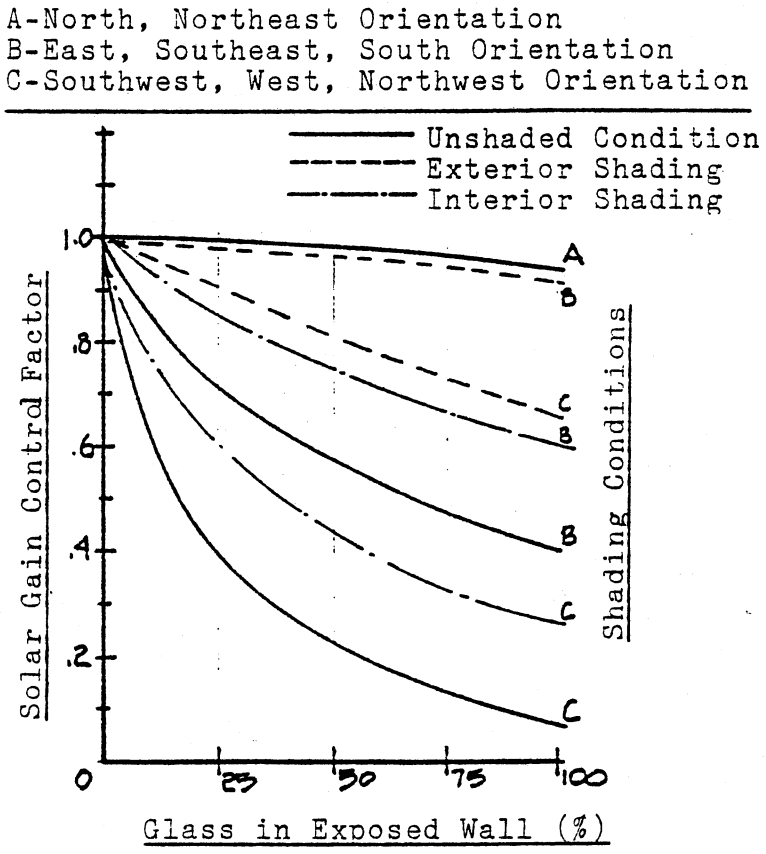
Source: 10

Figure 3. Ventilation Potential Factor

Solar Gain Control Factor

The solar gain control factor is a second factor developed as a part of the Plan Design Index which is incorporated into the Building Design Index. Solar gain during the cooling season increases the need for space cooling, thereby increasing the space conditioning energy

requirements. Proper shading of windows can significantly reduce the impact of solar gain during the cooling season. The majority of houses investigated in this study have at least one wall which is exposed. This wall generally contains the windows which allow access to solar radiation. The factors which are used to determine the solar gain control factor are orientation of windows, shading conditions of windows, and the percent of glass in the exposed wall. By using these factors, the solar gain control factor can be determined from Figure 4.



Source: 10

Figure 4. Solar Gain Control Factor

Solar Gain Potential Factor and Solar Access Factor

As mentioned previously, the Plan Design Index, upon which the Building Design Index is based, is concerned only with the cooling potential of earth sheltered houses. The Building Design Index, however, is concerned with both heating and cooling seasons. In the development of the Building Design Index for the heating season, the thermal mass factor and the total effective resistance of an earth sheltered house should not differ from the same factors during the cooling season. An earth contact factor for the heating season has been developed, and the thermal wick factor is an average value for both heating and cooling seasons. In the Building Design Index for the cooling season, there are two factors which identify cooling potential based upon exterior influences not directly associated with earth sheltering. These factors are the ventilation potential factor and the solar gain control factor.

It is the desire of the investigator that the equations for the Building Design Index (cooling season) and the Building Design Index (heating season) be as similar as possible, especially since the thermal mass factor, the thermal wick factor, and the total effective resistance values are the same for both seasons. In order to maintain the weighting factors utilized in the final calculation of the Building Design Index, two factors are required in the calculation of the heating season index which are based

upon exterior influences not directly associated with earth sheltering.

The two factors which are proposed are the solar access factor and the solar gain potential factor. These factors are designed to directly substitute for the ventilation potential factor and the solar gain control factor in the calculation of the Building Design Index. The solar access factor and the solar gain potential factor are designed to estimate the contribution of solar gain to the heating requirements of an earth sheltered house. The factors which control the contribution of solar gain to an interior space are: the ratio of the area of exposed glass to occupied floor area, the percent of glass in an exposed wall, the orientation of exposed walls, the shading effect of deciduous trees. These factors are shown in their combined forms in Figures 5 and 6.

The development of the curves of the solar access factor and the solar gain potential factor is based upon the premise that the solar gain control factor of the cooling season index was designed with the exclusion of solar radiation from the earth sheltered dwelling as its basis. As shown in Figure 4, a large area of unshaded, exposed glass allows a significant amount of solar radiation to enter the occupied space and, consequently, indicates a low solar gain control factor. To predict the introduction of solar radiation into the occupied space of an earth sheltered building, the curves should be inverted.

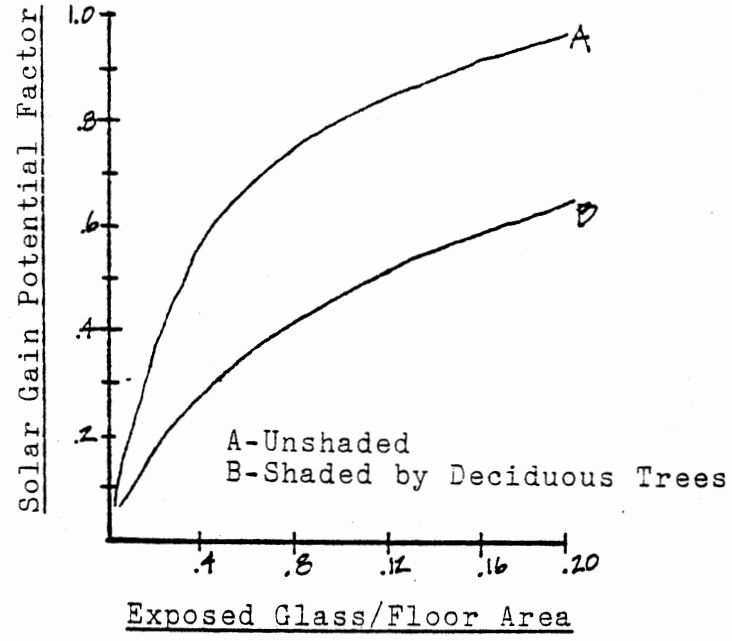


Figure 5. Solar Gain Potential Factor

A-East, Southeast, South Orientation
B-Southwest, West, Northwest Orientation

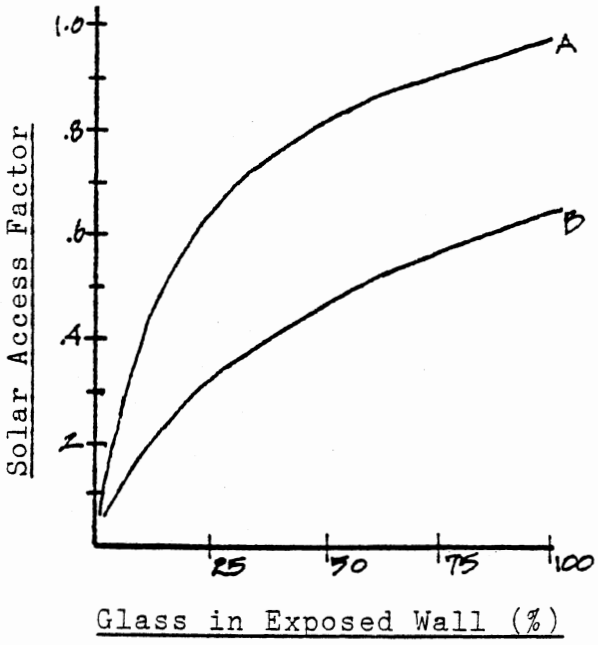


Figure 6. Solar Access Factor

The solar access factor and the solar gain potential factor are based on this premise. The horizontal axis in Figure 5 is based upon the fact that the highest ratio of exposed glass area to occupied floor area among earth sheltered houses investigated is 0.20. These two factors, the solar access factor and the solar gain potential factor, are tentative proposals, as are the other factors in the Building Design Index, and should be considered as such.

Calculation of Building Design Index

As mentioned in the earth contact factor section on page 27, there are actually two ratings for the effect of earth contact; one for the heating mode and one for the cooling mode. The same is true for the Building Design Index. There is a Building Design Index for the heating season (BDIh), and a Building Design Index for the cooling season (BDIc). The factors which are included in each of these indices are indicated in Table VI.

TABLE VI

BUILDING DESIGN INDEX COMPONENTS

	BDIh	BDIc
Thermal Mass Factor	X	X
Effective Resistance Factor	X	X
Earth Contact Factor (heating)	X	
Earth Contact Factor (cooling		X
Ventilation Potential Factor		X
Solar Gain Control Factor		X
Solar Gain Potential Factor	X	
Solar Access Factor	X	

The Building Design Index equations are similar to the Plan Design Index equation, which is:

$$PDI = (0.5W + 0.5C)(F)(0.4) + E(0.25) + V(0.10) + S(0.25)$$

Where:
- W = Wall Thermal Factor
- C = Ceiling Thermal Factor
- F = Front or Exposed Wall Modification
- E = Earth Cooling Potential Factor
- V = Ventilation Potential Factor
- S = Solar Gain Control Factor

In the Building Design Index (cooling season), the values for W and C are replaced by the thermal mass factor (Tmf) and the total effective resistance (Er), the value for F is replaced by the thermal wicks factor (Twf), and the value for E is replaced by the earth contact factor (cooling season, Ec). For the Building Design Index (heating season), the values for W, C, and F in the Plan Design Index equation are replaced with the values as described in the cooling season BDI, and the values for S and V are replaced by the solar gain potential factor and solar access factor (Saf), respectively. Also, the value for E is replaced by the earth contact factor (heating season, Eh). The equations for the two Building Design Indices are as follows:

$$BDIh = (0.5Tmf+0.5Er)(Twf)(0.4) + (Eh)(0.25) + (Saf)(0.10)+(Sgf)(.25)$$

$$BDIc = (0.5Tmf + 0.5Er)(Twf)(0.4) + (Ec)(0.25) + (V)(0.10) + (S)(0.25)$$

The entire Building Design Index procedure has been computerized and an index value is easily calculated by completing the BDI input sheet located in Appendix B and inserting this data into the Building Design Index computer program. This program is included as a part of the computer program listed in Appendix C.

Building Design Index Example Calculation

In order to provide a sense of "scale" to the Building Design Index and to provide an example of the Building Design Index calculation process, the following description is provided of a reference earth sheltered house for which the Building Design Index heating and cooling season values are equal to 0.50. The example house has an occupied floor area of 5145 ft^2, is earth-covered, and 3 of the 4 walls are earth contact walls. The exposed wall and the earth contact walls are constructed of filled concrete blocks, and all of the walls with the exception of one of the earth contact walls has 1 in. expanded polystyrene (beadboard) insulation located on the exterior of the walls. The earth contact wall which is the exception has no insulation in contact with the wall. The roof structure is a 10 in. concrete deck, with no insulation, but covered with 2 ft. of silty clay fill. The dwelling is designed so as to eliminate thermal wicks, and insulation extends to 1 ft. below the top of the earth contact walls.

The procedure for the calculation of the thermal mass factor and the total effective resistance is not complicated, but can be confusing. The results of the calculation procedure for this particular earth sheltered house are shown in Appendix D. To describe the procedure, wall number one of the example will be used. Other walls and the roof use the same procedure, but with different component values.

Wall number one is a 1,000 ft^2 wall, composed of concrete block, and has dry sand as backfill on its exterior side. Assuming an effective earth thickness of 6 ft. as described earlier, the total mass of earth in contact with the wall is 582,000 lb. The soil has a thermal conductivity of 1.2 Btu.in/h.ft^2.F, and has an effective resistance of 60 ft^2.F.h/Btu. The insulation utilized on the exterior of this wall is 1 in. beadboard, with an R-value of 5.0, and a total mass of 200 lb. As mentioned, the structure of the building is concrete block, and from Table V, a concrete block wall has a density of 97 lb/ft^3 and an R-value of 3.0. The total mass of the concrete block in the wall is 97,000 lb and the total mass of the entire wall assembly is 679,200 lb. The total effective resistance is the sum of the component resistances, and is equal to 68 ft^2 F h/Btu. Summing the total mass values for the walls and roof, and dividing by the total surface area of the dwelling excluding the floor area, yields a thermal mass factor of 0.54. Performing the same calculation with the

effective resistances of the walls and roof yields a total effective resistance value of 0.27.

The earth contact factors are calculated by dividing the maximum depth of wall insulation from the ground surface by the maximum desired depth of wall insulation. In the winter, this desired depth extends to the lowest portion of an earth contact wall, while in the summer the desired depth is dependent upon the climatic region. The earth contact factors for heating and cooling are, respectively: 0.31 and 0.36.

The house has an exposed wall which is 1320 ft^2 in area, 924 ft^2 of which is glass. The percent of glass to exposed wall area is then equal to 0.70. Only 8 percent of this exposed glass is operable, and from Figure 3, the ventilation potential factor for the house is equal to 0.20. The exposed wall faces southeasterly in direction, and exterior shading devices are used to provide control of solar radiation. Utilizing this information and the percent of glass in the exposed wall value previously determined, the solar gain control factor of 0.80 is derived from Figure 4. To calculate the amount of solar gain potential during the heating season, the ratio of exposed glass to floor area must be determined. From the values previously supplied for these areas, the exposed glass to floor area ratio is equal to 0.17. The exposed wall is not shaded by any vegetation, and from Figure 5, the solar gain potential factor is 0.80. Utilizing the orientation of the

exposed wall and the percent of glass in this wall, the solar access factor is equal to 0.90, from Figure 6.

Combine all of the factors calculated above according to equations 3 and 4, the Building Design Indices for the heating and cooling seasons are determined, and as previously mentioned, are both equal to 0.50. This house may appear to be rather poorly designed, in terms of the amount of insulation and its placement, as indicated by the total effective resistance, and yet has average Building Design Index values due to the large values of the solar gain control, solar gain potential, and solar access factors.

As mentioned previously, the Building Design Index is a tentative approach in identifying and combining energy-related design factors to "rate" earth sheltered houses. Since this work is, to a certain extent, exploratory in nature, the Building Design Index appears somewhat arbitrary. As researchers continue to investigate areas with the factors established in the Plan Design Index and the Building Design Index, perhaps a more accurate rating system for earth sheltered houses can be developed.

END NOTES

[1]Boyer, L., T. Johnston, "Organization of Interior Spaces for Earth Cooling." Proc. International Passive and Hybrid Cooling Conf., Miami Beach, AS/ISES, Nov. 1981, pp. 121-130.

[2]"Nine-State Earth Sheltered Housing Survey - Detailed Questionnaire for Earth Sheltered Housing Owners." (Survey conducted by Center for Natural Energy Design, College of Engineering, Oklahoma State University, Stillwater, OK, 1979.)

[3]Guy, H. "An economic Comparison of Passively Conditioned Underground Houses." Published Master of Architectural Engineering Thesis, Oklahoma State University, 1981, p 109.

[4]U. S. Dept of Energy, "Insulation Materials and Placement." Earth Sheltered Structures Fact Sheet 06, Underground Space Center, University of Minnesota, 1981.

[5]Blick, E. "A Simple Method for Determining Heat Flow Through Earth Covered Roofs." Proc. Earth Sheltered Building Design Innovations Conf., L. Boyer (ed.), Stillwater, OK: Oklahoma State University, April 1980. pp III-19-23.

[6]U.S. Dept of Energy, "Insulation Principles." Earth Sheltered Structures Fact Sheet 05, Underground Space Center, University of Minnesota, 1981.

[7]ibid.

[8]U. S. Dept of Energy, "Earth Coupled Cooling Techniques." Earth Sheltered Structures Fact Sheet 09, Center for Natural Energy Design, School of Architecture, Oklahoma State University, 1981.

[9]ibid.

[10]Boyer, L., p 124.

CHAPTER III

ENERGY CONSUMPTION ANALYSIS PROCEDURE

Basis for Analysis

The secondary goal of this thesis is the development of the Building Design Index, and the secondary goal is the analysis of metered and estimated energy consumption for selected earth sheltered houses. Results obtained from the energy analysis are utilized in the validation of the Building Design Index, and indicate trends in earth sheltered housing energy consumption, such as energy usage patterns, time lag of outdoor temperature changes indicated by changes in energy consumption, and variations of energy usage among regional housing groups. The analysis is designed as a series of incremental steps, with each step further normalizing energy consumption data from selected earth sheltered homes. The objective of the analysis process is to allow comparison of energy consumption of earth sheltered houses as a group rather than as individual dwellings. Internal loads from appliances and human activity can have a significant impact upon energy consumption of earth sheltered houses. Due to the limited information available pertaining to occupant lifestyle, internal loads are not considered in the estimation or calculation of

energy consumption.

Division of Analysis Process

As mentioned previously in this thesis, earth sheltered housing energy usage information was supplied in two forms, these being actual utility billings and owner-supplied estimates of energy consumption.[1] The differences in the accuracy of these two formats is very significant. The information supplied by utility metering is accurate, in so much as the actual quantity of energy or fuel supplied and the exact period of time over which this energy was consumed is known. In regard to the energy estimates provided by the earth sheltered housing occupants, the accuracy of their estimates of the breakdown of energy use in the house should be considered to be substantially less than that of the metered utility consumption. Due to the great difference in the accuracy of information supplied by these two sources, two analyses were performed; one included the owner estimates, and the other was based solely on the metered utility consumption. To assist in the presentation of the analysis process, an individual dwelling analysis flow chart is shown in Figure 7. To perform the actual analyses, a computer program was developed which reduces the amount of time required for computation, and allows the input of additional information in the future. A listing of the energy analysis program is found in Appendix C.

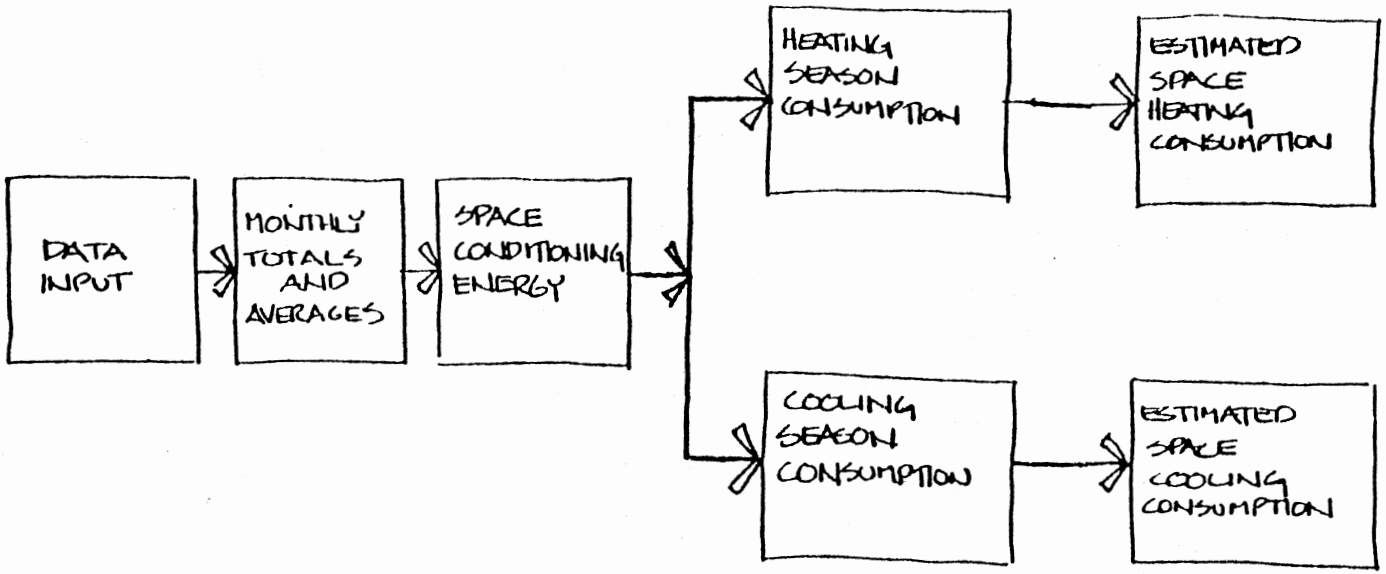


Figure 7. Individual Dwelling Calculations Flow Chart

Data Input

The energy analysis begins with the input of energy usage data for individual houses, and progresses in increments until various regional results are obtained. In this analysis, as opposed to the analysis which includes owner's estimations, only metered utility consumption data are utilized. Therefore, the initial input into the program consists of the consumption data of metered energy or fuel, which is either electricity, natural gas, or propane. In all cases, the beginning and ending dates of billing are input, with the typical billing period being 30 or 31 days. In order to maintain a common working unit of kWh throughout the majority of the analysis, gas consumption is converted into equivalent electrical consumption based on an assumed furnace efficiency of 75 percent,[2, 3] the heat content of propane being 2500 Btu/ft^3, and the heat content of natural gas being 1025 Btu/ft^3.[4] The average daily consumption during the billing period is then calculated by dividing the amount of energy used by the number of days in the billing period. This allows the calculation of energy consumption per calendar month, as opposed to energy consumption per billing period.

Monthly Values

The next steps in the analysis process are the calculation of the total consumption per month and the calculation of the average daily consumption per month. By

calculating the consumption per month, as opposed to consumption per billing period, the data from various houses can be more readily combined to give regional values, since the houses have calendar months in common, but very likely do not have billing periods in common. The total consumption per month is determined by summing the average daily consumption values for each day during the calendar month. To further normalize energy consumption values, the average daily consumption per month is then calculated by dividing the total consumption per month by the number of days in the calendar month. If there are more than 10 days within a calendar month which have not been assigned values, as would be the case if the first day of billing for the first month of consumption was during mid-month, then the entire month is not included in future calculations. If, due to similar circumstances, there are 10 or fewer days which have not been assigned values, these days are assumed to have the same value as the average daily consumption of the days in the month which have been assigned. At this point, the energy consumption values are also divided by the conditioned floor area of the house to obtain a value which normalizes the values from various houses to a common unit (kWh/ft^2).

Average Monthly Values

In the calculation of regional values, which is described in the next section, energy consumption values from

various earth sheltered houses within each region are combined. Among the earth sheltered houses utilized in this study, the periods of time for which utility consumption information was available varied from one year to six years. If the energy consumption values of the houses within a region are combined according to the actual periods of billing, then a six year span of values is obtained. During a specific time period within this six year span, the regional values calculated may be based upon one or two houses, while at other times all of the houses within the region may be used. In order to eliminate this inconsistency, and to compare and combine energy consumption from houses which may not have coincidental periods of billing, a method was developed which averages monthly values for the billing period. In essence, for an individual house, the average total consumption for January is the average of the total consumption values for all Januaries during the period of metering. In this way, an average 'January' consumption is determined. The values for average daily consumption per month are obtained in the same manner. This process is described in the flow chart presented in Figure 8.

Regional Values

As described in Chapter 2, the earth sheltered houses were combined into regional groups according to climate. The energy consumption values obtained from each of the

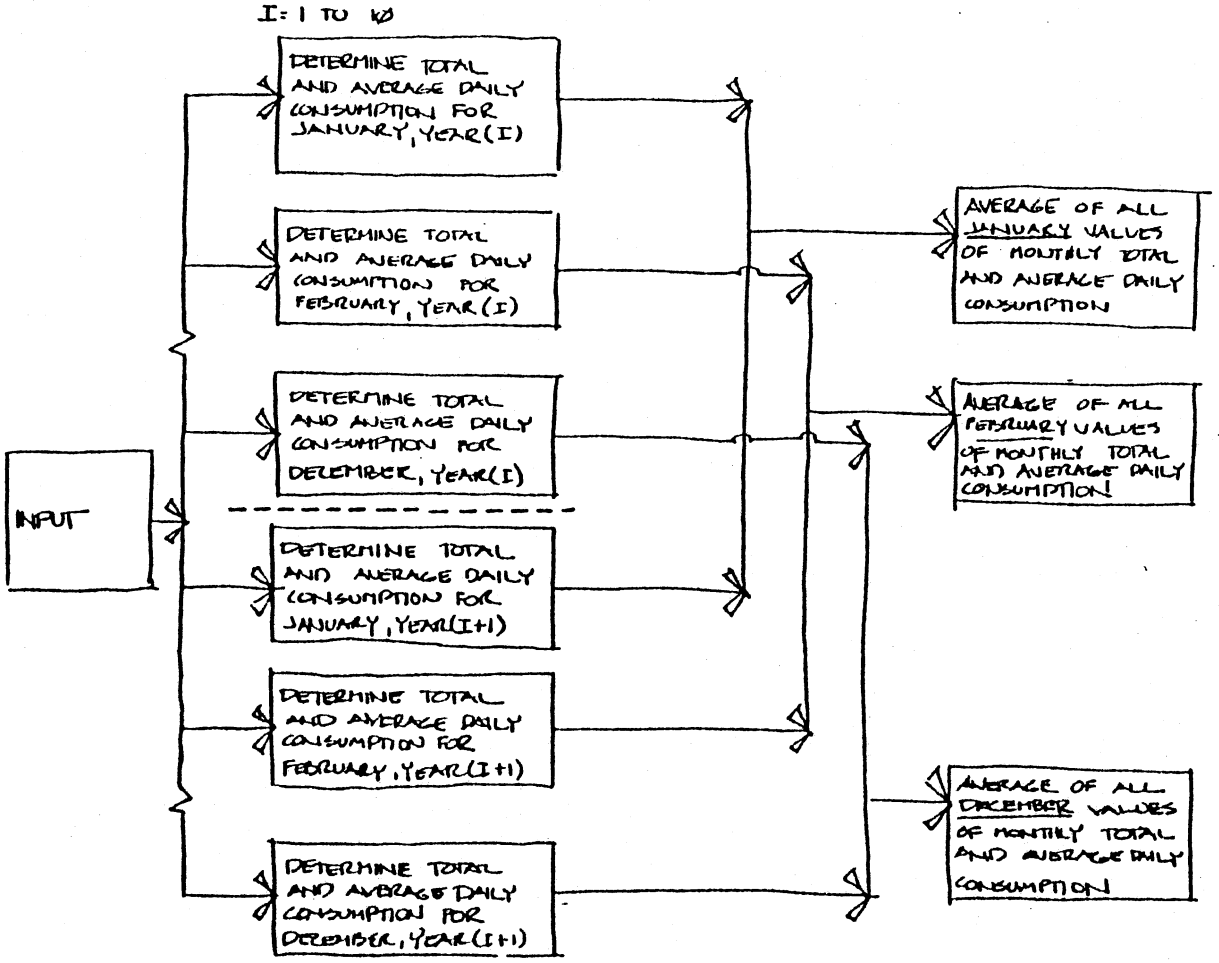


Figure 8. Individual Monthly Average Energy Consumption Process

houses within a region are combined to give regional values. The values for the regions can then be compared to determine whether or not there are any major differences in energy performance of earth sheltered housing between the regions. Average monthly totals and average daily consumptions per month from houses within the region are averaged to give regional average monthly totals and regional average daily consumptions per month. This process is described in the flow chart shown in Figure 9.

Space Conditioning: Baseline Consumption

For each individual house, a certain portion of the actual metered energy consumed is associated with space conditioning. Energy consumption increases during periods in which mechanical equipment is used to input or extract heat from the home to maintain comfort conditions. During periods when mechanical space conditioning usage is at a minimum, the metered energy consumption during this period is also at a minimum. It can, therefore, be assumed that the energy consumed during these periods is primarily used for domestic hot water and appliance operation.[5] If the value of energy consumption for this period is deleted from the total energy consumption for a period of equal length, then the remaining energy consumption would be an estimate of that required for space conditioning. The baseline value (that which is deleted) is defined as the lowest recurring total monthly consumption for each year. The

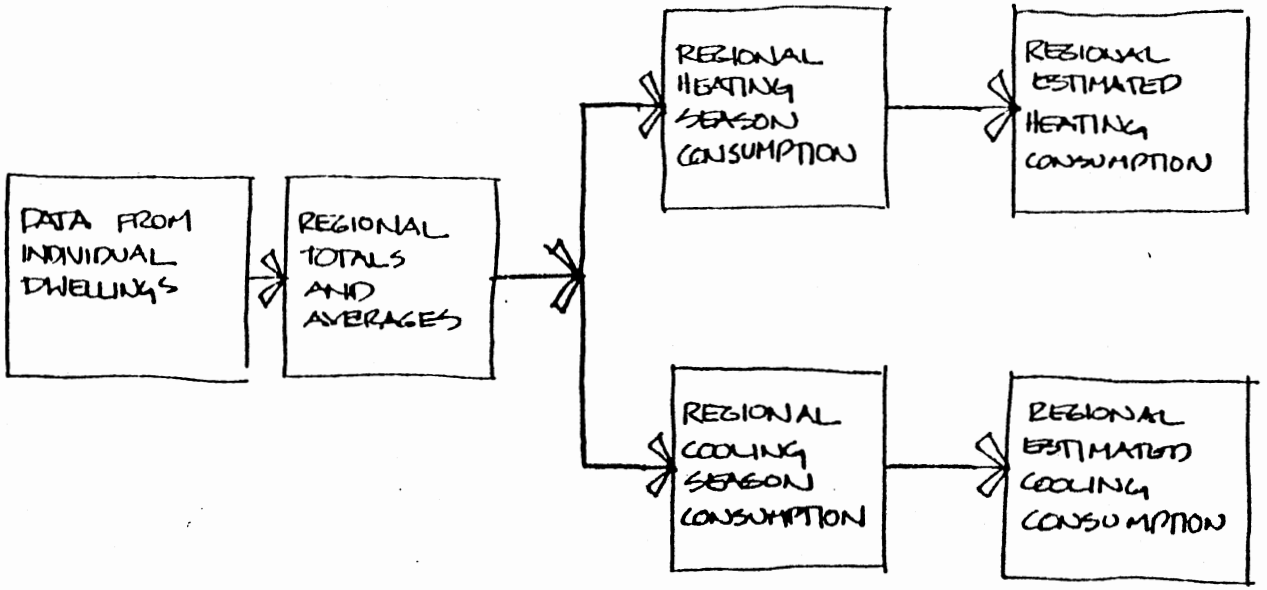


Figure 9. Regional Calculations Flow Chart

baseline value is then subtracted from the total monthly consumption for that particular year. The result is an estimation of the required space conditioning energy per month.

Heating Season

Having determined the energy used for space conditioning, the next step in the analysis procedure is to determine the energy required for space heating. As mentioned previously in this thesis, the temperature of the soil in contact with an earth sheltered dwelling is affected by the temperature related climatic conditions of the area. Due to this and the fact that the majority of earth sheltered houses investigated have at least one wall directly exposed to the exterior conditions, it seems justifiable to relate the energy used for space conditioning of an earth sheltered house to the temperature related climatic conditions of the area.

The heating season is based upon the number of heating degree days (base 65F) per month, and is defined as the period from November through March.[6] This period is determined from a review of average monthly heating degree day values for the study area. A significant increase in the average monthly heating degree day value occurs from October to November, and a decrease occurs from March to April. The values for space conditioning consumption for the heating season months are combined to obtain a total

heating season energy input. The total number of heating degree days (HDD) per season is determined by summing the HDD values for the five months of the heating season.

The heating season energy consumption is then divided by the seasonal HDD total to obtain a value which is an indication of how well a house performed during that particular season. At this point, the energy consumption is converted from KWh's to Btu's using 3.412E x 10^3 kWh per Btu, since this unit is more commonly used in calculations of space conditioning. Also at this point, the coefficient of performance (COP) of the mechanical system is included and multiplied by the resultant energy consumption to determine thermal output. Resistance heating is assumed to have a COP of 1.0, and heat pumps used for heating are assumed to have values ranging from 2.4 to 2.7, based upon manufacturer's estimates. The average heating season performance is calculated by averaging the heating season performance values over the number of years for which information is available.

Cooling Season

Cooling season values and average cooling season values are obtained in the same manner as are the heating values. The cooling season is defined as the period from June through September, based upon a significant change in the number of cooling degree days (base 65°F) per month.[7] The use of a 65°F base for cooling degree days is perhaps

not entirely appropriate, especially in earth sheltered structures, but values utilizing this base are used in this thesis due to the availability of cooling degree information. The total number of cooling degree days (CDD) per season is determined by summing the CDD values for the four months of the cooling season. The coefficient of performance for conventional air conditioning and heat pumps used for cooling is assumed to be 2.0.[8]

Regional Space Conditioning Values

Regional heating and cooling season performance values are determined by averaging the values calculated for each of the houses within each of three regions. Also, averages of heating and cooling season performances for all regions are calculated.

Owner Estimated Consumption

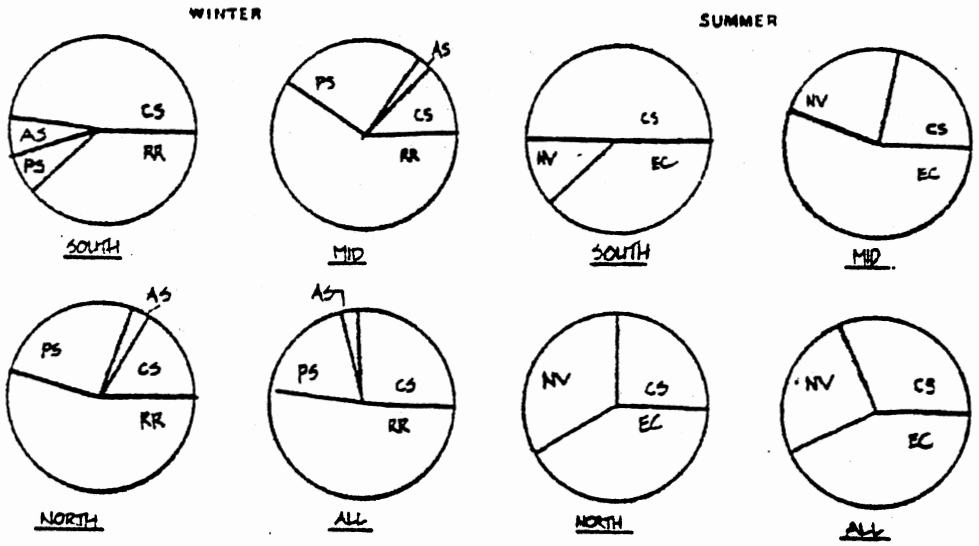
The second energy consumption analysis process is largely the same as the first method, which utilized metered energy. In fact, many of the results from the first analysis are included as data for the second process, which is primarily an effort to include energy input from sources other than those metered by utility companies. The input from these sources was estimated by earth sheltered housing owners in a survey conducted by the Center for Natural Energy Design in the College of Engineering at Oklahoma State University.[9] In this survey, occupants of

earth sheltered dwellings were asked to estimate the contributions of alternate energy sources, as well as typically metered sources of energy for water heating, lighting, and space heating and cooling needs. In this thesis, primary consideration is given to space heating and cooling, and therefore space conditioning is the focus of this analysis process. Under the heading of space heating, owners were asked to estimate the percent contribution of active solar, passive solar, renewable resources, and mechanical/electrical heating systems to their space heating needs. These estimations for the entire survey area are presented in Figure 10. Owners were also asked to estimate the contribution of natural ventilation, mechanical/electrical systems, and the effect of earth contact walls to the annual space cooling needs. The estimations of these values for the entire survey area also are illustrated in Figure 10. Included in both of these estimates is the contribution from mechanical/electrical systems, which was determined in the initial analysis process. This information is the data base from which energy consumption estimates from owner's estimates will be made.

To calculate the space conditioning energy consumption for both heating and cooling seasons, the first step is to determine the energy used by mechanical/ electrical systems. The estimated percent contribution of this system to

AS-Active Solar
PS-Passive Solar
RR-Renewable Resource (wood)
CS-Conventional Systems

NV-Natural Ventilation
EC-Earth Contact Surfaces
CS-Conventional Systems



Source: 18

Figure 10. Estimated Contribution to Space Conditioning Needs From Selected Earth Sheltered Housing Owners

the overall seasonal conditioning needs is then determined. The next step is to determine, based on the fact that the estimated energy consumption of the mechanical/electrical systems and the estimated percent contribution of this energy is known, the energy required to fulfill the estimated percent contribution from other sources. As an example:

> Assume a house has an average heating season consumption of 0.005 (Btu/ft^2/HDD), and has the following percent contribution estimates:
>
> | | |
> |---|---|
> | Active solar | 0% |
> | Passive solar | 30% |
> | Renewable resources | 20% |
> | Mechanical/Electrical | 50% |
>
> The resulting contributions from the various sources would be:
>
> | Source | % | (Btu/ft^2/HDD) |
> |---|---|---|
> | Active solar | 0 | 0.000 |
> | Passive solar | 30 | 0.003 |
> | Renewable resources | 20 | 0.002 |
> | Mech./electrical | 50 | 0.005 |
> | | Total | 0.010 |
>
> Therefore, the estimated energy from all sources required to maintain a thermal in the house is 0.01 Btu/ft^2/HDD.

These calculations are performed with the aid of the previously mentioned energy analysis computer program. As a check on several of these variables, some owners included estimated amounts of wood used for the heating season, glass area used for passive solar heating, and the area of operable glass used for natural ventilation. The results of checks of wood heating, passive solar, and natural ventilation contributions are fairly inconclusive. In many of the cases investigated, the owner's estimates of the contribution of alternate sources of energy appear to be very accurate. However, in a larger number of cases, the owner's estimations did not agree with estimations based upon other information, that being the amount of wood used, and the areas of glass and operable windows.

The owner estimated consumption calculations are performed for individual houses for both heating and cooling seasons, and then values for houses in each region are averaged to determine an average seasonal consumption for the three regions.

Energy consumption data for individual earth sheltered homes is found in Appendix E. Regional earth sheltered and above ground home energy consumption values are found in Appendix F.

END NOTES

[1]"Nine-State Earth Sheltered Housing Survey - Detailed Questionnaire for Earth Sheltered Housing Owners." (Survey conducted by Center for Natural Energy Design, College of Engineering, Oklahoma State University, Stillwater, OK, 1979.)

[2]ASHRAE Handbook and Product Directory-1976 Systems, Chapter 43: Energy Estimating Methods, American Society of Heating, Refrigerating, and Air Conditioning Engineers, 43.8, 1976.

[3]Grondzik, W., L. Boyer, and J. Zang. "Analysis of Utility Billings for 55 Earth Sheltered Projects." Proc. Earth Shelter Performance and Evaluation Conf., L. Boyer (ed.), Stillwater, OK: Oklahoma State University, Oct. 1981, pp 177-184.

[4]ASHRAE Handbook-1981 Fundamentals, Chapter 15, Combustion and Fuels, American Society of Heating, Refrigerating, and Air Conditioning Engineers, Atlanta, GA, 15.3, 1981.

[5]Coad, W. J.: "Energy Audits I: The Energy Profile:, Heating/Piping/Air Conditioning 51(7):105-106, 1979.

[6]Grondzik, p 181.

[7]ibid

[8]"Energy Performance Standards for New Buildings: Proposed Rule", U.S. Dept. of Energy, Federal Register, 44(230): 68120-68181, 1979.

[9]"Nine-State Earth Sheltered Housing Survey - Detailed Questionnaire for Earth Sheltered Housing Owners."

CHAPTER IV

ENERGY CONSUMPTION ANALYSIS AND RESULTS

Earth Shelter Energy Consumption

The secondary goal of this thesis is the development of the Building Design Index for earth sheltered houses, and the primary goal is the analysis of energy consumption data from selected earth sheltered houses in the south-central United States. The results of the development of the Building Design Index are presented in the next chapter, and the energy analysis results are described first, since the energy consumption information is used to validate the Building Design Index.

Energy consumption information has been compiled, and the results of the analysis process described in Chapter III have been calculated for each earth sheltered house in the study group. Appendix D contains the results of the analysis process for each individual earth sheltered dwelling. Regional energy analysis values have also been calculated, as described in Chapter III, and these values can be found in Appendix E.

By comparing the total average monthly consumption values of the three regions, as shown in Figure 11, several trends may be noted. The seasonal changes in energy con-

sumption are moderate in the northern and central regions, but the seasonal changes in the southern region are quite dramatic. The most obvious difference in the patterns of energy consumption of the three regions occurs during the summer. During this period, the houses in the northern and central regions exhibit very similar energy consumption patterns, while the curve of the houses in the southern region indicate a far greater amount of total energy consumption. The average total yearly consumption, defined as the sum of the average total monthly consumption values, of the southern region is 11.1 kWh/ft^2, compared to the average of 8.7 kWh/ft^2 for all three regions. The northern and central regions have total yearly consumption values, 8.2 and 6.7 kWh/ft^2, respectively, which are less than the average value.

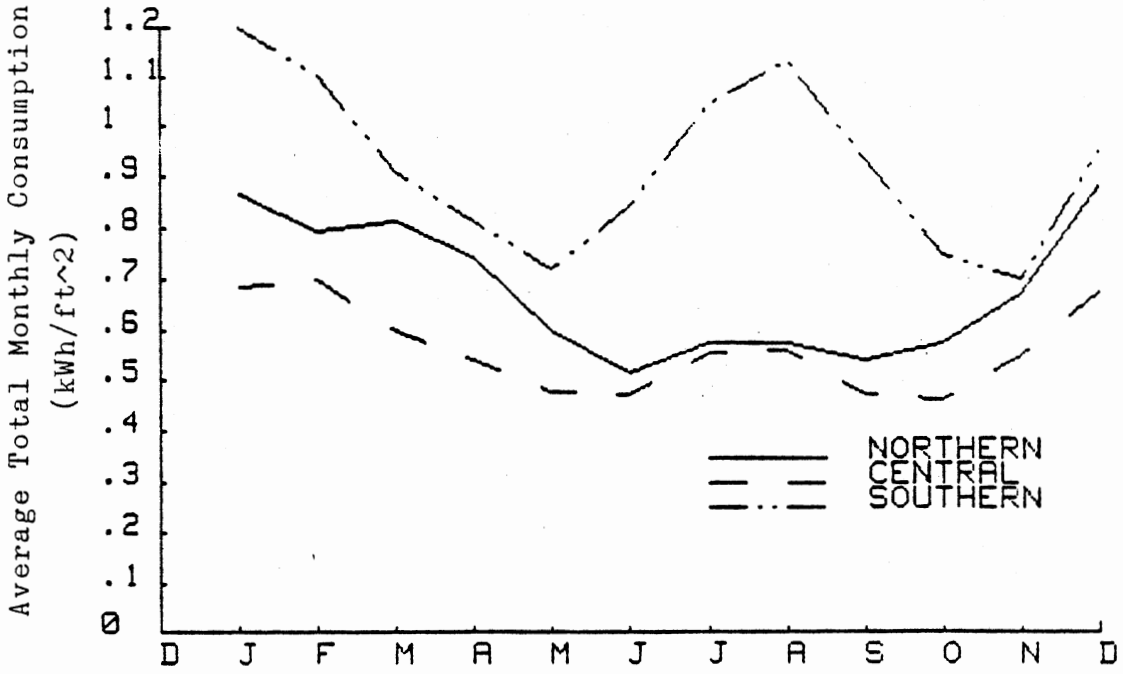


Figure 11. Average Total Monthly Energy Consumption Curves

Space Conditioning Consumption

To compare the heating and cooling seasonal performances of earth sheltered houses in the three regions, the average daily usage values per month during the respective seasons are averaged for each of the houses within the region. The regional results are presented in Table VII. Also presented in Table VII are the averages of the owners' estimated energy consumption values. In the heating season, the southern region again exhibits consumption values higher than the other three regions, and above the the average values. During the cooling season, the value of energy consumption based upon utility information for the southern region exceeds both those of the other regions and the average for the study area.

TABLE VII
HEATING AND COOLING SEASON SPACE CONDITIONING ENERGY CONSUMPTION
($Btu/ft^2/DD$)

	Heating Season		Cooling Season	
Region	Utility Estimate	Owner's Estimate	Utility Estimate	Owner's Estimate
Northern	0.061	0.261	0.203	0.899
Central	0.061	0.251	0.141	0.598
Southern	0.168	0.314	0.282	0.495
Average	0.09	0.263	0.208	0.664

In the owners' estimated consumption, however, the houses in the southern and central regions consume less energy than the houses in the northern region, the value for the northern region being well above the average value. A possible reason for the high value in the northern region may lie in the process of determining the owners' estimated usage itself. If an owner estimates a low percent of contribution to the space cooling needs from the mechanical system, when in fact the estimated energy consumption of the mechanical system is high, the resulting overall estimated consumption for space cooling will likewise be high. In the northern region, the owners generally did estimate a low percent contribution of the mechanical system to space cooling, as indicated in Figure 10. Although Figure 10 does indicate that owners of earth sheltered houses in the central region actually estimated a lower percent contribution of the mechanical system than did the owners in the northern region, inspection of Table VII indicates the northern region used more utility based energy for space cooling than the central region.

From the results of this investigation, it is apparent that earth sheltered houses in the southern region consume a greater amount of energy, both total and space conditioning, than do either of the other two regions. There are several possible reasons for this difference. The lifestyle of the occupants, which is not investigated in this thesis, will have an effect on the energy consumption

patterns of a house. Construction differences can cause a significant difference in the energy related performance of earth sheltered houses within a region, if the construction differences are constant throughout a region. This possibility is investigated in the development of the Building Design Index, and the results are presented later in this chapter.

Earth Sheltered vs. Above Ground Homes

An objective of this thesis is to compare energy consumption of earth sheltered houses to that of typical above ground homes. Limitations on the availability of information pertaining to energy usage in earth sheltered homes are mentioned on page 6 of this thesis. The availability of energy consumption information for typical above ground homes within the study area is equally limited. Information was obtained, however, for 36 above ground houses located within the study area. The energy consumption information of these dwellings has been analyzed utilizing the same process as that described for earth sheltered dwellings. A problem was encountered in the acquisition of the above ground housing data, however. While information pertaining to above ground homes in the northern and southern regions was readily obtained, data from the central region could not be obtained at the time of the investigation. Comparisons of the average total monthly consumption values of the above ground homes and the

average total monthly consumption values of the earth sheltered homes in the northern and southern regions are shown in Figure 12 and Figure 13, respectively. In addition, the average total monthly consumption for the entire group of above ground homes is compared to the average total monthly consumption for the entire group of earth sheltered houses within the study area, as shown in Figure 14. The energy information for the above ground homes within the study area is included in APPENDIX E. The curves in Figure 12 indicate a dramatic difference in the amount of energy consumption of selected earth sheltered, compared to typical above ground houses for the northern region. In the southern region, indicated in Figure 13, energy consumption of earth sheltered houses is less than consumption in above ground houses during the heating season, but during the summer, the energy consumption patterns of the two housing types are remarkably similar.

From Figure 14, it is evident that earth sheltered dwellings within the study area consume less metered energy per year than do selected above ground homes in the same area. The most dramatic difference between the two groups is the requirement for energy during the heating season. The above ground group consumed an average of 2.04 kWh/ft^2 during the heating season, while the earth sheltered houses consumed an average of 0.801 kWh/ft^2. During the cooling season, the above ground homes have an average total energy consumption of 1.05 kWh/ft^2 per year, compared to 0.69

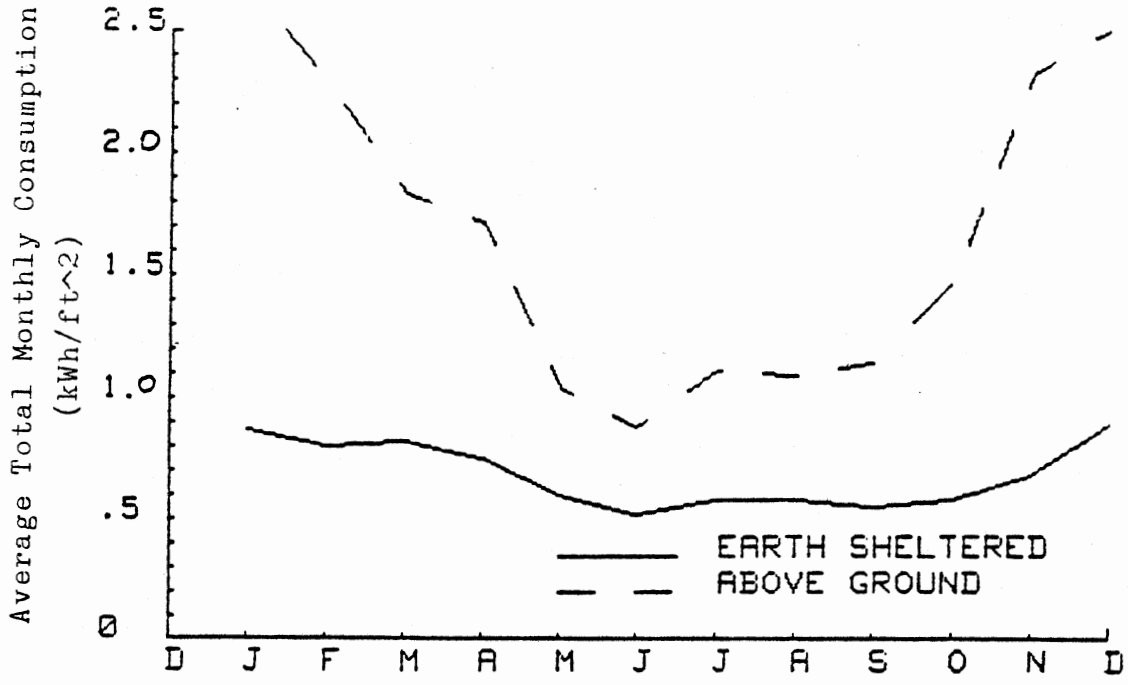


Figure 12. Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption (Northern Region)

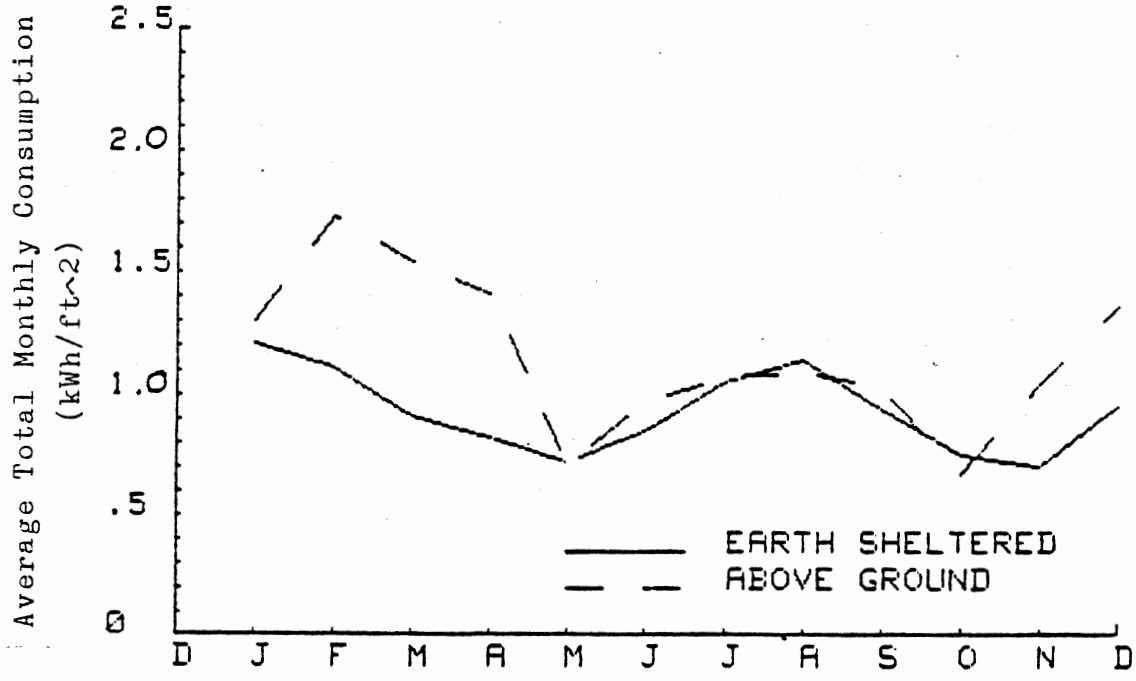


Figure 13. Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption (Southern Region)

kWh/ft^2 for the earth sheltered homes.

The estimated space heating energy consumption of the investigated above ground homes during the heating season is 0.28 $Btu/ft^2/HDD$. During the cooling season, the estimated space cooling energy consumption is 0.75 $Btu/ft^2/CDD$ for the same group of above ground homes. Comparing these values to the owners' estimated heating and cooling season consumption values from Table VII, the values of space conditioning energy consumption of the above ground houses are larger than the earth sheltered housing owners' estimates, but not substantially larger.

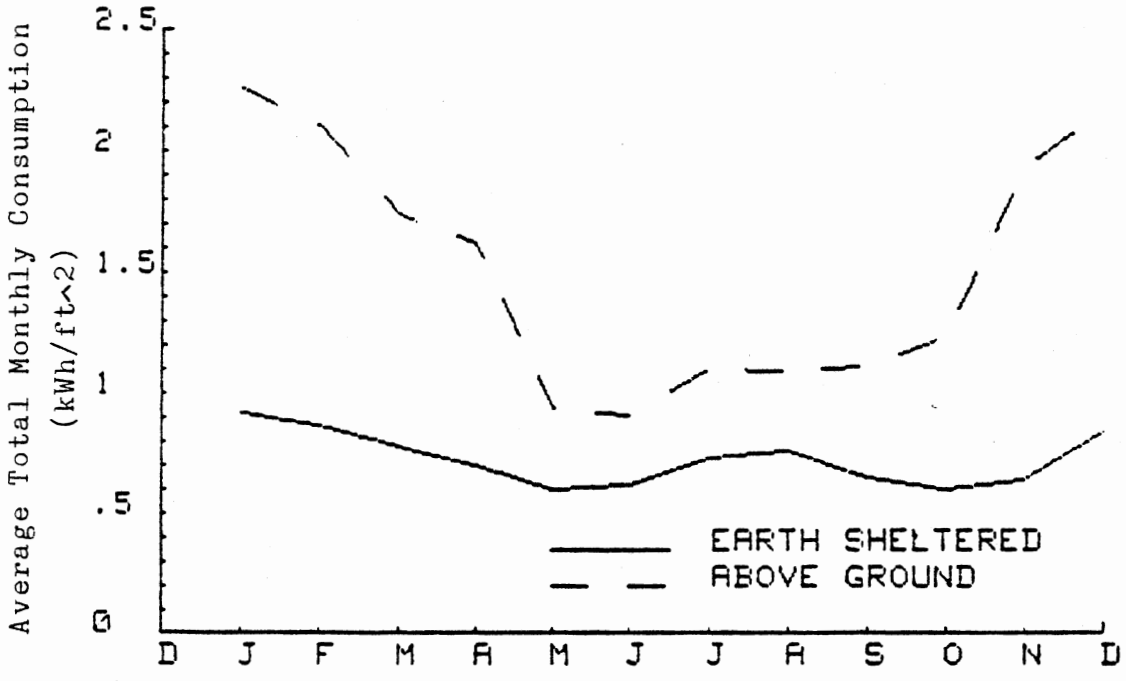


Figure 14. Earth Sheltered and Above Ground Housing Average Monthly Energy Consumption (Study Area)

CHAPTER V

BUILDING DESIGN INDEX ANALYSIS AND RESULTS

Building Design Index

The secondary goal of this thesis is to develop an index which is an indication of the appropriateness of an earth sheltered house design and construction. This index is called the Building Design Index (BDI). BDI's for the individual earth sheltered houses are listed in APPENDIX G.

As with the energy consumption values for the earth sheltered dwellings, the Building Design Indices exhibit strong regional differences. In both the heating and cooling seasons, the earth sheltered houses in the northern and central regions have building design indices which are above the average values, indicating good building design, while the southern region has values which are noticeably less than the average values. These differences are indicated in Table VIII.

Building Design Index vs. Energy Consumption

Building Design Indices for individual dwellings were compared to the utility-based estimated seasonal consumption values and the owners' estimated seasonal energy

consumption values. The results, indicated in Figures 15 through 18, show that there is no apparent strong correlation between the Building Design Index and the actual energy performance of the earth sheltered houses investigated.

TABLE VIII

REGIONAL BUILDING DESIGN INDICES

Region	Building Design Index (heating)	Building Design Index (cooling)
Northern	0.503	0.659
Central	0.448	0.643
Southern	0.384	0.505
Average	0.445	0.602

In order to more accurately determine if a correlation exists between the Building Design Index values and the space conditioning energy consumption values for the earth sheltered houses investigated in this study, these variables have been plotted by region, and are shown in Figures 19 through 30. In addition, a Pearson correlation coefficient (R) has been calculated for each of these scatter plots to determine if a correlation does, in fact, exist. The values of R are presented in Table IX.

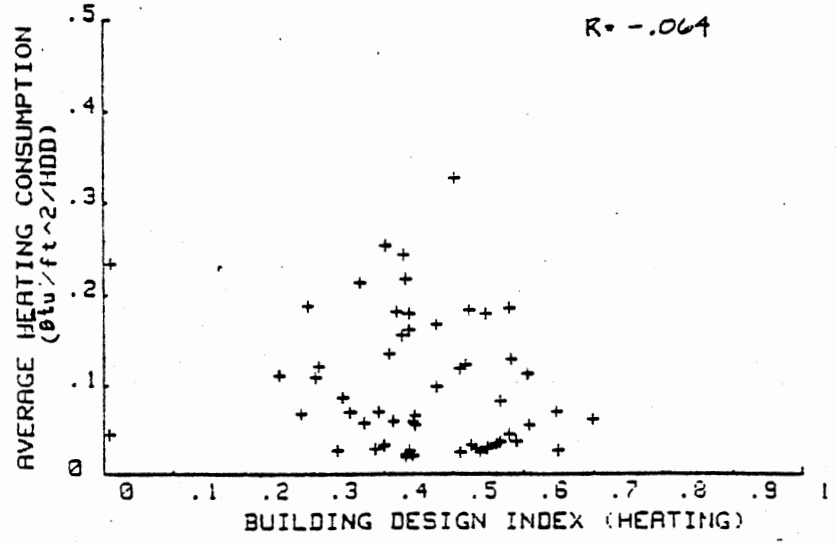


Figure 15. Building Design Index and Utility-based Heating Consumption Scatter Plot

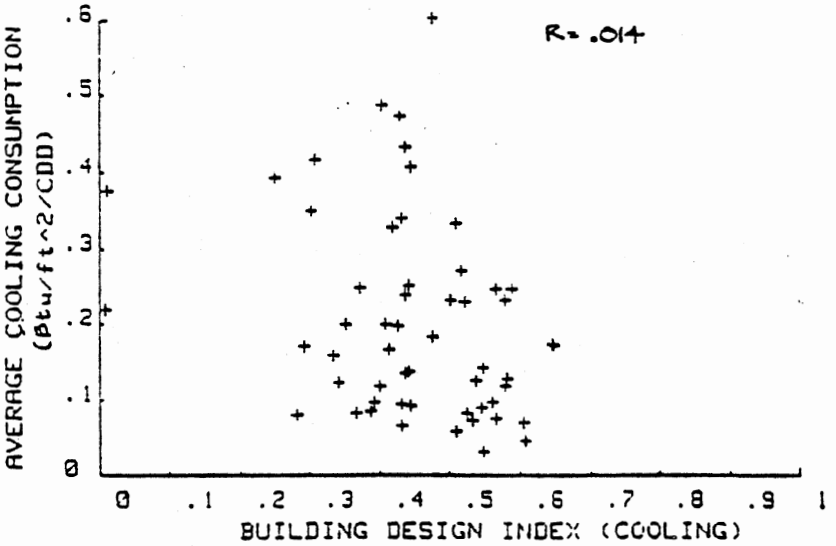


Figure 16. Building Design Index and Utility-based Cooling Consumption Scatter Plot

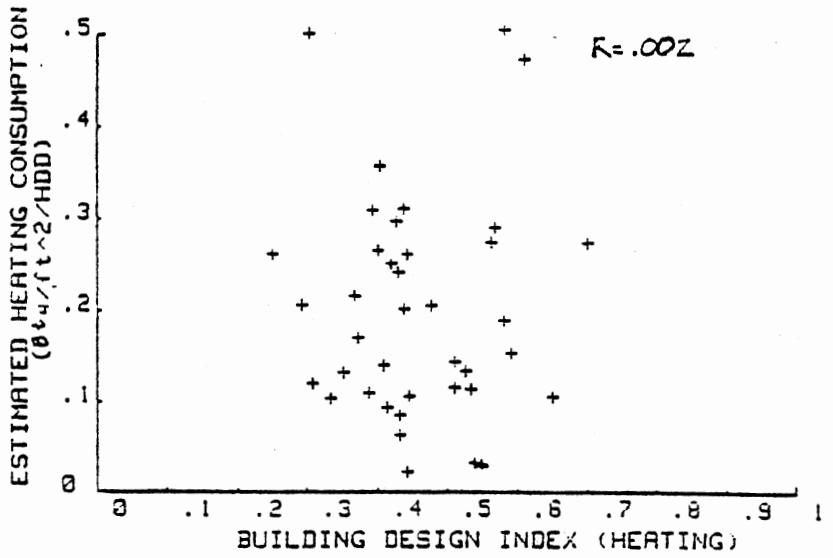


Figure 17. Building Design Index and Owner Estimated Heating Consumption Scatter Plot

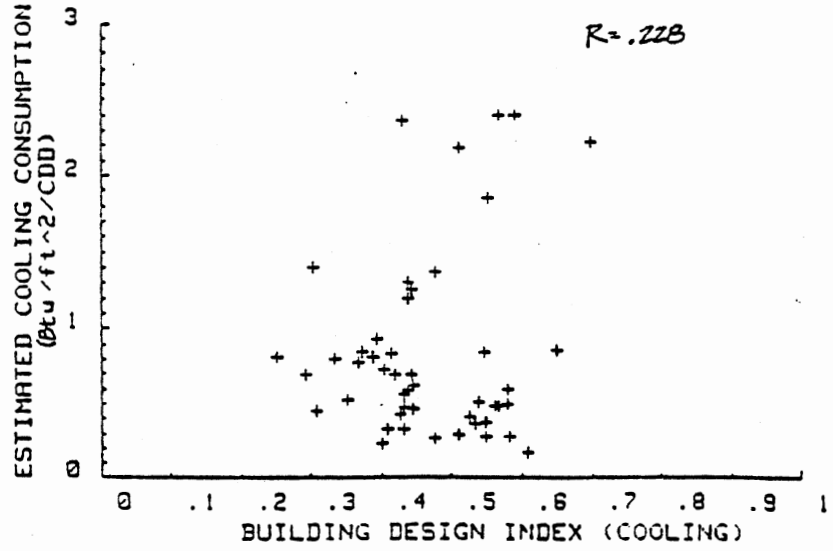


Figure 18. Building Design Index and Owner Estimated Cooling Consumption Scatter Plot

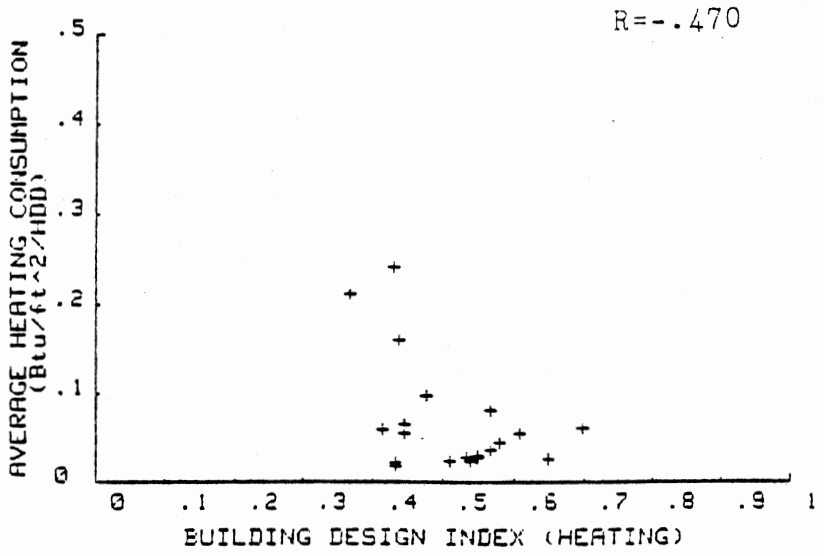


Figure 19. Building Design Index and Utility-based Heating Consumption Scatter Plot (Northern)

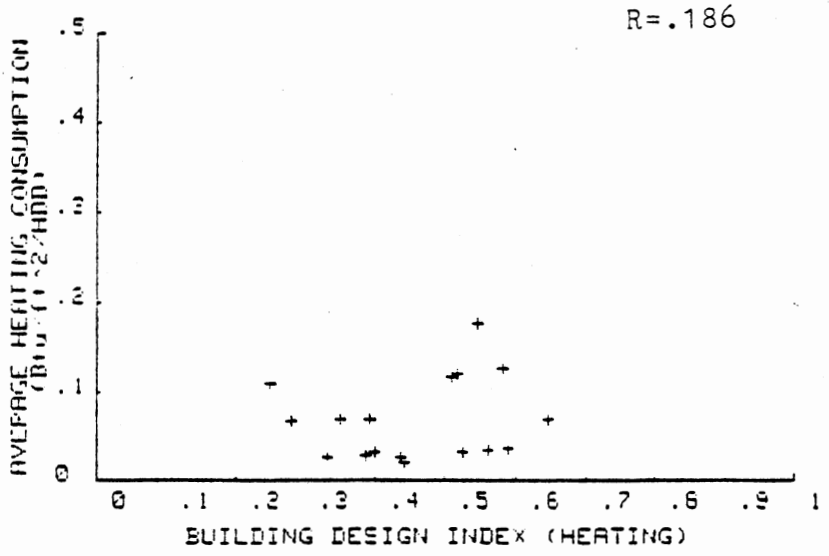


Figure 20. Building Design Index and Utility-based Heating Consumption Scatter Plot (Central)

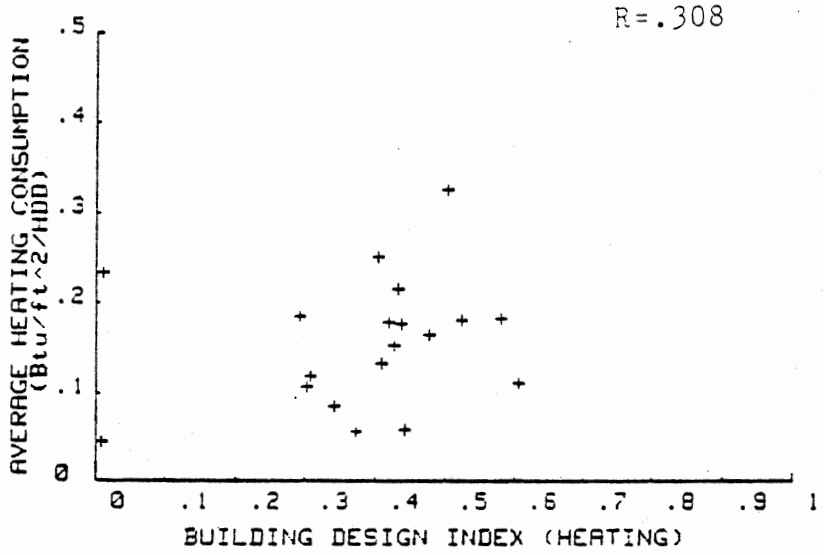


Figure 21. Building Design Index and Utility-based Heating Consumption Scatter Plot (Southern)

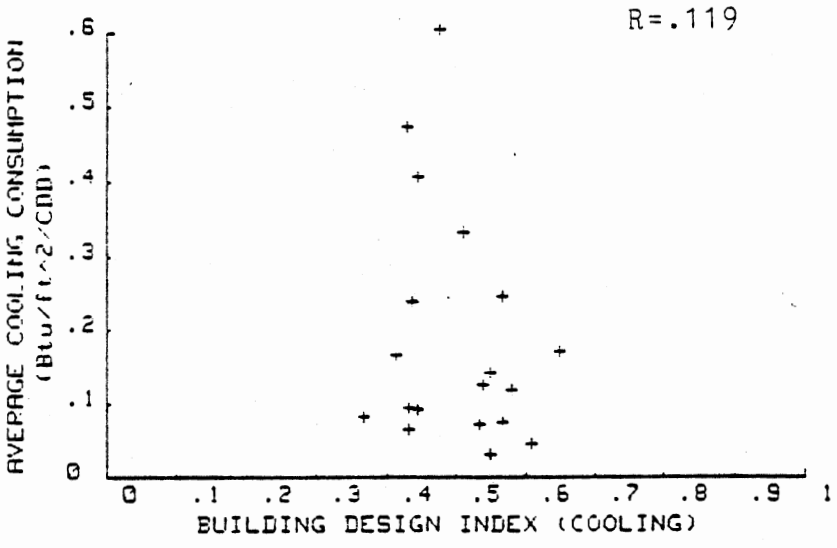


Figure 22. Building Design Index and Utility-based Cooling Consumption Scatter Plot (Northern)

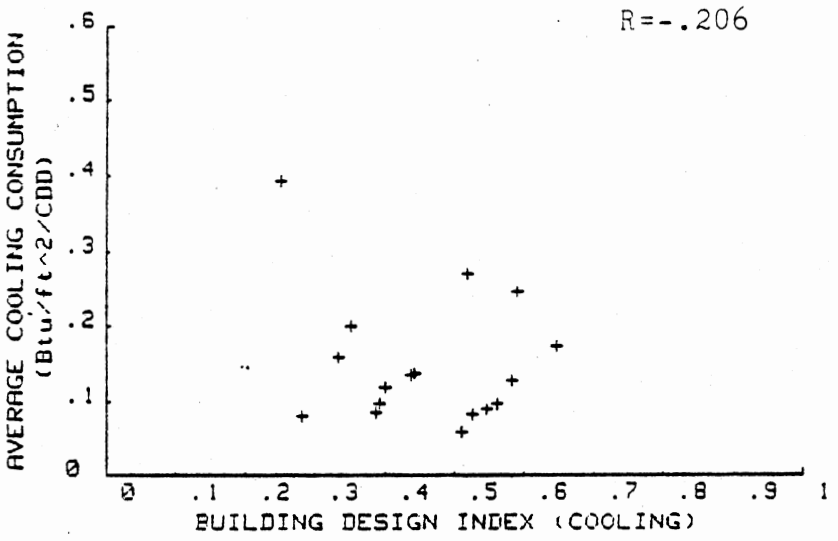


Figure 23. Building Design Index and Utility-based Cooling Consumption Scatter Plot (Central)

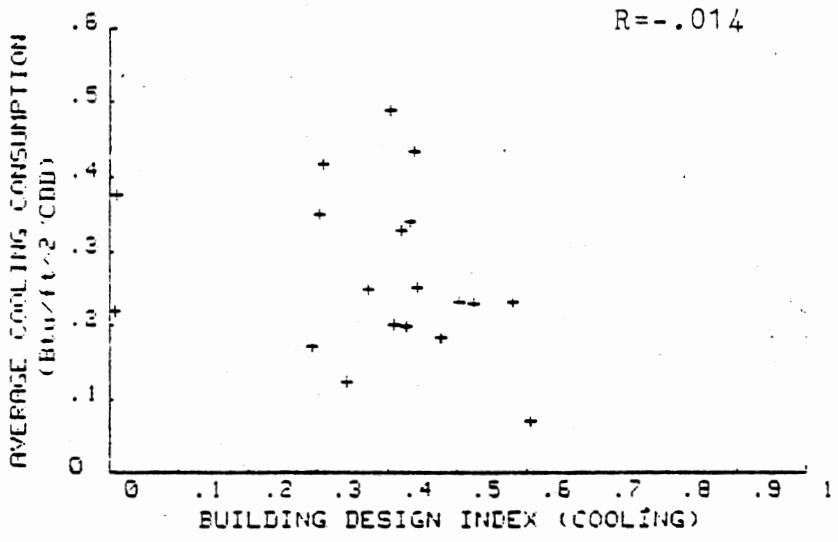


Figure 24. Building Design Index and Utility-based Cooling Consumption Scatter Plot (Southern)

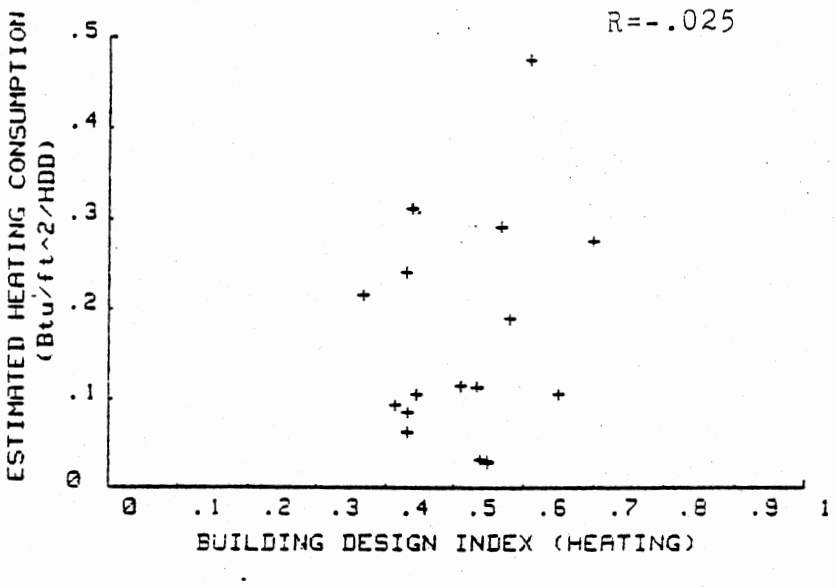


Figure 25. Building Desing Index and Estimated Heating Consumption Scatter Plot (Northern)

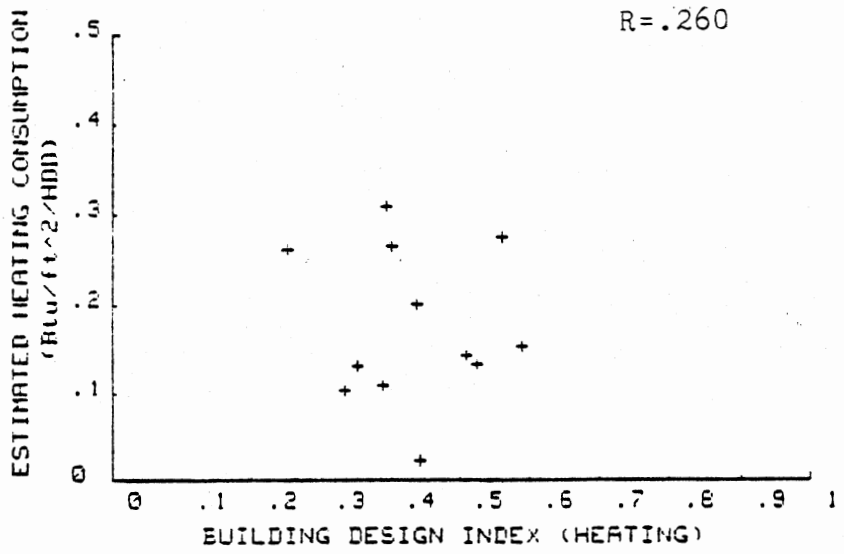


Figure 26. Building Design Index and Estimated Heating Consumption Scatter Plot (Central)

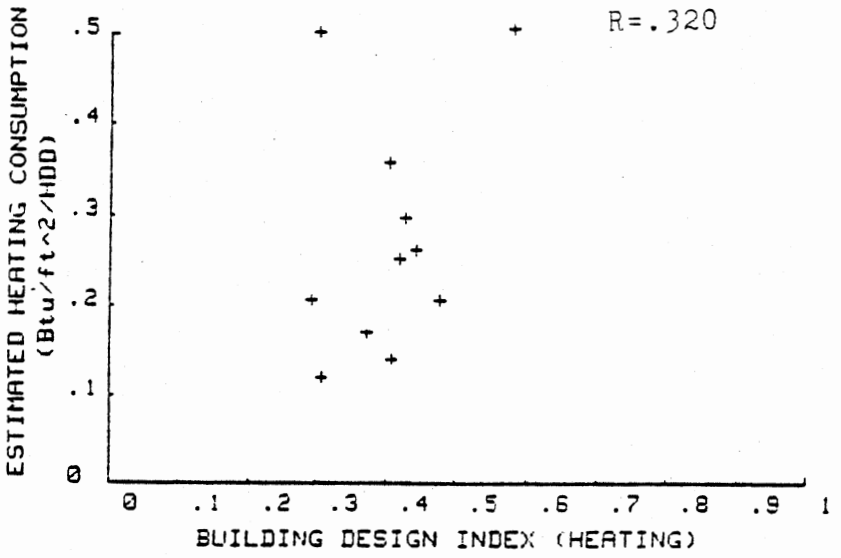


Figure 27. Building Design Index and Estimated Heating Consumption Scatter Plot (Southern)

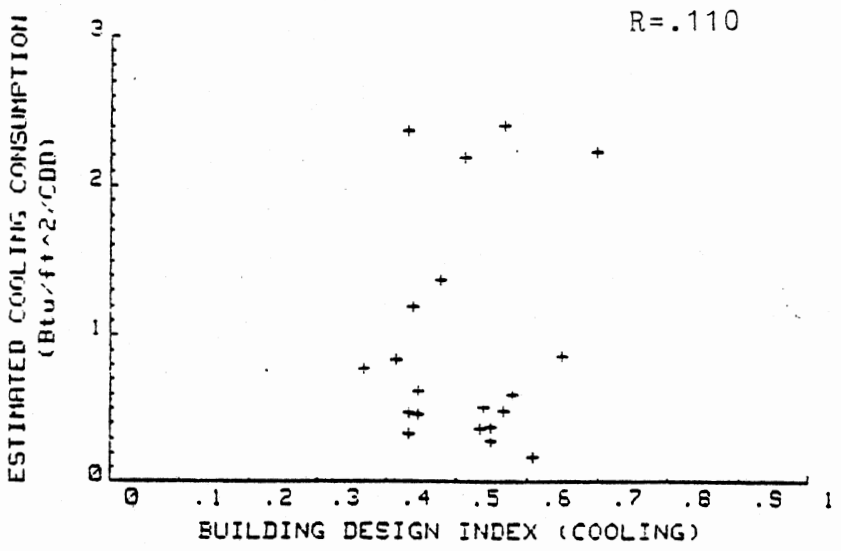


Figure 28. Building Design Index and Estimated Cooling Consumption Scatter Plot (Northern)

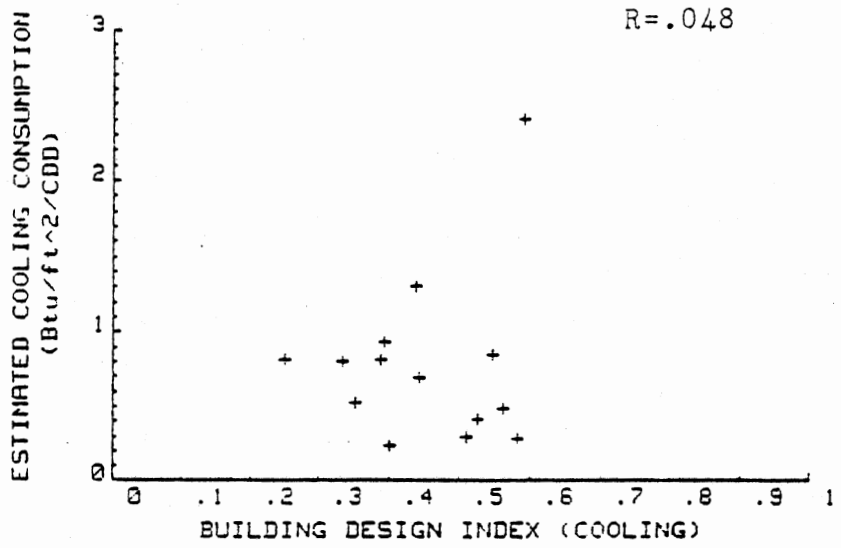


Figure 29. Building Design Index and Estimated Cooling Consumption Scatter Plot (Central)

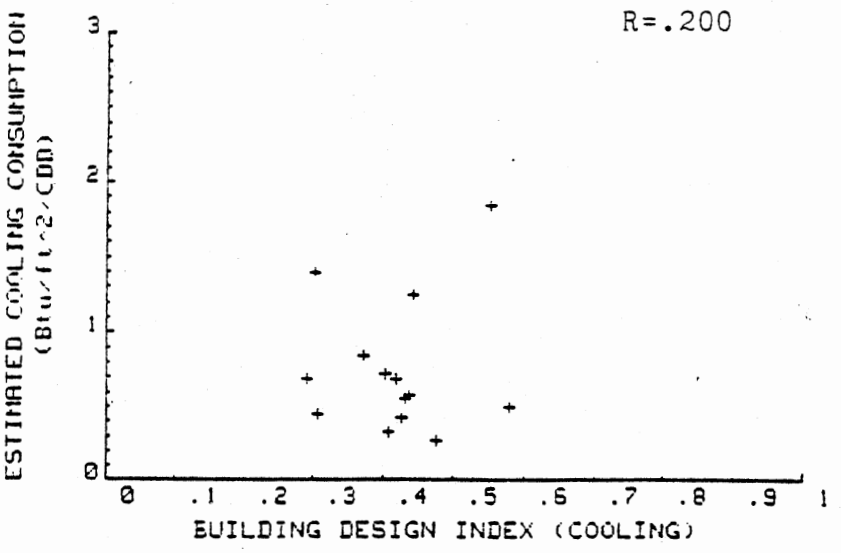


Figure 30. Building Design Index and Estimated Cooling Consumption Scatter Plot (Southern)

TABLE IX

PEARSON CORRELATION COEFFICIENTS
FOR FIGURES 19-30.

Fig.	Region	Variables	R
19	Northern	BDIh, Utility-based Heating Consumption	-.470
20	Central	BDIh, Utility-based Heating Consumption	.186
21	Southern	BDIh, Utility-based Heating Consumption	.308
22	Northern	BDIc, Utility-based Cooling Consumption	.1194
23	Central	BDIc, Utility-based Cooling Consumption	-.206
24	Southern	BDIc, Utility-based Cooling Consumption	-.014
25	Northern	BDIh, Owner-estimated Heating Consumption	-.025
26	Central	BDIh, Owner-estimated Heating Consumption	.260
27	Southern	BDIh, Owner-estimated Heating Consumption	.320
28	Northern	BDIc, Owner-estimated Cooling Consumption	.110
29	Central	BDIc, Owner-estimated Cooling Consumption	.048
30	Southern	BDIc, Owner-estimated Cooling Consumption	.200

In this study, a negative linear correlation of plotted values of BDI and energy consumption is desired. A negative linear correlation of the plotted values indicates a situation in which a house with a 'good' BDI has low energy usage, and a house with a 'bad' BDI has high energy usage. A positive linear correlation indicates a situation in which a house with a high BDI also has a high energy consumption value, and a house with a low BDI has a low energy consumption value.

From Figures 19 thru 30 and from Table IX, no significant correlation between BDI and energy consumption is apparent. The basis for determining if a Pearson correlation coefficient indicates a positive or negative linear correlation is a range of possible values within a set of decision points. These decision points are values, based upon the sample size and data type which, including the values of negative one and positive one, are the boundaries for determining the existence of a correlation. In this study, there are two sample sizes. The central region contains 17 earth sheltered homes. From Johnson, the decision points, based upon sample size of 17 and 20, are $\pm$ 0.482 and $\pm$ 0.444, respectively.[1] If the scatter plot of values of BDI and energy consumption in the northern region yields a value for R which is between -1 and -.444, there is a significant negative linear correlation. If, on the other hand, the value of R of the scatter plot for the same variables in the northern region is between .444 and 1,

then a significant positive linear correlation exists. Investigation of Figures 19 through 30 indicates only one plot which has a positive or negative linear correlation. The northern region BDI vs. average heating season consumption plot, Figure 19, indicates a slight negative linear correlation. Even though this particular plot indicates a correlation, none of the eleven other plots indicate any correlation between the BDI and the space conditioning energy consumption.

Energy Consumption vs. Climate

There are two possible reasons for the lack of significant correlation between the Building Design Index and the space conditioning energy consumption values of the investigated earth sheltered homes. The first possibility is that the Building Design Index does not adequately reflect or account for the issues central to space conditioning energy use of an earth sheltered house. This possibility is not eliminated; however, a second possibility does exist, and is investigated at this time. The second possible reason for the lack of correlation between the Building Design Index and the energy consumption values lies in the delineation of the energy consumption values.

The Building Design Indices for the heating and cooling seasons are based upon the ability of an earth sheltered house to effectively control heat loss and heat gain during the respective seasons. If, for example, an

earth sheltered house is unoccupied during the heating season, but the thermostat which controls the mechanical heating system is set to a standard setting of 68°F, the energy consumption pattern should, to a certain extent, follow the outside air temperature values, or another indication of the temperature-related climate, such as heating degree days. Therefore, the energy consumption of the house is controlled by the climate. If, when the house is occupied, the energy consumption pattern does not follow that of the climate, then something besides the climate is controlling the energy usage of the house. If this is the case, then the BDI of the house will not correlate with a temperature-based energy usage index for the house.

Figures 31 thru 36 are plots of the average monthly space conditioning energy consumption values per region, as compared to the temperature-related climatic values, HDD and CDD. In the northern and central regions, during both the heating and cooling seasons, the energy consumption curves do not follow those of the degree day values. The vertical separation of the curves in relation to each other is not significant, but the change in slope and the locations of peaks are indications that the energy consumption curve does not "follow" the degree day curve, even with a time lag. Therefore, it is assumed, based on the curves in Figures 31 through 36, that space conditioning energy consumption in the northern and central regions is not

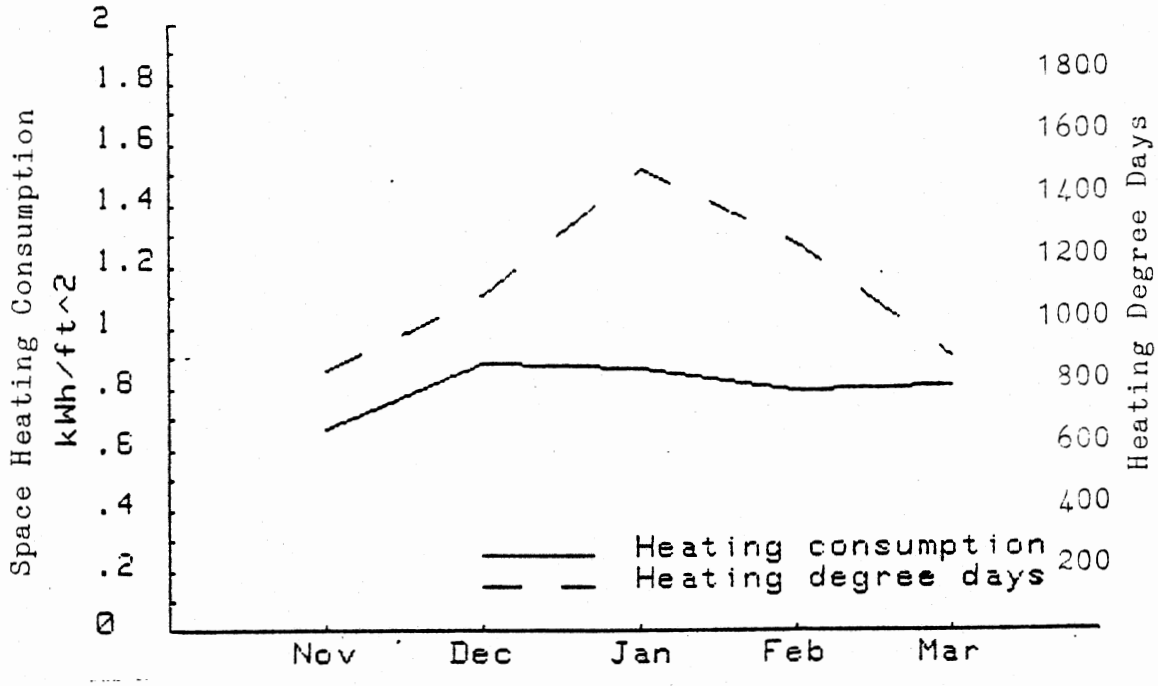


Figure 31. Space Heating Energy Consumption and Heating Degree Days (Northern Region)

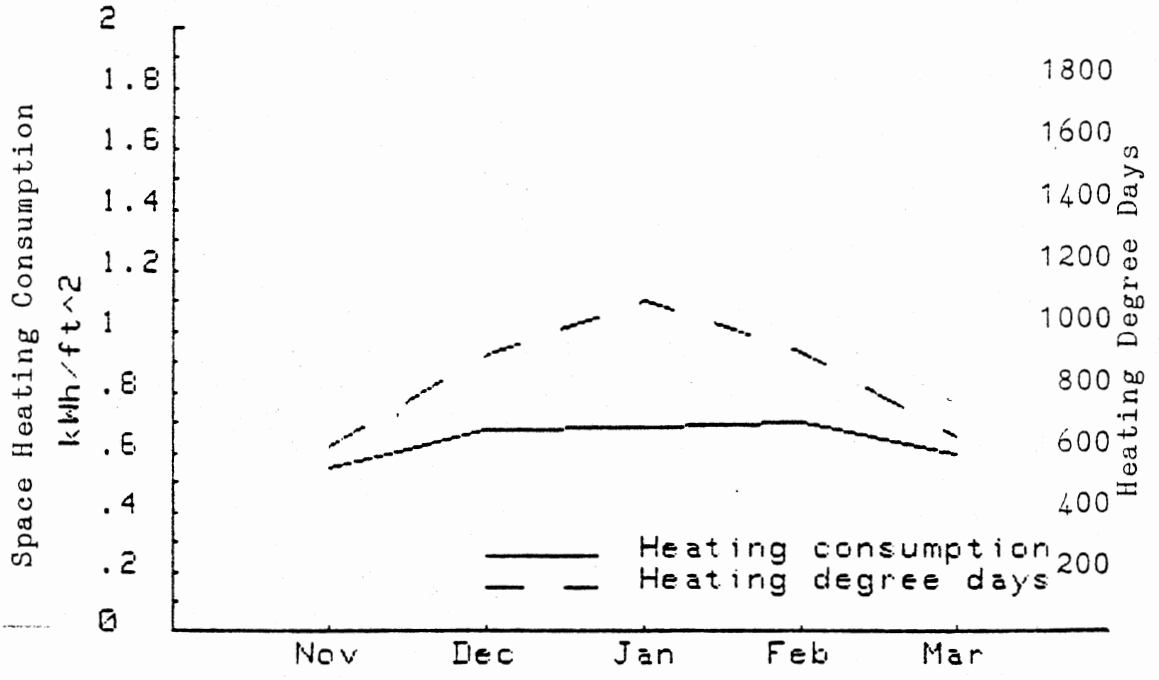


Figure 32. Space Heating Energy Consumption and Heating Degree Days (Central Region)

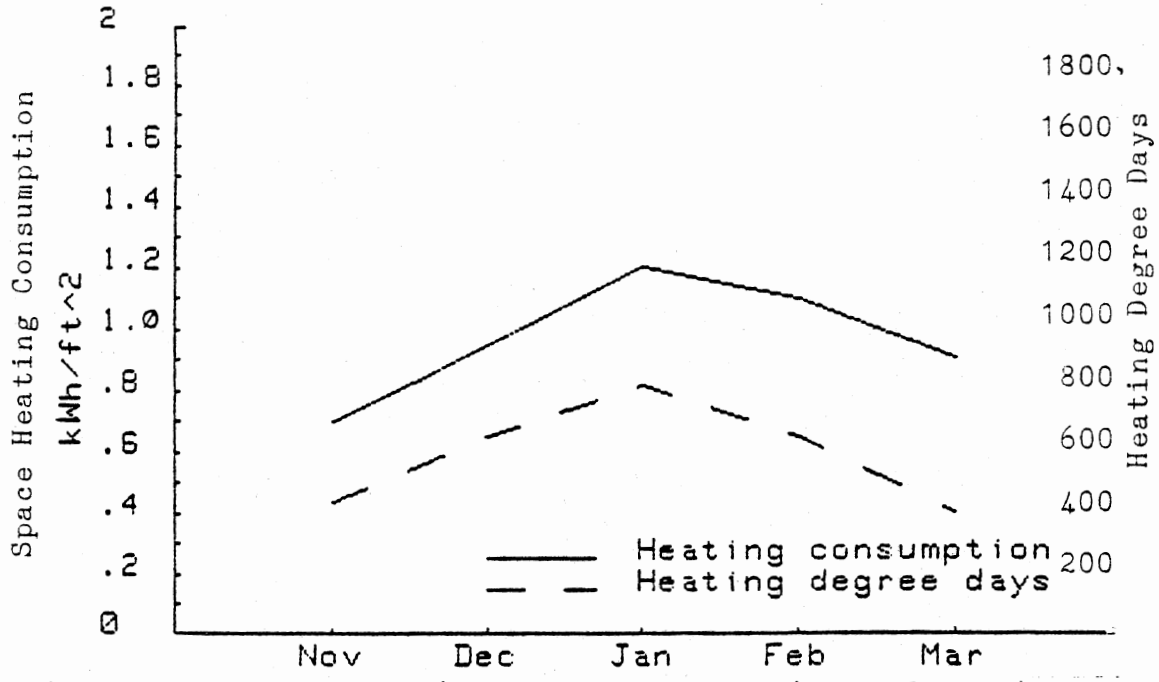


Figure 33. Space Heating Energy Consumption and Heating Degree Days (Southern Region)

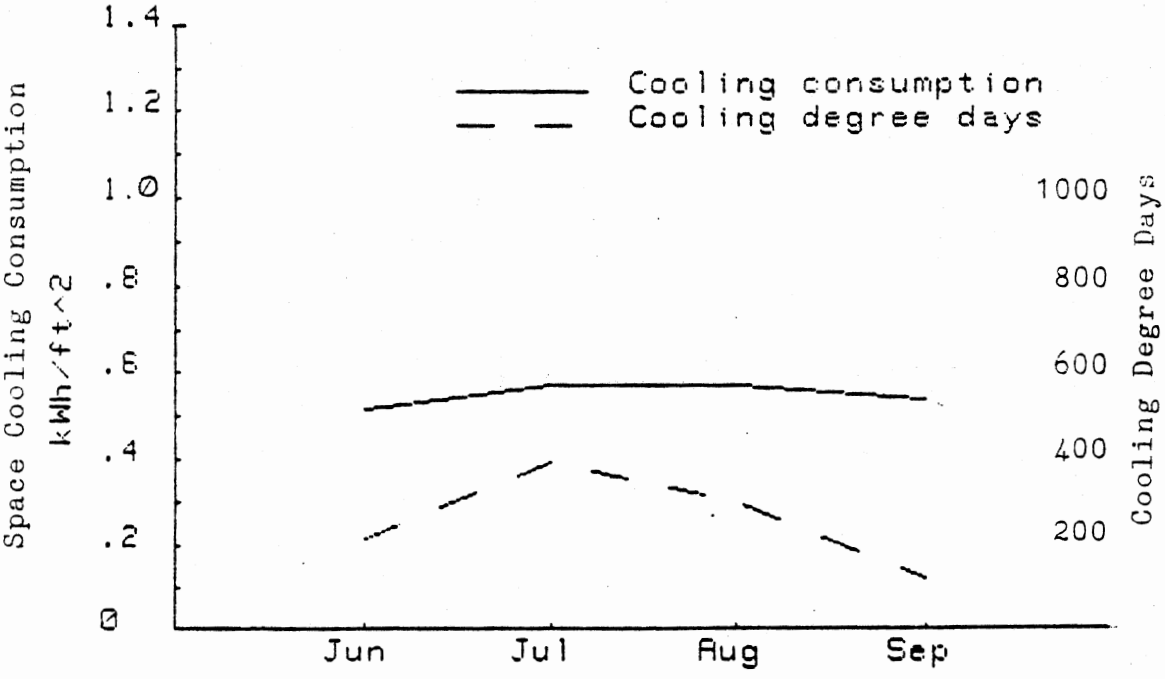


Figure 34. Space Cooling Energy Consumption and Cooling Degree Days (Northern Region)

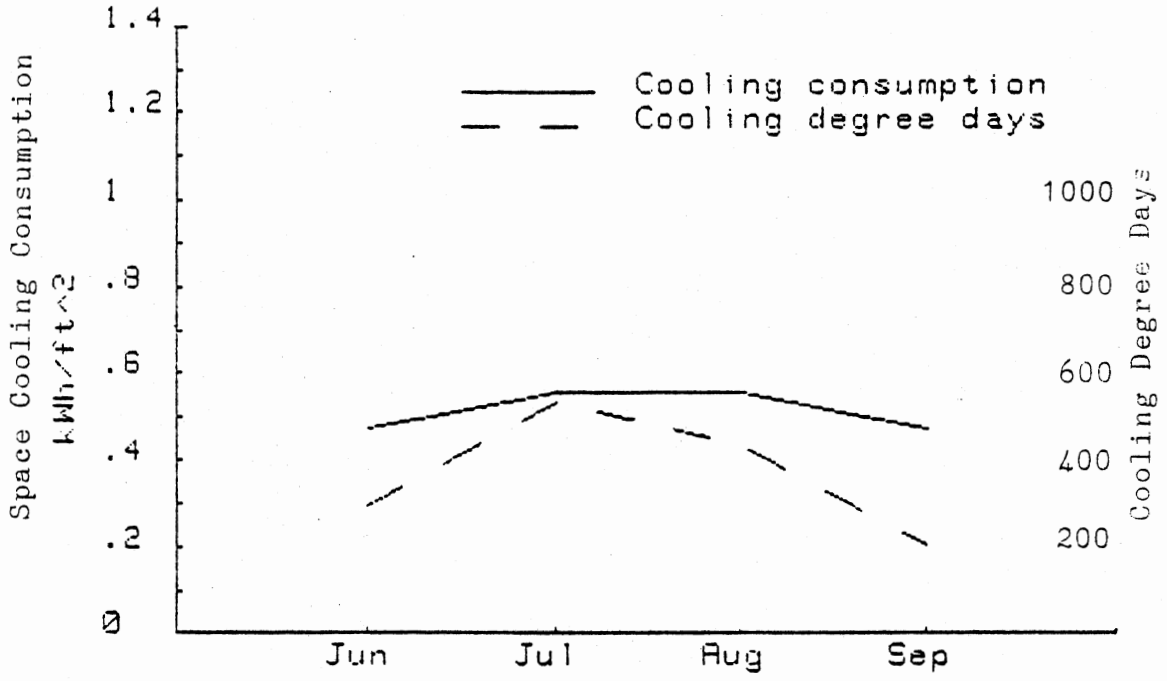


Figure 35. Space Cooling Energy Consumption and Cooling Degree Days (Central Region)

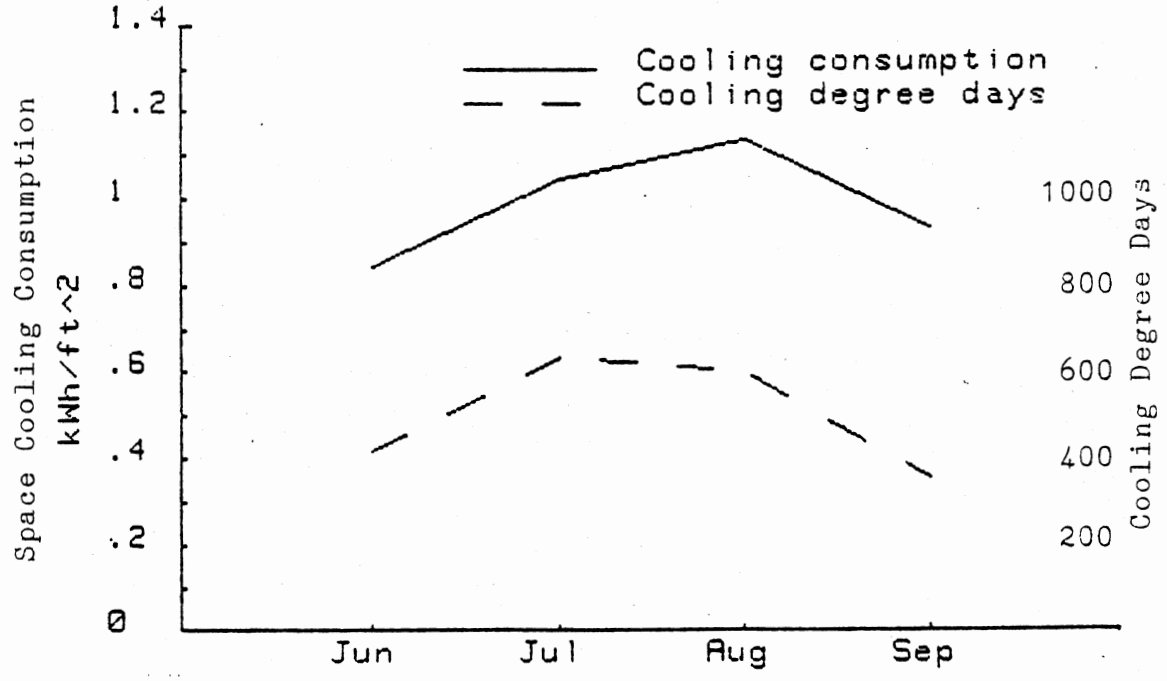


Figure 36. Space Cooling Energy Consumption and Cooling Degree Days (Southern Region)

climate controlled, and therefore no correlation of BDI and energy consumption is expected in these regions.

In the southern region, however, the graphs of space conditioning consumption compared to heating and cooling degree day values indicate energy consumption in earth sheltered homes is climate controlled, as indicated by the very similar patterns of energy consumption and degree days. Therefore a correlation is expected in the plots of BDI and space conditioning energy consumption for houses in the southern region. However, no significant correlations are indicated in Figures 21, 24, 27, or 30. Based upon this information, the possibility exists that the Building Design Index is not accurate in determining the appropriateness of the design of an earth sheltered dwelling. Utilizing the information available at this time, a thorough investigation into each of the factors contained in the Building Design Index is not possible, and is therefore beyond the scope of this thesis.

END NOTE

[1]Johnson, R., Elementary Statistics, 3rd Ed., Wadsworth, Inc., Belmont, CA, 1980, p. 102.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Energy consumption patterns for earth sheltered homes in the northern and central regions exhibit impressive energy related performance characteristics, while earth sheltered houses in the southern region have impressive, but consistently higher values of energy consumption. A possible reason for this, mentioned on page 62, is a difference in design and construction of these homes compared to earth sheltered homes in the other regions. As shown in Table VIII, the Building Design Index values for the southern region are lower than the values for the other regions, and are also lower than the average values for the study group. Even though the Building Design Index may not be entirely correct, the low BDI's indicate a consistent difference in earth sheltered housing design between the southern region and the northern and central regions.

Earth sheltered housing owners, as a rule, overestimated the percent contribution of alternative sources of energy to the space conditioning needs. As a result, owners' estimated space conditioning energy consumption values tend to greatly exceed the values of space

conditioning energy consumption which are based on metered utility data. Energy consumption of investigated earth shelters is significantly less than the energy consumption of typical above ground homes in the same area.

The Building Design Index cannot be sufficiently validated with the currently available information. It cannot be concluded, however, that the index is entirely inappropriate. As a preliminary tool, this index indicates the factors involved in the design of earth sheltered houses, the effect these factors have on the energy related performance of the house, and a suggested manner in which the factors chould be combined to achieve an appropriate design related index.

Recommendations

To aid in future work related to the ideas presented in this thesis, the following investigations are recommended:

1. Further investigation of the Building Design Index. Analyze all of the factors contained in the BDI based upon state-of-the-art information, as well as factors not presently included in the Building Design Index, such as internal loads. The use of a research facility to investigate the effects of insulation placement, wall and roof construction details, and alternate sources of energy, such as natural ventilation and passive

solar heating, in earth sheltered dwellings would be of invaluable assistance.

2. Further investigation of energy consumption in earth sheltered houses in the study area. Investigate the effects on energy consumption of lifestyle, including the number of occupants in the house, thermostat settings, hot water usage, and external consumption from shops, kilns, farms, etc. Submeter appliances and space conditioning equipment in selected earth sheltered houses.
3. Further investigation of energy consumption in above ground homes. Compile significant amounts of data pertaining to energy consumption of a large number of typical above ground houses in the study area. This information will be useful in comparing the energy consumption values of earth sheltered, super-insulated, double envelope, and other types of housing design to the values of typical above ground homes.

SELECTED BIBLIOGRAPHY

1. ASHRAE Handbook and Product Directory-1976 Systems, Chapter 43: Energy Estimating Methods, American Society of Heating, Refrigerating, and Air Conditioning Engineers, 43.8, 1976.

2. ASHRAE Handbook-1981 Fundamentals, Chapter 15, Combustion and Fuels, American Society of Heating, Refrigerating, and Air Conditioning Engineers, Atlanta, GA, 15.3, 1981.

3. ASHRAE Handbook - 1981 Fundamentals, Chapter 23, Design Heat Transmission Coefficients, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Atlanta, GA, 1981.

4. ASHRAE Handbook - 1981 Fundamentals, Chapter 39, Physical Properties of Materials, American Society of Heating, REfrigerating and Air Conditioning Engineers, Atlanta, GA, 1981.

5. Blick, E. "A Simple Method for Determining Heat Flow Through Earth Covered Roofs." Proc. Earth Sheltered Building Design Innovations Conf., L. Boyer (ed.), Stillwater, OK: Oklahoma State University, April, 1980, pp III-19-23.

6. Bligh, T. "Energy Conservation by Building Underground." Underground Space, Vol. 1, No. 1, pp 19-33.

7. Boyer, L. "Earth Sheltered Structures." Annual Review of Energy. J. Hollander (ed.), Palo Alto, CA: Annual Reviews, Inc., Vol. 7, 1982, pp 201-219.

8. Boyer, L., W. Grondzik, and T. Bice. "Energy Usage in Earth-Covered Dwellings in Oklahoma." Underground Space, Vol. 5, No. 4, pp 227-236.

9. Boyer, L., W. Grondzik, and M. Weber. "Passive Energy Design and Habitability Aspects of Earth Sheltered Housing in Oklahoma." Underground Space, Vol. 4, No. 6, pp 333-339.

10. Boyer, L., T. Johnston, "Organization of Interior Spaces for Earth Cooling." Proc. International Passive and Hybrid Cooling Conf., Miami Beach, AS/ISES, Nov 1981, pp 121-130.

11. Brunken, A., W. Grondzik, L. Boyer Earth Sheltered Housing, Architectural Extension, Oklahoma State University, Stillwater, OK, Sept. 1982, p VI-9.

12. Climatological Data; National Summaries, National Climatic Center, Environmental Data and Information Service, National Oceanic and Atmospheric Administration, Asheville, NC, 1976-1983.

13. Coad, W. J.: "Energy Audits I: The Energy Profile:, Heating/Piping/Air Conditioning 51(7):105-106, 1979.

14. Earth Shelter Living, Webco Publishing Co., St. Paul, MN, No. 21, May-June, 1982.

15. "Energy Performance Standards for New Buildings: Proposed Rule," U.S. Dept. Of Energy, Federal Register 44(230): 68120-68181, 1979.

16. Fairhurst, C., "Energy, Conservation, and the Underground." Underground Space, Vol. 1, No. 2, pp iii-v.

17. Grondzik, W., and L. Boyer. "Oklahoma Earth Shelters: A State-of-the-Art Review." Collected Papers Presented at Earth Sheltered Housing Conference and Exhibition, Minneapolis, April 1980, pp 43-54.

18. Grondzik, W., L. Boyer, and J. Zang. "Analysis of Utility Billings for 55 Earth Sheltered Projects." Proc. Earth Shelter Performance and Evaluation Conf., L. Boyer, (ed.), Stillwater, OK: Oklahoma State University, Oct. 1981, pp 177-184.

19. Guy, H. "An Economic Comparison of Passively Conditioned Underground Houses." Published Master of Architectural Engineering Thesis, Oklahoma State University, 1981, p 109.

20. Johnson, R., Elementary Statistics, 3rd Ed., Wadsworth, Inc., Belmont, CA, 1980, p 102.

21. Labs, K. Regional Analysis of Ground and Above-Ground Climate, U.S. Dept. of Energy, Oak Ridge National Laboratory, Oak Ridge, TN, Contract No. W-7405-eng-26, 1981, p 80.

22. "Nine-State Earth Sheltered Housing Survey - Detailed Questionnaire for Earth Sheltered Housing Owners." (Survey conducted by Center for Natural Energy Design, College of Engineering, Oklahoma State University, Stillwater, OK, 1979.)

23. Rawlings, R. "Why Build Below?" New Shelter, Vol. III, No. 1, Jan 1982, pp 18-22.

24. Sterling, R. "Current Research Into the Effectiveness and Acceptability of Earth Sheltered Buildings as a Passive Energy Conservation Technique." Proc. 4th National Passive Solar Conf., Kansas City, AS/ISES, Oct 1979, pp 425-428.

25. U.S. Dept. of Energy, "Earth Coupled Cooling Techniques." Earth Sheltered Structures Fact Sheet 09, Center for Natural Energy Design, School of Architecture, Oklahoma State University, 1981.

26. U.S. Dept. of Energy, "Insulation Materials and Placement." Earth Sheltered Structures Fact Sheet 06, Underground Space Center, University of Minnesota, 1981.

27. U.S. Dept. of Energy, "Insulation Principles." Earth Sheltered Structures Fact Sheet 05, Underground Space Center, University of Minnesota, 1981.

APPENDIXES

APPENDIX DIRECTORY

Appendix		Page
A.	NINE-STATE EARTH SHELTERED HOUSING SURVEY	93
B.	BUILDING DESIGN INDEX INPUT FORM	111
C.	ENERGY ANALYSIS COMPUTER PROGRAM	113
D.	BUILDING DESIGN INDEX EXAMPLE CALCULATION FORM	146
E.	EARTH SHELTERED HOUSING ENERGY CONSUMPTION	148
	Southern Region	149
	Central Region	169
	Northern Region	186
F.	REGIONAL EARTH SHELTERED HOUSING ENERGY CONSUMPTION	206
G.	BUILDING DESIGN INDEX VALUES	211
	Southern Region	212
	Central Region	230
	Northern Region	247

APPENDIX A

NINE-STATE EARTH SHELTERED HOUSING SURVEY

February 14, 1981

CENTER FOR NATURAL ENERGY DESIGN
OKLAHOMA STATE UNIVERSITY
124 ARCHITECTURE BUILDING
STILLWATER, OK 74078

TO:

Place mailing label here.

REGARDING: Nine-State Earth Sheltered Housing Survey-

DETAILED QUESTIONNAIRE FOR
EARTH SHELTERED HOUSING OWNERS.

Thank you for responding to the questionnaire which compares your previous above ground home with your present earth sheltered housing. This previous questionnaire is now being analyzed, and you should be receiving a summary of the results after the analyses are completed.

This new questionnaire asks for similar comparisons, but includes a wider scope of questions on living factors, planning considerations (costs and problems) and energy factors. Participants in the study will include owners, such as yourself, people whose earth sheltered homes are under construction, and those who are merely considering earth sheltered housing.

Your careful attention to all items in this longer questionnaire is very important. As a participant in this study, you will be part of the first attempt to obtain this type of information from residents in the region which includes Arkansas, Colorado, Iowa, Kansas, Missouri, Nebraska, New Mexico, Oklahoma and Texas. The results, when compiled and analyzed, will be useful in the future for those considering, constructing, or living in earth sheltered housing. Your personal responses, however, will remain confidential in that our reports will never refer to you by name or location.

You will be receiving a complimentary copy of our publication, "Earth Sheltered Condominiums," after you have completed and returned this questionnaire. The booklet is an interesting report of a recent design competition dealing with earth covered dwellings. Also, the summarized results of this survey will be sent to you as soon as the analyses are completed and summarized. (This process will take several months.)

Thank you once again for your very helpful cooperation.

Bob Helm
Survey Director

Lee Boyer
Center Director

EARTH SHELTERED HOUSING
OWNER'S QUESTIONNAIRE

--/--/--
DATE

CENTER FOR NATURAL ENERGY DESIGN
OKLAHOMA STATE UNIVERSITY
124 ARCHITECTURE BUILDING
STILLWATER, OK 74078

SECTION A Descriptive information

1. Your name _____
last first middle initial

2. Your address _____
street city county state zip

3. Your area code and telephone number _____

You are being asked to make ratings or evaluations with regard to your previous ABOVE GROUND DWELLING and your present EARTH SHELTERED HOUSE. WHEN ASKED TO RATE AN ABOVE GROUND DWELLING YOU SHOULD BASE YOUR RATING ON WHAT YOUR PREVIOUS ABOVE GROUND DWELLING WAS LIKE. IT IS VERY IMPORTANT TO REMEMBER THIS POINT AND USE IT AS A GUIDELINE THROUGHOUT THE QUESTIONNAIRE.

Items 4-5 below are similar to many items in the questionnaire in that each item requires TWO answers. The top scale is for your previous ABOVE GROUND DWELLING and is labeled "AG" (ABOVE GROUND). The bottom scale is for your present EARTH SHELTERED HOUSE and is labeled "ES" (EARTH SHELTERED).

4. Population setting. (If urban, circle city or town's population. If rural, circle "Rural".)

AG:	Rural	100-999	1000-9999	10000-49999	50000 & up
ES:	Rural	100-999	1000-9999	10000-49999	50000 & up

5. Size of lot (in acres).

AG:	under 1	1-5	6-20	21-49	50-99	over 99
ES:	under 1	1-5	6-20	21-49	50-99	over 99

6. Square footage of dwelling (excluding garage). Simply indicate square footage in blank.
AG: _____
ES: _____

7. When was construction of your earth sheltered home completed?
Month:_____ Year:_____

8. When did you first occupy your earth sheltered house?
Month:_____ Year:_____

9. Approximate year that your previous above ground home was built?
Before '60__ '60-'64__ '65-'69__ '70-'74__ '75-'79__ '80__

10. Please estimate the present market value of your previous ABOVE GROUND HOME and your present EARTH SHELTERED DWELLING, including the value of a 1 acre lot.

AG $_____
ES $_____

11. Type of earth contact walls in EARTH SHELTERED home.
a. poured concrete
b. concrete block
c. block
d. other (specify) _____

12. Type of floor structure in your earth sheltered home.
a. slab on grade
b. wood floor above dead air crawl space
c. wood floor above air circulation plenum
d. wood on furring strips
e. other (specify) _____

13. Type of roof structure in earth sheltered house.
a. metal deck/steel joist
b. poured concrete
c. precast concrete
d. wood
e. other (specify) _____

14. Type of ceiling in earth sheltered house.
a. exposed or painted structure
b. plaster applied directly to structure
c. tile or drywall applied directly to structure
d. suspended ceiling
e. furred tile or drywall
f. other (specify) _____

15. Material used for most interior partition walls in earth sheltered house.
a. poured concrete
b. concrete block
c. frame construction (wood)
d. other (specify) _____

16. Type of wall treatment installed or interior of earth contact walls.
a. bare or painted brick or concrete
b. stucco, plaster, etc. directly on structure
c. vinyl or wallpaper directly on structure
d. drywall or paneling glued on structure
e. drywall or paneling on furring strips
f. drywall or paneling with interior insulation
g. double wall construction
h. other (specify) _____

17. What type and thickness of insulation is used in your present earth sheltered home?

Surface	Type of Insulation	Thickness (Inches)	R Value	% of Surface Covered
Roof	_____	_____	____	_____%
Exposed walls	_____	_____	____	_____%
Earth Contact walls	_____	_____	____	_____%
Floor	_____	_____	____	_____%
Other _____	_____	_____	____	_____%

18. Please indicate the type of waterproofing used in your earth sheltered home and note the method of application.

Surface	Type of Waterproofing	Method of Application	Comments
Roof	_____	_____	_____
Walls	_____	_____	_____
Floors	_____	_____	_____

19. So we can determine the thermal mass of your earth sheltered house, please give the area and thickness of all roof, wall and floor constructions which are either concrete or concrete block. If you know the cubic yardage, please circle the appropriate number. DO NOT include garage.

	Area: SQ.FT.	Thickness: Inches	Material Type	Cubic Yards
Roof	_____	_____	_____	0 25 50 75 100 125 150 175 200
Perimeter Walls	_____	_____	_____	0 25 50 75 100 125 150 175 200
Interior Walls	_____	_____	_____	0 25 50 75 100 125 150 175 200
Floor	_____	_____	_____	0 25 50 75 100 125 150 175 200

20. Were potential "energy nosebleeds" or "thermal wicks" treated in your earth sheltered home design and construction?

Treated___ Not Treated___ Not Sure___

21. In your earth sheltered home, what percentage of the occupied floor area is covered by earth? _____% Earth Thickness? ___inches

22. During which month of the year was your earth sheltered home backfilled? _____

23. What type of backfill material was placed against your earth-packed walls? (Circle answer.)
    a. mostly gravel
    b. mostly sand
    c. mostly black earth
    d. mixture of clay and topsoil
    e. mostly clay soil

24. What type of earth material was placed on your roof? (Circle answer.)
    a. mostly gravel
    b. mostly sand
    c. mostly black earth
    d. mixture of clay and topsoil
    e. mostly clay soil
    f. none

25. What is the final topping treatment over the major earth covered roof area? (Circle answer.)
    a. asphalt
    b. concrete
    c. wood
    d. grows wild
    e. garden
    f. mowed grass
    g. other (specify) _____

SECTION B Living factors

Like many of the forthcoming items in the questionnaire, items 26-39 on the next page have four scales (sets of numbers from 1-7). The top two scales are for rating your previous ABOVE GROUND DWELLING and are labeled "AG" accordingly. The bottom two scales are for rating your EARTH SHELTERED HOUSE and are labeled "ES".

In the far left column are specific housing OBJECTIVES (things which might or might not be important in a dwelling). In the second (or middle) column are scales which allow you to express agreement or disagreement that the objective is IMPORTANT TO YOU (first, as it would have been in your previous above ground house, and second, as it is in your earth sheltered house). In the third (or far right) column are scales which allow you to express agreement or disagreement with the statement that this objective IS ACHIEVED in the home (first, as it might have been in your previous above ground, and secondly, as it is in your earth sheltered home). (If there are ever times when you don't feel you can make a distinction between the above ground house and the earth sheltered house, feel free to simply rate them the same).

Note that each scale has SEVEN numbers. If you wish to express strong disagreement, you should circle a #1. If you wish to express strong agreement, you should circle a #7. Circling a #4 would indicate that you feel neutral or are not sure. Other numbers indicate various degrees of agreement or disagreement between the extremes of 1 and 7. Proceed to make your rating now by CIRCLING the number on each scale which best expresses your feelings.

HOUSING OBJECTIVE	THIS HOUSING OBJECTIVE IS IMPORTANT TO ME (OR WAS IN AG). Disagree ____ Agree	THIS OBJECTIVE IS ACHIEVED IN MY HOME (OR WAS IN AG). Disagree ____ Agree
26. Ample internal storage space.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
27. Flexibility of internal space for expansion and different usage.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
28. Accessibility to bring in groceries.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
29. Protection from vandalism or crime.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
30. Storm protection.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
31. Multipurpose rooftop usage.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
32. Sufficiency of fire exits.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
33. Having shade trees near the house.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
34. Comfortable air temperature in living space.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
35. Comfortable humidity level.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
36. Space temperature uniformity in winter.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
37. Space temperature uniformity in summer.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
38. Elimination of cold drafts in winter.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
39. Air circulation in dwelling.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

ACTIVITY	HOW OFTEN DO (OR DID) YOUR LIVING HABITS INCLUDE THIS ACTIVITY? Never ... Always
40. Altering thermostat setting from day to night.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
41. Shutoff or setback of air conditioner or heater when house is unoccupied.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
42. Turning off lights which are not in use.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
43. Adjusting the type of clothing worn while inside to allow for warmer summer and cooler winter temperatures.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
44. Selective use of space (closing off space which is not in use).	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
45. Adjusting living habits to more fully utilize those spaces which are most comfortable at any given time of the day.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
46. Making a conscious effort to change your daily pattern of activities in order to save energy.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

47. Please provide the following information on thermostat settings. On the left indicate what, to you, is an IDEAL setting. In the middle, indicate the AVERAGE setting in your previous ABOVE GROUND DWELLING. On the right, indicate the AVERAGE setting in your EARTH SHELTERED HOUSE. Do so by circling the appropriate temperature (degrees in Fahrenheit).

	IDEAL	ABOVE GROUND DWELLING	EARTH SHELTERED HOUSE
Summer Setting	72 74 76 78 80 or less ... or more	72 74 76 78 80 or less ... or more	72 74 76 78 80 or less ... or more
Winter Setting	64 66 68 70 72 or less ... or more	64 66 68 70 72 or less ... or more	64 66 68 70 72 or less ... or more

48. In comparison to your previous above ground dwelling, is your earth sheltered home lower, equal or higher in overall achieved comfort? Answer by circling a specific percentage of difference on the following scale.

ES is Lower ... ES is Equal ... ES is Higher
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

49. How does the overall comfort of your earth sheltered home compare with what you had EXPECTED before moving into it?

Much Lower			Same			Much Higher
1	2	3	4	5	6	7

50. What is your degree of satisfaction with respect to air temperature in your main living area during the four seasons? (Please don't answer for a season you have yet to experience in your house.)

	Dissatisfied			Neutral			Satisfied
Summer	1	2	3	4	5	6	7
Autumn	1	2	3	4	5	6	7
Winter	1	2	3	4	5	6	7
Spring	1	2	3	4	5	6	7

51. What is your degree of satisfaction with the surface temperature of earth backed walls? (Please don't answer for a season you have yet to experience in your house.)

	Dissatisfied			Neutral			Satisfied
Summer	1	2	3	4	5	6	7
Autumn	1	2	3	4	5	6	7
Winter	1	2	3	4	5	6	7
Spring	1	2	3	4	5	6	7

HOUSING OBJECTIVE	THIS HOUSING OBJECTIVE IS IMPORTANT TO ME (OR WAS IN AG). Disagree ... Agree	THIS OBJECTIVE IS ACHIEVED IN MY HOME (OR WAS IN AG). Disagree ... Agree
52. Privacy of family from neighbors.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
53. Elimination of noise from the outside.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
54. Elimination of echoing sound qualities.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
55. Control of plumbing noises.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
56. Control of mechanical equipment noises.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

HOUSING OBJECTIVE	THIS HOUSING OBJECTIVE IS IMPORTANT TO ME (OR WAS IN AG). Disagree ____ Agree	THIS OBJECTIVE IS ACHIEVED IN MY HOME (OR WAS IN AG). Disagree ____ Agree
57. Adequate electric lighting levels.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
58. Adequate natural lighting design.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
59. Uniform daylight in living area in early evening.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
60. Elimination of contrast, such as bright sunny windows located near darker walls.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
61. Window design which permits eyes to easily adjust when looking up from reading or other close work to see outside.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
62. Adequate interior lighting arrangements at night.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
63. Pleasing style, arrangement and color of electric lighting.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
64. Pleasing exterior appearance from highway.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
65. House blends with or conforms to its site.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
66. Pleasing quality of architectural style.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
67. Pleasing main house entrance design.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
68. Pleasing appearance of materials used on walls, floors and ceilings.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
69. Adequate views to outside from living area.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

SECTION C Planning, costs, and problems

70. Please list the five most important factors which led you to consider earth sheltered housing. Then rank these factors from 1 to 5, with the most important factor being assigned #1, the least important #5.

Factor	Rank

71. Whom of the following was involved in developing plans and drawings for your earth sheltered home? (Check all that apply.)
___Designer ___Contractor ___Mail order ___Other(specify)
___Engineer ___Architect ___Yourself _____

72. Whom of the following took part in the actual construction of your earth sheltered house?
___Yourself ___Contractor ___Both ___Other(specify)_____

73. In comparison to the construction cost of a COMPARABLE above ground dwelling, was your earth sheltered home lower, equal or higher in construction cost? Answer by circling a specific percentage of difference on the following scale.

ES was Lower ES was Equal ES was Higher
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

74. In comparison to your previous above ground dwelling, is your earth sheltered home relatively less expensive, equal or more expensive to insure? Answer by circling a specific percentage of difference on the following scale.

ES is Lower ES is Equal ES is Higher
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

75. In comparison to your previous above ground dwelling, does your earth sheltered home have relatively lower, equal or higher maintenance requirements? Answer by circling a specific percentage of difference on the following scale.

ES is Lower ES is Equal ES is Higher
100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

76. How do the maintenance requirements of your earth sheltered home compare with what you had EXPECTED before moving into it?

Much Lower Same Much Higher
1 2 3 4 5 6 7

MAINTENANCE FACTOR	EXTENT OF DIFFICULTIES EXPERIENCED IN AG AND IN ES None Minor Major
77. Control or repair of water erosion.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
78. Upkeep of vegetation (trimming, mowing, weeding, etc.).	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
79. Repair of earth retaining walls (cracks, leaks, movement, etc.).	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
80. Upkeep of exposed exterior surfaces (painting, cleaning, etc.).	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
81. Control or repair of animal pest damage.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
82. Repair of waterproofing membrane or roof surfaces.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
83. Upkeep of vertical roof penetrations (breakage, blockage, leaks, cleaning, etc.)	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
84. Repair or replacement of insulation.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
85. Cleaning, servicing of dehumidification devices.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
86. Condensation on window surfaces.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
87. Condensation on wall surfaces.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
88. Water leakage into building.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

QUESTIONS 89-94 REFER TO YOUR EARTH SHELTERED HOUSE.

	Extent of Difficulties Experienced None Minor Major
89. Obtaining plans for construction.	1 2 3 4 5 6 7
90. Complying with building codes.	1 2 3 4 5 6 7
91. Getting contractor or construction workers.	1 2 3 4 5 6 7
92. Obtaining financing.	1 2 3 4 5 6 7
93. Obtaining appropriate insurance.	1 2 3 4 5 6 7
94. Obtaining information about ways to minimize energy consumption in the design.	1 2 3 4 5 6 7

95. Do you have a sewage ejector in your earth sheltered home?
Yes___ No___

96. The following factors seem to be important to others who are considering earth sheltered housing. Please indicate how important each of these factors was to you in considering earth sheltered housing, by rating each factor on a scale of "1"(Not Important) to "7"(Very Important).

	Not Important						very Important
Land preservation	1	2	3	4	5	6	7
Improved lifestyle	1	2	3	4	5	6	7
Reduced cooling load	1	2	3	4	5	6	7
Reduced heating load	1	2	3	4	5	6	7
Maintenance reduction	1	2	3	4	5	6	7
Environmental noise reduction	1	2	3	4	5	6	7
Personal privacy	1	2	3	4	5	6	7
Demonstration or experimentation with ES concept	1	2	3	4	5	6	7
Storm protection	1	2	3	4	5	6	7
Enhanced alternative energy potential	1	2	3	4	5	6	7
Security from vandalism/crime	1	2	3	4	5	6	7
Insurance reduction/elimination	1	2	3	4	5	6	7

SECTION D Energy factors

97. Type of space heating system in your earth sheltered dwelling. (Circle all that apply.)

a. none
b. passive solar
c. active solar
d. stove or fireplace
e. space heaters
f. electric baseboard
g. hot water/steam radiator
h. central electric furnace
i. central gas furnace
j. heat pump
k. other (specify) _____

98. Type of cooling system in your earth sheltered dwelling. (Circle all that apply.)

a. none
b. natural ventilation
c. central air conditioner
d. heat pump air-cond.
e. window air-conditioner
f. evaporative cooler
g. other (specify) _____

99. Type of air distribution system in your earth sheltered dwelling. (Circle all that apply.)

a. none
b. natural circulation
c. individual space fans
d. double wall air circ.
e. central ducts-ceiling
f. central ducts-floor
g. other (specify) _____

100. Number and location of exhaust fans in your earth sheltered home.

a. ___bathroom(s)
b. ___attic
c. ___sun room(s)
d. ___garden room(s)
e. ___kitchen
f. ___laundry (including dryer vent)
g. ___large whole house fan
h. ___other (specify) _____

101. How many square feet of glass is utilized for passive solar heating in your earth sheltered home?_____
In your previous above ground dwelling?_____

102. If active or passive solar heating, solar assisted water heating, or a solar greenhouse is used in your present home, please indicate the type, square feet of collector, and total cost.

Type	Sq.ft. of Collector	Total Cost
Active Solar	_____	_____
Passive Solar	_____	_____
Solar Water Heating	_____	_____
Solar Greenhouse	_____	_____

103. Is solar heating utilized in your earth sheltered home in any other way than those mentioned in this and the previous sections?_____
If so, please describe.

IN ITEMS 104-116 YOU ARE ASKED TO ESTIMATE THE CONTRIBUTIONS OF VARIOUS FACTORS TO YOUR WATER HEATING, LIGHTING, SPACE HEATING AND COOLING NEEDS. PLEASE NOTE THAT CONTRIBUTIONS IN THE "SPACE HEATING" AND "COOLING" SECTIONS SHOULD TOTAL TO 100 PERCENT.

	IN AG (In Percentage)	IN ES (In Percentage)
CONTRIBUTION TO ANNUAL WATER HEATING NEEDS		
104. Domestic solar water heating	____%	____%
LIGHTING FACTORS		
105. Contribution of natural daylighting to annual lighting needs.	____%	____%
106. Percentage of house which is adequately served by daylighting, thus requiring no electric lights during daylight hours.	____%	____%
107. Percentage of East, South and West windows which receive external shading from sun.	____%	____%
CONTRIBUTIONS TO ANNUAL SPACE HEATING NEEDS (TOTAL TO 100%.)		
108. Active solar	____%	____%
109. Passive solar	____%	____%
110. Renewable resources (wood, wind, etc)	____%	____%
111. Mechanical/electrical heating system	____%	____%
112. Other _____	____%	____%
	TOTAL=100%	TOTAL=100%
CONTRIBUTIONS TO ANNUAL COOLING NEEDS (TOTAL TO 100%.)		
113. Natural ventilation (no fans)	____%	____%
114. Mechanical/electrical cooling system	____%	____%
115. Natural cooling effect of earth contact walls	____%	____%
116. Other _____	____%	____%
	TOTAL=100%	TOTAL=100%

117. What percentage of exterior building surface area (walls, floor, roof) is used for its free cooling effect in warm weather?_____%

118. Please describe the types of shading devices used in your earth sheltered home for each of the four orientations. (If a particular side has no windows, simply indicate "No windows.")

SOUTH:_____ WEST:_____

EAST:_____ NORTH:_____

119. Is outside air for combustion supplied directly to the fuel burning apparatus in your present home? (N/A means "not applicable" to your situation.)

FURNACE:	___Yes	___No	___N/A
STOVE:	___Yes	___No	___N/A
FIREPLACE:	___Yes	___No	___N/A

120. If you have vegetation around or on top of your earth sheltered house, how often is it watered during the growing season?

a. never
b. once a month
c. once a week
d. every few days
e. every day

121. Please provide information about the major building features listed below for your earth sheltered house.

	Direction that walls face	Percent of surface area contacting the earth	Percent of surface area consisting of windows, doors or skylights	Percent of window/door/ skylight area which can be opened
Roof	XXXXXXXXXX	_____	_____	_____
Front wall(s)	_____	_____	_____	_____
Rear wall(s)	_____	_____	_____	_____
Left wall(s)	_____	_____	_____	_____
Right wall(s)	_____	_____	_____	_____
Interior court	XXXXXXXXXX	_____	_____	_____

HOUSING OBJECTIVE	THIS HOUSING OBJECTIVE IS IMPORTANT TO ME (OR WAS IN AG). Disagree ... Agree	THIS OBJECTIVE IS ACHIEVED IN MY HOME (OR WAS IN AG). Disagree ... Agree
122. Maximal energy conservation.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
123. Minimal humidifier usage.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7
124. Minimal dehumidifier usage.	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7	AG 1 2 3 4 5 6 7 ES 1 2 3 4 5 6 7

125. Please indicate the number and type (gas, electric, etc.) of water heaters used in your present home.

Number	Type(s)	Capacity
_____	_____	____Gal.

126. Please indicate the number of humidifiers and/or dehumidifiers used in your present home and in your previous above ground home.

	Humidifiers	Dehumidifiers
Above Ground Dwelling	No.=_____	No.=_____
Earth Sheltered Dwelling	No.=_____	No.=_____

127. In comparison to your previous above ground dwelling, does your earth sheltered home require relatively lower, equal or higher energy consumption? Answer by circling a specific percentage of difference on the following scale.

ES is Lower — ES is Equal — ES is Higher

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

128. How does the energy consumption of your earth sheltered home compare with what you had EXPECTED before moving into it?

Much Lower — Same — Much Higher

1 2 3 4 5 6 7

129. Please complete this table by detailing the energy consumption of your earth sheltered home FOR THE PAST YEAR. Begin with your most recent billing and work backward for 12 months. Each entry should represent one billing period, typically about thirty (30) days. Do not be overly concerned if a bill or two is missing--partial information is more valuable than none. Please note that CONSUMPTION, not cost, is requested.

ELECTRICITY		NATURAL GAS	
TIME PERIOD	USAGE (KWH)	TIME PERIOD	USAGE (MCF)
EXAMPLE- 8-17-79 to 9-17-79	670	1-18-80 to 2-22-80	115
1)_____to_____	____	_____to_____	____
2)_____to_____	____	_____to_____	____
3)_____to_____	____	_____to_____	____
4)_____to_____	____	_____to_____	____
5)_____to_____	____	_____to_____	____
6)_____to_____	____	_____to_____	____
7)_____to_____	____	_____to_____	____
8)_____to_____	____	_____to_____	____
9)_____to_____	____	_____to_____	____
10)_____to_____	____	_____to_____	____
11)_____to_____	____	_____to_____	____
12)_____to_____	____	_____to_____	____

130. Annual Propane Usage (Gallons) _____

131. Annual Wood Usage (Cords) _____ (or Ricks_____)

132. Annual Usage of Other Fuels (Fuel Oil, Diesel, etc.) _____

133. If the energy use data given above is unusual or abnormal for any reason, please describe the reason below.

134. In addition to present energy analyses, we would like to conduct CONTINUING analyses of energy usage in earth sheltered homes. For this reason, we have included the following utility data release forms. These forms represent a mechanism which we hope will allow us to obtain much needed energy consumption data, without imposing unreasonable demands on your time. Please be assured that any and all information you provide will be treated with strict confidence.

Form A: Electric

I, _____ (Name of account holder), do hereby authorize and request that _____ (Name of utility) release any and all available records regarding utility consumption associated with account number _____ (Account Number) for service at _____ (Address of home served by utility) to the Center for Natural Energy Design, Oklahoma State University. This authorization shall remain in effect for two (2) years from the date of signature unless otherwise terminated by signee.

(Signed) _____ (Account Holder)

_____ (Date)

_____ (Address of above utility company, if known)

Form B: Gas (or other)

I, _____ (Name of account holder), do hereby authorize and request that _____ (Name of utility) release any and all available records regarding utility consumption associated with account number _____ (Account Number) for service at _____ (Address of home served by utility) to the Center for Natural Energy Design, Oklahoma State University. This authorization shall remain in effect for two (2) years from the date of signature unless otherwise terminated by signee.

(Signed) _____ (Account Holder)

_____ (Date)

_____ (Address of above utility company, if known)

APPENDIX B

BUILDING DESIGN INDEX

INPUT FORM

BUILDING DESIGN INDEX INPUT FORM

ID# _____

Region _____

Number of wall types _____

WALLS COMPONENT	WALL #1	WALL #2	WALL #3	WALL #4
Earth contact?				
Soil density				
Soil conductivity				
Insulation density				
Insulation thickness				
Insulation R-value				
Wall area				
Wall type				
Concrete thickness				
Insulation location				

ROOF COMPONENT	
Earth contact?	
Soil density	
Soil conductivity	
Depth of covering	
Insulation density	
Insulation thickness	
Insulation R-value	
Roof area	
Roof type	
Concrete thickness	

Thermal wicks present? _____

Maximum depth of wall insulation from surface _____

Ventilation potential factor _____

Solar gain control factor _____

Solar gain potential factor _____

Solar access factor _____

APPENDIX C

ENERGY ANALYSIS COMPUTER PROGRAM

```
1     OPTION BASE 1
2     PRINTER IS 16
3     MASS STORAGE IS ":C12"
4     DIM Answer$[20],A$[3],File$[6],Id$[3]
5     PRINT PAGE
6     PRINT "1.    INPUT NAME AND ADDRESS"
7     PRINT "2.    INPUT UTILITY DATA"
8     PRINT "3.    CALCULATE INDIVIDUAL MONTHLY TOTALS AND AVERAGE
        S"
9     PRINT "4.    CALCULATE SPACE CONDITIONING ENERGY"
10    PRINT "5.    CALCULATE INDIVIDUAL HEATING SEASON CONSUMPTION
        "
11    PRINT "6.    CALCULATE INDIVIDUAL COOLING SEASON CONSUMPTION
        "
12    PRINT "7.    CALCULATE ESTIMATED SPACE HEATING CONSUMPTION"
13    PRINT "8.    CALCULATE ESTIMATED SPACE COOLING CONSUMPTION"
14    PRINT "9.    CALCULATE BUILDING DESIGN INDEX"
15    PRINT "10.   CALCULATE REGIONAL TOTALS AND AVERAGES"
16    PRINT "11.   CALCULATE REGIONAL HEATING SEASON CONSUMPTION"
17    PRINT "12.   CALCULATE REGIONAL COOLING SEASON CONSUMPTION"
18    PRINT "13.   CALCULATE REGIONAL ESTIMATED HEATING CONSUMPTIO
        N"
19    PRINT "14.   CALCULATE REGIONAL ESTIMATED COOLING CONSUMPTIO
        N"
20    PRINT "15.   CALCULATE REGIONAL BUILDING DESIGN INDICES"
21    PRINT "16.   PRINT INDIVIDUAL HOUSE SUMMARY"
22    PRINT "17.   PRINT REGIONAL SUMMARY"
23    INPUT "SELECT ACTION FROM ABOVE LISTING",Answer$
24    PRINT PAGE
25    IF Answer$="1" THEN CALL Infoin
26    IF Answer$="2" THEN CALL Datain
27    IF Answer$="3" THEN CALL Calc1
28    IF Answer$="4" THEN CALL Calc3a
29    IF Answer$="5" THEN CALL Calc3
30    IF Answer$="6" THEN CALL Calc4
31    IF Answer$="7" THEN CALL Calc7
32    IF Answer$="8" THEN CALL Calc8
33    IF Answer$="9" THEN CALL Bdi
34    IF Answer$="10" THEN CALL Calc2
35    IF Answer$="11" THEN CALL Calc5
36    IF Answer$="12" THEN CALL Calc6
37    IF Answer$="13" THEN CALL Calc9
38    IF Answer$="14" THEN CALL Calc10
39    IF Answer$="15" THEN CALL Calc11
40    IF Answer$="16" THEN CALL Output
41    IF Answer$="17" THEN CALL Regout
42    GOTO 5
43    END
44    SUB Datain
```

```
45      DIM Answer$[20],A$[3],File$[6],Id$[3]
46      SHORT Kwh(10,365),Gas(10,365)
47      A$="20"
48      INPUT "ENTER ID NUMBER",Id$
49      INPUT "IS THIS A NEW FILE?",Answer$
50      IF Answer$="N" THEN 64
51      File$=A$&Id$
52      CREATE File$,10,2000
53      ASSIGN File$ TO #2
54      A$="27"
55      File$=A$&Id$
56      CREATE File$,10,2000
57      ASSIGN File$ TO #3
58       FOR I=1 TO 10
59        FOR J=1 TO 365
60         Kwh(I,J)=Gas(I,J)=0
61        NEXT J
62       NEXT I
63      GOTO 72
64      A$="20"
65      File$=A$&Id$
66      ASSIGN File$ TO #2
67      A$="27"
68      File$=A$&Id$
69      ASSIGN File$ TO #3
70      MAT READ #2;Kwh
71      MAT READ #3;Gas
72      INPUT "DO YOU WISH TO ENTER GAS(G) OR ELECTRICAL(E) USAGE
        ?",Answer$
73      IF Answer$="G" THEN 142
74      INPUT "ENTER BEGINNING DATE OF BILLING, EX. 3,15,77",M1,D
        1,Yr1
75      PRINT "BEGINNING DATE OF BILLING IS ";M1;D1;Yr1
76      IF Yr1=77 THEN Y1=1
77      IF Yr1=78 THEN Y1=2
78      IF Yr1=79 THEN Y1=3
79      IF Yr1=80 THEN Y1=4
80      IF Yr1=81 THEN Y1=5
81      IF Yr1=82 THEN Y1=6
82      IF Yr1=83 THEN Y1=7
83      IF Yr1=84 THEN Y1=8
84      IF Yr1=85 THEN Y1=9
85      IF Yr1=86 THEN Y1=10
86      IF M1=1 THEN D1=D1
87      IF M1=2 THEN D1=D1+31
88      IF M1=3 THEN D1=D1+59
89      IF M1=4 THEN D1=D1+90
90      IF M1=5 THEN D1=D1+120
91      IF M1=6 THEN D1=D1+151
92      IF M1=7 THEN D1=D1+181
93      IF M1=8 THEN D1=D1+212
94      IF M1=9 THEN D1=D1+243
95      IF M1=10 THEN D1=D1+273
96      IF M1=11 THEN D1=D1+304
97      IF M1=12 THEN D1=D1+334
```

```
98      INPUT "ENTER ENDING DATE OF BILLING, EX. 4,16,77",M2,D2,Y
        r2
99      PRINT "ENDING DATE OF BILLING IS ";M2;D2;Yr2
100     IF Yr2=77 THEN Y2=1
101     IF Yr2=78 THEN Y2=2
102     IF Yr2=79 THEN Y2=3
103     IF Yr2=80 THEN Y2=4
104     IF Yr2=81 THEN Y2=5
105     IF Yr2=82 THEN Y2=6
106     IF Yr2=83 THEN Y2=7
107     IF Yr2=84 THEN Y2=8
108     IF Yr2=85 THEN Y2=9
109     IF Yr2=86 THEN Y2=10
110     IF M2=1 THEN D2=D2
111     IF M2=2 THEN D2=D2+31
112     IF M2=3 THEN D2=D2+59
113     IF M2=4 THEN D2=D2+90
114     IF M2=5 THEN D2=D2+120
115     IF M2=6 THEN D2=D2+151
116     IF M2=7 THEN D2=D2+181
117     IF M2=8 THEN D2=D2+212
118     IF M2=9 THEN D2=D2+243
119     IF M2=10 THEN D2=D2+273
120     IF M2=11 THEN D2=D2+304
121     IF M2=12 THEN D2=D2+334
122     INPUT "ENTER KWH USAGE FOR PERIOD",K
123     IF Y1<>Y2 THEN GOTO 130
124     Diff=D2-D1
125     Kpd=K/Diff
126      FOR I=D1 TO D2
127       Kwh(Y1,I)=Kpd
128      NEXT I
129     GOTO 139
130     D3=365-D1
131     Diff=D3+D2
132     Kpd=K/Diff
133      FOR I=D1 TO 365
134       Kwh(Y1,I)=Kpd
135      NEXT I
136      FOR I=1 TO D2
137       Kwh(Y2,I)=Kpd
138      NEXT I
139     INPUT "DO YOU WISH TO INPUT MORE ELECTRICAL DATA? (Y,N)",
        Answer$
140     IF Answer$="Y" THEN 74
141     GOTO 215
142     INPUT "ENTER BEGINNING DATE OF BILLING, EX. 3,15,77",M1,D
        1,Yr1
143     PRINT "BEGINNING DATE OF BILLING IS ";M1;D1;Yr1
144     IF Yr1=77 THEN Y1=1
145     IF Yr1=78 THEN Y1=2
146     IF Yr1=79 THEN Y1=3
147     IF Yr1=80 THEN Y1=4
```

```
148     IF Yr1=81 THEN Y1=5
149     IF Yr1=82 THEN Y1=6
150     IF Yr1=83 THEN Y1=7
151     IF Yr1=84 THEN Y1=8
152     IF Yr1=85 THEN Y1=9
153     IF Yr1=86 THEN Y1=10
154     IF M1=1 THEN D1=D1
155     IF M1=2 THEN D1=D1+31
156     IF M1=3 THEN D1=D1+59
157     IF M1=4 THEN D1=D1+90
158     IF M1=5 THEN D1=D1+120
159     IF M1=6 THEN D1=D1+151
160     IF M1=7 THEN D1=D1+181
161     IF M1=8 THEN D1=D1+212
162     IF M1=9 THEN D1=D1+243
163     IF M1=10 THEN D1=D1+273
164     IF M1=11 THEN D1=D1+304
165     IF M1=12 THEN D1=D1+334
166     INPUT "ENTER ENDING DATE OF BILLING, EX. 4,16,77",M2,D2,Y
        r2
167     PRINT "ENDING DATE OF BILLING IS ";M2;D2;Yr2
168     IF Yr2=77 THEN Y2=1
169     IF Yr2=78 THEN Y2=2
170     IF Yr2=79 THEN Y2=3
171     IF Yr2=80 THEN Y2=4
172     IF Yr2=81 THEN Y2=5
173     IF Yr2=82 THEN Y2=6
174     IF Yr2=83 THEN Y2=7
175     IF Yr2=84 THEN Y2=8
176     IF Yr2=85 THEN Y2=9
177     IF Yr2=86 THEN Y2=10
178     IF M2=1 THEN D2=D2
179     IF M2=2 THEN D2=D2+31
180     IF M2=3 THEN D2=D2+59
181     IF M2=4 THEN D2=D2+90
182     IF M2=5 THEN D2=D2+120
183     IF M2=6 THEN D2=D2+151
184     IF M2=7 THEN D2=D2+181
185     IF M2=8 THEN D2=D2+212
186     IF M2=9 THEN D2=D2+243
187     IF M2=10 THEN D2=D2+273
188     IF M2=11 THEN D2=D2+304
189     IF M2=12 THEN D2=D2+334
190     INPUT "IS FUEL NATURAL GAS(N) OR PROPANE(P)?",Answer$
191     IF Answer$="N" THEN 195
192     INPUT "ENTER PROPANE USAGE FOR PERIOD(Gallons)",P
193     K=P*36.2*2500*.75/3.4285714E3
194     GOTO 197
195     INPUT "ENTER NATURAL GAS USAGE FOR PERIOD(MCF)",N
196     K=N*1E-6*1025*.75/3.4285714E3
197     IF Y1<>Y2 THEN 204
198     Diff=D2-D1
199     Kpd=K/Diff
200      FOR I=D1 TO D2
201       Gas(Y1,I)=Kpd
202      NEXT I
203     GOTO 213
```

```
204      D3=365-D1
205      Diff=D3+D2
206      Kpd=K/Diff
207       FOR I=D1 TO 365
208        Gas(Y1,I)=Kpd
209       NEXT I
210       FOR I=1 TO D2
211        Gas(Y2,I)=Kpd
212       NEXT I
213      INPUT "DO YOU WISH TO INPUT ANY MORE GAS DATA? (Y,N)",Ans
         wer$
214      IF Answer$="Y" THEN 142
215      INPUT "IS THERE ANY FURTHER DATA?",Answer$
216      IF Answer$="N" THEN GOTO 218
217      GOTO 72
218      A$="20"
219      File$=A$&Id$
220      ASSIGN File$ TO #2
221      A$="27"
222      File$=A$&Id$
223      ASSIGN File$ TO #3
224      MAT PRINT #2;Kwh
225      MAT PRINT #3;Gas
226      ASSIGN * TO #2
227      ASSIGN * TO #3
228    SUBEND
229   !     INDIVIDUAL MONTHLY TOTALS AND AVERAGES    *
230    SUB Calc1
231      DIM Answer$[20],A$[3],File$[6],Id$[3]
232      SHORT Kwh(10,365),Sum(10,12),Avg(10,12),Moavg(12),Mosums(
         12),Gas(10,365)
233      INPUT "ENTER ID NUMBER",Id$
234      INPUT "ENTER FLOOR AREA (Sq.ft.)",Sqft
235      A$="27"
236      File$=A$&Id$
237      ASSIGN File$ TO #5
238      MAT READ #5;Gas
239      A$="20"
240      File$=A$&Id$
241      ASSIGN File$ TO #2
242      MAT READ #2;Kwh
243      A$="21"
244      File$=A$&Id$
245      CREATE File$,10
246      ASSIGN File$ TO #3
247      A$="22"
248      File$=A$&Id$
249      CREATE File$,10
250      ASSIGN File$ TO #1
251       FOR I=1 TO 10
252   ! JANUARY
253       Sum1=0
254       L=0
255       FOR J=1 TO 31
256       IF Kwh(I,J)=0 THEN L=L+1
```

```
257       Sum1=Sum1+Kwh(I,J)+Gas(I,J)
258       NEXT J
259       IF L>10 THEN 264
260       Sum(I,1)=Sum1/Sqft
261       Days=31-L
262       Avg(I,1)=Sum(I,1)/Days
263       GOTO 265
264       Sum(I,1)=Avg(I,1)=0
265    ! FEBRUARY
266       Sum2=0
267       L=0
268       FOR J=32 TO 59
269       IF Kwh(I,J)=0 THEN L=L+1
270       Sum2=Sum2+Kwh(I,J)+Gas(I,J)
271       NEXT J
272       IF L>10 THEN 277
273       Sum(I,2)=Sum2/Sqft
274       Days=28-L
275       Avg(I,2)=Sum(I,2)/Days
276       GOTO 278
277       Sum(I,2)=Avg(I,2)=0
278    ! MARCH
279       Sum3=0
280       L=0
281       FOR J=60 TO 90
282       IF Kwh(I,J)=0 THEN L=L+1
283       Sum3=Sum3+Kwh(I,J)+Gas(I,J)
284       NEXT J
285       IF L>10 THEN 290
286       Sum(I,3)=Sum3/Sqft
287       Days=31-L
288       Avg(I,3)=Sum(I,3)/Days
289       GOTO 291
290       Sum(I,3)=Avg(I,3)=0
291    ! APRIL
292       Sum4=0
293       L=0
294       FOR J=90 TO 120
295       IF Kwh(I,J)=0 THEN L=L+1
296       Sum4=Sum4+Kwh(I,J)+Gas(I,J)
297       NEXT J
298       IF L>10 THEN 303
299       Sum(I,4)=Sum4/Sqft
300       Days=30-L
301       Avg(I,4)=Sum(I,4)/Days
302       GOTO 304
303       Sum(I,4)=Avg(I,4)=0
304    ! MAY
305       Sum5=0
306       L=0
307       FOR J=121 TO 151
308       IF Kwh(I,J)=0 THEN L=L+1
309       Sum5=Sum5+Kwh(I,J)+Gas(I,J)
310       NEXT J
311       IF L>10 THEN 316
312       Sum(I,5)=Sum5/Sqft
313       Days=31-L
314       Avg(I,5)=Sum(I,5)/Days
315       GOTO 317
```

```
316       Sum(I,5)=Avg(I,5)=0
317   ! JUNE
318       Sum6=0
319       L=0
320       FOR J=152 TO 181
321       IF Kwh(I,J)=0 THEN L=L+1
322       Sum6=Sum6+Kwh(I,J)+Gas(I,J)
323       NEXT J
324       IF L>10 THEN 329
325       Sum(I,6)=Sum6/Sqft
326       Days=30-L
327       Avg(I,6)=Sum(I,6)/Days
328       GOTO 330
329       Sum(I,6)=Avg(I,6)=0
330   ! JULY
331       Sum7=0
332       L=0
333       FOR J=182 TO 212
334       IF Kwh(I,J)=0 THEN L=L+1
335       Sum7=Sum7+Kwh(I,J)+Gas(I,J)
336       NEXT J
337       IF L>10 THEN 342
338       Sum(I,7)=Sum7/Sqft
339       Days=31-L
340       Avg(I,7)=Sum(I,7)/Days
341       GOTO 343
342       Sum(I,7)=Avg(I,7)=0
343   ! AUGUST
344       Sum8=0
345       L=0
346       FOR J=213 TO 243
347       IF Kwh(I,J)=0 THEN L=L+1
348       Sum8=Sum8+Kwh(I,J)+Gas(I,J)
349       NEXT J
350       IF L>10 THEN 355
351       Sum(I,8)=Sum8/Sqft
352       Days=31-L
353       Avg(I,8)=Sum(I,8)/Days
354       GOTO 356
355       Sum(I,8)=Avg(I,8)=0
356   ! SEPTEMBER
357       Sum9=0
358       L=0
359       FOR J=244 TO 273
360       IF Kwh(I,J)=0 THEN L=L+1
361       Sum9=Sum9+Kwh(I,J)+Gas(I,J)
362       NEXT J
363       IF L>10 THEN 368
364       Sum(I,9)=Sum9/Sqft
365       Days=30-L
366       Avg(I,9)=Sum(I,9)/Days
367       GOTO 369
368       Sum(I,9)=Avg(I,9)=0
369   ! OCTOBER
370       Sum10=0
371       L=0
372       FOR J=274 TO 304
373       IF Kwh(I,J)=0 THEN L=L+1
374       Sum10=Sum10+Kwh(I,J)+Gas(I,J)
```

```
375       NEXT J
376       IF L>10 THEN 381
377       Sum(I,10)=Sum10/Sqft
378       Days=31-L
379       Avg(I,10)=Sum(I,10)/Days
380       GOTO 382
381       Sum(I,10)=Avg(I,10)=0
382   ! NOVEMBER
383       Sum11=0
384       L=0
385       FOR J=305 TO 334
386       IF Kwh(I,J)=0 THEN L=L+1
387       Sum11=Sum11+Kwh(I,J)+Gas(I,J)
388       NEXT J
389       IF L>10 THEN 394
390       Sum(I,11)=Sum11/Sqft
391       Days=30-L
392       Avg(I,11)=Sum(I,11)/Days
393       GOTO 395
394       Sum(I,11)=Avg(I,11)=0
395   ! DECEMBER
396       Sum12=0
397       L=0
398       FOR J=335 TO 365
399       IF Kwh(I,J)=0 THEN L=L+1
400       Sum12=Sum12+Kwh(I,J)+Gas(I,J)
401       NEXT J
402       IF L>10 THEN 407
403       Sum(I,12)=Sum12/Sqft
404       Days=31-L
405       Avg(I,12)=Sum(I,12)/Days
406       GOTO 408
407       Sum(I,12)=Avg(I,12)=0
408       NEXT I
409      MAT PRINT #1;Avg
410      MAT PRINT #3;Sum
411       FOR I=1 TO 10
412        FOR J=1 TO 12
413         PRINT I;SPA(5);J;SPA(5);Sum(I,J);Avg(I,J)
414        NEXT J
415       NEXT I
416      ASSIGN * TO #2
417      A$="23"
418      File$=A$&Id$
419      CREATE File$,1
420      ASSIGN File$ TO #2
421      A$="24"
422      File$=A$&Id$
423      CREATE File$,1
424      ASSIGN File$ TO #4
425       FOR J=1 TO 12
426        L=R=Ave=Sums=0
427        FOR I=1 TO 10
428         IF Avg(I,J)=0 THEN L=L+1
429         Ave=Ave+Avg(I,J)
430         IF Sum(I,J)=0 THEN R=R+1
431         Sums=Sums+Sum(I,J)
432        NEXT I
433       IF L=10 THEN 437
```

```
434       Mo=10-L
435       Moavg(J)=Ave/Mo
436       GOTO 438
437       Moavg(J)=0
438       PRINT #2;Moavg(J)
439       IF R=10 THEN 443
440       Mr=10-R
441       Mosums(J)=Sums/Mr
442       GOTO 444
443       Mosums(J)=0
444       PRINT #4;Mosums(J)
445       PRINT J;SPA(5);Mosums(J);Moavg(J)
446     NEXT J
447     ASSIGN * TO #1
448     ASSIGN * TO #2
449     ASSIGN * TO #3
450     ASSIGN * TO #4
451     ASSIGN * TO #5
452   SUBEND
453   !      NAMES, ADDRESSES, CITY, STATE, AND ZIP    *
454   SUB Infoin
455     DIM Name$[40],Add$[40],Loc$[50],Zip$[5],A$[3],File$[6],Id
      $[3]
456     A$="10"
457     INPUT "ENTER ID NUMBER",Id$
458     File$=A$&Id$
459     CREATE File$,1
460     ASSIGN File$ TO #1
461     INPUT "ENTER NAME",Name$
462     PRINT #1;Name$
463     A$="11"
464     File$=A$&Id$
465     CREATE File$,1
466     ASSIGN File$ TO #2
467     INPUT "ENTER ADDRESS",Add$
468     PRINT #2;Add$
469     A$="12"
470     File$=A$&Id$
471     CREATE File$,1
472     ASSIGN File$ TO #3
473     INPUT "ENTER CITY AND STATE. (NO COMMA, PLEASE)",Loc$
474     PRINT #3;Loc$
475     A$="13"
476     File$=A$&Id$
477     CREATE File$,1
478     ASSIGN File$ TO #4
479     INPUT "ENTER ZIP CODE",Zip$
480     PRINT #4;Zip$
481     PRINT Name$
482     PRINT Add$
483     PRINT Loc$
484     PRINT Zip$
485     ASSIGN * TO #1
486     ASSIGN * TO #2
487     ASSIGN * TO #3
488     ASSIGN * TO #4
489   SUBEND
```

```
490 !      REGIONAL TOTALS AND AVERAGES    *
491   SUB Calc2
492     DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
493     SHORT Nsum(12),Navg(12),Mosums(12),Moavg(12),Rsum(12),Rav
        g(12)
494     INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
495     IF Answer$="N" THEN Reg$="100"
496     IF Answer$="C" THEN Reg$="200"
497     IF Answer$="S" THEN Reg$="300"
498     IF Reg$="100" THEN Numo=20
499     IF Reg$="200" THEN Numo=17
500     IF Reg$="300" THEN Numo=20
501     Nsum(1)=Nsum(2)=Nsum(3)=Nsum(4)=Nsum(5)=Nsum(6)=Nsum(7)=N
        sum(8)=Nsum(9)=Nsum(10)=Nsum(11)=Nsum(12)=0
502     Navg(1)=Navg(2)=Navg(3)=Navg(4)=Navg(5)=Navg(6)=Navg(7)=N
        avg(8)=Navg(9)=Navg(10)=Navg(11)=Navg(12)=0
503     DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
504     DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
505     DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
506     IF Reg$="200" THEN 527
507     IF Reg$="300" THEN 546
508     RESTORE 503
509      FOR K=1 TO Numo
510       READ Id$
511       A$="23"
512       File$=A$&Id$
513       ASSIGN File$ TO #2
514       A$="24"
515       File$=A$&Id$
516       ASSIGN File$ TO #1
517       FOR J=1 TO 12
518        READ #1;Mosums(J)
519        READ #2;Moavg(J)
520       NEXT J
521       FOR I=1 TO 12
522        Nsum(I)=Nsum(I)+Mosums(I)
523        Navg(I)=Navg(I)+Moavg(I)
524       NEXT I
525      NEXT K
526     GOTO 564
527     RESTORE 504
```

```
528       FOR K=1 TO Numo
529        READ Id$
530        A$="23"
531        File$=A$&Id$
532        ASSIGN File$ TO #2
533        A$="24"
534        File$=A$&Id$
535        ASSIGN File$ TO #1
536        FOR J=1 TO 12
537         READ #1;Mosums(J)
538         READ #2;Moavg(J)
539        NEXT J
540        FOR I=1 TO 12
541         Nsum(I)=Nsum(I)+Mosums(I)
542         Navg(I)=Navg(I)+Moavg(I)
543        NEXT I
544       NEXT K
545      GOTO 564
546      RESTORE 505
547       FOR K=1 TO Numo
548        READ Id$
549        A$="23"
550        File$=A$&Id$
551        ASSIGN File$ TO #2
552        A$="24"
553        File$=A$&Id$
554        ASSIGN File$ TO #1
555        FOR J=1 TO 12
556         READ #1;Mosums(J)
557         READ #2;Moavg(J)
558        NEXT J
559        FOR I=1 TO 12
560         Nsum(I)=Nsum(I)+Mosums(I)
561         Navg(I)=Navg(I)+Moavg(I)
562        NEXT I
563       NEXT K
564       FOR I=1 TO 12
565        Rsum(I)=Nsum(I)/Numo
566        Ravg(I)=Navg(I)/Numo
567       NEXT I
568      A$="25"
569      File$=A$&Reg$
570      CREATE File$,1
571      ASSIGN File$ TO #3
572      MAT PRINT #3;Rsum
573      A$="26"
574      File$=A$&Reg$
575      CREATE File$,1
576      ASSIGN File$ TO #4
577      MAT PRINT #4;Ravg
578      ASSIGN * TO #1
579      ASSIGN * TO #2
580      ASSIGN * TO #3
581      ASSIGN * TO #4
582    SUBEND
583  !      SPACE CONDITIONING CONSUMPTION    *
584    SUB Calc3a
585      DIM A$[3],File$[6],Id$[3]
586      SHORT Kuse(10,12),Avg(10,12)
```

```
587     INPUT "ENTER ID NUMBER",Id$
588     A$="22"
589     File$=A$&Id$
590     ASSIGN File$ TO #1
591     MAT READ #1;Avg
592     A$="40"
593     File$=A$&Id$
594     CREATE File$,10
595     ASSIGN File$ TO #2
596      FOR I=1 TO 10
597       FOR J=1 TO 12
598        IF J>1 THEN 600
599        C=Avg(I,1)
600        IF Avg(I,J)>C THEN 604
601        Base=C
602        C=Avg(I,J)
603        GOTO 606
604        IF Avg(I,J)>Base THEN 606
605        Base=Avg(I,J)
606       NEXT J
607       FOR J=1 TO 12
608        Kuse(I,J)=Avg(I,J)-Base
609        IF Kuse(I,J)>0 THEN 611
610        Kuse(I,J)=0
611        PRINT #2;Kuse(I,J)
612       NEXT J
613      NEXT I
614     ASSIGN * TO #1
615     ASSIGN * TO #2
616     ASSIGN * TO #3
617   SUBEND
618  !      INDIVIDUAL HEATING SEASON CONSUMPTION    *
619   SUB Calc3
620     DIM Answer$[20],A$[3],File$[6],Id$[3]
621     SHORT Kuse(10,12),Htg(9),Heat(9),Hdd(9)
622     INPUT "ENTER ID NUMBER",Id$
623     INPUT "ENTER COEFFICIENT OF PERFORMANCE OF MECHANICAL SYS
        TEM",Cop
624     A$="40"
625     File$=A$&Id$
626     ASSIGN File$ TO #1
627      FOR I=1 TO 10
628       FOR J=1 TO 12
629        READ #1;Kuse(I,J)
630       NEXT J
631      NEXT I
632     A$="41"
633     File$=A$&Id$
634     CREATE File$,1
635     ASSIGN File$ TO #2
636     A$="42"
637     File$=A$&Id$
638     CREATE File$,1
639     ASSIGN File$ TO #3
640     A$="45"
641     File$=A$&Id$
642     CREATE File$,1
```

```
643      ASSIGN File$ TO #4
644       FOR K=1 TO 9
645        Htg(K)=Heat(K)=0
646       NEXT K
647      INPUT "ENTER HEATING SEASON (ex. 77-78)",Answer$
648      IF Answer$="77-78" THEN I=1
649      IF Answer$="78-79" THEN I=2
650      IF Answer$="79-80" THEN I=3
651      IF Answer$="80-81" THEN I=4
652      IF Answer$="81-82" THEN I=5
653      IF Answer$="82-83" THEN I=6
654      IF Answer$="83-84" THEN I=7
655      IF Answer$="84-85" THEN I=8
656      IF Answer$="85-86" THEN I=9
657      Htg(I)=Kuse(I,11)+Kuse(I,12)+Kuse(I+1,1)+Kuse(I+1,2)+Kuse
         (I+1,3)
658      INPUT "ENTER HDD TOTAL FOR HEATING SEASON",Hdd(I)
659      PRINT #2;Hdd(I)
660      Heat(I)=Htg(I)/Hdd(I)*3.4285714E3*Cop
661      INPUT "DO YOU WISH TO CALCULATE FOR ANOTHER SEASON? (Y,N)
         ",Answer$
662      IF Answer$="N" THEN 664
663      GOTO 647
664      Avght=L=0
665       FOR I=1 TO 9
666        IF Heat(I)=0 THEN L=L+1
667        Avght=Avght+Heat(I)
668       NEXT I
669      Avght=Avght/(9-L)
670      PRINT #4;Avght
671       FOR I=1 TO 9
672        PRINT #3;Heat(I)
673       NEXT I
674      ASSIGN * TO #1
675      ASSIGN * TO #2
676      ASSIGN * TO #3
677      ASSIGN * TO #4
678    SUBEND
679    !   INDIVIDUAL COOLING SEASON CONSUMPTION   *
680    SUB Calc4
681      DIM Answer$[20],A$[3],File$[6],Id$[3]
682      SHORT Kuse(10,12),Clg(9),Cool(9),Cdd(9)
683      INPUT "ENTER ID NUMBER",Id$
684      INPUT "ENTER COEFFICIENT OF PERFORMANCE OF MECHANICAL SYS
         TEM",Cop
685      A$="40"
686      File$=A$&Id$
687      ASSIGN File$ TO #1
688       FOR I=1 TO 10
689        FOR J=1 TO 12
690         READ #1;Kuse(I,J)
691        NEXT J
692       NEXT I
```

```
693     A$="43"
694     File$=A$&Id$
695     CREATE File$,1
696     ASSIGN File$ TO #2
697     A$="44"
698     File$=A$&Id$
699     CREATE File$,1
700     ASSIGN File$ TO #3
701     A$="46"
702     File$=A$&Id$
703     CREATE File$,1
704     ASSIGN File$ TO #4
705      FOR K=1 TO 9
706       Clg(K)=Cool(K)=0
707      NEXT K
708     INPUT "ENTER COOLING SEASON (ex. 77)",Answer$
709     IF Answer$="77" THEN I=1
710     IF Answer$="78" THEN I=2
711     IF Answer$="79" THEN I=3
712     IF Answer$="80" THEN I=4
713     IF Answer$="81" THEN I=5
714     IF Answer$="82" THEN I=6
715     IF Answer$="83" THEN I=7
716     IF Answer$="84" THEN I=8
717     IF Answer$="85" THEN I=9
718     Clg(I)=Kuse(I,6)+Kuse(I,7)+Kuse(I,8)+Kuse(I,9)
719     INPUT "ENTER CDD TOTAL FOR COOLING SEASON",Cdd(I)
720     PRINT #2;Cdd(I)
721     Cool(I)=Clg(I)/Cdd(I)*3.4285714E3*Cop
722     INPUT "DO YOU WISH TO CALCULATE FOR ANOTHER SEASON? (Y,N)
        ",Answer$
723     IF Answer$="N" THEN 725
724     GOTO 708
725     Avgcl=L=0
726      FOR I=1 TO 9
727       IF Cool(I)=0 THEN L=L+1
728       Avgcl=Avgcl+Cool(I)
729      NEXT I
730     Avgcl=Avgcl/(9-L)
731     PRINT #4;Avgcl
732      FOR I=1 TO 9
733       PRINT #3;Cool(I)
734      NEXT I
735     ASSIGN * TO #1
736     ASSIGN * TO #2
737     ASSIGN * TO #3
738     ASSIGN * TO #4
739   SUBEND
740     !     REGIONAL HEATING CONSUMPTION    *
741   SUB Calc5
742     DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
743     INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
744     IF Answer$="N" THEN X=1
745     IF Answer$="C" THEN X=2
```

```
746     IF Answer$="S" THEN X=3
747     IF X=1 THEN Numo=20
748     IF X=2 THEN Numo=17
749     IF X=3 THEN Numo=20
750     IF X=1 THEN Reg$="100"
751     IF X=2 THEN Reg$="200"
752     IF X=3 THEN Reg$="300"
753     A$="47"
754     File$=A$&Reg$
755     CREATE File$,1
756     ASSIGN File$ TO #2
757     Rhtg=0
758     DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
759     DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
760     DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
761     IF X=2 THEN 773
762     IF X=3 THEN 783
763     RESTORE 758
764      FOR K=1 TO Numo
765       READ Id$
766       A$="45"
767       File$=A$&Id$
768       ASSIGN File$ TO #1
769       READ #1;Avght
770       Rhtg=Rhtg+Avght
771      NEXT K
772     GOTO 792
773     RESTORE 759
774      FOR K=1 TO Numo
775       READ Id$
776       A$="45"
777       File$=A$&Id$
778       ASSIGN File$ TO #1
779       READ #1;Avght
780       Rhtg=Rhtg+Avght
781      NEXT K
782     GOTO 792
783     RESTORE 760
784      FOR K=1 TO Numo
785       READ Id$
786       A$="45"
787       File$=A$&Id$
788       ASSIGN File$ TO #1
789       READ #1;Avght
790       Rhtg=Rhtg+Avght
791      NEXT K
792     Rheat=Rhtg/Numo
793     PRINT #2;Rheat
794     ASSIGN * TO #1
795     ASSIGN * TO #2
```

```
796   SUBEND
797  !      REGIONAL COOLING CONSUMPTION    *
798   SUB Calc6
799     DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
800     INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
801     IF Answer$="N" THEN Reg$="100"
802     IF Answer$="C" THEN Reg$="200"
803     IF Answer$="S" THEN Reg$="300"
804     IF Reg$="100" THEN Numo=20
805     IF Reg$="200" THEN Numo=17
806     IF Reg$="300" THEN Numo=20
807     A$="48"
808     File$=A$&Reg$
809     CREATE File$,1
810     ASSIGN File$ TO #2
811     Rclg=0
812     DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
813     DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
814     DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
815     IF Reg$="200" THEN GOTO 827
816     IF Reg$="300" THEN GOTO 837
817     RESTORE 812
818      FOR K=1 TO Numo
819       READ Id$
820       A$="46"
821       File$=A$&Id$
822       ASSIGN File$ TO #1
823       READ #1;Avgcl
824       Rclg=Rclg+Avgcl
825      NEXT K
826     GOTO 846
827     RESTORE 813
828      FOR K=1 TO Numo
829       READ Id$
830       A$="46"
831       File$=A$&Id$
832       ASSIGN File$ TO #1
833       READ #1;Avgcl
834       Rclg=Rclg+Avgcl
835      NEXT K
836     GOTO 846
837     RESTORE 814
838      FOR K=1 TO Numo
839       READ Id$
840       A$="46"
841       File$=A$&Id$
842       ASSIGN File$ TO #1
```

```
843       READ #1;Avgcl
844       Rclg=Rclg+Avgcl
845      NEXT K
846     Rcool=Rclg/Numo
847     PRINT #2;Rcool
848     ASSIGN * TO #1
849     ASSIGN * TO #2
850   SUBEND
851  !      INDIVIDUAL ESTIMATED SPACE HEATING REQUIREMENTS    *
852   SUB Calc7
853     DIM A$[3],File$[6],Id$[3]
854     INPUT "ENTER ID NUMBER",Id$
855     A$="45"
856     File$=A$&Id$
857     ASSIGN File$ TO #1
858     READ #1;Avght
859     A$="50"
860     File$=A$&Id$
861     CREATE File$,1
862     ASSIGN File$ TO #2
863     INPUT "ENTER PERCENT CONTRIBUTION OF MECH. SYSTEM TO SPAC
        E HEATING",Mech
864     INPUT "ENTER PERCENT CONTRIBUTION OF ACTIVE SOLAR SYSTEMS
        ",Act
865     INPUT "ENTER PERCENT CONTRIBUTION OF PASSIVE SOLAR SYSTEM
        S",Pass
866     INPUT "ENTER PERCENT CONTRIBUTION OF RENEWABLE RESOURCES"
        ,Ren
867     IF Mech<>0 THEN 870
868     Htot=0
869     GOTO 871
870     Htot=Avght/(Mech/100)
871     PRINT #2;Htot
872     Hact=Htot*(Act/100)
873     PRINT #2;Hact
874     Hpass=Htot*(Hass/100)
875     PRINT #2;Hpass
876     Hren=Htot*(Ren/100)
877     PRINT #2;Hren
878     Hmech=Avght
879     PRINT #2;Hmech
880     ASSIGN * TO #1
881     ASSIGN * TO #2
882   SUBEND
883  !      INDIVIDUAL ESTIMATED SPACE COOLING REQUIREMENTS    *
884   SUB Calc8
885     DIM A$[3],File$[6],Id$[3]
886     INPUT "ENTER ID NUMBER",Id$
887     A$="46"
888     File$=A$&Id$
889     ASSIGN File$ TO #1
```

```
890     READ #1;Avgcl
891     A$="51"
892     File$=A$&Id$
893     CREATE File$,1
894     ASSIGN File$ TO #2
895     INPUT "ENTER PERCENT CONTRIBUTION OF MECH. SYSTEM TO SPAC
        E COOLING",Mech
896     INPUT "ENTER PERCENT CONTRIBUTION OF NATURAL VENTILATION"
        ,Nvent
897     INPUT "ENTER PERCENT CONTRIBUTION OF EARTH CONTACT",Earth

898     IF Mech<>0 THEN 901
899     Ctot=0
900     GOTO 902
901     Ctot=Avgcl/(Mech/100)
902     PRINT #2;Ctot
903     Cvent=Ctot*(Nvent/100)
904     PRINT #2;Cvent
905     Cearth=Ctot*(Earth/100)
906     PRINT #2;Cearth
907     Cmech=Avgcl
908     PRINT #2;Cmech
909     ASSIGN * TO #1
910     ASSIGN * TO #2
911   SUBEND
912  !       REGIONAL ESTIMATED HEATING CONSUMPTION    *
913   SUB Calc9
914     DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
915     INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
916     IF Answer$="N" THEN Reg$="100"
917     IF Answer$="C" THEN Reg$="200"
918     IF Answer$="S" THEN Reg$="300"
919     IF Reg$="100" THEN Numo=20
920     IF Reg$="200" THEN Numo=17
921     IF Reg$="300" THEN Numo=20
922     A$="52"
923     File$=A$&Reg$
924     CREATE File$,1
925     ASSIGN File$ TO #2
926     Ehtg=0
927     DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
928     DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
929     DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
```

```
930     IF Reg$="200" THEN GOTO 942
931     IF Reg$="300" THEN GOTO 952
932     RESTORE 927
933      FOR K=1 TO Numo
934       READ Id$
935       A$="50"
936       File$=A$&Id$
937       ASSIGN File$ TO #1
938       READ #1;Htot
939       Ehtg=Ehtg+Htot
940      NEXT K
941     GOTO 961
942     RESTORE 928
943      FOR K=1 TO Numo
944       READ Id$
945       A$="50"
946       File$=A$&Id$
947       ASSIGN File$ TO #1
948       READ #1;Htot
949       Ehtg=Ehtg+Htot
950      NEXT K
951     GOTO 961
952     RESTORE 929
953      FOR K=1 TO Numo
954       READ Id$
955       A$="50"
956       File$=A$&Id$
957       ASSIGN File$ TO #1
958       READ #1;Htot
959       Ehtg=Ehtg+Htot
960      NEXT K
961     Eheat=Ehtg/Numo
962     PRINT #2;Eheat
963     ASSIGN * TO #1
964     ASSIGN * TO #2
965   SUBEND
966   !       REGIONAL ESTIMATED COOLING CONSUMPTION    *
967   SUB Calc10
968     DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
969     INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
970     IF Answer$="N" THEN Reg$="100"
971     IF Answer$="C" THEN Reg$="200"
972     IF Answer$="S" THEN Reg$="300"
973     IF Reg$="100" THEN Numo=20
974     IF Reg$="200" THEN Numo=17
975     IF Reg$="300" THEN Numo=20
976     A$="53"
977     File$=A$&Reg$
```

```
978     CREATE File$,1
979     ASSIGN File$ TO #2
980     Eclg=0
981     DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
982     DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
983     DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
984     IF Reg$="200" THEN GOTO 996
985     IF Reg$="300" THEN GOTO 1006
986     RESTORE 981
987      FOR K=1 TO Numo
988       READ Id$
989       A$="51"
990       File$=A$&Id$
991       ASSIGN File$ TO #1
992       READ #1;Ctot
993       Eclg=Eclg+Ctot
994      NEXT K
995     GOTO 1015
996     RESTORE 982
997      FOR K=1 TO Numo
998       READ Id$
999       A$="51"
1000      File$=A$&Id$
1001      ASSIGN File$ TO #1
1002      READ #1;Ctot
1003      Eclg=Eclg+Ctot
1004     NEXT K
1005    GOTO 1015
1006    RESTORE 983
1007     FOR K=1 TO Numo
1008      READ Id$
1009      A$="51"
1010      File$=A$&Id$
1011      ASSIGN File$ TO #1
1012      READ #1;Ctot
1013      Eclg=Eclg+Ctot
1014     NEXT K
1015    Ecool=Eclg/Numo
1016    PRINT #2;Ecool
1017    ASSIGN * TO #1
1018    ASSIGN * TO #2
1019  SUBEND
1020  !       PRINT OUT        *
1021  SUB Output
1022    DIM P$[20],Answer$[20],A$[3],File$[6],Id$[3]
1023    SHORT Sum(10,12),Avg(10,12),Mosums(12),Moavg(12),Heat(9),
        Cool(9)
1024    INPUT "ENTER ID NUMBER",Id$
```

```
1025     INPUT "ENTER REGION (N,C,S)",Answer$
1026     IF Answer$="N" THEN P$="Northern"
1027     IF Answer$="C" THEN P$="Central"
1028     IF Answer$="S" THEN P$="Southern"
1029     A$="21"
1030     File$=A$&Id$
1031     ASSIGN File$ TO #1
1032     A$="22"
1033     File$=A$&Id$
1034     ASSIGN File$ TO #2
1035     A$="24"
1036     File$=A$&Id$
1037     ASSIGN File$ TO #3
1038     A$="23"
1039     File$=A$&Id$
1040     ASSIGN File$ TO #4
1041     A$="42"
1042     File$=A$&Id$
1043     ASSIGN File$ TO #5
1044     A$="45"
1045     File$=A$&Id$
1046     ASSIGN File$ TO #6
1047     A$="50"
1048     File$=A$&Id$
1049     ASSIGN File$ TO #7
1050     A$="44"
1051     File$=A$&Id$
1052     ASSIGN File$ TO #8
1053     A$="46"
1054     File$=A$&Id$
1055     ASSIGN File$ TO #9
1056     A$="51"
1057     File$=A$&Id$
1058     ASSIGN File$ TO #10
1059     MAT READ #1;Sum
1060     MAT READ #2;Avg
1061      FOR J=1 TO 12
1062       READ #3;Mosums(J)
1063       READ #4;Moavg(J)
1064      NEXT J
1065      FOR I=1 TO 9
1066       READ #5;Heat(I)
1067       READ #8;Cool(I)
1068      NEXT I
1069     READ #6;Avght
1070     READ #7;Htot
1071     READ #9;Avgcl
1072     READ #10;Ctot
1073     ASSIGN * TO #1
1074     A$="30"
1075     File$=A$&Id$
1076     ASSIGN File$ TO #1
1077     READ #1;Bdih,Bdic
1078     PRINTER IS 0
1079     PRINT LIN(3);TAB(5);"ENERGY CONSUMPTION DATA",LIN(1)
1080     PRINT TAB(5);"ID# ";Id$;LIN(1);TAB(5);"REGION: ";P$;LIN(1
         )
```

```
1081    PRINT TAB(5);"MONTHLY DATA";SPA(13);"KEY: XXXXX=Total mon
        thly consumption (kWh/ft^2)"
1082    PRINT TAB(5);SPA(30);"XXXXX=Average daily consumption (kW
        h/ft^2)";LIN(2)
1083    IMAGE 5X"Yr",3X"Jan"3X,"Feb"3X,"Mar"3X,"Apr"3X,
        "May"3X,"Jne"3X,"Jly"3X,"Aug"3X,"Sep"3X,"O
        ct"3X,"Nov"3X,"Dec"
1084    PRINT USING 1083
1085    PRINT " "
1086     FOR I=1 TO 10
1087       IF I=1 THEN P$="77"
1088       IF I=2 THEN P$="78"
1089       IF I=3 THEN P$="79"
1090       IF I=4 THEN P$="80"
1091       IF I=5 THEN P$="81"
1092       IF I=6 THEN P$="82"
1093       IF I=7 THEN P$="83"
1094       IF I=8 THEN P$="84"
1095       IF I=9 THEN P$="85"
1096       IF I=10 THEN P$="86"
1097       IMAGE 5X,2AX,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.
        DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD
1098       PRINT USING 1097;P$,Sum(I,1),Sum(I,2),Sum(I,3),Sum(I,4)
        ,Sum(I,5),Sum(I,6),Sum(I,7),Sum(I,8),Sum(I,9),Sum(I,1
        0),Sum(I,11),Sum(I,12)
1099       IMAGE 8X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,
        X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD
1100       PRINT USING 1099;Avg(I,1),Avg(I,2),Avg(I,3),Avg(I,4),Av
        g(I,5),Avg(I,6),Avg(I,7),Avg(I,8),Avg(I,9),Avg(I,10),
        Avg(I,11),Avg(I,12)
1101       PRINT " "
1102     NEXT I
1103    PRINT TAB(5);CHR$(132);"AVERAGE MONTHLY TOTAL CONSUMPTION
         (kWh/ft^2)";CHR$(128);LIN(1)
1104    IMAGE 10X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X
        ,5A,3X,5A,3X,5A,3X,5A,3X,5A
1105    IMAGE 8X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,
        D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD
1106    PRINT USING 1104;"Jan","Feb","Mar","Apr","May",
        "Jne","Jly","Aug","Sep","Oct","Nov","Dec
        "
```

```
1107    PRINT USING 1105;Mosums(1),Mosums(2),Mosums(3),Mosums(4),
        Mosums(5),Mosums(6),Mosums(7),Mosums(8),Mosums(9),Mos
        ums(10),Mosums(11),Mosums(12)
1108    PRINT " "
1109    PRINT TAB(5);CHR$(132);"MONTHLY AVERAGE DAILY CONSUMPTION
         (kWh/ft^2)";CHR$(128);LIN(1)
1110    PRINT USING 1104;"Jan","Feb","Mar","Apr","May",
        "Jne","Jly","Aug","Sep","Oct","Nov","Dec
        "
1111    PRINT USING 1105;Moavg(1),Moavg(2),Moavg(3),Moavg(4),Moav
        g(5),Moavg(6),Moavg(7),Moavg(8),Moavg(9),Moavg(10),Mo
        avg(11),Moavg(12)
1112    PRINT " "
1113    PRINT TAB(5);"HEATING SEASON DATA"
1114    PRINT TAB(8);"Consumption per season (Btu/ft^2/HDD)"
1115    IMAGE 10X"77/78"3X,"78/79"3X,"79/80"3X,"80/81"3X,
        "81/82"3X,"82/83"3X,"83/84"3X,"84/85"3X,"85/
        86"
1116    IMAGE 10X,D.DDD,3X,D.DDD,3X,D.DDD,3X,D.DDD,3X,D.DDD,3X,D.
        DDD,3X,D.DDD,3X,D.DDD,3X,D.DDD
1117    PRINT USING 1115
1118    PRINT USING 1116;Heat(1),Heat(2),Heat(3),Heat(4),Heat(5),
        Heat(6),Heat(7),Heat(8),Heat(9)
1119    PRINT " "
1120    IMAGE 7X,8AX,D.DDD 15X,10AX,D.DDD
1121    PRINT USING 1120;"AVERAGE:",Avght,"ESTIMATED:",Htot
1122    PRINT " "
1123    PRINT TAB(5);"COOLING SEASON DATA"
1124    PRINT TAB(8);"Consumption per season (Btu/ft^2/CDD)"
1125    IMAGE 12X,"77"6X,"78"6X,"79"6X,"80"6X,"81"6X,"
        82"6X,"83"6X,"84"6X,"85"
1126    PRINT USING 1125
1127    PRINT USING 1116;Cool(1),Cool(2),Cool(3),Cool(4),Cool(5),
        Cool(6),Cool(7),Cool(8),Cool(9)
1128    PRINT " "
1129    PRINT USING 1120;"AVERAGE:",Avgcl,"ESTIMATED:",Ctot
1130    PRINT " "
1131    IMAGE 4X,"BUILDING DESIGN INDEX"6X,D.DDD,X"(heating)"6X
        ,D.DDD,X"(cooling)"
```

```
1132    PRINT USING 1131;Bdih,Bdic
1133    PRINT LIN(6)
1134    PRINTER IS 16
1135    ASSIGN * TO #1
1136    ASSIGN * TO #2
1137    ASSIGN * TO #3
1138    ASSIGN * TO #4
1139    ASSIGN * TO #5
1140    ASSIGN * TO #6
1141    ASSIGN * TO #7
1142    ASSIGN * TO #8
1143    ASSIGN * TO #9
1144    ASSIGN * TO #10
1145  SUBEND
1146 !          BUILDING DESIGN INDEX        *
1147  SUB Bdi
1148    PRINTER IS 16
1149    DIM Reg$[3],P$[22],Answer$[20],A$[3],File$[6],Id$[3]
1150    SHORT Sd(7),Sc(7),St(7),Sm(7),Sr(7),Std(7),Stc(7),Stt(7),
        Stm(7),Str(7),Id(7),Ir(7),It(7),Im(7),M(7),Er(7),A(7)
        ,K(7)
1151    INPUT "ENTER ID NUMBER",Id$
1152    INPUT "ENTER REGION (N,C,S)",Answer$
1153    IF Answer$="N" THEN Reg$="100"
1154    IF Answer$="C" THEN Reg$="200"
1155    IF Answer$="S" THEN Reg$="300"
1156    IF Reg$="100" THEN Idepth=8
1157    IF Reg$="200" THEN Idepth=6
1158    IF Reg$="300" THEN Idepth=4
1159    A$="30"
1160    File$=A$&Id$
1161    CREATE File$,1
1162    ASSIGN File$ TO #1
1163    INPUT "ENTER NUMBER OF WALLS TYPES",Nwalls
1164    N=Nwalls+1
1165     FOR I=1 TO N
1166      IF I=N THEN 1214
1167      PRINT "WALL NUMBER ";I
1168      INPUT "IS THIS WALL EARTH SHELTERED? (Y,N)",Answer$
1169      IF Answer$="N" THEN 1174
1170      St(I)=6
1171      INPUT "ENTER DENSITY OF SURROUNDING SOIL (lb/ft^3)",Sd(
        I)
1172      INPUT "ENTER CONDUCTIVITY OF SURROUNDING SOIL (Btu in/h
         ft^2 F)",Sc(I)
1173      GOTO 1175
1174      St(I)=0
1175      INPUT "ENTER DENSITY OF INSULATION (lb/ft^3)",Id(I)
1176      INPUT "ENTER THICKNESS OF INSULATION (in)",It(I)
1177      INPUT "ENTER R-VALUE OF INSULATION",Ir(I)
1178      INPUT "ENTER AREA OF WALL(Sq.ft.)",A(I)
```

```
1179      PRINT "C -Concrete"
1180      PRINT "B -Concrete block"
1181      PRINT "W -Wood frame/siding"
1182      PRINT "WB-Wood frame/brick siding"
1183      INPUT "ENTER WALL TYPE",P$
1184      IF P$="C" THEN Wall(I)=1
1185      IF P$="B" THEN Wall(I)=2
1186      IF P$="W" THEN Wall(I)=3
1187      IF P$="WB" THEN Wall(I)=4
1188      IF Wall(I)=1 THEN 1197
1189      IF Wall(I)=2 THEN Std(I)=97
1190      IF Wall(I)=3 THEN Std(I)=6.06
1191      IF Wall(I)=4 THEN Std(I)=36.9
1192      IF Wall(I)=2 THEN Str(I)=3
1193      IF Wall(I)=3 THEN Str(I)=7.26
1194      IF Wall(I)=4 THEN Str(I)=6.78
1195      Stm(I)=A(I)*Std(I)
1196      GOTO 1200
1197      INPUT "ENTER THICKNESS OF CONCRETE (in)",Stt(I)
1198      Stm(I)=144*Stt(I)/12*A(I)
1199      Str(I)=Stt(I)/6.48
1200      IF St(I)=0 THEN 1203
1201      Sm(I)=Sd(I)*6*A(I)
1202      Sr(I)=72/Sc(I)
1203      Im(I)=Id(I)*It(I)/12
1204      INPUT "IS INSULATION ON INTERIOR OF WALL? (Y,N)",Answer
      $
1205      IF Answer$="N" THEN 1208
1206      K(I)=0
1207      GOTO 1209
1208      K(I)=1
1209      M(I)=Sm(I)+Stm(I)*K(I)+Im(I)
1210      Er(I)=(Sr(I)+Str(I)+Ir(I))*A(I)
1211      Wr(I)=Er(I)/A(I)
1212      PRINT PAGE
1213      GOTO 1255
1214      PRINT "ROOF"
1215      INPUT "IS ROOF EARTH COVERED? (Y,N)",Answer$
1216      IF Answer$="N" THEN 1220
1217      INPUT "ENTER DENSITY OF SURROUNDING SOIL (lb/ft^3)",Sd(
      I)
1218      INPUT "ENTER CONDUCTIVITY OF SURROUNDING SOIL (Btu in/h
       ft^2 F)",Sc(I)
1219      INPUT "ENTER THICKNESS OF EARTH COVERING(in)",St(I)
1220      Dh=St(I)+8
1221      Dc=St(I)+Idepth
1222      INPUT "ENTER DENSITY OF INSULATION (lb/ft^3)",Id(I)
1223      INPUT "ENTER THICKNESS OF INSULATION (in)",It(I)
1224      INPUT "ENTER R-VALUE OF INSULATION",Ir(I)
1225      INPUT "ENTER AREA OF ROOF (Sq.ft.)",A(I)
1226      PRINT "C -Concrete"
```

```
1227      PRINT "S -Steel joist/conc.deck"
1228      PRINT "W -Wood joist/shingles"
1229      PRINT "WA-Wood joist/asphalt shingles"
1230      INPUT "ENTER ROOF TYPE",P$
1231      IF P$="C" THEN Wall(I)=5
1232      IF P$="S" THEN Wall(I)=6
1233      IF P$="W" THEN Wall(I)=7
1234      IF P$="WA" THEN Wall(I)=8
1235      IF Wall(I)=5 THEN 1244
1236      IF Wall(I)=6 THEN Std(I)=39.5
1237      IF Wall(I)=7 THEN Std(I)=5.77
1238      IF Wall(I)=8 THEN Std(I)=7.35
1239      IF Wall(I)=6 THEN Str(I)=4.73
1240      IF Wall(I)=7 THEN Str(I)=7.88
1241      IF Wall(I)=8 THEN Str(I)=7.38
1242      Stm(I)=A(I)*Std(I)
1243      GOTO 1247
1244      INPUT "ENTER THICKNESS OF CONCRETE(in)",Stt(I)
1245      Stm(I)=144*Stt(I)/12*A(I)
1246      Str(I)=Stt(I)/6.48
1247      IF St(I)=0 THEN 1250
1248      Sm(I)=Sd(I)*St(I)/12*A(I)
1249      Sr(I)=St(I)/Sc(I)
1250      Im(I)=Id(I)*It(I)/12*A(I)
1251      M(I)=Sm(I)+Stm(I)+Im(I)
1252      Er(I)=(Sr(I)+Str(I)+Ir(I))*A(I)
1253      Wr(I)=Er(I)/A(I)
1254      PRINT PAGE
1255     NEXT I
1256    INPUT "ARE THERMAL WICKS PRESENT? (Y,N)",Answer$
1257    IF Answer$="N" THEN 1260
1258    Wick=.96
1259    GOTO 1261
1260    Wick=1
1261    Tmf=Area=Er=0
1262     FOR I=1 TO N
1263      Tmf=Tmf+M(I)
1264      Area=Area+A(I)
1265      Er=Er+Er(I)
1266     NEXT I
1267    Tmf=Tmf*Wick/Area
1268    Tmfx=Tmf/633
1269    Er=Er/Area
1270    Erx=Er/56
1271    INPUT "ENTER MAXIMUM DEPTH OF WALL INSULATION FROM SURFAC
        E (Ft.)",D
1272    Eh=D/Dh
1273    IF D>Dc THEN 1276
1274    Ec=D/Dc
1275    GOTO 1277
1276    Ec=Dc/D
1277    INPUT "ENTER VENTILATION POTENTIAL FACTOR",V
1278    INPUT "ENTER SOLAR GAIN CONTROL FACTOR",S
1279    INPUT "ENTER SOLAR GAIN POTENTIAL FACTOR",Sgf
1280    INPUT "ENTER SOLAR ACCESS FACTOR",Saf
1281    Bdih=Tmf*.20/625+Er*.20/82.6+Eh*.25+Saf*.10+Sgf*.25
1282    Bdic=Tmf*.20/757+Er*.20/30.02+Ec*.25+V*.10+S*.25
```

```
1283    PRINT #1;Bdih,Bdic
1284    IF Reg$="100" THEN P$="Northern"
1285    IF Reg$="200" THEN P$="Central"
1286    IF Reg$="300" THEN P$="Southern"
1287    PRINTER IS 0
1288    PRINT LIN(5),TAB(10);"BUILDING DESIGN INDEX",LIN(1)
1289    PRINT TAB(10);"ID# ";Id$,LIN(1),TAB(10),"REGION:";P$,LIN(
        1)
1290    Lc=10
1291     FOR I=1 TO N
1292      IF I=N THEN 1299
1293      IF I<>1 THEN 1297
1294      PRINT TAB(10);"WALL";I;SPA(10);"DENSITY";SPA(2);"CONDUC
        TIVITY";SPA(2);"THICKNESS";SPA(2);"MASS";SPA(2);"RESI
        STANCE"
1295      PRINT TAB(10);CHR$(132);TAB(27);"(lb/ft^3) (Btuin/hft^2
        F) (in) (lb/ft^2)(Btu/hft^2F)";CHR$(128)
1296      GOTO 1300
1297      PRINT TAB(10);CHR$(132);"WALL";I;SPA(10);"DENSITY";SPA(
        2);"CONDUCTIVITY";SPA(2);"THICKNESS";SPA(2);"MASS";SP
        A(2);"RESISTANCE";CHR$(128)
1298      GOTO 1300
1299      PRINT TAB(10);CHR$(132);"ROOF";SPA(13);"DENSITY";SPA(2)
        ;"CONDUCTIVITY";SPA(2);"THICKNESS";SPA(2);"MASS";SPA(
        2);"RESISTANCE";CHR$(128)
1300      IMAGE 10X,16AX,DDD.DD,6X,DDD.DD,6X,DDD.DD,2X,DDDDDDD,4X
        ,DDD.DD
1301      IF St(I)=0 THEN 1303
1302      PRINT USING 1300;"SURROUNDING SOIL",Sd(I),Sc(I),St(I),S
        m(I),Sr(I)
1303      IMAGE 10X,16AX,DDD.DD,9X,"*",9X,DD.DD,2X,DDDDD.D,4X,DDD
        .DD
1304      PRINT USING 1303;"INSULATION",Id(I),It(I),Im(I),Ir(I)
1305      IMAGE 10X,16AX,22A,3X,DD.DD,3X,DDDDDD,4X,DDD.DD
1306      IMAGE 10X,16AX,22A,5X,"*",5X,DDDDDD,4X,DDD.DD
1307      IF Wall(I)=1 THEN P$="Concrete"
1308      IF Wall(I)=2 THEN P$="Concrete block"
1309      IF Wall(I)=3 THEN P$="Wood frame/siding"
1310      IF Wall(I)=4 THEN P$="Wood frame/brick"
1311      IF Wall(I)=5 THEN P$="Concrete"
1312      IF Wall(I)=6 THEN P$="Steel joist/conc.deck"
1313      IF Wall(I)=7 THEN P$="Wood joist/shingles"
```

```
1314      IF Wall(I)=8 THEN P$="Wood joist/asphalt sh."
1315      IF Wall(I)=1 THEN 1319
1316      IF Wall(I)=5 THEN 1319
1317      PRINT USING 1306;"STRUCTURE",P$,Stm(I),Str(I)
1318      GOTO 1320
1319      PRINT USING 1305;"STRUCTURE",P$,Stt(I),Stm(I),Str(I)
1320      IF I=N THEN 1329
1321      IF K(I)=0 THEN P$="Interior"
1322      IF K(I)=1 THEN P$="Exterior"
1323      IMAGE 10X,20AX,8A,6X,18AX,DDDDDDD.DD
1324      IMAGE 10X,5AX,DDDD.D,23X,21AX,DDDD.DD
1325      PRINT USING 1323;"INSULATION LOCATION:",P$,"MASS:",M(I)

1326      PRINT USING 1324;"AREA:",A(I),"EFFECTIVE RESISTANCE:",W
          r(I)
1327      PRINT " "
1328      GOTO 1334
1329      IMAGE 10X,5AX,DDDD.D,23X,18AX,DDDDDDD.DD
1330      IMAGE 45X,21AX,DDDD.DD
1331      PRINT USING 1329;"AREA:",A(I),"MASS:",M(I)
1332      PRINT USING 1330;"EFFECTIVE RESISTANCE:",Wr(I)
1333      PRINT " "
1334      Lc=Lc+7
1335     NEXT I
1336    IF Wick=.96 THEN P$="YES"
1337    IF Wick=1 THEN P$="NO"
1338    IMAGE 9X,14A,2X,3A
1339    PRINT USING 1338;"THERMAL WICKS?",P$
1340    IMAGE 9X,39AX,DDDD.DD
1341    IMAGE 9X,39AX,DDDD.DD
1342    PRINT USING 1341;"THERMAL MASS FACTOR:",Tmfx
1343    PRINT USING 1340;"TOTAL EFFECTIVE RESISTANCE:",Erx
1344    PRINT USING 1340;"DEPTH OF INSULATION BELOW SURFACE (FT):
        ",D
1345    PRINT USING 1340;"EARTH CONTACT FACTOR (HEATING):",Eh
1346    PRINT USING 1340;"EARTH CONTACT FACTOR (COOLING):",Ec
1347    PRINT USING 1340;"VENTILATION POTENTIAL FACTOR:",V
1348    PRINT USING 1340;"SOLAR GAIN CONTROL FACTOR:",S
1349    PRINT USING 1340;"SOLAR GAIN POTENTIAL FACTOR:",Sgf
1350    PRINT USING 1340;"SOLAR ACCESS FACTOR:",Saf
1351    PRINT " "
1352    IMAGE 9X,22AX,DDDDD.DDX,9A,4X,DDDDD.DDX,9A
1353    PRINT USING 1352;"BUILDING DESIGN INDEX:";Bdih;"(heating)
        ";Bdic;"(cooling)"
1354    Lc=Lc+12
1355    PRINT LIN(72-Lc)
1356    ASSIGN * TO #1
1357    PRINTER IS 16
```

```
1358  SUBEND
1359  !       REGIONAL BUILDING DESIGN INDEX AVERAGES    *
1360  SUB Calc11
1361    DIM Reg$[3],Answer$[20],A$[3],File$[6],Id$[3]
1362    INPUT "WHICH REGION DO YOU WISH TO CALCULATE? North(N),Ce
        ntral(C),South(S)",Answer$
1363    IF Answer$="N" THEN Reg$="100"
1364    IF Answer$="C" THEN Reg$="200"
1365    IF Answer$="S" THEN Reg$="300"
1366    IF Reg$="100" THEN Numo=20
1367    IF Reg$="200" THEN Numo=17
1368    IF Reg$="300" THEN Numo=20
1369    A$="55"
1370    File$=A$&Reg$
1371    CREATE File$,1
1372    ASSIGN File$ TO #2
1373    Bimp=Bymp=0
1374    DATA 401,402,601,602,603,604,605,606,607,608,609,610,611,
        612,801,802,803,804,805,806
1375    DATA 301,302,303,304,305,306,701,702,703,704,705,706,707,
        708,709,710,711
1376    DATA 101,102,103,201,202,501,502,503,504,505,506,507,508,
        509,510,511,512,513,514,515
1377    IF Reg$="200" THEN GOTO 1390
1378    IF Reg$="300" THEN GOTO 1401
1379    RESTORE 1374
1380     FOR K=1 TO Numo
1381      READ Id$
1382      A$="30"
1383      File$=A$&Id$
1384      ASSIGN File$ TO #1
1385      READ #1;Bdih,Bdic
1386      Bimp=Bimp+Bdih
1387      Bymp=Bymp+Bdic
1388     NEXT K
1389    GOTO 1411
1390    RESTORE 1375
1391     FOR K=1 TO Numo
1392      READ Id$
1393      A$="30"
1394      File$=A$&Id$
1395      ASSIGN File$ TO #1
1396      READ #1;Bdih,Bdic
1397      Bimp=Bimp+Bdih
1398      Bymp=Bymp+Bdic
1399     NEXT K
1400    GOTO 1411
1401    RESTORE 1376
1402     FOR K=1 TO Numo
1403      READ Id$
1404      A$="30"
```

```
1405      File$=A$&Id$
1406      ASSIGN File$ TO #1
1407      READ #1;Bdih,Bdic
1408      Bimp=Bimp+Bdih
1409      Bymp=Bymp+Bdic
1410     NEXT K
1411    Rbdih=Bimp/Numo
1412    Rbdic=Bymp/Numo
1413    PRINT #2;Rbdih,Rbdic
1414    ASSIGN * TO #1
1415    ASSIGN * TO #2
1416  SUBEND
1417  !    REGIONAL PRINT OUT         *
1418  SUB Regout
1419    DIM P$[20],Answer$[20],A$[3],File$[6],Id$[3]
1420    SHORT Rsum(12),Ravg(12)
1421    INPUT "ENTER REGION (N,C,S)",Answer$
1422    IF Answer$="N" THEN P$="Northern"
1423    IF Answer$="C" THEN P$="Central"
1424    IF Answer$="S" THEN P$="Southern"
1425    IF Answer$="N" THEN Reg$="100"
1426    IF Answer$="C" THEN Reg$="200"
1427    IF Answer$="S" THEN Reg$="300"
1428    A$="25"
1429    File$=A$&Reg$
1430    ASSIGN File$ TO #1
1431    A$="26"
1432    File$=A$&Reg$
1433    ASSIGN File$ TO #2
1434    A$="47"
1435    File$=A$&Reg$
1436    ASSIGN File$ TO #3
1437    A$="48"
1438    File$=A$&Reg$
1439    ASSIGN File$ TO #4
1440    A$="52"
1441    File$=A$&Reg$
1442    ASSIGN File$ TO #5
1443    A$="53"
1444    File$=A$&Reg$
1445    ASSIGN File$ TO #6
1446    A$="55"
1447    File$=A$&Reg$
1448    ASSIGN File$ TO #7
1449    MAT READ #1;Rsum
1450    MAT READ #2;Ravg
1451    READ #3;Rheat
1452    READ #4;Rcool
1453    READ #5;Eheat
1454    READ #6;Ecool
1455    READ #7;Rbdih,Rbdic
1456    PRINTER IS 0
1457    PRINT LIN(3);TAB(5);"REGIONAL ENERGY CONSUMPTION DATA",LI
       N(1)
1458    PRINT TAB(5);"REGION: ";P$;LIN(1)
1459    PRINT TAB(5);CHR$(132);"REGIONAL AVERAGE MONTHLY TOTAL CO
       NSUMPTION (kWh/ft^2)";CHR$(128);LIN(1)
```

```
1460    IMAGE 10X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X,5A,3X
        ,5A,3X,5A,3X,5A,3X,5A
1461    IMAGE 8X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,
        D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD,X,D.DDD
1462    PRINT USING 1460;"Jan","Feb","Mar","Apr","May",
        "Jne","Jly","Aug","Sep","Oct","Nov","Dec
        "
1463    PRINT USING 1461;Rsum(1),Rsum(2),Rsum(3),Rsum(4),Rsum(5),
        Rsum(6),Rsum(7),Rsum(8),Rsum(9),Rsum(10),Rsum(11),Rsu
        m(12)
1464    PRINT " "
1465    PRINT TAB(5);CHR$(132);"REGIONAL MONTHLY AVERAGE DAILY CO
        NSUMPTION (kWh/ft^2)";CHR$(128);LIN(1)
1466    PRINT USING 1460;"Jan","Feb","Mar","Apr","May",
        "Jne","Jly","Aug","Sep","Oct","Nov","Dec
        "
1467    PRINT USING 1461;Ravg(1),Ravg(2),Ravg(3),Ravg(4),Ravg(5),
        Ravg(6),Ravg(7),Ravg(8),Ravg(9),Ravg(10),Ravg(11),Rav
        g(12)
1468    PRINT " "
1469    PRINT TAB(5);"HEATING SEASON DATA"
1470    PRINT " "
1471    IMAGE 7X,8AX,D.DDD 15X,17AX,D.DDD
1472    PRINT USING 1471;"AVERAGE:",Rheat,"AVERAGE ESTIMATED:",Eh
        eat
1473    PRINT " "
1474    PRINT TAB(5);"COOLING SEASON DATA"
1475    PRINT " "
1476    PRINT USING 1471;"AVERAGE:",Rcool,"AVERAGE ESTIMATED:",Ec
        ool
1477    PRINT " "
1478    PRINT TAB(5);"REGIONAL AVERAGE BUILDING DESIGN INDICES"
        ,LIN(1)
1479    IMAGE 7X"HEATING:"4X,D.DDD6X,"COOLING:"4X,D.DDD
1480    PRINT USING 1479;Rbdih,Rbdic
1481    PRINT LIN(46)
1482    PRINTER IS 16
1483    ASSIGN * TO #1
1484    ASSIGN * TO #2
```

```
1485     ASSIGN * TO #3
1486     ASSIGN * TO #4
1487     ASSIGN * TO #5
1488     ASSIGN * TO #6
1489     ASSIGN * TO #7
1490   SUBEND
```

APPENDIX D

BUILDING DESIGN INDEX EXAMPLE CALCULATION FORM

BUILDING DESIGN INDEX

ID# _
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft²·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	582000	60.00
INSULATION	2.00	*	1.00	200	5.00
STRUCTURE	Concrete block		*	97000	3.00
INSULATION LOCATION: Exterior			MASS:		679200.00
AREA: 1000.0			EFFECTIVE RESISTANCE:		68.00

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	200	5.00
STRUCTURE	Concrete block		*	128040	3.00
INSULATION LOCATION: Exterior			MASS:		128240.00
AREA: 1320.0			EFFECTIVE RESISTANCE:		8.00

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	72.00	162960	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete block		*	27160	3.00
INSULATION LOCATION: Exterior			MASS:		190120.00
AREA: 280.0			EFFECTIVE RESISTANCE:		63.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	1029000	2.64
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	617400	1.54
AREA: 5145.0			MASS:		1646400.00
			EFFECTIVE RESISTANCE:		4.18

THERMAL WICKS? NO
THERMAL MASS FACTOR: .54
TOTAL EFFECTIVE RESISTANCE: .27
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .36
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .80
SOLAR ACCESS FACTOR: .90

BUILDING DESIGN INDEX: .51 (heating) .50 (cooling)

APPENDIX E

EARTH SHELTERED HOUSING

ENERGY CONSUMPTION

ENERGY CONSUMPTION DATA

ID# 101
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
· XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	.905	.836	.783	.402	.346	.729	.920	.910	.927	.541	.310	.900
	.029	.030	.025	.013	.011	.024	.030	.029	.031	.017	.010	.029
81	1.472	1.203	.607	.276	.297	.592	1.077	.919	.796	.536	.383	.370
	.047	.043	.020	.009	.010	.020	.035	.030	.027	.017	.013	.012
82	.594	.897	.508	.378	.332	.617	1.019	1.113	1.254	.609	.319	.771
	.019	.032	.016	.013	.011	.021	.033	.036	.042	.020	.011	.025
83	1.094	1.075	.582	.405	.314	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.035	.038	.019	.014	.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.016	1.003	.620	.366	.322	.646	1.005	.981	.992	.562	.337	.680

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.033	.036	.020	.012	.010	.022	.032	.032	.033	.018	.011	.022

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.212	.188	.213	0.000	0.000	0.000

AVERAGE: .175 ESTIMATED: .500

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.192	.224	.254	0.000	0.000	0.000

AVERAGE: .223 ESTIMATED: .446

BUILDING DESIGN INDEX .571 (heating) .545 (cooling)

ENERGY CONSUMPTION DATA

ID# 102
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.183	.189	.055	.047
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.006	.006	.002	.002
80	.776	1.088	1.533	.826	1.160	1.600	1.742	1.776	.572	.591	.392	.047
	.025	.039	.049	.028	.037	.053	.056	.057	.019	.019	.013	.002
81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.776	1.088	1.533	.826	1.160	1.600	1.742	1.776	.378	.390	.223	.047

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.025	.039	.049	.028	.037	.053	.056	.057	.013	.013	.007	.002

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.111	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE: .111 ESTIMATED: .111

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.407	0.000	0.000	0.000	0.000	0.000

AVERAGE: .407 ESTIMATED: .407

BUILDING DESIGN INDEX .300 (heating) .326 (cooling)

ENERGY CONSUMPTION DATA

ID# 103
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.662	.500	.395	.379	.285	.276	1.020
	0.000	0.000	0.000	0.000	0.000	.022	.016	.013	.013	.009	.009	.033
81	1.122	.802	.477	.743	.283	.279	.225	.141	.161	.216	.196	.077
	.036	.029	.015	.025	.009	.009	.007	.005	.005	.007	.007	.002
82	.413	1.201	.677	.698	.373	.269	.314	.340	.494	.338	.379	.778
	.013	.043	.022	.023	.012	.009	.010	.011	.016	.011	.013	.025
83	.957	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.831	1.001	.577	.720	.328	.403	.346	.292	.345	.280	.284	.625

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.027	.036	.019	.024	.011	.013	.011	.009	.011	.009	.009	.020

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.129	.054	.046	0.000	0.000	0.000

AVERAGE: .077 ESTIMATED: 0.000

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.271	.038	.035	0.000	0.000	0.000

AVERAGE: .115 ESTIMATED: 0.000

BUILDING DESIGN INDEX .333 (heating) .565 (cooling)

ENERGY CONSUMPTION DATA

ID# 201
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	.453	.440	.801	1.058	1.299	1.319	.703	.395	.441
	0.000	0.000	0.000	.016	.014	.027	.034	.042	.044	.023	.013	.014
81	.366	.279	.419	.387	.452	.470	0.000	0.000	0.000	0.000	0.000	0.000
	.012	.010	.014	.013	.015	.016	0.000	0.000	0.000	0.000	0.000	0.000
82	.982	.400	.165	.372	.362	.593	.894	.961	.740	.586	.420	.523
	.032	.014	.005	.012	.012	.020	.029	.031	.025	.019	.014	.017
83	.860	.806	.797	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.028	.029	.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.736	.495	.461	.404	.418	.621	.976	1.130	1.030	.645	.407	.482

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.024	.018	.015	.014	.013	.021	.031	.036	.034	.021	.014	.016

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.077	0.000	.121	0.000	0.000	0.000

AVERAGE: .099 ESTIMATED: .494

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.440	0.000	.238	0.000	0.000	0.000

AVERAGE: .339 ESTIMATED: 1.356

BUILDING DESIGN INDEX .294 (heating) .553 (cooling)

ENERGY CONSUMPTION DATA

ID# 202
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	.195	.261	.202	.255	.218	.239	.591	.556	.476	.424	.349	.338
	.006	.009	.007	.008	.007	.008	.019	.018	.016	.014	.012	.011
78	.304	.553	.524	.562	.562	.556	.707	.987	.903	.618	.556	.411
	.010	.020	.017	.019	.018	.019	.023	.032	.030	.020	.019	.013
79	.653	.688	.540	.456	.379	.462	.836	1.204	1.161	.726	.788	.771
	.021	.025	.017	.015	.012	.015	.027	.039	.039	.023	.026	.025
80	.780	1.037	.926	.912	.861	.969	1.034	1.513	2.086	1.067	.582	.650
	.025	.037	.030	.030	.028	.032	.033	.049	.070	.034	.019	.021
81	.855	.815	.749	.766	.668	.889	0.000	0.000	0.000	0.000	0.000	0.000
	.028	.029	.024	.026	.022	.030	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.557	.671	.568	.590	.538	.623	.792	1.065	1.157	.709	.569	.543

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.018	.024	.019	.020	.017	.021	.026	.034	.039	.023	.019	.018

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
.025	.028	.051	.089	0.000	0.000	0.000	0.000	0.000

AVERAGE: .048 ESTIMATED: .161

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
.129	.222	.289	.320	0.000	0.000	0.000	0.000	0.000

AVERAGE: .240 ESTIMATED: .800

BUILDING DESIGN INDEX .364 (heating) .584 (cooling)

ENERGY CONSUMPTION DATA

ID# 501
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	.745	.745	.150	.145	.908	.908	.872	.901	1.233	1.274
	0.000	0.000	.024	.025	.005	.005	.029	.029	.029	.029	.041	.041
80	1.747	1.578	1.377	1.377	1.342	1.299	1.358	1.358	.687	.710	1.393	1.439
	.056	.056	.044	.046	.043	.043	.044	.044	.023	.023	.046	.046
81	1.563	1.411	1.511	1.511	.873	.845	.985	.985	.954	.986	.831	.859
	.050	.050	.049	.050	.028	.028	.032	.032	.032	.032	.028	.028
82	1.718	2.568	1.084	.835	.733	.505	.671	.856	1.207	.794	.573	1.063
	.055	.092	.035	.028	.024	.017	.022	.028	.040	.026	.019	.034
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.676	1.852	1.179	1.117	.775	.699	.981	1.027	.930	.848	1.007	1.159

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.054	.066	.038	.037	.025	.023	.032	.033	.031	.027	.034	.037

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.173	.138	.123	0.000	0.000	0.000	0.000

AVERAGE: .145 ESTIMATED: .290

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.411	.177	.047	.120	0.000	0.000	0.000

AVERAGE: .189 ESTIMATED: .378

BUILDING DESIGN INDEX .418 (heating) .616 (cooling)

ENERGY CONSUMPTION DATA

ID# 502
REGION: Southern

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	1.489	1.748	1.909	1.207	.577	.505	.726	.980	.955	.843	.750	.945
	.048	.062	.062	.040	.019	.017	.023	.032	.032	.027	.025	.030
78	1.216	1.635	1.911	1.557	.937	.863	1.156	1.266	1.265	1.054	.922	.882
	.039	.058	.062	.052	.030	.029	.037	.041	.042	.034	.031	.028
79	1.562	2.020	1.819	1.273	.788	.927	1.210	0.000	0.000	0.000	0.000	0.000
	.050	.072	.059	.042	.025	.031	.039	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	1.111	1.111	1.296	.796	.741	.926	1.435
	0.000	0.000	0.000	0.000	0.000	.037	.036	.042	.027	.024	.031	.046
81	1.630	1.056	.778	.914	.796	.796	1.222	1.296	1.000	.741	.667	.842
	.053	.038	.025	.030	.026	.027	.039	.042	.033	.024	.022	.027
82	1.704	2.037	1.407	.860	.689	.926	.963	1.370	1.111	1.481	.796	.880
	.055	.073	.045	.029	.029	.031	.031	.044	.037	.048	.027	.028
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.520	1.698	1.565	1.162	.797	.855	1.065	1.242	1.025	.972	.812	.997

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.049	.061	.050	.039	.026	.028	.034	.040	.034	.031	.027	.032

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
.081	.161	0.000	.148	.109	0.000	0.000	0.000	0.000

AVERAGE: .125 ESTIMATED: .131

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
.102	.113	0.000	.435	.178	.126	0.000	0.000	0.000

AVERAGE: .191 ESTIMATED: .281

BUILDING DESIGN INDEX .401 (heating) .541 (cooling)

ENERGY CONSUMPTION DATA

ID# 503
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	.552	.835	.923	1.093	.912	.593	.804	1.335
	0.000	0.000	0.000	0.000	.020	.028	.030	.035	.030	.019	.027	.043
81	1.470	1.376	.891	.634	.626	.624	0.000	0.000	0.000	0.000	0.000	0.000
	.047	.049	.029	.021	.020	.025	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.470	1.376	.891	.634	.589	.730	.923	1.093	.912	.593	.604	1.335

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.047	.049	.029	.021	.020	.026	.030	.035	.030	.019	.027	.043

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.225	0.000	0.000	0.000	0.000	0.000

AVERAGE: .225 ESTIMATED: 0.000

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.365	0.000	0.000	0.000	0.000	0.000

AVERAGE: .365 ESTIMATED: 0.000

BUILDING DESIGN INDEX .004 (heating) .004 (cooling)

ENERGY CONSUMPTION DATA

ID# 504
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	3.670	3.315	3.707	3.707	1.171	1.133	1.803	1.803	2.114	2.184	1.680	1.736
	.118	.118	.120	.124	.038	.038	.058	.058	.070	.070	.056	.056
80	4.077	3.682	2.659	2.659	1.391	1.346	1.317	1.317	1.742	1.800	1.012	1.045
	.132	.132	.086	.089	.045	.045	.042	.042	.058	.058	.034	.034
81	1.254	1.133	1.049	1.049	1.026	.993	1.137	1.137	1.258	1.300	.856	.884
	.040	.040	.034	.035	.033	.033	.037	.037	.042	.042	.029	.029
82	2.730	1.308	1.067	1.139	1.422	1.206	1.206	1.384	1.879	.533	1.244	.958
	.088	.047	.034	.038	.046	.040	.039	.045	.063	.017	.041	.031
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
2.933	2.359	2.120	2.139	1.253	1.170	1.366	1.410	1.749	1.455	1.198	1.156

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.095	.084	.068	.071	.040	.039	.044	.045	.058	.047	.040	.037

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.690	.080	.181	0.000	0.000	0.000	0.000

AVERAGE: .317 ESTIMATED: 0.000

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.327	.159	.139	.268	0.000	0.000	0.000

AVERAGE: .223 ESTIMATED: 0.000

BUILDING DESIGN INDEX .495 (heating) .737 (cooling)

ENERGY CONSUMPTION DATA

ID# 505
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.815	1.092	1.000	.585	.585	.538	.819
	0.000	0.000	0.000	0.000	0.000	.027	.035	.032	.019	.019	.018	.026
81	.546	.531	.569	.518	.604	.585	.808	1.115	.862	.554	.654	.795
	.018	.019	.018	.017	.019	.019	.026	.036	.029	.018	.022	.026
82	.669	.562	.554	.672	.646	.569	.723	.962	.969	.685	.569	.588
	.022	.020	.018	.022	.021	.019	.023	.031	.032	.022	.019	.019
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.608	.546	.562	.595	.625	.656	.874	1.026	.805	.608	.587	.734

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.020	.020	.018	.020	.020	.022	.028	.033	.027	.020	.020	.024

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.057	.019	0.000	0.000	0.000	0.000

AVERAGE: .038 ESTIMATED: 0.000

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.352	.156	.127	0.000	0.000	0.000

AVERAGE: .211 ESTIMATED: 0.000

BUILDING DESIGN INDEX .001 (heating) .001 (cooling)

ENERGY CONSUMPTION DATA

ID# 506
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.883	1.106	1.061	.683	.583	.483	.677
	0.000	0.000	0.000	0.000	0.000	.029	.036	.034	.023	.019	.016	.022
81	.756	.761	.756	.652	.385	.372	1.006	.661	.806	.739	.467	.408
	.024	.027	.024	.022	.012	.012	.032	.021	.027	.024	.016	.013
82	.417	.389	.339	.433	.411	.411	.567	.917	.872	.567	.456	.385
	.013	.014	.011	.014	.013	.014	.018	.030	.029	.018	.015	.012
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.586	.575	.547	.543	.398	.556	.893	.880	.787	.630	.469	.490

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.019	.021	.018	.018	.013	.019	.029	.028	.026	.020	.016	.016

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.094	.008	0.000	0.000	0.000	0.000

AVERAGE: .051 ESTIMATED: .254

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.377	.170	.175	0.000	0.000	0.000

AVERAGE: .240 ESTIMATED: 1.202

BUILDING DESIGN INDEX .435 (heating) .658 (cooling)

ENERGY CONSUMPTION DATA

ID# 507
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	.521	.542	.823	1.253	1.709	.932	.657	.795	1.073	1.246
	0.000	0.000	.017	.018	.027	.042	.055	.030	.022	.026	.036	.040
80	1.723	1.121	.967	.717	.984	1.191	1.505	1.493	.954	1.085	1.093	1.520
	.056	.040	.031	.024	.032	.040	.049	.048	.032	.035	.036	.049
81	1.259	.904	.699	.485	.736	1.208	1.398	1.194	.894	.852	.829	1.490
	.041	.032	.023	.016	.024	.040	.045	.039	.030	.027	.028	.048
82	1.475	1.369	.776	.656	.533	.972	1.464	1.299	1.007	.880	.801	1.344
	.048	.049	.025	.022	.017	.032	.047	.042	.034	.028	.027	.043
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.486	1.131	.741	.600	.769	1.156	1.519	1.229	.878	.903	.949	1.400

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.048	.040	.024	.020	.025	.039	.049	.040	.029	.029	.032	.045

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.265	.140	.217	0.000	0.000	0.000	0.000

AVERAGE: .207 ESTIMATED: .830

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.662	.129	.249	.283	0.000	0.000	0.000

AVERAGE: .330 ESTIMATED: .508

BUILDING DESIGN INDEX .425 (heating) .354 (cooling)

ENERGY CONSUMPTION DATA

ID# 508
REGION: Southern

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	.608	1.206	1.462	1.746	1.731	1.229	.889	1.298	1.799
	0.000	0.000	0.000	.030	.039	.049	.056	.056	.041	.029	.043	.058
81	1.944	1.600	1.531	1.273	1.281	1.500	1.496	1.443	1.230	.964	1.112	1.739
	.063	.057	.049	.042	.041	.050	.048	.047	.041	.031	.037	.056
82	2.003	1.593	1.337	.956	1.007	1.060	1.297	1.547	.915	.577	.764	1.293
	.065	.057	.043	.032	.032	.035	.042	.050	.031	.019	.025	.042
83	1.561	1.357	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.050	.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.836	1.516	1.434	.946	1.164	1.340	1.513	1.574	1.124	.810	1.058	1.610

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.059	.054	.046	.035	.038	.045	.049	.051	.037	.026	.035	.052

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.216	.126	0.000	0.000	0.000	0.000

AVERAGE: .171 ESTIMATED: .244

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.584	.142	.231	0.000	0.000	0.000

AVERAGE: .319 ESTIMATED: .638

BUILDING DESIGN INDEX .418 (heating) .625 (cooling)

ENERGY CONSUMPTION DATA

ID# 509
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	.326	.394	.579	.691	.697	.482	.383	.483	.628
	0.000	0.000	0.000	.014	.013	.019	.022	.022	.016	.012	.016	.020
81	.536	.449	.522	.407	.360	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.017	.016	.017	.014	.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	.501	.464	.458	.422	.395	.495	.663	.689	.438	.393	.413	.476
	.019	.017	.015	.014	.013	.016	.021	.022	.015	.013	.014	.015
83	.489	.460	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.016	.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.509	.458	.490	.385	.383	.537	.677	.693	.460	.388	.448	.552

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.017	.016	.016	.014	.012	.018	.022	.022	.015	.013	.015	.018

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.255	0.000	.101	0.000	0.000	0.000

AVERAGE: .178 ESTIMATED: .198

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.227	0.000	.095	0.000	0.000	0.000

AVERAGE: .161 ESTIMATED: .645

BUILDING DESIGN INDEX .284 (heating) .346 (cooling)

ENERGY CONSUMPTION DATA

ID# 510
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	.809	1.092	1.306	1.322	1.157	.844	.941	1.409
	0.000	0.000	0.000	0.000	.026	.036	.042	.043	.039	.027	.031	.045
81	1.567	1.177	.882	.899	1.190	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.051	.042	.028	.030	.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	.955	.763	.833	.981	1.150	1.158	.882	.630	.826	1.322
	0.000	0.000	.031	.025	.027	.033	.037	.037	.029	.020	.028	.043
83	1.593	1.280	1.070	.767	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.051	.046	.035	.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.580	1.229	.969	.810	.944	1.037	1.228	1.240	1.019	.737	.883	1.365

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.051	.044	.031	.031	.030	.035	.040	.040	.034	.024	.029	.044

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.248	0.000	.240	0.000	0.000	0.000

AVERAGE: .244 ESTIMATED: .349

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.448	0.000	.509	0.000	0.000	0.000

AVERAGE: .479 ESTIMATED: .684

BUILDING DESIGN INDEX .396 (heating) .479 (cooling)

ENERGY CONSUMPTION DATA

ID# 511
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.155	.047	.064
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.005	.002	.002
79	.140	.078	.093	.446	.202	.241	.358	.264	.288	1.703	.202	.241
	.005	.003	.003	.015	.007	.008	.012	.009	.010	.055	.007	.008
80	.707	.148	.303	.259	.420	.148	.163	1.532	.917	1.936	1.547	1.510
	.023	.005	.010	.009	.014	.005	.005	.049	.031	.062	.052	.049
81	1.151	1.648	1.547	1.356	.536	1.287	0.000	0.000	0.000	0.000	0.000	0.000
	.037	.059	.050	.045	.017	.043	0.000	0.000	0.000	0.000	0.000	0.000
82	1.112	.816	.645	.635	.505	1.516	.987	1.011	1.462	.575	.746	.940
	.036	.029	.021	.021	.016	.051	.032	.033	.049	.019	.025	.030
83	.855	.264	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.028	.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.793	.591	.647	.674	.416	.798	.503	.936	.889	1.092	.636	.689

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.026	.021	.021	.022	.013	.027	.016	.030	.030	.035	.021	.022

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	.005	.272	.244	0.000	0.000	0.000	0.000	0.000

AVERAGE: .173 ESTIMATED: 0.000

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.114	.223	0.000	.363	0.000	0.000	0.000

AVERAGE: .219 ESTIMATED: 0.000

BUILDING DESIGN INDEX .514 (heating) .501 (cooling)

ENERGY CONSUMPTION DATA

ID# 512
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.917	1.364	.942	.982	1.080	.528	1.116
	0.000	0.000	0.000	0.000	0.000	.031	.044	.030	.033	.035	.018	.036
81	.877	1.039	.617	.905	.856	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.028	.037	.020	.030	.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.877	1.039	.617	.905	.856	.917	1.364	.942	.982	1.080	.528	1.116

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.028	.037	.020	.030	.028	.031	.044	.030	.033	.035	.018	.036

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.170	0.000	0.000	0.000	0.000	0.000

AVERAGE: .170 ESTIMATED: 1.133

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.424	0.000	0.000	0.000	0.000	0.000

AVERAGE: .424 ESTIMATED: .531

BUILDING DESIGN INDEX .429 (heating) .658 (cooling)

ENERGY CONSUMPTION DATA

ID# 513
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.052	1.087
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.035	.035
80	.762	.688	.582	.582	.751	.727	.744	.744	.514	.531	1.128	1.166
	.025	.025	.019	.019	.024	.024	.024	.024	.017	.017	.038	.038
81	.686	.620	.440	.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.022	.022	.014	.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.724	.654	.511	.511	.751	.727	.744	.744	.514	.531	1.090	1.127

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.023	.023	.016	.017	.024	.024	.024	.024	.017	.017	.036	.036

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.088	.118	0.000	0.000	0.000	0.000	0.000

AVERAGE: .103 ESTIMATED: 0.000

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.060	0.000	0.000	0.000	0.000	0.000

AVERAGE: .060 ESTIMATED: 0.000

BUILDING DESIGN INDEX .597 (heating) .677 (cooling)

ENERGY CONSUMPTION DATA

ID# 514
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	1.989	2.206	1.600	1.537	.537	.514	.514	1.417	1.257	.880	.869	1.512
	.064	.079	.052	.051	.017	.017	.017	.046	.042	.028	.029	.049
81	1.269	.686	.880	1.388	1.103	.414	0.000	0.000	0.000	0.000	0.000	0.000
	.041	.024	.028	.046	.036	.014	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.629	1.446	1.240	1.463	.820	.464	.514	1.417	1.257	.880	.869	1.512

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.053	.052	.040	.049	.026	.015	.017	.046	.042	.028	.029	.049

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.158	0.000	0.000	0.000	0.000	0.000

AVERAGE: .158 ESTIMATED: .197

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.175	0.000	0.000	0.000	0.000	0.000

AVERAGE: .175 ESTIMATED: .219

BUILDING DESIGN INDEX .468 (heating) .686 (cooling)

ENERGY CONSUMPTION DATA

ID# 515
REGION: Southern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	.978	1.449	1.822	1.873	1.380	.768	.947	1.343
	0.000	0.000	0.000	0.000	.032	.048	.059	.060	.046	.025	.032	.043
81	1.441	1.079	.845	.865	1.077	1.234	0.000	0.000	0.000	0.000	0.000	0.000
	.046	.039	.027	.029	.035	.049	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	.975	.866	1.155	1.347	1.872	2.091	1.538	.864	.741	1.430
	0.000	0.000	.031	.029	.037	.045	.060	.067	.051	.028	.025	.046
83	2.407	1.628	.943	.998	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.078	.058	.030	.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.924	1.353	.921	.910	1.070	1.343	1.847	1.982	1.459	.816	.844	1.386

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.062	.048	.030	.032	.035	.048	.060	.064	.049	.026	.028	.045

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.526	0.000	.584	0.000	0.000	0.000

AVERAGE: .555 ESTIMATED: 1.388

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.619	0.000	.826	0.000	0.000	0.000

AVERAGE: .723 ESTIMATED: 1.807

BUILDING DESIGN INDEX .542 (heating) .654 (cooling)

ENERGY CONSUMPTION DATA

ID# 301
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.787	.992	1.367
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.025	.033	.044
80	1.535	1.484	1.258	.857	.635	.502	.650	.607	.486	.570	1.061	1.494
	.050	.053	.041	.029	.020	.017	.021	.020	.016	.018	.035	.048
81	1.617	1.299	1.060	.677	.564	.571	.698	.569	.573	.622	.882	1.475
	.052	.046	.034	.023	.018	.019	.023	.018	.019	.020	.029	.048
82	1.988	1.493	1.242	.989	.629	.563	.717	.632	.434	.538	.964	1.364
	.064	.053	.040	.033	.020	.019	.023	.020	.014	.017	.032	.044
83	1.635	1.256	1.504	1.288	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.053	.045	.049	.043	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.694	1.383	1.266	.953	.609	.545	.688	.603	.498	.609	.975	1.425

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.055	.049	.041	.032	.020	.018	.022	.019	.017	.020	.032	.046

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.127	.108	.091	0.000	0.000	0.000	0.000

AVERAGE: .109 ESTIMATED: .136

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.028	.034	.083	0.000	0.000	0.000

AVERAGE: .048 ESTIMATED: .241

BUILDING DESIGN INDEX .500 (heating) .765 (cooling)

ENERGY CONSUMPTION DATA

ID# 302
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	.003	.006	.169	.325	.463	1.284	.623
	0.000	0.000	0.000	0.000	0.000	.000	.000	.005	.011	.015	.043	.020
80	.597	.472	1.056	.622	.372	.306	.544	.475	.434	.369	.456	.464
	.019	.017	.034	.021	.012	.010	.018	.015	.014	.012	.015	.016
81	.566	.444	.419	.360	.378	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.018	.016	.014	.012	.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.581	.458	.738	.491	.375	.155	.275	.322	.380	.416	.870	.554

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.019	.016	.024	.016	.012	.005	.009	.010	.013	.013	.029	.018

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.216	.122	0.000	0.000	0.000	0.000	0.000

AVERAGE: .169 ESTIMATED: .846

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.115	.045	0.000	0.000	0.000	0.000	0.000

AVERAGE: .080 ESTIMATED: .799

BUILDING DESIGN INDEX .537 (heating) .716 (cooling)

ENERGY CONSUMPTION DATA

ID# 303
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.034	.165	.674
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.002	.005	.022
80	.821	.730	.937	.861	.953	.991	1.393	1.243	1.062	.921	.844	.869
	.026	.026	.030	.029	.031	.033	.045	.040	.035	.030	.028	.028
81	.904	.752	.932	.957	.916	.838	.952	.842	.757	.810	.791	.861
	.029	.027	.030	.032	.030	.028	.031	.027	.025	.026	.026	.028
82	.468	.601	.841	.817	.794	.841	1.065	.945	.768	.834	.829	.894
	.015	.021	.027	.027	.026	.028	.034	.030	.026	.027	.028	.029
83	.922	.851	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.030	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.779	.734	.904	.878	.888	.890	1.137	1.010	.862	.650	.657	.824

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.025	.026	.029	.029	.029	.030	.037	.033	.029	.021	.022	.027

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.023	.008	.014	.071	0.000	0.000	0.000

AVERAGE: .029 ESTIMATED: .146

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.188	.052	.469	0.000	0.000	0.000

AVERAGE: .236 ESTIMATED: 2.363

BUILDING DESIGN INDEX .582 (heating) .779 (cooling)

ENERGY CONSUMPTION DATA

ID# 304
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	.001	.007	.080	.425	.609	.632
	0.000	0.000	0.000	0.000	0.000	0.000	.000	.000	.003	.014	.020	.020
79	.635	.618	.517	.638	.501	.604	.535	.590	.722	.565	.499	.665
	.020	.022	.017	.021	.016	.020	.017	.019	.024	.018	.017	.021
80	.471	.611	.543	.523	.509	.531	.510	.642	.580	.407	.465	.536
	.015	.022	.018	.017	.016	.018	.016	.021	.019	.013	.015	.017
81	.428	.594	.479	.508	.462	.480	.480	.616	.480	.475	.501	.509
	.014	.021	.015	.018	.015	.016	.015	.020	.016	.015	.017	.016
82	.540	.694	.492	.477	.563	.554	.529	.704	.566	.503	.486	.532
	.017	.025	.016	.016	.018	.018	.017	.023	.019	.016	.016	.017
83	.575	.649	.526	.502	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.019	.023	.017	.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.530	.633	.511	.529	.509	.543	.411	.512	.486	.475	.512	.575

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.017	.023	.016	.018	.016	.018	.013	.017	.016	.015	.017	.019

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	.036	.011	.010	.013	.057	0.000	0.000	0.000

AVERAGE: .025 ESTIMATED: .126

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.068	.052	.076	.097	0.000	0.000	0.000

AVERAGE: .073 ESTIMATED: .365

BUILDING DESIGN INDEX .517 (heating) .761 (cooling)

ENERGY CONSUMPTION DATA

ID# 305
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	.026	.025	.034	.061	.068	.333	.666	.867
	0.000	0.000	0.000	0.000	.001	.001	.001	.002	.002	.011	.022	.028
80	.702	.818	.969	.718	.700	.727	.972	1.138	.782	.712	.723	.858
	.023	.029	.031	.024	.023	.024	.031	.037	.023	.023	.024	.028
81	.737	.845	.839	.764	.834	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.024	.030	.027	.025	.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.719	.832	.904	.741	.520	.376	.503	.600	.385	.522	.695	.863

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.023	.030	.029	.025	.017	.013	.016	.019	.013	.017	.023	.028

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.049	.068	0.000	0.000	0.000	0.000	0.000

AVERAGE: .058 ESTIMATED: 0.000

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.040	.099	0.000	0.000	0.000	0.000	0.000

AVERAGE: .070 ESTIMATED: 0.000

BUILDING DESIGN INDEX .272 (heating) .347 (cooling)

ENERGY CONSUMPTION DATA

ID# 306
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.078	2.136
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.003	.069
79	3.094	1.261	.694	.561	.511	.583	.728	.772	.656	.597	.770	1.132
	.100	.045	.022	.019	.016	.019	.023	.025	.022	.019	.026	.037
80	1.683	1.527	1.062	.782	.695	.954	1.027	.888	.781	.619	.542	.669
	.054	.055	.034	.026	.022	.032	.033	.029	.026	.020	.018	.022
81	.617	.611	.611	.545	.541	.655	.907	.805	.585	.555	.488	.574
	.020	.022	.020	.018	.017	.022	.029	.026	.019	.018	.016	.019
82	.883	.764	.642	.519	.546	.643	.877	.908	.709	.613	.576	.789
	.028	.027	.021	.017	.018	.021	.028	.029	.024	.020	.019	.025
83	.623	.529	.575	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.020	.019	.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.380	.938	.717	.602	.573	.709	.885	.844	.683	.596	.491	1.060

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.045	.034	.023	.020	.018	.024	.029	.027	.023	.019	.016	.034

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	.130	.080	.010	.020	.064	0.000	0.000	0.000

AVERAGE: .061 ESTIMATED: 0.000

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.098	.157	.174	.233	0.000	0.000	0.000

AVERAGE: .165 ESTIMATED: 0.000

BUILDING DESIGN INDEX .638 (heating) .739 (cooling)

ENERGY CONSUMPTION DATA

ID# 701
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.844	.741	.658	.859	1.527
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.027	.025	.021	.029	.049
80	1.409	1.352	1.427	1.344	1.100	1.063	1.318	.933	.686	.792	1.220	1.344
	.045	.048	.046	.045	.035	.035	.043	.030	.023	.026	.041	.043
81	1.347	1.927	1.567	1.226	.881	.633	.716	.567	.509	.667	.889	1.139
	.043	.069	.051	.041	.028	.021	.023	.018	.017	.022	.030	.037
82	1.241	1.117	1.436	1.424	.838	.654	.898	1.319	1.338	1.279	1.160	1.480
	.040	.040	.046	.047	.027	.022	.029	.043	.045	.041	.039	.048
83	1.816	1.529	1.581	1.311	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.059	.055	.051	.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.453	1.481	1.503	1.326	.940	.783	.977	.916	.818	.849	1.032	1.373

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.047	.053	.048	.049	.030	.026	.032	.030	.027	.027	.034	.044

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.104	.135	.060	.177	0.000	0.000	0.000

AVERAGE: .119 ESTIMATED: .793

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.124	.040	.195	0.000	0.000	0.000

AVERAGE: .119 ESTIMATED: .239

BUILDING DESIGN INDEX .573 (heating) .789 (cooling)

ENERGY CONSUMPTION DATA

ID# 702
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	.220	.230	.212	.329	.358	.347	.327	.344	.294
	0.000	0.000	0.000	.008	.007	.007	.011	.012	.012	.011	.011	.009
80	.338	.285	.286	.354	.264	.344	.353	.370	.384	.345	.231	.255
	.011	.010	.009	.012	.009	.011	.011	.012	.013	.011	.008	.008
81	.296	.262	.256	.279	.264	.324	.511	.499	.278	.339	.236	.320
	.010	.009	.008	.009	.009	.011	.016	.016	.009	.011	.008	.010
82	.312	.276	.283	.285	.279	.240	.487	.436	.498	.357	.273	.272
	.010	.010	.009	.010	.009	.008	.016	.014	.017	.012	.009	.009
83	.299	.255	.247	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.010	.009	.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.311	.269	.268	.284	.259	.280	.420	.416	.377	.342	.271	.285

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.010	.010	.009	.010	.008	.009	.014	.013	.013	.011	.009	.009

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.020	.002	.004	.023	0.000	0.000	0.000

AVERAGE: .012 ESTIMATED: .015

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.241	.058	.104	.111	0.000	0.000	0.000

AVERAGE: .128 ESTIMATED: .641

BUILDING DESIGN INDEX .433 (heating) .773 (cooling)

ENERGY CONSUMPTION DATA

ID# 703
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	.061	.144	.136	.166	.153	.139	.183	.655
	0.000	0.000	0.000	0.000	.002	.005	.004	.005	.005	.004	.006	.021
79	.072	.284	.280	.299	.305	.251	.406	.327	.259	.257	.252	.249
	.002	.010	.009	.010	.010	.008	.013	.011	.009	.008	.008	.008
80	.300	.270	.273	.275	.337	.357	.471	.420	.340	.319	.270	.335
	.010	.010	.009	.009	.011	.012	.015	.014	.011	.010	.009	.011
81	.275	.285	.325	.273	.273	.317	0.000	0.000	0.000	0.000	0.000	0.000
	.009	.010	.010	.009	.009	.011	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.215	.280	.292	.282	.244	.267	.338	.304	.251	.238	.235	.413

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.007	.010	.009	.009	.008	.009	.011	.010	.008	.008	.008	.013

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	.074	.026	.080	0.000	0.000	0.000	0.000	0.000

AVERAGE: .060 ESTIMATED: .301

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	.072	.144	.049	0.000	0.000	0.000	0.000	0.000

AVERAGE: .088 ESTIMATED: .884

BUILDING DESIGN INDEX .385 (heating) .536 (cooling)

ENERGY CONSUMPTION DATA

ID# 704
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.062	.162	.331
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.002	.005	.011
80	.153	.270	.220	.444	.262	.370	.445	.303	.553	.445	.437	.503
	.005	.010	.007	.015	.008	.012	.014	.010	.018	.014	.015	.016
81	.862	.428	.528	.520	.470	.478	.520	.437	.489	.343	.545	.606
	.028	.015	.017	.017	.015	.016	.017	.014	.016	.011	.018	.020
82	.678	.578	.612	.523	.537	.312	.395	.687	.303	.345	.526	.701
	.022	.021	.020	.017	.017	.010	.013	.022	.010	.011	.018	.023
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.564	.426	.453	.496	.423	.387	.453	.476	.449	.299	.418	.535

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.018	.015	.015	.017	.014	.013	.015	.015	.015	.010	.014	.017

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.016	.035	.030	0.000	0.000	0.000	0.000

AVERAGE: .027 ESTIMATED: .268

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.145	.034	.064	0.000	0.000	0.000

AVERAGE: .088 ESTIMATED: .438

BUILDING DESIGN INDEX .554 (heating) .696 (cooling)

ENERGY CONSUMPTION DATA

ID# 705
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	.030	.030	.057	0.000	.007	.071	.067	.689	.399	.202	.460	.399
	.001	.001	.002	0.000	.000	.002	.002	.022	.013	.007	.015	.013
81	.323	.336	.326	.323	.289	.269	.296	.349	.313	.386	.225	.340
	.010	.012	.011	.011	.009	.009	.010	.011	.010	.012	.008	.011
82	.440	.360	.339	.377	.323	.343	.380	.504	.370	.363	.390	.455
	.014	.013	.011	.013	.010	.011	.012	.016	.012	.012	.013	.015
83	.420	.380	.349	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.014	.014	.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.303	.276	.268	.350	.206	.227	.248	.514	.360	.317	.358	.396

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.010	.010	.009	.012	.007	.008	.008	.017	.012	.010	.012	.013

HEATING SEASON DATA

Consumption per season (kWh/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.030	.005	.042	0.000	0.000	0.000

AVERAGE: .026 ESTIMATED: .258

COOLING SEASON DATA

Consumption per season (kWh/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.240	.026	.061	0.000	0.000	0.000

AVERAGE: .109 ESTIMATED: .182

BUILDING DESIGN INDEX .394 (heating) .579 (cooling)

ENERGY CONSUMPTION DATA

ID# 706
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	.578	.723	.477	.338	.480	.547	.451
	0.000	0.000	0.000	0.000	0.000	.019	.023	.015	.011	.015	.018	.015
80	.527	.597	.465	.577	.541	.347	.360	.469	.467	.475	.336	.356
	.017	.021	.015	.019	.017	.012	.012	.015	.016	.015	.011	.011
81	.413	.293	.275	.314	.324	.358	.330	.564	.342	.341	.397	.364
	.013	.010	.009	.010	.010	.012	.011	.018	.011	.011	.013	.012
82	.407	.467	.527	.477	.348	.260	.275	.330	.367	.511	.381	.442
	.013	.017	.017	.016	.011	.009	.009	.011	.012	.016	.013	.014
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.449	.452	.422	.456	.404	.386	.422	.460	.378	.452	.415	.403

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.014	.016	.014	.015	.013	.013	.014	.015	.013	.015	.014	.013

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.037	.003	.019	0.000	0.000	0.000	0.000

AVERAGE: .019 ESTIMATED: .193

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.393	.033	.049	.028	0.000	0.000	0.000

AVERAGE: .126 ESTIMATED: 1.256

BUILDING DESIGN INDEX .429 (heating) .549 (cooling)

ENERGY CONSUMPTION DATA

ID# 707
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	.143	.329	.424	.438	.319	.200	.238	.143
	0.000	0.000	0.000	0.000	.005	.011	.014	.014	.011	.006	.008	.005
80	.290	.243	.224	.193	.262	.319	.450	.571	.288	.296	.244	.240
	.009	.009	.007	.006	.008	.011	.015	.018	.010	.010	.008	.008
81	.307	.231	.231	.218	.357	.273	0.000	0.000	0.000	0.000	0.000	0.000
	.010	.008	.007	.007	.012	.009	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.299	.237	.228	.206	.254	.307	.437	.505	.303	.248	.241	.191

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.010	.008	.007	.007	.008	.010	.014	.016	.010	.008	.008	.006

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.013	.026	0.000	0.000	0.000	0.000	0.000

AVERAGE: .019 ESTIMATED: .096

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.226	.075	0.000	0.000	0.000	0.000	0.000

AVERAGE: .151 ESTIMATED: .753

BUILDING DESIGN INDEX .324 (heating) .491 (cooling)

ENERGY CONSUMPTION DATA

ID# 708
REGION: Central

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	1.094	.888	.743	.595	1.087	1.593	1.662
	0.000	0.000	0.000	0.000	0.000	.036	.029	.024	.020	.035	.053	.054
81	1.254	.956	.539	.474	.541	.862	.804	.793	.590	.570	.765	1.046
	.040	.034	.017	.016	.017	.029	.026	.026	.020	.018	.026	.034
82	1.330	1.566	1.130	.717	.586	.608	.461	.233	.444	.532	.732	0.000
	.043	.056	.036	.024	.019	.020	.015	.008	.015	.017	.024	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.292	1.261	.834	.595	.564	.855	.718	.590	.543	.730	1.030	1.354

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.042	.045	.027	.020	.018	.028	.023	.019	.018	.024	.034	.044

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.125	.102	0.000	0.000	0.000	0.000

AVERAGE: .113 ESTIMATED: 0.000

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.429	.176	.175	0.000	0.000	0.000

AVERAGE: .260 ESTIMATED: 0.000

BUILDING DESIGN INDEX .508 (heating) .739 (cooling)

ENERGY CONSUMPTION DATA

ID# 709
REGION: Central

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	.540	.740	.955	.771	.640	.607	.642	.649	.545
	0.000	0.000	0.000	.018	.024	.032	.025	.021	.020	.021	.022	.018
81	.401	1.608	.292	.373	.639	.452	0.000	0.000	0.000	0.000	0.000	0.000
	.013	.057	.009	.012	.021	.020	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.401	1.608	.292	.457	.689	.703	.771	.640	.607	.642	.649	.545

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.013	.057	.009	.015	.022	.026	.025	.021	.020	.021	.022	.018

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.101	0.000	0.000	0.000	0.000	0.000

AVERAGE: .101 ESTIMATED: .253

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.384	0.000	0.000	0.000	0.000	0.000

AVERAGE: .384 ESTIMATED: .768

BUILDING DESIGN INDEX .242 (heating) .483 (cooling)

ENERGY CONSUMPTION DATA

ID# 710
REGION: Central

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.385	.581	.520	.413	.332	.312	.428
	0.000	0.000	0.000	0.000	0.000	.013	.019	.017	.014	.011	.010	.014
81	.400	.366	.318	.316	.447	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.013	.013	.010	.011	.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.400	.366	.318	.316	.447	.385	.581	.520	.413	.332	.312	.428

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.013	.013	.010	.011	.014	.013	.019	.017	.014	.011	.010	.014

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.061	0.000	0.000	0.000	0.000	0.000

AVERAGE: .061 ESTIMATED: .123

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.191	0.000	0.000	0.000	0.000	0.000

AVERAGE: .191 ESTIMATED: .478

BUILDING DESIGN INDEX .344 (heating) .547 (cooling)

ENERGY CONSUMPTION DATA

ID# 711
REGION: Central

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	.092	.219	.194	.184	.221	.262
	0.000	0.000	0.000	0.000	0.000	0.000	.003	.007	.006	.006	.007	.008
80	.264	.275	.226	.236	.197	.229	.314	.341	.291	.190	.163	.269
	.009	.010	.007	.008	.006	.008	.010	.011	.010	.006	.005	.009
81	.263	.271	.214	.212	.175	.225	0.000	0.000	0.000	0.000	0.000	0.000
	.008	.010	.007	.007	.006	.008	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.263	.273	.220	.224	.186	.227	.203	.280	.243	.187	.192	.266

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.008	.010	.007	.007	.006	.008	.007	.009	.008	.006	.006	.009

HEATING SEASON DATA

Consumption per season (kWh/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.017	.024	0.000	0.000	0.000	0.000	0.000

AVERAGE: .020 ESTIMATED: .101

COOLING SEASON DATA

Consumption per season (kWh/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.097	.055	0.000	0.000	0.000	0.000	0.000

AVERAGE: .076 ESTIMATED: .761

BUILDING DESIGN INDEX .379 (heating) .633 (cooling)

ENERGY CONSUMPTION DATA

ID# 401
REGION: Northern

MONTHLY DATA KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	.297	.505	.832	.738	.568	.438	.346	.496	.452	.426	.451	.516
	.012	.018	.027	.025	.018	.015	.011	.016	.015	.014	.015	.017
81	.202	.200	.376	.326	.248	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.007	.007	.012	.011	.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.249	.352	.604	.533	.408	.438	.346	.496	.452	.426	.451	.516

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.009	.013	.019	.018	.014	.015	.011	.016	.015	.014	.015	.017

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.021	0.000	0.000	0.000	0.000	0.000

AVERAGE: .021 ESTIMATED: .105

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.063	0.000	0.000	0.000	0.000	0.000

AVERAGE: .063 ESTIMATED: .315

BUILDING DESIGN INDEX .526 (heating) .416 (cooling)

ENERGY CONSUMPTION DATA

ID# 402
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	2.082	1.685	1.329	.803	.594	.527	.512	.811	1.968	2.367
	0.000	0.000	.067	.056	.043	.027	.019	.017	.017	.026	.066	.076
80	1.414	2.533	2.220	1.934	1.097	.562	.617	.581	.573	.699	1.213	1.283
	.046	.090	.072	.064	.035	.019	.020	.019	.019	.023	.040	.041
81	1.220	1.447	1.314	.932	.908	.539	.572	.623	.572	.567	1.351	1.910
	.039	.052	.042	.031	.029	.018	.018	.020	.019	.018	.045	.062
82	2.439	1.990	1.643	1.392	.904	.517	.493	.574	.553	.772	1.294	2.076
	.079	.071	.053	.046	.029	.017	.016	.019	.018	.025	.043	.067
83	2.408	1.833	1.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.078	.065	.051	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.870	1.950	1.664	1.486	1.059	.605	.569	.576	.552	.712	1.456	1.909

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.060	.070	.057	.050	.034	.020	.018	.019	.018	.023	.049	.062

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.210	.109	.168	0.000	0.000	0.000	0.000

AVERAGE: .152 ESTIMATED: .304

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.842	.011	.029	.038	0.000	0.000	0.000

AVERAGE: .230 ESTIMATED: 1.149

BUILDING DESIGN INDEX .429 (heating) .621 (cooling)

ENERGY CONSUMPTION DATA

ID# 601
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.306	.312
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.010	.010
80	.163	.063	.163	.061	.063	.031	.363	.488	.512	.306	.306	.323
	.005	.002	.005	.002	.002	.001	.012	.016	.017	.010	.010	.010
81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.163	.063	.163	.061	.063	.031	.363	.488	.512	.306	.306	.318

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.005	.002	.005	.002	.002	.001	.012	.016	.017	.010	.010	.010

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.016	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE: .016 ESTIMATED: .108

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.322	0.000	0.000	0.000	0.000	0.000

AVERAGE: .322 ESTIMATED: 2.149

BUILDING DESIGN INDEX .502 (heating) .765 (cooling)

ENERGY CONSUMPTION DATA

ID# 602
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.764	.833	.785	.694	.799	.799	1.112
	0.000	0.000	0.000	0.000	0.000	.025	.027	.025	.023	.026	.027	.036
81	.938	.819	.958	.864	1.104	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.030	.029	.031	.029	.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.938	.819	.958	.864	1.104	.764	.833	.785	.694	.799	.799	1.112

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.030	.029	.031	.029	.036	.025	.027	.025	.023	.026	.027	.036

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.089	0.000	0.000	0.000	0.000	0.000

AVERAGE: .089 ESTIMATED: .891

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.596	0.000	0.000	0.000	0.000	0.000

AVERAGE: .596 ESTIMATED: 1.324

BUILDING DESIGN INDEX .467 (heating) .689 (cooling)

ENERGY CONSUMPTION DATA

ID# 603
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	.380	.313	.364	.470	.733	.573	.460	.422	.468	.597
	0.000	0.000	.012	.010	.012	.016	.024	.018	.015	.014	.016	.019
81	.577	.522	.488	.456	.415	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.019	.019	.016	.015	.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	.107	.374	.340	.349	.363	.565	.469	.407	.315	.504
	0.000	0.000	.003	.012	.011	.012	.012	.018	.016	.013	.010	.016
83	.581	.508	.415	.375	.331	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.019	.018	.013	.012	.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.579	.515	.348	.379	.363	.410	.548	.569	.464	.414	.392	.550

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.019	.018	.011	.013	.012	.014	.018	.018	.015	.013	.013	.018

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.051	0.000	.045	0.000	0.000	0.000

AVERAGE: .048 ESTIMATED: .961

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.432	0.000	.362	0.000	0.000	0.000

AVERAGE: .397 ESTIMATED: .567

BUILDING DESIGN INDEX .438 (heating) .584 (cooling)

ENERGY CONSUMPTION DATA

ID# 604
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	.261	.265	.301	.251	.236	.296	.498	.890
	0.000	0.000	0.000	0.000	.008	.009	.010	.008	.008	.010	.017	.029
81	.872	.738	.563	.276	.270	.221	.262	.230	.204	.296	.521	.943
	.028	.026	.018	.009	.009	.007	.008	.007	.007	.010	.017	.030
82	1.198	.853	.738	.503	.235	.271	.274	.281	.278	.322	.536	0.000
	.039	.030	.024	.017	.008	.009	.009	.009	.009	.010	.018	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.035	.795	.650	.390	.255	.252	.279	.254	.239	.304	.518	.917

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.033	.028	.021	.013	.008	.008	.009	.008	.008	.010	.017	.030

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.056	.060	0.000	0.000	0.000	0.000

AVERAGE: .058 ESTIMATED: .097

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.204	.007	.037	0.000	0.000	0.000

AVERAGE: .063 ESTIMATED: .413

BUILDING DESIGN INDEX .437 (heating) .497 (cooling)

ENERGY CONSUMPTION DATA

ID# 605
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.072	.126
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.003	.004
80	.173	.142	.723	1.062	.590	.480	.309	.299	.424	.377	.397	1.100
	.006	.005	.023	.035	.019	.016	.010	.010	.014	.012	.013	.035
81	1.284	.838	1.117	1.147	.941	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.041	.030	.036	.038	.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.728	.490	.920	1.185	.766	.480	.309	.299	.424	.377	.234	.613

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.023	.017	.030	.037	.025	.016	.010	.010	.014	.012	.008	.020

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.016	.087	0.000	0.000	0.000	0.000	0.000

AVERAGE: .051 ESTIMATED: .085

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.158	0.000	0.000	0.000	0.000	0.000

AVERAGE: .158 ESTIMATED: .792

BUILDING DESIGN INDEX .405 (heating) .608 (cooling)

ENERGY CONSUMPTION DATA

ID# 606
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	.025	.028	.028	.134	.130	.134	.366	.355	.366	.426	.440
	0.000	.001	.001	.001	.004	.004	.004	.012	.012	.012	.014	.014
79	.440	.312	.346	.346	.375	.362	.375	.428	.414	.428	.378	.390
	.014	.011	.011	.012	.012	.012	.012	.014	.014	.014	.013	.013
80	.390	.335	.371	.371	.625	.605	.625	.448	.433	.448	.443	.458
	.013	.012	.012	.012	.020	.020	.020	.014	.014	.014	.015	.015
81	.458	.361	.400	.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.015	.013	.013	.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.429	.258	.286	.286	.378	.366	.378	.414	.401	.414	.416	.429

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.014	.009	.009	.010	.012	.012	.012	.013	.013	.013	.014	.014

HEATING SEASON DATA

Consumption per season (kWh/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	.019	.002	.028	0.000	0.000	0.000	0.000	0.000

AVERAGE: .016 ESTIMATED: .025

COOLING SEASON DATA

Consumption per season (kWh/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	.179	.046	.123	0.000	0.000	0.000	0.000	0.000

AVERAGE: .116 ESTIMATED: .465

BUILDING DESIGN INDEX .538 (heating) .741 (cooling)

ENERGY CONSUMPTION DATA

ID# 607
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.404	.474	.399
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.013	.016	.013
80	.404	.380	.398	.381	.354	.372	.397	.385	.337	.349	.336	.413
	.013	.014	.013	.013	.011	.012	.013	.012	.011	.011	.011	.013
81	.408	.388	.400	.408	.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.013	.014	.013	.014	.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.406	.384	.399	.395	.364	.372	.397	.385	.337	.377	.405	.406

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.013	.014	.013	.013	.012	.012	.013	.012	.011	.012	.014	.013

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.022	.024	0.000	0.000	0.000	0.000	0.000

AVERAGE: .023 ESTIMATED: .024

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.023	0.000	0.000	0.000	0.000	0.000

AVERAGE: .023 ESTIMATED: .230

BUILDING DESIGN INDEX .542 (heating) .595 (cooling)

ENERGY CONSUMPTION DATA

ID# 608
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	.343	.463	.438	.472	.492	.448	.427	.479	.548	.624
	0.000	0.000	.015	.015	.014	.016	.016	.014	.014	.015	.018	.020
81	.604	.475	.483	.446	.449	.432	.481	.467	.461	.466	.498	.567
	.019	.017	.016	.015	.014	.014	.016	.015	.015	.015	.017	.018
82	.485	.488	.548	.451	.407	.439	.487	.446	.408	.438	.452	.489
	.016	.017	.018	.015	.013	.015	.016	.014	.014	.014	.015	.016
83	.549	.552	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.018	.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.546	.505	.458	.453	.431	.448	.486	.454	.432	.461	.499	.560

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.018	.018	.016	.015	.014	.015	.016	.015	.014	.015	.017	.018

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.027	.009	.024	0.000	0.000	0.000

AVERAGE: .020 ESTIMATED: .021

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.357	.016	.025	0.000	0.000	0.000

AVERAGE: .132 ESTIMATED: .331

BUILDING DESIGN INDEX .541 (heating) .742 (cooling)

ENERGY CONSUMPTION DATA

ID# 609
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	.023	.123	.246	.662	.700	.692	3.307
	0.000	0.000	0.000	0.000	0.000	.001	.004	.008	.022	.023	.023	.107
80	.746	.762	.623	.751	.585	.562	.515	.592	.685	.646	.662	.692
	.024	.027	.020	.025	.019	.019	.017	.019	.023	.021	.022	.022
81	.692	.677	.554	.664	.562	.597	.615	.615	.654	.615	.585	.715
	.022	.024	.018	.022	.018	.020	.020	.020	.022	.020	.019	.023
82	.700	.762	.654	.721	.608	.392	.685	.638	.646	.692	.692	.715
	.023	.027	.021	.024	.020	.013	.022	.021	.022	.022	.023	.023
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.713	.733	.610	.712	.585	.393	.485	.523	.662	.663	.658	1.357

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.023	.026	.020	.024	.019	.013	.016	.017	.022	.021	.022	.044

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.089	.089	.010	0.000	0.000	0.000	0.000

AVERAGE: .036 ESTIMATED: .180

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.287	.031	.075	.045	0.000	0.000	0.000

AVERAGE: .110 ESTIMATED: .549

BUILDING DESIGN INDEX .573 (heating) .704 (cooling)

ENERGY CONSUMPTION DATA

ID# 610
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	.437	.387	.625	.711	.579	.672	.825	1.181
	0.000	0.000	0.000	0.000	.014	.013	.020	.023	.019	.022	.027	.038
81	1.379	1.062	.824	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.044	.038	.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	1.461	1.049	.753	.506	.518	.644	.676	.516	.565	.855
	0.000	0.000	.047	.035	.024	.017	.017	.021	.023	.017	.019	.028
83	1.065	1.162	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.034	.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.222	1.112	1.143	1.049	.595	.446	.571	.678	.627	.594	.695	1.018

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.039	.040	.037	.035	.019	.015	.018	.022	.021	.019	.023	.033

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.275	0.000	.192	0.000	0.000	0.000

AVERAGE: .233 ESTIMATED: .233

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.445	0.000	.486	0.000	0.000	0.000

AVERAGE: .466 ESTIMATED: 2.328

BUILDING DESIGN INDEX .422 (heating) .783 (cooling)

ENERGY CONSUMPTION DATA

ID# 611
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	.410	.513	.282	.328	.267	.487	.806
	0.000	0.000	0.000	0.000	0.000	.014	.017	.009	.011	.009	.016	.026
81	.262	.657	.672	.658	.570	.513	.482	.554	.811	.646	.410	.585
	.008	.023	.022	.022	.018	.017	.016	.018	.027	.021	.014	.019
82	.713	.595	.595	.717	.708	.482	.800	.611	.857	.657	.570	.544
	.023	.021	.019	.024	.023	.016	.026	.020	.029	.021	.019	.018
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.487	.626	.634	.687	.639	.469	.599	.482	.665	.523	.489	.645

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.016	.022	.020	.023	.021	.016	.019	.016	.022	.017	.016	.021

HEATING SEASON DATA

Consumption per season (kWh/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.041	.015	0.000	0.000	0.000	0.000

AVERAGE: .028 ESTIMATED: .283

COOLING SEASON DATA

Consumption per season (kWh/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.297	.277	.136	0.000	0.000	0.000

AVERAGE: .237 ESTIMATED: 2.366

BUILDING DESIGN INDEX .559 (heating) .784 (cooling)

ENERGY CONSUMPTION DATA

ID# 612
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	1.473	1.354	1.162	.787	.369	.380	.422	.352	.261	.592	.986	1.750
	.055	.048	.037	.026	.012	.013	.014	.011	.009	.019	.033	.056
78	2.053	2.155	1.606	1.034	.536	.336	.420	.332	.258	.512	.750	1.984
	.066	.077	.052	.034	.017	.011	.014	.011	.009	.017	.025	.064
79	3.320	3.543	1.742	1.144	.831	.824	.851	.865	.820	.769	1.008	1.134
	.107	.127	.056	.038	.027	.027	.027	.028	.027	.025	.034	.037
80	1.004	1.527	1.213	1.359	.943	1.016	1.184	1.410	1.082	.936	1.259	1.569
	.032	.055	.039	.045	.030	.034	.038	.045	.036	.030	.042	.051
81	1.191	1.081	1.309	1.237	1.041	.956	1.042	1.053	1.008	1.131	1.378	1.926
	.038	.039	.042	.041	.034	.032	.034	.034	.034	.036	.046	.062
82	1.946	1.611	1.924	1.690	1.238	1.180	1.287	1.168	1.167	1.505	1.854	1.521
	.063	.058	.062	.056	.040	.039	.042	.038	.039	.049	.062	.066
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.830	1.878	1.493	1.208	.826	.782	.868	.863	.766	.908	1.206	1.648

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.060	.067	.048	.040	.027	.026	.028	.028	.026	.029	.040	.056

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
.111	.140	.030	.026	.055	0.000	0.000	0.000	0.000

AVERAGE: .072 ESTIMATED: .725

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
.043	.029	.028	.265	.004	.029	0.000	0.000	0.000

AVERAGE: .066 ESTIMATED: .443

BUILDING DESIGN INDEX .557 (heating) .711 (cooling)

ENERGY CONSUMPTION DATA

ID# 801
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	0.000	.543	.628	.608	.558	.509	.549
	0.000	0.000	0.000	0.000	0.000	0.000	.018	.020	.020	.018	.017	.018
81	.617	.483	.464	.530	.578	.627	.646	.626	.633	.627	.658	.677
	.020	.017	.015	.018	.019	.021	.021	.020	.021	.020	.022	.022
82	.640	.547	.588	.649	.736	.663	.758	.669	.540	.630	.755	0.000
	.021	.020	.019	.022	.024	.022	.024	.022	.018	.020	.025	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.629	.515	.526	.590	.657	.645	.649	.641	.594	.605	.641	.613

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.020	.018	.017	.020	.021	.022	.021	.021	.020	.020	.021	.020

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.022	.009	0.000	0.000	0.000	0.000

AVERAGE: .015 ESTIMATED: .077

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	0.000	.064	.085	0.000	0.000	0.000

AVERAGE: .085 ESTIMATED: .423

BUILDING DESIGN INDEX .424 (heating) .573 (cooling)

ENERGY CONSUMPTION DATA

ID# 802
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.290
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.042
80	1.120	.748	.660	.571	.637	.456	.630	.737	.500	.400	.475	.532
	.036	.027	.021	.019	.021	.015	.020	.024	.017	.013	.016	.017
81	.621	.555	.532	.490	.411	.459	.484	.425	.483	.499	.515	.596
	.020	.020	.017	.016	.013	.015	.016	.014	.016	.016	.017	.019
82	.578	.510	.646	.577	.498	.496	.531	.477	.469	.492	.531	.667
	.019	.018	.021	.019	.016	.017	.017	.015	.016	.016	.018	.022
83	.596	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.729	.604	.613	.546	.515	.470	.548	.546	.484	.464	.507	.771

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.024	.022	.020	.018	.017	.016	.018	.018	.016	.015	.017	.025

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.011	.011	0.000	0.000	0.000	0.000

AVERAGE: .011 ESTIMATED: .055

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.102	.048	.019	0.000	0.000	0.000

AVERAGE: .057 ESTIMATED: .283

BUILDING DESIGN INDEX .423 (heating) .471 (cooling)

ENERGY CONSUMPTION DATA

ID# 803
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	1.092	1.278	1.037	.708	.500	.531	.665
	0.000	0.000	0.000	0.000	0.000	.036	.041	.033	.024	.016	.018	.021
81	.581	.456	.489	.475	.666	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.019	.016	.016	.016	.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.581	.456	.489	.475	.666	1.092	1.278	1.037	.708	.500	.531	.665

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.019	.016	.016	.016	.021	.036	.041	.033	.024	.016	.018	.021

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.053	0.000	0.000	0.000	0.000	0.000

AVERAGE: .053 ESTIMATED: .267

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.655	0.000	0.000	0.000	0.000	0.000

AVERAGE: .655 ESTIMATED: 2.183

BUILDING DESIGN INDEX .689 (heating) .869 (cooling)

ENERGY CONSUMPTION DATA

ID# 804
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	.120	.128	.106	.356	.625	.579	.550	.809
	0.000	0.000	0.000	0.000	.004	.004	.003	.011	.021	.019	.018	.026
80	.500	.369	.627	.642	.551	.520	.570	.570	.574	.602	.545	.416
	.016	.013	.020	.021	.018	.017	.018	.018	.019	.019	.018	.013
81	.902	.500	.666	.542	.388	.554	.622	.572	.576	.728	.526	.469
	.029	.018	.021	.018	.013	.018	.020	.018	.019	.023	.018	.015
82	.602	.555	.544	.561	.544	.937	.602	.602	.463	.463	.578	.598
	.019	.020	.018	.019	.018	.031	.019	.019	.015	.015	.019	.019
83	.312	.625	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	.010	.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.579	.512	.612	.582	.401	.535	.475	.525	.559	.593	.550	.573

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.019	.018	.020	.019	.013	.018	.015	.017	.019	.019	.018	.018

HEATING SEASON DATA

Consumption per season (kWh/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.034	.016	.008	0.000	0.000	0.000	0.000

AVERAGE: .019 ESTIMATED: .097

COOLING SEASON DATA

Consumption per season (kWh/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	.292	.106	.100	.152	0.000	0.000	0.000

AVERAGE: .163 ESTIMATED: .813

BUILDING DESIGN INDEX .641 (heating) .710 (cooling)

ENERGY CONSUMPTION DATA

ID# 805
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	0.000	.675	.802	.833	.779	.672	.949
	0.000	0.000	0.000	0.000	0.000	0.000	.022	.026	.028	.025	.029	.031
81	1.043	.797	.624	.627	.616	.617	.637	.631	.622	.651	.757	1.212
	.034	.028	.020	.021	.020	.021	.021	.020	.021	.021	.025	.039
82	1.639	1.469	1.747	1.657	1.380	1.196	1.256	1.254	1.098	1.233	1.368	0.000
	.053	.052	.056	.055	.045	.040	.041	.040	.037	.040	.046	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.341	1.133	1.186	1.142	.998	.903	.856	.896	.851	.887	.999	1.081

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.043	.040	.039	.038	.032	.030	.028	.029	.028	.029	.033	.035

HEATING SEASON DATA

Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	0.000	.048	.045	0.000	0.000	0.000	0.000

AVERAGE: .047 ESTIMATED: .467

COOLING SEASON DATA

Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	0.000	.010	.065	0.000	0.000	0.000

AVERAGE: .038 ESTIMATED: .125

BUILDING DESIGN INDEX .601 (heating) .828 (cooling)

ENERGY CONSUMPTION DATA

ID# 806
REGION: Northern

MONTHLY DATA

KEY: XXXXX=Total monthly consumption (kWh/ft^2)
XXXXX=Average daily consumption (kWh/ft^2)

Yr	Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.681	1.923
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	.056	.062
80	2.296	2.185	2.556	1.934	.914	.436	.664	.571	.413	1.200	1.681	1.987
	.074	.078	.082	.064	.029	.015	.021	.018	.014	.039	.056	.064
81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
2.296	2.185	2.556	1.934	.914	.436	.664	.571	.413	1.200	1.681	1.955

MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.074	.078	.082	.064	.029	.015	.021	.018	.014	.039	.056	.063

HEATING SEASON DATA
Consumption per season (Btu/ft^2/HDD)

77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85	85/86
0.000	0.000	.204	0.000	0.000	0.000	0.000	0.000	0.000

AVERAGE: .204 ESTIMATED: .208

COOLING SEASON DATA
Consumption per season (Btu/ft^2/CDD)

77	78	79	80	81	82	83	84	85
0.000	0.000	0.000	.073	0.000	0.000	0.000	0.000	0.000

AVERAGE: .073 ESTIMATED: .729

BUILDING DESIGN INDEX .360 (heating) .547 (cooling)

APPENDIX F

REGIONAL EARTH SHELTERED HOUSING ENERGY CONSUMPTION

REGIONAL ENERGY CONSUMPTION DATA

REGION: Southern

REGIONAL AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
1.203	1.104	.911	.815	.719	.844	1.044	1.134	.935	.746	.708	.950

REGIONAL MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.039	.039	.029	.028	.023	.028	.034	.037	.031	.024	.023	.031

HEATING SEASON DATA

AVERAGE: .168 AVERAGE ESTIMATED .314

COOLING SEASON DATA

AVERAGE: .282 AVERAGE ESTIMATED .495

REGIONAL AVERAGE BUILDING DESIGN INDICES

HEATING: .384 COOLING: .505

REGIONAL ENERGY CONSUMPTION DATA

REGION: Central

REGIONAL AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.684	.700	.596	.540	.476	.472	.557	.559	.473	.465	.550	.676

REGIONAL MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.022	.025	.019	.018	.015	.016	.018	.018	.016	.015	.018	.022

HEATING SEASON DATA

AVERAGE: .061 AVERAGE ESTIMATED .215

COOLING SEASON DATA

AVERAGE: .141 AVERAGE ESTIMATED .598

REGIONAL AVERAGE BUILDING DESIGN INDICES

HEATING: .448 COOLING: .643

REGIONAL ENERGY CONSUMPTION DATA

REGION: Northern

REGIONAL AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.868	.794	.815	.744	.599	.517	.575	.574	.542	.576	.672	.883

REGIONAL MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.028	.028	.027	.025	.019	.017	.019	.019	.018	.019	.022	.029

HEATING SEASON DATA

AVERAGE: .061 AVERAGE ESTIMATED .261

COOLING SEASON DATA

AVERAGE: .203 AVERAGE ESTIMATED .899

REGIONAL AVERAGE BUILDING DESIGN INDICES

HEATING: .503 COOLING: .659

ABOVE GROUND ENERGY CONSUMPTION DATA

ABOVE GROUND AVERAGE MONTHLY TOTAL CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
2.259	2.109	1.740	1.616	.938	.903	1.096	1.088	1.101	1.224	1.929	2.163

REGIONAL MONTHLY AVERAGE DAILY CONSUMPTION (kWh/ft^2)

Jan	Feb	Mar	Apr	May	Jne	Jly	Aug	Sep	Oct	Nov	Dec
.073	.075	.056	.054	.030	.030	.035	.035	.037	.039	.064	.070

HEATING SEASON DATA

AVERAGE: .280

COOLING SEASON DATA

AVERAGE: .752

APPENDIX G

BUILDING DESIGN INDEX VALUES

BUILDING DESIGN INDEX

ID# 101
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·h/Btu)
SURROUNDING SOIL	100.00	6.00	72.00	1104000	12.00
INSULATION	17.00	*	1.50	3910	4.00
STRUCTURE	Concrete		9.00	198720	1.39
INSULATION LOCATION: Exterior		MASS:		1306630.00	
AREA: 1840.0		EFFECTIVE RESISTANCE:		17.39	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	320	11.00
STRUCTURE	Wood frame/siding		*	4848	7.26
INSULATION LOCATION: Interior		MASS:		320	
AREA: 800.0		EFFECTIVE RESISTANCE:		18.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	6.00	16.00	266667	2.67
INSULATION	2.50	*	3.00	1250.0	19.00
STRUCTURE	Concrete		9.00	216000	1.39
AREA: 2000.0		MASS:		483917.00	
		EFFECTIVE RESISTANCE:		23.06	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.58
TOTAL EFFECTIVE RESISTANCE:	.36
DEPTH OF INSULATION BELOW SURFACE (FT):	9.50
EARTH CONTACT FACTOR (HEATING):	.40
EARTH CONTACT FACTOR (COOLING):	.48
VENTILATION POTENTIAL FACTOR:	.70
SOLAR GAIN CONTROL FACTOR:	.50
SOLAR GAIN POTENTIAL FACTOR:	.90
SOLAR ACCESS FACTOR:	.80

BUILDING DESIGN INDEX: .57 (heating) .54 (cooling)

BUILDING DESIGN INDEX

ID# 102
REGION: Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2Fh/Btu)
SURROUNDING SOIL	100.00	6.00	72.00	720000	12.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete block		*	116400	3.00
INSULATION LOCATION: Exterior			MASS:		836400.00
AREA: 1200.0			EFFECTIVE RESISTANCE:		15.00

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete block		*	48112	3.00
INSULATION LOCATION: Exterior			MASS:		48112.00
AREA: 496.0			EFFECTIVE RESISTANCE:		3.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	6.00	12.00	222800	2.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		6.00	160416	.93
AREA: 2228.0			MASS:		383216.00
			EFFECTIVE RESISTANCE:		2.93

THERMAL WICKS? YES
THERMAL MASS FACTOR: .49
TOTAL EFFECTIVE RESISTANCE: .12
DEPTH OF INSULATION BELOW SURFACE (FT): 0.00
EARTH CONTACT FACTOR (HEATING): 0.00
EARTH CONTACT FACTOR (COOLING): 0.00
VENTILATION POTENTIAL FACTOR: 0.00
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .60

BUILDING DESIGN INDEX: .30 (heating) .33 (cooling)

BUILDING DESIGN INDEX

ID# 103
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	493536	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	81408	1.23
INSULATION LOCATION: Exterior		MASS:		574944.00	
AREA: 848.0		EFFECTIVE RESISTANCE:		61.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	112	5.00
STRUCTURE	Concrete		8.00	53760	1.23
INSULATION LOCATION: Exterior		MASS:		53872.00	
AREA: 560.0		EFFECTIVE RESISTANCE:		6.23	

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	27648	1.23
INSULATION LOCATION: Exterior		MASS:		27648.00	
AREA: 288.0		EFFECTIVE RESISTANCE:		1.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	18.00	361568	15.00
INSULATION	3.15	*	6.00	3913.9	24.00
STRUCTURE	Concrete		6.00	178920	.93
AREA: 2485.0		MASS:		544402.00	
		EFFECTIVE RESISTANCE:		39.93	

THERMAL WICKS? YES
THERMAL MASS FACTOR: .44
TOTAL EFFECTIVE RESISTANCE: .66
DEPTH OF INSULATION BELOW SURFACE (FT): 0.00
EARTH CONTACT FACTOR (HEATING): 0.00
EARTH CONTACT FACTOR (COOLING): 0.00
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .30

BUILDING DESIGN INDEX: .33 (heating) .56 (cooling)

BUILDING DESIGN INDEX

ID# 201
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	1061570	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	175104	1.23
INSULATION LOCATION: Exterior		MASS:		1236670.00	
AREA: 1824.0		EFFECTIVE RESISTANCE:		61.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	500000	2.64
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	240000	1.23
AREA: 2500.0		MASS:		740000.00	
		EFFECTIVE RESISTANCE:		3.87	

THERMAL WICKS? NO

THERMAL MASS FACTOR:	.72
TOTAL EFFECTIVE RESISTANCE:	.50
DEPTH OF INSULATION BELOW SURFACE (FT):	0.00
EARTH CONTACT FACTOR (HEATING):	0.00
EARTH CONTACT FACTOR (COOLING):	0.00
VENTILATION POTENTIAL FACTOR:	.20
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.20
SOLAR ACCESS FACTOR:	.30

BUILDING DESIGN INDEX: .29 (heating) .55 (cooling)

BUILDING DESIGN INDEX

ID# 202
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	679680	10.00
INSULATION	2.00	*	2.00	263	11.00
STRUCTURE	Concrete		8.00	90624	1.23
INSULATION LOCATION: Exterior			MASS:		770567.00
AREA: 944.0			EFFECTIVE RESISTANCE:		22.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.50	792	8.00
STRUCTURE	Concrete		8.00	50688	1.23
INSULATION LOCATION: Exterior			MASS:		51480. 0
AREA: 528.0			EFFECTIVE RESISTANCE:		9.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	24.00	446400	3.33
INSULATION	2.00	*	2.00	620.0	11.00
STRUCTURE	Concrete		8.00	178560	1.23
AREA: 1860.0			MASS:		625580.00
			EFFECTIVE RESISTANCE:		15.57

THERMAL WICKS? NO
THERMAL MASS FACTOR: .69
TOTAL EFFECTIVE RESISTANCE: .29
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .36
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: 1.00
SOLAR GAIN POTENTIAL FACTOR: .35
SOLAR ACCESS FACTOR: .20

BUILDING DESIGN INDEX: .36 (heating) .58 (cooling)

BUILDING DESIGN INDEX

ID# 501
REGION: Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	521472	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	86016	1.23
INSULATION LOCATION: Exterior			MASS:		607488.00
AREA: 896.0			EFFECTIVE RESISTANCE:		61.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	83.2	5.00
STRUCTURE	Concrete		8.00	39936	1.23
INSULATION LOCATION: Exterior			MASS:		40019.20
AREA: 416.0			EFFECTIVE RESISTANCE:		6.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	24.00	315056	20.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		9.00	175392	1.39
AREA: 1624.0			MASS:		490448.00
			EFFECTIVE RESISTANCE:		21.39

THERMAL WICKS? NO
THERMAL MASS FACTOR: .61
TOTAL EFFECTIVE RESISTANCE: .56
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .36
VENTILATION POTENTIAL FACTOR: .15
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .40
SOLAR ACCESS FACTOR: .40

BUILDING DESIGN INDEX: .42 (heating) .62 (cooling)

BUILDING DESIGN INDEX

ID# 502
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·Fh/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	849600	7.91
INSULATION	2.50	*	1.50	424	6.00
STRUCTURE	Concrete block		*	137352	3.00
INSULATION LOCATION: Exterior			MASS:		987376.00
AREA: 1416.0			EFFECTIVE RESISTANCE:		16.91

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.50	*	1.50	141	6.00
STRUCTURE	Concrete block		*	45784	3.00
INSULATION LOCATION: Exterior			MASS:		45925.30
AREA: 472.0			EFFECTIVE RESISTANCE:		9.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	1035.0	11.00
STRUCTURE	Wood joist/shingles		*	15579	7.88
AREA: 2700.0			MASS:		16614.00
			EFFECTIVE RESISTANCE:		18.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.35
TOTAL EFFECTIVE RESISTANCE:	.31
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.57
VENTILATION POTENTIAL FACTOR:	0.00
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.20
SOLAR ACCESS FACTOR:	.20

BUILDING DESIGN INDEX: .40 (heating) .54 (cooling)

BUILDING DESIGN INDEX

ID# 504
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	777552	60.00
INSULATION	2.00	*	.75	193	4.00
STRUCTURE	Concrete		8.00	128256	1.23
INSULATION LOCATION: Exterior			MASS:		905949.00
AREA: 1336.0			EFFECTIVE RESISTANCE:		65.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.50	189	8.00
STRUCTURE	Concrete		8.00	60672	1.23
INSULATION LOCATION: Exterior			MASS:		60861.00
AREA: 632.0			EFFECTIVE RESISTANCE:		9.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	24.00	305550	20.00
INSULATION	2.00	*	.75	196.9	4.00
STRUCTURE	Concrete		12.00	226800	1.85
AREA: 1575.0			MASS:		532547.00
			EFFECTIVE RESISTANCE:		25.85

THERMAL WICKS? NO

THERMAL MASS FACTOR:	.67
TOTAL EFFECTIVE RESISTANCE:	.67
DEPTH OF INSULATION BELOW SURFACE (FT):	10.00
EARTH CONTACT FACTOR (HEATING):	.31
EARTH CONTACT FACTOR (COOLING):	.36
VENTILATION POTENTIAL FACTOR:	.60
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.60
SOLAR ACCESS FACTOR:	.40

BUILDING DESIGN INDEX: .49 (heating) .74 (cooling)

BUILDING DESIGN INDEX

ID# 506
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2Fh/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	576000	7.91
INSULATION	2.70	*	3.00	672	15.00
STRUCTURE	Concrete		12.00	138240	1.85
INSULATION LOCATION: Exterior			MASS:		714913.00
AREA: 960.0			EFFECTIVE RESISTANCE:		24.76

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.70	*	6.00	672	30.00
STRUCTURE	Concrete		12.00	69120	1.85
INSULATION LOCATION: Exterior			MASS:		69792.40
AREA: 480.0			EFFECTIVE RESISTANCE:		31.85

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	360000	2.64
INSULATION	2.70	*	6.00	2430.0	30.00
STRUCTURE	Concrete		12.00	259200	1.85
AREA: 1800.0			MASS:		621630.00
			EFFECTIVE RESISTANCE:		34.49

THERMAL WICKS? NO	
THERMAL MASS FACTOR:	.69
TOTAL EFFECTIVE RESISTANCE:	.56
DEPTH OF INSULATION BELOW SURFACE (FT):	9.00
EARTH CONTACT FACTOR (HEATING):	.28
EARTH CONTACT FACTOR (COOLING):	.32
VENTILATION POTENTIAL FACTOR:	.30
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .43 (heating) .66 (cooling)

BUILDING DESIGN INDEX

ID# 507
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	783360	10.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	130560	1.54
INSULATION LOCATION: Exterior			MASS:		913920.00
AREA: 1088.0			EFFECTIVE RESISTANCE:		11.54

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	.50	59	3.00
STRUCTURE	Concrete		10.00	71040	1.54
INSULATION LOCATION: Exterior			MASS:		71099.10
AREA: 592.0			EFFECTIVE RESISTANCE:		4.54

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	24.00	408000	3.33
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		4.00	81600	.62
AREA: 1700.0			MASS:		489600.00
			EFFECTIVE RESISTANCE:		3.95

THERMAL WICKS? YES
THERMAL MASS FACTOR: .66
TOTAL EFFECTIVE RESISTANCE: .12
DEPTH OF INSULATION BELOW SURFACE (FT): 0.00
EARTH CONTACT FACTOR (HEATING): 0.00
EARTH CONTACT FACTOR (COOLING): 0.00
VENTILATION POTENTIAL FACTOR: .50
SOLAR GAIN CONTROL FACTOR: .60
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .42 (heating) .35 (cooling)

BUILDING DESIGN INDEX

ID# 508
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	651840	60.00
INSULATION	2.00	*	1.00	224	5.00
STRUCTURE	Concrete		8.00	107520	1.23
INSULATION LOCATION: Exterior			MASS:		759584.00
AREA: 1120.0			EFFECTIVE RESISTANCE:		66.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	2.00	96	11.00
STRUCTURE	Concrete		8.00	30720	1.23
INSULATION LOCATION: Exterior			MASS:		30816.30
AREA: 320.0			EFFECTIVE RESISTANCE:		12.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	400000	2.64
INSULATION	2.00	*	2.00	666.7	11.00
STRUCTURE	Concrete		12.00	288000	1.85
AREA: 2000.0			MASS:		688667.00
			EFFECTIVE RESISTANCE:		15.49

THERMAL WICKS? NO
THERMAL MASS FACTOR: .68
TOTAL EFFECTIVE RESISTANCE: .57
DEPTH OF INSULATION BELOW SURFACE (FT): 9.00
EARTH CONTACT FACTOR (HEATING): .28
EARTH CONTACT FACTOR (COOLING): .32
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .30
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .41 (heating) .63 (cooling)

BUILDING DESIGN INDEX

ID# 509
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	683280	10.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	113880	1.54
INSULATION LOCATION: Exterior		MASS:		797160.00	
AREA: 949.0		EFFECTIVE RESISTANCE:		11.54	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	59520	1.54
INSULATION LOCATION: Exterior		MASS:		59520.00	
AREA: 496.0		EFFECTIVE RESISTANCE:		1.54	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	24.00	660000	3.33
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		4.00	132000	.62
AREA: 2750.0		MASS:		792000.00	
		EFFECTIVE RESISTANCE:		3.95	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.60
TOTAL EFFECTIVE RESISTANCE:	.10
DEPTH OF INSULATION BELOW SURFACE (FT):	0.00
EARTH CONTACT FACTOR (HEATING):	0.00
EARTH CONTACT FACTOR (COOLING):	0.00
VENTILATION POTENTIAL FACTOR:	.10
SOLAR GAIN CONTROL FACTOR:	.80
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .28 (heating) .35 (cooling)

BUILDING DESIGN INDEX

ID# 510
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	662400	7.91
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		8.00	105984	1.23
INSULATION LOCATION: Exterior			MASS:		768384.00
AREA: 1104.0			EFFECTIVE RESISTANCE:		9.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	371	11.00
STRUCTURE	Concrete		8.00	89088	1.23
INSULATION LOCATION: Interior			MASS:		371
AREA: 928.0			EFFECTIVE RESISTANCE:		12.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	460000	2.64
INSULATION	2.50	*	2.00	958.3	12.00
STRUCTURE	Concrete		8.00	220800	1.23
AREA: 2300.0			MASS:		681758.00
			EFFECTIVE RESISTANCE:		15.87

THERMAL WICKS? YES

THERMAL MASS FACTOR:	.51
TOTAL EFFECTIVE RESISTANCE:	.24
DEPTH OF INSULATION BELOW SURFACE (FT):	9.00
EARTH CONTACT FACTOR (HEATING):	.28
EARTH CONTACT FACTOR (COOLING):	.32
VENTILATION POTENTIAL FACTOR:	0.00
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.60
SOLAR ACCESS FACTOR:	.40

BUILDING DESIGN INDEX: .40 (heating) .48 (cooling)

BUILDING DESIGN INDEX

ID# 511
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	582000	60.00
INSULATION	2.00	*	1.00	200	5.00
STRUCTURE	Concrete block		*	97000	3.00
INSULATION LOCATION: Exterior			MASS:		679200.00
AREA: 1000.0			EFFECTIVE RESISTANCE:		68.00

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	264	5.00
STRUCTURE	Concrete block		*	128040	3.00
INSULATION LOCATION: Exterior			MASS:		128304.00
AREA: 1320.0			EFFECTIVE RESISTANCE:		8.00

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	72.00	162960	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete block		*	27160	3.00
INSULATION LOCATION: Exterior			MASS:		190120.00
AREA: 280.0			EFFECTIVE RESISTANCE:		63.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	1029000	2.64
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	617400	1.54
AREA: 5145.0			MASS:		1646400.00
			EFFECTIVE RESISTANCE:		4.18

THERMAL WICKS? NO
THERMAL MASS FACTOR: .54
TOTAL EFFECTIVE RESISTANCE: .27
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .36
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .80
SOLAR ACCESS FACTOR: .90

BUILDING DESIGN INDEX: .50 (heating) .50 (cooling)

BUILDING DESIGN INDEX

ID# 512
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	480000	7.91
INSULATION	2.70	*	3.00	5[illegible]0	15.00
STRUCTURE	Concrete		8.00	76800	1.23
INSULATION LOCATION: Exterior			MASS:		557361.00
AREA: 800.0			EFFECTIVE RESISTANCE:		24.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.70	*	1.00	70.2	5.00
STRUCTURE	Concrete		8.00	33792	1.23
INSULATION LOCATION: Exterior			MASS:		33862.20
AREA: 352.0			EFFECTIVE RESISTANCE:		6.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	24.00	239008	20.00
INSULATION	2.70	*	6.00	1663.2	30.00
STRUCTURE	Concrete		8.00	118272	1.23
AREA: 1232.0			MASS:		358943.00
			EFFECTIVE RESISTANCE:		51.23

THERMAL WICKS? YES
THERMAL MASS FACTOR: .60
TOTAL EFFECTIVE RESISTANCE: .63
DEPTH OF INSULATION BELOW SURFACE (FT): 9.00
EARTH CONTACT FACTOR (HEATING): .28
EARTH CONTACT FACTOR (COOLING): .32
VENTILATION POTENTIAL FACTOR: .40
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .40
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .43 (heating) .66 (cooling)

BUILDING DESIGN INDEX

ID# 513
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	672000	7.91
INSULATION	16.00	*	6.00	2560	21.00
STRUCTURE	Concrete block		*	108640	3.00
INSULATION LOCATION: Interior			MASS:		782600.00
AREA: 1120.0			EFFECTIVE RESISTANCE:		31.91

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	16.00	*	6.00	2560	21.00
STRUCTURE	Concrete block		*	31040	3.00
INSULATION LOCATION: Interior			MASS:		2560
AREA: 320.0			EFFECTIVE RESISTANCE:		24.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	16.00	*	12.00	28800.0	41.00
STRUCTURE	Wood joist/shingles		*	10386	7.88
AREA: 1800.0			MASS:		39186.00
			EFFECTIVE RESISTANCE:		48.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.33
TOTAL EFFECTIVE RESISTANCE:	.72
DEPTH OF INSULATION BELOW SURFACE (FT):	9.00
EARTH CONTACT FACTOR (HEATING):	1.13
EARTH CONTACT FACTOR (COOLING):	.44
VENTILATION POTENTIAL FACTOR:	.40
SOLAR GAIN CONTROL FACTOR:	.80
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .60 (heating) .68 (cooling)

BUILDING DESIGN INDEX

ID# 514
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	791520	60.00
INSULATION	2.00	*	1.00	272	5.00
STRUCTURE	Concrete		8.00	130560	1.23
INSULATION LOCATION: Exterior		MASS:		922352.00	
AREA: 1360.0		EFFECTIVE RESISTANCE:		66.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	112	5.00
STRUCTURE	Concrete		8.00	53760	1.23
INSULATION LOCATION: Exterior		MASS:		53872.20	
AREA: 560.0		EFFECTIVE RESISTANCE:		6.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	24.00	679000	20.00
INSULATION	2.00	*	2.00	1166.7	11.00
STRUCTURE	Concrete		8.00	336000	1.23
AREA: 3500.0		MASS:		1016170.00	
		EFFECTIVE RESISTANCE:		32.23	

THERMAL WICKS? YES
THERMAL MASS FACTOR: .56
TOTAL EFFECTIVE RESISTANCE: .68
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .36
VENTILATION POTENTIAL FACTOR: .50
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .60

BUILDING DESIGN INDEX: .47 (heating) .69 (cooling)

BUILDING DESIGN INDEX

ID# 515
REGION:Southern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	665808	60.00
INSULATION	2.00	*	1.00	226.2	5.00
STRUCTURE	Concrete		8.00	109824	1.23
INSULATION LOCATION: Exterior		MASS:		775860.00	
AREA: 1144.0		EFFECTIVE RESISTANCE:		66.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	164	5.00
STRUCTURE	Concrete		8.00	80640	1.23
INSULATION LOCATION: Exterior		MASS:		80804.20	
AREA: 840.0		EFFECTIVE RESISTANCE:		6.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	24.00	592476	20.00
INSULATION	2.00	*	1.00	509.0	5.00
STRUCTURE	Concrete		7.50	274860	1.16
AREA: 3054.0		MASS:		867845.00	
		EFFECTIVE RESISTANCE:		26.16	

THERMAL WICKS? NO
THERMAL MASS FACTOR: .54
TOTAL EFFECTIVE RESISTANCE: .57
DEPTH OF INSULATION BELOW SURFACE (FT): 9.00
EARTH CONTACT FACTOR (HEATING): .28
EARTH CONTACT FACTOR (COOLING): .32
VENTILATION POTENTIAL FACTOR: .70
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .60

BUILDING DESIGN INDEX: .54 (heating) .65 (cooling)

BUILDING DESIGN INDEX

ID# 301
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	100.00	6.00	72.00	576000	12.00
INSULATION	2.50	*	1.00	192	6.00
STRUCTURE	Concrete		8.00	92160	1.23
INSULATION LOCATION: Exterior		MASS:		668352.00	
AREA: 960.0		EFFECTIVE RESISTANCE:		19.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	192	11.00
STRUCTURE	Concrete		8.00	46080	1.23
INSULATION LOCATION: Interior		MASS:		192.00	
AREA: 480.0		EFFECTIVE RESISTANCE:		12.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.30	*	12.00	2340.0	30.00
STRUCTURE	Wood joist/shingles		*	10386	7.88
AREA: 1800.0		MASS:		12726.00	
		EFFECTIVE RESISTANCE:		37.88	

THERMAL WICKS? NO	
THERMAL MASS FACTOR:	.33
TOTAL EFFECTIVE RESISTANCE:	.51
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.86
VENTILATION POTENTIAL FACTOR:	.80
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.70

BUILDING DESIGN INDEX: .50 (heating) .77 (cooling)

BUILDING DESIGN INDEX

ID# 302
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·R/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	806400	10.00
INSULATION	2.00	*	.50	112	3.00
STRUCTURE	Concrete		6.00	80640	.93
INSULATION LOCATION: Exterior			MASS:		887152.00
AREA: 1120.0			EFFECTIVE RESISTANCE:		13.93

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	.50	140	3.00
STRUCTURE	Concrete		6.00	20160	.93
INSULATION LOCATION: Exterior			MASS:		20300.10
AREA: 280.0			EFFECTIVE RESISTANCE:		3.93

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	312	19.00
STRUCTURE	Wood frame/siding		*	3151	7.26
INSULATION LOCATION: Interior			MASS:		312
AREA: 520.0			EFFECTIVE RESISTANCE:		26.26

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.30	*	12.00	4160.0	30.00
STRUCTURE	Wood joist/shingles		*	18464	7.88
AREA: 3200.0			MASS:		22624.00
			EFFECTIVE RESISTANCE:		37.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.28
TOTAL EFFECTIVE RESISTANCE:	.53
DEPTH OF INSULATION BELOW SURFACE (FT):	8.00
EARTH CONTACT FACTOR (HEATING):	1.00
EARTH CONTACT FACTOR (COOLING):	.75
VENTILATION POTENTIAL FACTOR:	.60
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.85

BUILDING DESIGN INDEX: .54 (heating) .72 (cooling)

BUILDING DESIGN INDEX

ID# 303
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	540000	7.91
INSULATION	2.15	*	2.00	360	17.00
STRUCTURE	Concrete		8.00	86400	1.23
INSULATION LOCATION: Exterior		MASS:		626760.00	
AREA: 900.0		EFFECTIVE RESISTANCE:		26.15	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	298	11.00
STRUCTURE	Wood frame/brick		*	27564	6.78
INSULATION LOCATION: Interior		MASS:		298	
AREA: 747.0		EFFECTIVE RESISTANCE:		17.78	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	12.00	1955.0	38.00
STRUCTURE	Wood joist/shingles		*	9809	7.88
AREA: 1700.0		MASS:		11764.00	
		EFFECTIVE RESISTANCE:		45.88	

THERMAL WICKS? YES

THERMAL MASS FACTOR:	.29
TOTAL EFFECTIVE RESISTANCE:	.61
DEPTH OF INSULATION BELOW SURFACE (FT):	8.00
EARTH CONTACT FACTOR (HEATING):	1.00
EARTH CONTACT FACTOR (COOLING):	.75
VENTILATION POTENTIAL FACTOR:	.90
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.90

BUILDING DESIGN INDEX: .58 (heating) .78 (cooling)

BUILDING DESIGN INDEX

ID# 304
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	558720	60.00
INSULATION	2.50	*	4.00	768	19.00
STRUCTURE	Concrete		8.00	92160	1.23
INSULATION LOCATION: Exterior		MASS:		651649.00	
AREA: 960.0		EFFECTIVE RESISTANCE:		80.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	8.00	435	22.00
STRUCTURE	Wood frame/siding		*	3297	7.26
INSULATION LOCATION: Interior		MASS:		435	
AREA: 544.0		EFFECTIVE RESISTANCE:		29.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	8.00	1364.7	22.00
STRUCTURE	Wood joist/shingles		*	10271	7.88
AREA: 1780.0		MASS:		11635.30	
		EFFECTIVE RESISTANCE:		29.88	

THERMAL WICKS? NO
THERMAL MASS FACTOR: .32
TOTAL EFFECTIVE RESISTANCE: .79
DEPTH OF INSULATION BELOW SURFACE (FT): 4.00
EARTH CONTACT FACTOR (HEATING): .50
EARTH CONTACT FACTOR (COOLING): .67
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .60
SOLAR ACCESS FACTOR: .70

BUILDING DESIGN INDEX: .52 (heating) .76 (cooling)

BUILDING DESIGN INDEX

ID# 305
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	6.00	72.00	576000	12.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Concrete		10.00	115200	1.54
INSULATION LOCATION: Exterior			MASS:		691200.00
AREA: 960.0			EFFECTIVE RESISTANCE:		13.54

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	16.00	*	6.00	3840	21.00
STRUCTURE	Concrete		10.00	57600	1.54
INSULATION LOCATION: Interior			MASS:		3840
AREA: 480.0			EFFECTIVE RESISTANCE:		22.54

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	16.00	84000	1.90
INSULATION	2.00	*	1.00	300.0	5.00
STRUCTURE	Concrete		3.00	64800	.46
AREA: 1800.0			MASS:		149100.00
			EFFECTIVE RESISTANCE:		7.37

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.39
TOTAL EFFECTIVE RESISTANCE:	.20
DEPTH OF INSULATION BELOW SURFACE (FT):	0.00
EARTH CONTACT FACTOR (HEATING):	0.00
EARTH CONTACT FACTOR (COOLING):	0.00
VENTILATION POTENTIAL FACTOR:	.80
SOLAR GAIN CONTROL FACTOR:	.50
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.90

BUILDING DESIGN INDEX: .27 (heating) .35 (cooling)

BUILDING DESIGN INDEX

ID# 306
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2Fhr/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	558720	60.00
INSULATION	1.15	*	6.00	576	19.00
STRUCTURE	Wood frame/siding		*	5818	7.26
INSULATION LOCATION: Interior			MASS:		559297.00
AREA: 960.0			EFFECTIVE RESISTANCE:		86.26

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	288	19.00
STRUCTURE	Wood frame/siding		*	2909	7.26
INSULATION LOCATION: Interior			MASS:		288
AREA: 480.0			EFFECTIVE RESISTANCE:		26.26

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Wood joist/shingles		*	10386	7.88
AREA: 1800.0			MASS:		10386.00
			EFFECTIVE RESISTANCE:		7.88

THERMAL WICKS? NO	
THERMAL MASS FACTOR:	.28
TOTAL EFFECTIVE RESISTANCE:	.60
DEPTH OF INSULATION BELOW SURFACE (FT):	8.00
EARTH CONTACT FACTOR (HEATING):	1.00
EARTH CONTACT FACTOR (COOLING):	.75
VENTILATION POTENTIAL FACTOR:	.55
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.80
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .64 (heating) .74 (cooling)

BUILDING DESIGN INDEX

ID# 701
REGION: Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb.)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	530784	60.00
INSULATION	2.00	*	1.50	273	8.00
STRUCTURE	Concrete		8.00	87552	1.23
INSULATION LOCATION: Exterior		MASS:		618609.00	
AREA: 912.0		EFFECTIVE RESISTANCE:		69.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	259	19.00
STRUCTURE	Concrete		8.00	41472	1.23
INSULATION LOCATION: Interior		MASS:		259	
AREA: 432.0		EFFECTIVE RESISTANCE:		20.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	9.00	1380.0	22.00
STRUCTURE	Wood joist/shingles		*	9232	7.88
AREA: 1600.0		MASS:		10612.00	
		EFFECTIVE RESISTANCE:		29.88	

THERMAL WICKS?	YES
THERMAL MASS FACTOR:	.32
TOTAL EFFECTIVE RESISTANCE:	.73
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.86
VENTILATION POTENTIAL FACTOR:	.50
SOLAR GAIN CONTROL FACTOR:	.80
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.90

BUILDING DESIGN INDEX: .57 (heating) .79 (cooling)

BUILDING DESIGN INDEX

ID# 702
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	619248	60.00
INSULATION	2.00	*	2.00	319	12.00
STRUCTURE	Concrete		10.00	127680	1.54
INSULATION LOCATION: Exterior		MASS:		747247.00	
AREA: 1064.0		EFFECTIVE RESISTANCE:		73.54	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	350	19.00
STRUCTURE	Concrete		10.00	70080	1.54
INSULATION LOCATION: Interior		MASS:		350	
AREA: 584.0		EFFECTIVE RESISTANCE:		20.54	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	18.00	261900	15.00
INSULATION	2.00	*	4.00	1200.0	22.00
STRUCTURE	Concrete		8.00	172800	1.23
AREA: 1800.0		MASS:		435900.00	
		EFFECTIVE RESISTANCE:		38.23	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.52
TOTAL EFFECTIVE RESISTANCE:	.82
DEPTH OF INSULATION BELOW SURFACE (FT):	9.50
EARTH CONTACT FACTOR (HEATING):	.37
EARTH CONTACT FACTOR (COOLING):	.40
VENTILATION POTENTIAL FACTOR:	.80
SOLAR GAIN CONTROL FACTOR:	.80
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .43 (heating) .77 (cooling)

BUILDING DESIGN INDEX

ID# 703
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	657600	7.91
INSULATION	2.00	*	1.00	219	5.00
STRUCTURE	Concrete		5.50	72336	.85
INSULATION LOCATION: Exterior			MASS:		730155.00
AREA: 1096.0			EFFECTIVE RESISTANCE:		13.76

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	91.2	5.00
STRUCTURE	Concrete		5.50	30096	.85
INSULATION LOCATION: Exterior			MASS:		30187.20
AREA: 456.0			EFFECTIVE RESISTANCE:		5.85

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	36.00	660000	3.96
INSULATION	1.90	*	1.00	348.3	10.00
STRUCTURE	Concrete		8.00	211200	1.23
AREA: 2200.0			MASS:		871548.00
			EFFECTIVE RESISTANCE:		15.19

THERMAL WICKS? NO
THERMAL MASS FACTOR: .69
TOTAL EFFECTIVE RESISTANCE: .24
DEPTH OF INSULATION BELOW SURFACE (FT): 11.00
EARTH CONTACT FACTOR (HEATING): .25
EARTH CONTACT FACTOR (COOLING): .26
VENTILATION POTENTIAL FACTOR: .40
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .40
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .38 (heating) .54 (cooling)

BUILDING DESIGN INDEX

ID# 704
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	552000	7.91
INSULATION	2.00	*	2.00	276	11.00
STRUCTURE	Concrete		8.00	88320	1.23
INSULATION LOCATION: Exterior			MASS:		640596.00
AREA: 920.0			EFFECTIVE RESISTANCE:		20.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	302	19.00
STRUCTURE	Concrete		8.00	48384	1.23
INSULATION LOCATION: Interior			MASS:		302
AREA: 504.0			EFFECTIVE RESISTANCE:		20.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	9.00	1035.0	22.00
STRUCTURE	Wood joist/shingles		*	6924	7.88
AREA: 1200.0			MASS:		7959.00
			EFFECTIVE RESISTANCE:		29.88

THERMAL WICKS? YES
THERMAL MASS FACTOR: .37
TOTAL EFFECTIVE RESISTANCE: .44
DEPTH OF INSULATION BELOW SURFACE (FT): 7.00
EARTH CONTACT FACTOR (HEATING): .88
EARTH CONTACT FACTOR (COOLING): .86
VENTILATION POTENTIAL FACTOR: .30
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .60
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .55 (heating) .70 (cooling)

BUILDING DESIGN INDEX

ID# 705
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	869760	10.00
INSULATION	2.00	*	2.00	362	11.00
STRUCTURE	Concrete		8.00	115968	1.23
INSULATION LOCATION: Exterior			MASS:		986090.00
AREA: 1208.0			EFFECTIVE RESISTANCE:		22.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	.75	70	4.00
STRUCTURE	Concrete		8.00	67584	1.23
INSULATION LOCATION: Exterior			MASS:		67654.10
AREA: 704.0			EFFECTIVE RESISTANCE:		5.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	20.00	595200	2.78
INSULATION	2.00	*	2.00	992.0	11.00
STRUCTURE	Concrete		8.00	285696	1.23
AREA: 2976.0			MASS:		881888.00
			EFFECTIVE RESISTANCE:		15.01

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.60
TOTAL EFFECTIVE RESISTANCE:	.27
DEPTH OF INSULATION BELOW SURFACE (FT):	9.50
EARTH CONTACT FACTOR (HEATING):	.34
EARTH CONTACT FACTOR (COOLING):	.37
VENTILATION POTENTIAL FACTOR:	.60
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .39 (heating) .58 (cooling)

BUILDING DESIGN INDEX

ID# 706
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	672000	7.91
INSULATION	2.00	*	1.00	224	6.00
STRUCTURE	Concrete		8.00	107520	1.23
INSULATION LOCATION: Exterior			MASS:		779744.00
AREA: 1120.0			EFFECTIVE RESISTANCE:		15.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	156	5.00
STRUCTURE	Concrete		8.00	75264	1.23
INSULATION LOCATION: Exterior			MASS:		75420.20
AREA: 784.0			EFFECTIVE RESISTANCE:		6.23

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	72.00	172800	7.91
INSULATION	2.00	*	1.00	57	6.00
STRUCTURE	Concrete		8.00	27648	1.23
INSULATION LOCATION: Exterior			MASS:		200505.00
AREA: 288.0			EFFECTIVE RESISTANCE:		15.15

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	36.00	690000	3.96
INSULATION	2.00	*	1.50	575.0	9.00
STRUCTURE	Concrete		8.00	220800	1.23
AREA: 2300.0			MASS:		911375.00
			EFFECTIVE RESISTANCE:		14.19

THERMAL WICKS? YES
THERMAL MASS FACTOR: .66
TOTAL EFFECTIVE RESISTANCE: .23
DEPTH OF INSULATION BELOW SURFACE (FT): 11.00
EARTH CONTACT FACTOR (HEATING): .25
EARTH CONTACT FACTOR (COOLING): .26
VENTILATION POTENTIAL FACTOR: .60
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .60
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .43 (heating) .55 (cooling)

BUILDING DESIGN INDEX

ID# 707
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	35.00	8.40	72.00	184800	8.57
INSULATION	2.00	*	1.00	176	5.00
STRUCTURE	Concrete		10.00	105600	1.54
INSULATION LOCATION: Exterior			MASS:		290576.00
AREA: 880.0			EFFECTIVE RESISTANCE:		15.11

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	80.2	5.00
STRUCTURE	Concrete		10.00	48000	1.54
INSULATION LOCATION: Exterior			MASS:		48080.20
AREA: 400.0			EFFECTIVE RESISTANCE:		6.54

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	30.00	131250	3.57
INSULATION	2.00	*	2.00	500.0	11.00
STRUCTURE	Concrete		8.00	144000	1.23
AREA: 1500.0			MASS:		275750.00
			EFFECTIVE RESISTANCE:		15.81

THERMAL WICKS? NO

THERMAL MASS FACTOR:	.35
TOTAL EFFECTIVE RESISTANCE:	.25
DEPTH OF INSULATION BELOW SURFACE (FT):	10.50
EARTH CONTACT FACTOR (HEATING):	.28
EARTH CONTACT FACTOR (COOLING):	.29
VENTILATION POTENTIAL FACTOR:	.40
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .32 (heating) .49 (cooling)

BUILDING DESIGN INDEX

ID# 708
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (fi^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	558720	60.00
INSULATION	1.15	*	4.00	384	11.00
STRUCTURE	Wood frame/siding		*	5818	7.26
INSULATION LOCATION: Interior		MASS:		559104.00	
AREA: 960.0		EFFECTIVE RESISTANCE:		78.26	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	192	11.00
STRUCTURE	Wood frame/siding		*	2909	7.26
INSULATION LOCATION: Interior		MASS:		192	
AREA: 480.0		EFFECTIVE RESISTANCE:		18.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	1035.0	19.00
STRUCTURE	Wood joist/shingles		*	10386	7.88
AREA: 1800.0		MASS:		11421.00	
		EFFECTIVE RESISTANCE:		26.88	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.27
TOTAL EFFECTIVE RESISTANCE:	.73
DEPTH OF INSULATION BELOW SURFACE (FT):	8.00
EARTH CONTACT FACTOR (HEATING):	1.00
EARTH CONTACT FACTOR (COOLING):	.75
VENTILATION POTENTIAL FACTOR:	.10
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.30

BUILDING DESIGN INDEX: .51 (heating) .74 (cooling)

BUILDING DESIGN INDEX

ID# 709
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	446976	60.00
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Wood frame/siding		*	4654	7.26
INSULATION LOCATION: Exterior		MASS:		451630.00	
AREA: 768.0		EFFECTIVE RESISTANCE:		67.26	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Wood frame/siding		*	2327	7.26
INSULATION LOCATION: Exterior		MASS:		2327.04	
AREA: 384.0		EFFECTIVE RESISTANCE:		7.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	0.00	*	0.00	0.0	0.00
STRUCTURE	Wood joist/shingles		*	6780	7.88
AREA: 1175.0		MASS:		6779.75	
		EFFECTIVE RESISTANCE:		7.88	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.30
TOTAL EFFECTIVE RESISTANCE:	.49
DEPTH OF INSULATION BELOW SURFACE (FT):	0.00
EARTH CONTACT FACTOR (HEATING):	0.00
EARTH CONTACT FACTOR (COOLING):	0.00
VENTILATION POTENTIAL FACTOR:	.25
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.30
SOLAR ACCESS FACTOR:	.40

BUILDING DESIGN INDEX: .24 (heating) .48 (cooling)

BUILDING DESIGN INDEX

ID# 710
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	1019520	10.00
INSULATION	2.00	*	1.50	424	6.00
STRUCTURE	Concrete		10.00	169920	1.54
INSULATION LOCATION: Exterior		MASS:		1189864.00	
AREA: 1416.0		EFFECTIVE RESISTANCE:		17.54	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	208	11.00
STRUCTURE	Concrete		10.00	62400	1.54
INSULATION LOCATION: Interior		MASS:		208	
AREA: 520.0		EFFECTIVE RESISTANCE:		12.54	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	30.00	1050000	4.17
INSULATION	1.15	*	4.00	1341.7	11.00
STRUCTURE	Concrete		8.00	336000	1.23
AREA: 3500.0		MASS:		1387340.00	
		EFFECTIVE RESISTANCE:		16.40	

THERMAL WICKS? YES
THERMAL MASS FACTOR: .72
TOTAL EFFECTIVE RESISTANCE: .29
DEPTH OF INSULATION BELOW SURFACE (FT): 10.50
EARTH CONTACT FACTOR (HEATING): .28
EARTH CONTACT FACTOR (COOLING): .29
VENTILATION POTENTIAL FACTOR: .20
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .20
SOLAR ACCESS FACTOR: .40

BUILDING DESIGN INDEX: .34 (heating) .55 (cooling)

BUILDING DESIGN INDEX

ID# 711
REGION:Central

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	835200	7.91
INSULATION	2.00	*	2.00	417	11.00
STRUCTURE	Concrete		6.00	100224	.93
INSULATION LOCATION: Exterior			MASS:		935841.00
AREA: 1392.0			EFFECTIVE RESISTANCE:		19.84

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	432	19.00
STRUCTURE	Concrete		6.00	51840	.93
INSULATION LOCATION: Interior			MASS:		432
AREA: 720.0			EFFECTIVE RESISTANCE:		19.93

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	24.00	210000	2.86
INSULATION	1.15	*	10.00	2875.0	30.00
STRUCTURE	Wood joist/shingles		*	17310	7.88
AREA: 3000.0			MASS:		230185.00
			EFFECTIVE RESISTANCE:		40.74

THERMAL WICKS? NO

THERMAL MASS FACTOR:	.36
TOTAL EFFECTIVE RESISTANCE:	.57
DEPTH OF INSULATION BELOW SURFACE (FT):	10.00
EARTH CONTACT FACTOR (HEATING):	.31
EARTH CONTACT FACTOR (COOLING):	.33
VENTILATION POTENTIAL FACTOR:	.50
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .38 (heating) .63 (cooling)

BUILDING DESIGN INDEX

ID# 401
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h·Btu)
SURROUNDING SOIL	100.00	9.10	72.00	633600	7.91
INSULATION	2.00	*	2.00	316	11.00
STRUCTURE	Concrete		10.00	126720	1.54
INSULATION LOCATION: Exterior			MASS:		760636.00
AREA: 1056.0			EFFECTIVE RESISTANCE:		20.46

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	2.00	115	7.00
STRUCTURE	Concrete		10.00	69120	1.54
INSULATION LOCATION: Interior			MASS:		115
AREA: 576.0			EFFECTIVE RESISTANCE:		8.54

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	24.00	540000	2.64
INSULATION	2.00	*	2.00	900.0	11.00
STRUCTURE	Concrete		8.00	259200	1.23
AREA: 2700.0			MASS:		800100.00
			EFFECTIVE RESISTANCE:		14.87

THERMAL WICKS? NO
THERMAL MASS FACTOR: .57
TOTAL EFFECTIVE RESISTANCE: .27
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .31
VENTILATION POTENTIAL FACTOR: .40
SOLAR GAIN CONTROL FACTOR: .40
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .70

BUILDING DESIGN INDEX: .53 (heating) .42 (cooling)

BUILDING DESIGN INDEX

ID# 402
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	35.00	8.40	72.00	324240	8.57
INSULATION	2.00	*	2.00	463	6.00
STRUCTURE	Concrete		8.00	148224	1.23
INSULATION LOCATION: Exterior		MASS:		472927.00	
AREA: 1544.0		EFFECTIVE RESISTANCE:		15.81	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	140	5.00
STRUCTURE	Wood frame/siding		*	4266	7.26
INSULATION LOCATION: Exterior		MASS:		4406.41	
AREA: 704.0		EFFECTIVE RESISTANCE:		12.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	5.00	56250	.55
INSULATION	1.15	*	6.00	776.3	19.00
STRUCTURE	Concrete		8.00	129600	1.23
AREA: 1350.0		MASS:		186626.00	
		EFFECTIVE RESISTANCE:		20.78	

THERMAL WICKS? NO
THERMAL MASS FACTOR: .29
TOTAL EFFECTIVE RESISTANCE: .30
DEPTH OF INSULATION BELOW SURFACE (FT): 8.00
EARTH CONTACT FACTOR (HEATING): .62
EARTH CONTACT FACTOR (COOLING): .62
VENTILATION POTENTIAL FACTOR: .80
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .43 (heating) .62 (cooling)

BUILDING DESIGN INDEX

ID# 601
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	670464	60.00
INSULATION	2.00	*	2.00	345	11.00
STRUCTURE	Concrete		8.00	110592	1.23
INSULATION LOCATION: Exterior		MASS:		781401.00	
AREA: 1152.0		EFFECTIVE RESISTANCE:		72.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	3.00	256	16.00
STRUCTURE	Concrete		8.00	49152	1.23
INSULATION LOCATION: Exterior		MASS:		49408.50	
AREA: 512.0		EFFECTIVE RESISTANCE:		17.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	6.00	18.00	240000	3.00
INSULATION	1.30	*	12.00	2080.0	30.00
STRUCTURE	Wood joist/shingles		*	9232	7.88
AREA: 1600.0		MASS:		251312.00	
		EFFECTIVE RESISTANCE:		40.88	

THERMAL WICKS? NO
THERMAL MASS FACTOR: .52
TOTAL EFFECTIVE RESISTANCE: .86
DEPTH OF INSULATION BELOW SURFACE (FT): 9.50
EARTH CONTACT FACTOR (HEATING): .37
EARTH CONTACT FACTOR (COOLING): .37
VENTILATION POTENTIAL FACTOR: .60
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .55
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .50 (heating) .79 (cooling)

BUILDING DESIGN INDEX

ID# 602
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	466560	10.00
INSULATION	2.00	*	1.75	194	9.00
STRUCTURE	Concrete		8.00	62208	1.23
INSULATION LOCATION: Exterior			MASS:		528962.00
AREA: 648.0			EFFECTIVE RESISTANCE:		20.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	240	11.00
STRUCTURE	Concrete		8.00	57600	1.23
INSULATION LOCATION: Interior			MASS:		240
AREA: 600.0			EFFECTIVE RESISTANCE:		12.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.30	*	12.00	1872.0	30.00
STRUCTURE	Wood joist/shingles		*	8309	7.88
AREA: 1440.0			MASS:		10180.80
			EFFECTIVE RESISTANCE:		37.88

THERMAL WICKS? YES
THERMAL MASS FACTOR: .30
TOTAL EFFECTIVE RESISTANCE: .50
DEPTH OF INSULATION BELOW SURFACE (FT): 6.00
EARTH CONTACT FACTOR (HEATING): .75
EARTH CONTACT FACTOR (COOLING): .75
VENTILATION POTENTIAL FACTOR: .40
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .40
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .47 (heating) .69 (cooling)

BUILDING DESIGN INDEX

ID# 603
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)(ft^2-h/Btu)	RESISTANCE
SURROUNDING SOIL	100.00	9.10	72.00	489600	7.91
INSULATION	2.00	*	1.00	163	5.00
STRUCTURE	Concrete		8.00	78336	1.23
INSULATION LOCATION: Exterior			MASS:		568099.00
AREA: 816.0			EFFECTIVE RESISTANCE:		14.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.75	*	6.00	206	2.00
STRUCTURE	Concrete		8.00	55296	1.23
INSULATION LOCATION: Exterior			MASS:		56402.40
AREA: 576.0			EFFECTIVE RESISTANCE:		3.23

WALL 3	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	48	5.00
STRUCTURE	Concrete		8.00	23040	1.23
INSULATION LOCATION: Exterior			MASS:		23088.20
AREA: 240.0			EFFECTIVE RESISTANCE:		6.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.75	*	12.00	4125.0	3.00
STRUCTURE	Wood joist/shingles		*	8655	7.88
AREA: 1500.0			MASS:		12780.00
			EFFECTIVE RESISTANCE:		10.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.32
TOTAL EFFECTIVE RESISTANCE:	.18
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.88
VENTILATION POTENTIAL FACTOR:	.20
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.30

BUILDING DESIGN INDEX: .44 (heating) .58 (cooling)

BUILDING DESIGN INDEX

ID# 604
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	35.00	8.40	72.00	231840	8.57
INSULATION	2.00	*	1.50	331	8.00
STRUCTURE	Concrete		8.00	105984	1.23
INSULATION LOCATION: Exterior			MASS:		338155.00
AREA: 1104.0			EFFECTIVE RESISTANCE:		17.81

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	140	11.00
STRUCTURE	Concrete		8.00	33792	1.23
INSULATION LOCATION: Interior			MASS:		140
AREA: 352.0			EFFECTIVE RESISTANCE:		12.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.75	*	12.00	5687.0	3.00
STRUCTURE	Wood joist/shingles		*	11932	7.88
AREA: 2068.0			MASS:		17619.40
			EFFECTIVE RESISTANCE:		10.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.15
TOTAL EFFECTIVE RESISTANCE:	.24
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.88
VENTILATION POTENTIAL FACTOR:	.15
SOLAR GAIN CONTROL FACTOR:	.60
SOLAR GAIN POTENTIAL FACTOR:	.50
SOLAR ACCESS FACTOR:	.30

BUILDING DESIGN INDEX: .44 (heating) .50 (cooling)

BUILDING DESIGN INDEX

ID# 605
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2F hr/Btu)
SURROUNDING SOIL	35.00	8.40	72.00	221760	8.57
INSULATION	2.00	*	4.00	739	22.00
STRUCTURE	Concrete		8.00	101376	1.23
INSULATION LOCATION: Exterior			MASS:		323876.00
AREA: 1056.0			EFFECTIVE RESISTANCE:		31.81

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	4.00	403	22.00
STRUCTURE	Concrete		8.00	55296	1.23
INSULATION LOCATION: Exterior			MASS:		55699.70
AREA: 576.0			EFFECTIVE RESISTANCE:		23.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	18.00	110670	2.14
INSULATION	2.00	*	4.00	1405.3	22.00
STRUCTURE	Concrete		14.00	354144	2.16
AREA: 2108.0			MASS:		466219.00
			EFFECTIVE RESISTANCE:		26.30

THERMAL WICKS? NO
THERMAL MASS FACTOR: .36
TOTAL EFFECTIVE RESISTANCE: .49
DEPTH OF INSULATION BELOW SURFACE (FT): 9.50
EARTH CONTACT FACTOR (HEATING): .37
EARTH CONTACT FACTOR (COOLING): .37
VENTILATION POTENTIAL FACTOR: .50
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .40 (heating) .61 (cooling)

BUILDING DESIGN INDEX

ID# 606
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	552000	7.91
INSULATION	1.15	*	4.00	368	11.00
STRUCTURE	Concrete		8.00	88320	1.23
INSULATION LOCATION: Interior			MASS:		552368.00
AREA: 920.0			EFFECTIVE RESISTANCE:		20.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	176	11.00
STRUCTURE	Concrete		8.00	42240	1.23
INSULATION LOCATION: Interior			MASS:		176
AREA: 440.0			EFFECTIVE RESISTANCE:		12.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.30	*	12.00	2145.0	30.00
STRUCTURE	Wood joist/asphalt sh.		*	12128	7.38
AREA: 1650.0			MASS:		14272.50
			EFFECTIVE RESISTANCE:		37.38

THERMAL WICKS? YES

THERMAL MASS FACTOR:	.29
TOTAL EFFECTIVE RESISTANCE:	.51
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.88
VENTILATION POTENTIAL FACTOR:	.60
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.50
SOLAR ACCESS FACTOR:	.60

BUILDING DESIGN INDEX: .53 (heating) .74 (cooling)

BUILDING DESIGN INDEX

ID# 607
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	691200	7.91
INSULATION	2.00	*	2.00	549	11.00
STRUCTURE	Concrete		8.00	110592	1.23
INSULATION LOCATION: Exterior		MASS:		802137.00	
AREA: 1152.0		EFFECTIVE RESISTANCE:		20.15	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	2.00	201	11.00
STRUCTURE	Concrete		8.00	64512	1.23
INSULATION LOCATION: Exterior		MASS:		64713.30	
AREA: 672.0		EFFECTIVE RESISTANCE:		12.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	120.00	7.20	36.00	907200	5.00
INSULATION	2.00	*	2.00	840.0	11.00
STRUCTURE	Concrete		10.00	302400	1.54
AREA: 2520.0		MASS:		1210440.00	
		EFFECTIVE RESISTANCE:		17.54	

THERMAL WICKS? YES
THERMAL MASS FACTOR: .73
TOTAL EFFECTIVE RESISTANCE: .31
DEPTH OF INSULATION BELOW SURFACE (FT): 11.00
EARTH CONTACT FACTOR (HEATING): .25
EARTH CONTACT FACTOR (COOLING): .25
VENTILATION POTENTIAL FACTOR: .70
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .65

BUILDING DESIGN INDEX: .54 (heating) .59 (cooling)

BUILDING DESIGN INDEX

ID# 608
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F-h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	411000	7.91
INSULATION	2.00	*	2.00	205	11.00
STRUCTURE	Concrete		8.00	65760	1.23
INSULATION LOCATION: Exterior		MASS:		476965.00	
AREA: 685.0		EFFECTIVE RESISTANCE:		20.15	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	4.00	118.4	11.00
STRUCTURE	Wood frame/siding		*	1794	7.26
INSULATION LOCATION: Interior		MASS:		118.4	
AREA: 296.0		EFFECTIVE RESISTANCE:		18.26	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	519.8	19.00
STRUCTURE	Wood joist/shingles		*	5216	7.88
AREA: 904.0		MASS:		5735.88	
		EFFECTIVE RESISTANCE:		26.88	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.39
TOTAL EFFECTIVE RESISTANCE:	.41
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.88
VENTILATION POTENTIAL FACTOR:	.80
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.55
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .54 (heating) .74 (cooling)

BUILDING DESIGN INDEX

ID# 609
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	489600	7.91
INSULATION	2.00	*	2.00	244	11.00
STRUCTURE	Concrete block		*	79152	3.00
INSULATION LOCATION: Exterior			MASS:		568996.00
AREA: 816.0			EFFECTIVE RESISTANCE:		21.91

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	259	19.00
STRUCTURE	Concrete block		*	41904	3.00
INSULATION LOCATION: Interior			MASS:		259
AREA: 432.0			EFFECTIVE RESISTANCE:		22.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	747.5	19.00
STRUCTURE	Wood joist/shingles		*	7501	7.88
AREA: 1300.0			MASS:		8248.50
			EFFECTIVE RESISTANCE:		26.88

THERMAL WICKS? YES
THERMAL MASS FACTOR: .34
TOTAL EFFECTIVE RESISTANCE: .44
DEPTH OF INSULATION BELOW SURFACE (FT): 7.00
EARTH CONTACT FACTOR (HEATING): .88
EARTH CONTACT FACTOR (COOLING): .88
VENTILATION POTENTIAL FACTOR: .40
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .70
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .57 (heating) .70 (cooling)

BUILDING DESIGN INDEX

ID# 610
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	120.00	7.20	72.00	622080	10.00
INSULATION	2.00	*	2.00	259	11.00
STRUCTURE	Concrete		10.00	103680	1.54
INSULATION LOCATION: Exterior		MASS:		726019.00	
AREA: 864.0		EFFECTIVE RESISTANCE:		22.54	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	297	19.00
STRUCTURE	Concrete		10.00	59520	1.54
INSULATION LOCATION: Interior		MASS:		297	
AREA: 496.0		EFFECTIVE RESISTANCE:		20.54	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	948.8	19.00
STRUCTURE	Wood joist/shingles		*	9521	7.88
AREA: 1650.0		MASS:		10469.30	
		EFFECTIVE RESISTANCE:		26.88	

THERMAL WICKS? YES
THERMAL MASS FACTOR: .37
TOTAL EFFECTIVE RESISTANCE: .44
DEPTH OF INSULATION BELOW SURFACE (FT): 6.00
EARTH CONTACT FACTOR (HEATING): .75
EARTH CONTACT FACTOR (COOLING): .75
VENTILATION POTENTIAL FACTOR: .90
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .20
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .42 (heating) .70 (cooling)

BUILDING DESIGN INDEX

ID# 611
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	586656	60.00
INSULATION	1.15	*	6.00	604	19.00
STRUCTURE	Wood frame/siding		*	6108	7.26
INSULATION LOCATION: Interior		MASS:		587260	.00
AREA: 1008.0		EFFECTIVE RESISTANCE:			86.26

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	259	19.00
STRUCTURE	Wood frame/siding		*	2618	7.26
INSULATION LOCATION: Interior		MASS:		259	
AREA: 432.0		EFFECTIVE RESISTANCE:			26.26

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.75	*	10.00	4466.5	3.00
STRUCTURE	Wood joist/shingles		*	11246	7.88
AREA: 1949.0		MASS:		15712.20	
		EFFECTIVE RESISTANCE:			10.88

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.27
TOTAL EFFECTIVE RESISTANCE:	.63
DEPTH OF INSULATION BELOW SURFACE (FT):	7.00
EARTH CONTACT FACTOR (HEATING):	.88
EARTH CONTACT FACTOR (COOLING):	.88
VENTILATION POTENTIAL FACTOR:	.60
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.60
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .56 (heating) .78 (cooling)

BUILDING DESIGN INDEX

ID# 612
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (H^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	446976	60.00
INSULATION	2.00	*	2.00	230	11.00
STRUCTURE	Concrete		8.00	73728	1.23
INSULATION LOCATION: Exterior			MASS:		520934.00
AREA: 768.0			EFFECTIVE RESISTANCE:		72.23

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	4.00	268.7	22.00
STRUCTURE	Concrete		8.00	36864	1.23
INSULATION LOCATION: Exterior			MASS:		37132.70
AREA: 384.0			EFFECTIVE RESISTANCE:		23.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	8.00	28000	.95
INSULATION	2.00	*	2.00	400.0	11.00
STRUCTURE	Concrete		12.00	172800	1.85
AREA: 1200.0			MASS:		201200.00
			EFFECTIVE RESISTANCE:		13.80

THERMAL WICKS? YES
THERMAL MASS FACTOR: .49
TOTAL EFFECTIVE RESISTANCE: .61
DEPTH OF INSULATION BELOW SURFACE (FT): 8.00
EARTH CONTACT FACTOR (HEATING): .50
EARTH CONTACT FACTOR (COOLING): .50
VENTILATION POTENTIAL FACTOR: .50
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .80
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .56 (heating) .71 (cooling)

BUILDING DESIGN INDEX

ID# 801
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2-F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	451200	7.91
INSULATION	2.00	*	2.00	225	11.00
STRUCTURE	Concrete		12.00	108288	1.85
INSULATION LOCATION: Exterior			MASS:		559713.00
AREA: 752.0			EFFECTIVE RESISTANCE:		20.76

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	2.00	225	11.00
STRUCTURE	Concrete		12.00	108288	1.85
INSULATION LOCATION: Exterior			MASS:		108513.00
AREA: 752.0			EFFECTIVE RESISTANCE:		12.85

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	35.00	8.40	24.00	147000	2.86
INSULATION	2.00	*	4.00	1400.0	22.00
STRUCTURE	Concrete		15.00	378000	2.31
AREA: 2100.0			MASS:		526400.00
			EFFECTIVE RESISTANCE:		27.17

THERMAL WICKS? NO
THERMAL MASS FACTOR: .52
TOTAL EFFECTIVE RESISTANCE: .41
DEPTH OF INSULATION BELOW SURFACE (FT): 10.00
EARTH CONTACT FACTOR (HEATING): .31
EARTH CONTACT FACTOR (COOLING): .31
VENTILATION POTENTIAL FACTOR: .30
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .50
SOLAR ACCESS FACTOR: .60

BUILDING DESIGN INDEX: .42 (heating) .57 (cooling)

BUILDING DESIGN INDEX

ID# 802
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	585600	7.91
INSULATION	2.00	*	1.00	195	5.00
STRUCTURE	Concrete		8.00	93696	1.23
INSULATION LOCATION: Exterior			MASS:		679491.00
AREA: 976.0			EFFECTIVE RESISTANCE:		14.15

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	1.00	115	5.00
STRUCTURE	Concrete		8.00	55296	1.23
INSULATION LOCATION: Exterior			MASS:		55411.20
AREA: 576.0			EFFECTIVE RESISTANCE:		6.23

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	36.00	780000	3.96
INSULATION	2.00	*	1.00	433.3	5.00
STRUCTURE	Steel joist/conc.deck		*	102700	4.73
AREA: 2600.0			MASS:		883133.00
			EFFECTIVE RESISTANCE:		13.69

THERMAL WICKS? YES
THERMAL MASS FACTOR: .59
TOTAL EFFECTIVE RESISTANCE: .23
DEPTH OF INSULATION BELOW SURFACE (FT): 11.00
EARTH CONTACT FACTOR (HEATING): .25
EARTH CONTACT FACTOR (COOLING): .25
VENTILATION POTENTIAL FACTOR: 0.00
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .60
SOLAR ACCESS FACTOR: .60

BUILDING DESIGN INDEX: .42 (heating) .47 (cooling)

BUILDING DESIGN INDEX

ID# 803
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	97.00	1.20	72.00	987072	60.00
INSULATION	2.00	*	4.00	1187	22.00
STRUCTURE	Concrete		12.00	244224	1.85
INSULATION LOCATION: Exterior		MASS:		1232487.00	
AREA: 1696.0		EFFECTIVE RESISTANCE:			83.85

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	595	19.00
STRUCTURE	Concrete		12.00	142848	1.85
INSULATION LOCATION: Interior		MASS:		595	
AREA: 992.0		EFFECTIVE RESISTANCE:			20.85

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	97.00	1.20	30.00	390910	25.00
INSULATION	2.00	*	4.00	1074.7	22.00
STRUCTURE	Concrete		12.00	232128	1.85
AREA: 1612.0		MASS:		624113.00	
		EFFECTIVE RESISTANCE:			48.85

THERMAL WICKS? NO
THERMAL MASS FACTOR: .68
TOTAL EFFECTIVE RESISTANCE: 1.00
DEPTH OF INSULATION BELOW SURFACE (FT): 16.00
EARTH CONTACT FACTOR (HEATING): .42
EARTH CONTACT FACTOR (COOLING): .42
VENTILATION POTENTIAL FACTOR: .50
SOLAR GAIN CONTROL FACTOR: .90
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .85

BUILDING DESIGN INDEX: .69 (heating) .87 (cooling)

BUILDING DESIGN INDEX

ID# 804
REGION:Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	422400	7.91
INSULATION	1.15	*	6.00	422	25.00
STRUCTURE	Concrete block		*	68288	3.00
INSULATION LOCATION: Interior			MASS:		422823.00
AREA: 704.0			EFFECTIVE RESISTANCE:		35.91

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	9.50	403	25.00
STRUCTURE	Concrete block		*	43456	3.00
INSULATION LOCATION: Interior			MASS:		403
AREA: 448.0			EFFECTIVE RESISTANCE:		28.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	1030.4	19.00
STRUCTURE	Wood joist/asphalt sh.		*	13171	7.38
AREA: 1792.0			MASS:		14201.60
			EFFECTIVE RESISTANCE:		26.38

THERMAL WICKS? YES
THERMAL MASS FACTOR: .22
TOTAL EFFECTIVE RESISTANCE: .52
DEPTH OF INSULATION BELOW SURFACE (FT): 8.00
EARTH CONTACT FACTOR (HEATING): 1.00
EARTH CONTACT FACTOR (COOLING): 1.00
VENTILATION POTENTIAL FACTOR: .30
SOLAR GAIN CONTROL FACTOR: .80
SOLAR GAIN POTENTIAL FACTOR: .90
SOLAR ACCESS FACTOR: .50

BUILDING DESIGN INDEX: .64 (heating) .71 (cooling)

BUILDING DESIGN INDEX

ID# 805
REGION: Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	9.10	72.00	480000	7.91
INSULATION	2.00	*	2.00	240	12.00
STRUCTURE	Concrete block		*	77600	3.00
INSULATION LOCATION: Exterior			MASS:		557840.00
AREA: 800.0			EFFECTIVE RESISTANCE:		22.91

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	2.00	*	2.00	105	12.00
STRUCTURE	Concrete block		*	34144	3.00
INSULATION LOCATION: Exterior			MASS:		34249.30
AREA: 352.0			EFFECTIVE RESISTANCE:		15.00

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	16.00	*	12.00	19712.0	41.00
STRUCTURE	Wood joist/shingles		*	7109	7.88
AREA: 1232.0			MASS:		26820.60
			EFFECTIVE RESISTANCE:		48.88

THERMAL WICKS? NO

THERMAL MASS FACTOR:	.41
TOTAL EFFECTIVE RESISTANCE:	.63
DEPTH OF INSULATION BELOW SURFACE (FT):	8.00
EARTH CONTACT FACTOR (HEATING):	1.00
EARTH CONTACT FACTOR (COOLING):	1.00
VENTILATION POTENTIAL FACTOR:	.50
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.45
SOLAR ACCESS FACTOR:	.70

BUILDING DESIGN INDEX: .60 (heating) .83 (cooling)

BUILDING DESIGN INDEX

ID# 806
REGION: Northern

WALL 1	DENSITY (lb/ft^3)	CONDUCTIVITY (Btuin/hft^2F)	THICKNESS (in)	MASS (lb)	RESISTANCE (ft^2·F·h/Btu)
SURROUNDING SOIL	100.00	6.00	72.00	546000	12.00
INSULATION	1.15	*	6.00	546	19.00
STRUCTURE	Concrete		8.00	87360	1.23
INSULATION LOCATION: Interior		MASS:		546547.00	
AREA: 910.0		EFFECTIVE RESISTANCE:		32.23	

WALL 2	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
INSULATION	1.15	*	6.00	546	19.00
STRUCTURE	Concrete		8.00	87360	1.23
INSULATION LOCATION: Interior		MASS:		546	
AREA: 910.0		EFFECTIVE RESISTANCE:		20.23	

ROOF	DENSITY	CONDUCTIVITY	THICKNESS	MASS	RESISTANCE
SURROUNDING SOIL	100.00	9.10	30.00	675000	3.30
INSULATION	2.00	*	1.50	675.0	9.00
STRUCTURE	Steel joist/conc.deck		*	106650	4.73
AREA: 2700.0		MASS:		782325.00	
		EFFECTIVE RESISTANCE:		17.03	

THERMAL WICKS? YES	
THERMAL MASS FACTOR:	.45
TOTAL EFFECTIVE RESISTANCE:	.37
DEPTH OF INSULATION BELOW SURFACE (FT):	10.50
EARTH CONTACT FACTOR (HEATING):	.28
EARTH CONTACT FACTOR (COOLING):	.28
VENTILATION POTENTIAL FACTOR:	.40
SOLAR GAIN CONTROL FACTOR:	.90
SOLAR GAIN POTENTIAL FACTOR:	.40
SOLAR ACCESS FACTOR:	.50

BUILDING DESIGN INDEX: .36 (heating) .55 (cooling)

VITA

Lanny Maurice Seals

Candidate for the Degree of

Master of Architectural Engineering

Thesis: BUILDING DESIGN AND ENERGY CONSUMPTION OF A SELECTED GROUP OF EARTH SHELTERED HOUSES IN AN EIGHT STATE AREA.

Major Field: Architectural Engineering

Biographical:

Personal Data: Born in Duncan, Oklahoma, October 10, 1957, the son of George G. and Vernell Seals.

Education: Graduated from Sulphur High School, Sulphur, Oklahoma; received Bachelor of Architectural Studies Degree from Oklahoma State University in May, 1981; completed requirements for the Master of Architectural Engineering Degree at Oklahoma State University in December, 1983.

Professional Experience: Teaching Assistant, School of Architecture, Oklahoma State University, August, 1981, to May, 1982; Research Assistant, School of Architecture, Oklahoma State University, August, 1982, to March, 1983. Draftsman, Architectural Section, Phillips Petroleum Co., May, 1980, to August, 1980, and May, 1981, to August, 1981; Engineer, Architectural Section, Phillips Petroleum Co., May, 1982, to August, 1982; Member American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1982 to present.