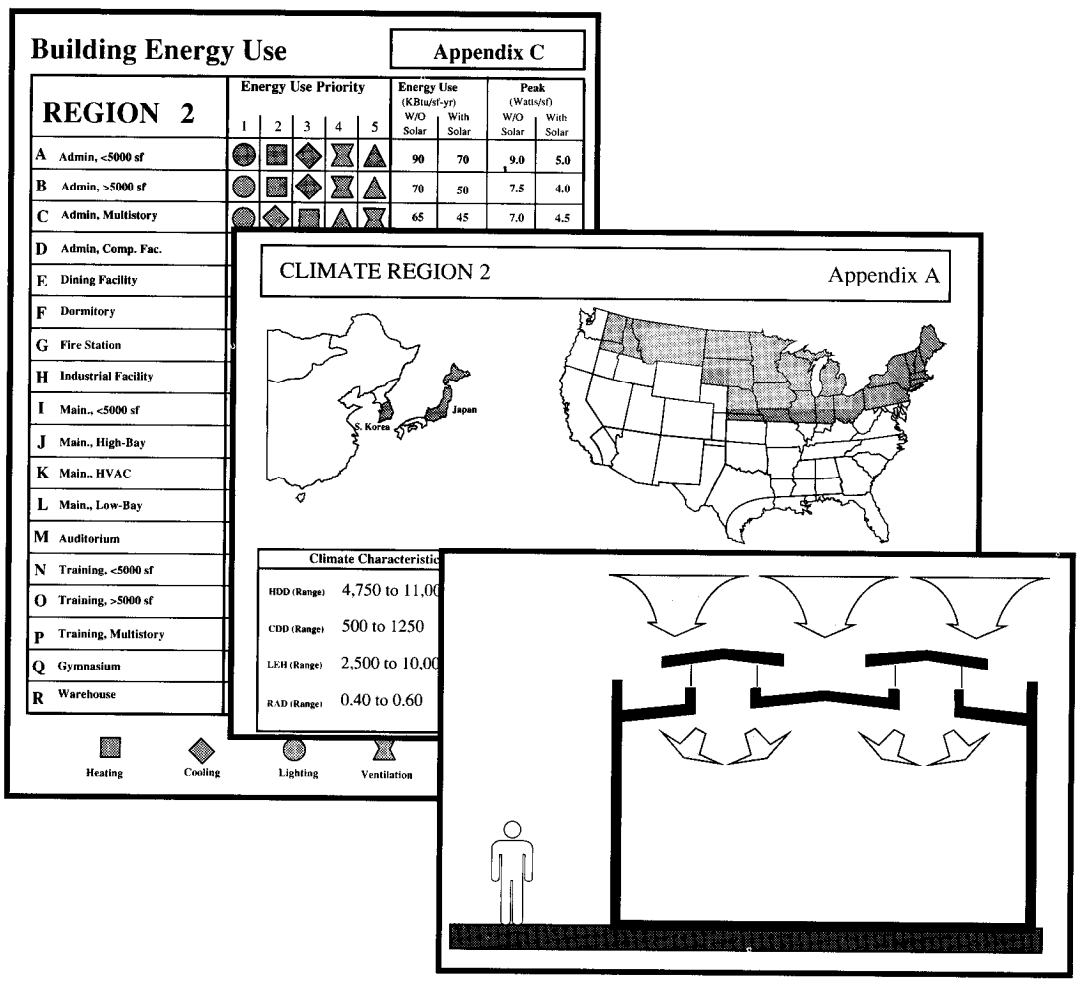
# United States Air Force

# Passive Solar Handbook

## Comprehensive Planning Guide




## Volume II

# Foreword

The United States Air Force is committed to energy efficiency and the use of renewable forms of energy in all of its facilities when shown to be reliable and cost effective. In its response to the Military Construction Codification Act of 10 USC 2801, Executive Order 12003 and Office of the Secretary of Defense directives, the Air Force has implemented numerous policies and procedures to significantly reduce the usage of fossil fuel derived energy. Since the oil embargo of the early 1970's, the Air Force has encouraged and demonstrated the integration of a variety of energy conserving features, including solar applications, in its facilities. Passive solar systems represent one type of solar application that can be used in almost all facilities to improve their energy efficiency and to lower their energy costs.

The audience for this five-volume passive solar handbook is the numerous Air Force personnel and others responsible for programming, planning, designing, supervising construction, commissioning, and operating and maintaining Air Force commercial-type facilities worldwide. This handbook was developed in response to MAJCOM and base needs for information on the integration of passive solar systems into new Air Force commercial-type facilities.

The goal of the Air Force Passive Solar Handbook series is to integrate passive solar concepts into the Air Force planning, programming, design, construction, and operation processes for commercial-type facilities.

The five volumes of the Passive Solar Handbook are as follows:

*Volume I: Introduction To Passive Solar Concepts*
***Volume II: Comprehensive Planning Guide***
*Volume III: Programming Guide*
*Volume IV: Passive Solar Design (proposed)*
*Volume V: Construction Inspection (proposed)*

This is the second volume of the series.

**Joseph A. Ahearn, Major General, USAF**
Director of Engineering and Services

# Acknowledgements

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Michael J Holtz, A.I.A. President
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# Table of Contents

# Energy and Site Planning 1.0

## Introduction

Passive solar systems use the energy from the sun to heat, cool, and illuminate buildings. A properly designed passive commercial-type building will not completely eliminate the need for auxiliary energy systems for heating, cooling, or lighting. Building size, large internal loads, and diverse building use patterns will cause continual reliance on conventional auxiliary energy sources. However, it is possible, through a combination of passive solar concepts, to reduce total energy costs by as much as 40% while maintaining positive savings-to-investment ratios (SIR).

*It is virtually impossible to separate the passive solar design features of a building from the building as a whole.* In this regard a passive solar building is nonconventional; one must learn to think of such a building and the site as a totality, not as a collection of separate, interchangeable parts. In a conventional (nonsolar) building, if a particular heating, cooling, or lighting system is not economically viable then it usually can be changed without influencing any other aspect of the building design. *To change the passive features of a solar building may require a complete relocation and/or redesign of the building.* Therefore, it is important to choose correctly, during the planning stage, the appropriate site and passive solar concepts.

For additional information about passive solar systems, see Volume I: Introduction to Passive Solar Concepts.

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## Base Comprehensive Plan

Energy-conserving planning and passive solar design begins with site selection. If the base has implemented a *Base Comprehensive Plan (BCP),* then energy requirements are specified in the plan, Section II-J. The BCP may require certain building types and functions to occur in specific interrelationships with other existing buildings. These restrictions are critical to good base planning and have minimal adverse impact on site planning for solar buildings. Frequently, their impact is supportive of solar planning techniques and objectives. See Figure l-l on the following page.

The site selection process generally follows the guidelines set down by the BCP in terms of working within the overall land use goals and objectives for the base. Based on the needs, constraints, and opportunities afforded by the BCP, it is possible to identify several possible sites appropriate for the proposed buildings. From these sites, it is possible to pick out one site that achieves all or most of the needs and goals of the project, including any site planning constraints caused by the use of passive solar systems. It is not anticipated that energy issues will dictate site selection. *However, all other things being equal, if one site has better access to the sun and sky, then it should receive a higher priority than other sites.*

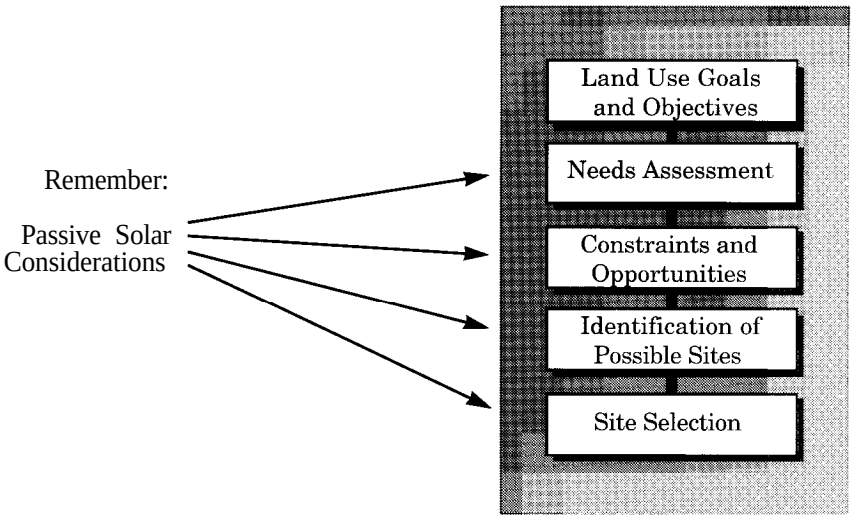



**Figure 1-1: Site Selection Process**

## Site Planning For Passive Heating

Site planning for passively heated buildings involves ensuring that the solar collection facades of the building have access to the sun. Since not all facades of any building have 'access' to the sun, site planning for solar access typically involves consideration of one, or possibly two, key facades. The most important facade usually is the south facade (north facade in the Southern Hemisphere). Next, usually, is the east facade, although protecting the solar access of this facade is not as critical as it is with the primary solar facade.

### Solar Envelope

The primary method of site planning for passive heating in commercial-type buildings is a concept called the *solar envelope.* A solar envelope is defined as the boundaries of a three-dimensional volume, on the site, having unobstructed access to the sun during a certain time period over the year. The solar envelope is explained in more detail in Volume I; the methods for delineating one are presented in Volume IV.

The solar envelope concept offers an approach to providing solar access that is potentially useful to any Air Force base, irrespective of changing economic or technological factors or the specific solar-related use. The solar envelope concept was developed specifically for use in urbanized areas, in which other buildings surround the site.

Solar envelopes can be simple or complex, depending upon the surrounding buildings, topography, and the ingenuity of the planner. Figure 1-2, on the following page, illustrates the solar envelope for a site. The final building form may be quite different from the solar envelope but must fit within the three dimensional boundaries established by the envelope.

Buildings designed within the solar envelope, such as the one shown in Figure 1-3, may sometimes be different from current architectural practice. *Passive commercial-type buildings will be lower, where possible, and fill more of the site than do most present day buildings*. However, the inability to "fit" a solar envelope to a site, or to fit the functional spatial needs of a building to the solar envelope, does not negate the possible use of passive solar systems in the building. Buildings larger than the solar envelope still have access to the sun; however, they block access to surrounding buildings or undeveloped sites.

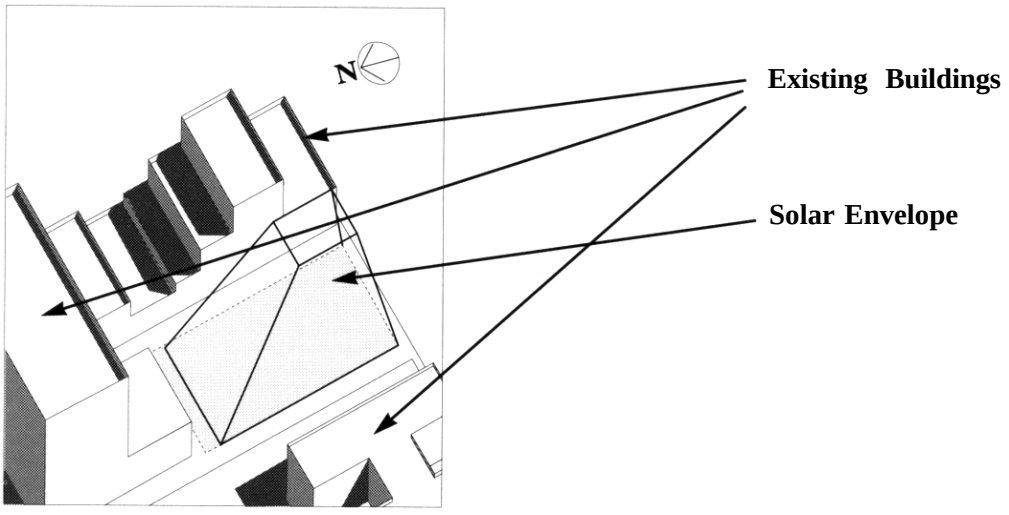



**Figure 1-2: Solar Envelope**

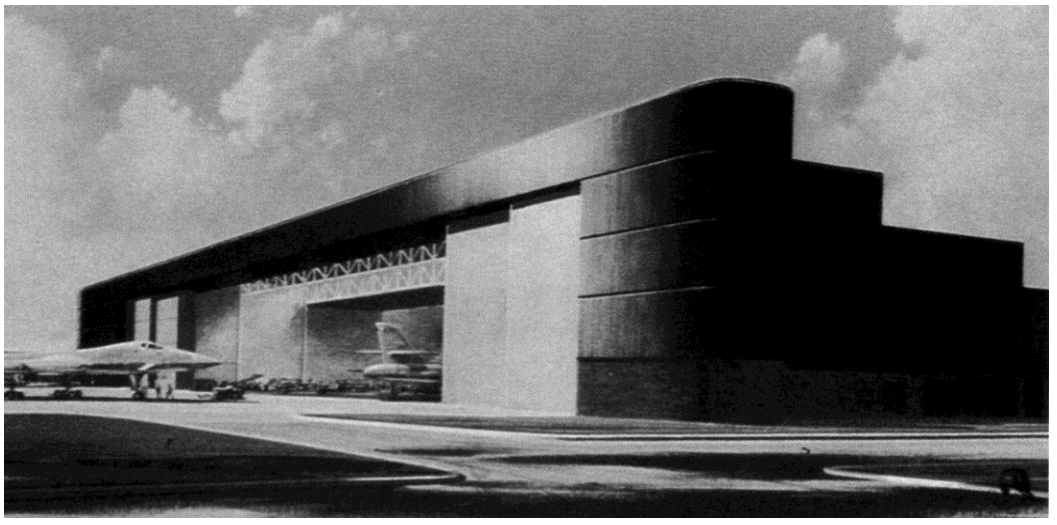


**Figure 1-3: B-1B Bomber Hangar, Dyess AFB, Texas**
Note expression of the solar envelope in the architectural form.

## Site Planning For Passive Cooling

Passive cooling of commercial-type buildings relies on cooling load avoidance and ventilation to reduce dependency on mechanical cooling equipment. Site planning for passive cooling should only be done for building types in which cooling is an important requirement and in climates where passive cooling strategies can be effective.

If no passive cooling strategies are appropriate, there is no need to go through the detailed site planning process for passive cooling. *None of the passive cooling strategies are as effective as either the passive heating or the daylighting strategies.* Therefore, site planning for passive cooling may be of secondary importance.

**Natural Ventilation**
**Night Mechanical Ventilation**

Of the two cooling strategies recommended in this handbook, only one of them, natural ventilation (NVN), requires special site planning consideration. The second, night mechanical ventilation (NMV), as illustrated in Figure 1-4, is not usually affected by most site conditions. *Other site considerations that impact cooling energy use include building orientation and shape.*

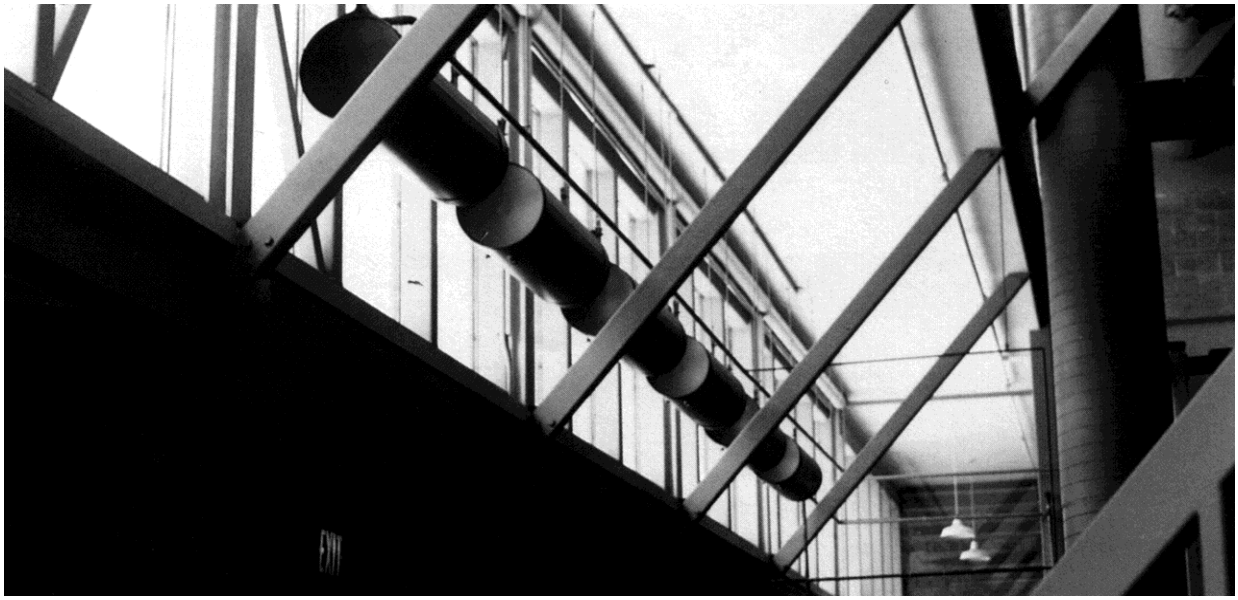


**Figure 1-4: Night Mechanical Ventilation. Colorado Mountain College, Glenwood Springs, Colorado**

The vertical duct system on the right hand side of the picture is part of the night mechanical ventilation system.

Adequate ventilation is perhaps the most important aspect of passive cooling. Air movement as low as 2.3 miles per hour can reduce the effective air temperature in a building by as much as 5°F. Site planning to allow for ventilation should focus on prevailing wind directions and speeds and a knowledge of what parts of a site are most favorable for ventilation. Rapid changes in slope, dense vegetation, tall surrounding buildings, and the design of the building facades can effectively block prevailing breezes even though the same features may be useful in shading the building from the sun.

## Planning For Daylighting

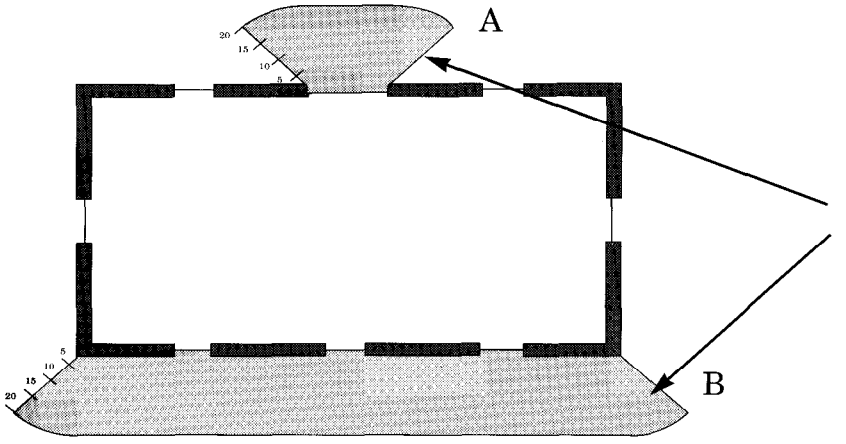
Site planning for daylighting is different from site planning for solar thermal systems. Daylighting systems use the light from a clear or overcast sky to illuminate the interior of buildings. In most cases, direct sunlight is avoided. Therefore, it is not necessary to protect a specific facade (such as the south or east facade) as in a passive thermal system. *In general, any facade can be used to daylight the interior of a building.* When site planning for daylight, the following simple rules can be applied:

### Daylight Planning Rules

*Protect any two opposite facades of a building.*

*Protect any facade and the roof of the building.*

Site planning to "protect" a facade of a building means to keep it free of major obstructions, such as adjacent buildings and large trees. For a daylighted building, this means a space, adjacent to the daylighted facade(s) equal to one-half of the building height must be left relatively free of obstructions to ensure that light from the sky can reach the facade(s). This type of daylight access requirement is far less constraining than most requirements for passive heating systems.




**Protected zones.**
**A) single aperture**
**B) entire wall**
**Dependent upon building height or height of the surrounding buildings.**

**Figure 1-5: Site Planning For Daylight**

For example, if the north and south facades of a building are being used to daylight the building and the building is 40 feet tall, then a space 20 feet wide must be left clear adjacent to the daylighted facades of the building. See Figure 1-5. Similarly, if the site already has a building 60 feet tall, no new buildings can be built within 30 feet of it, assuming the new buildings are less than 60 feet tall. All of the values used in these examples represent minimum protection zones. Good design sense and the scale of the building will also help determine the size and shape of the protected zone. Daylight planning tools are explained in more detail in Volume IV Passive Solar Design.

No special protection or site planning is needed for toplighting and core daylighting because they typically have an unobstructed view of the sky.

**Daylighting plus Passive Thermal**

When looking at a possible building site and attempting to determine whether the site has appropriate space for daylighting, it is helpful to have some sense of the building's overall size and volume so that an estimate of the space needed to protect the daylighting facades can be made. If the building is also going to use passive solar heating systems, then the space surrounding the solar envelope must be protected.

Most building sites are adjacent to streets or alleyways. Facades facing these usually are relatively easy to protect even if the surrounding buildings are tall. Sites used for low (one-story, low-bay) buildings which are surrounded by tall or high-bay buildings should consider the use of toplighting concepts, assuming these concepts are appropriate for the building type and climate.

*Daylighting is the most appropriate passive system for all building types in all climate regions.* Therefore, site planning for daylighting will be a routine part of the comprehensive building planning process. Fortunately, it is also the easiest to accommodate.

## Building Orientation and Shape

In general, *passive solar buildings which take advantage of the climate are less tolerant to changes in orientation and shape than are climate rejecting buildings.* However, sites do not have to be ideal for passive solar strategies to be appropriate. This does not negate the need for site planning; it just helps keep the site planning process, as applied to large passive solar commercial-type buildings, in its proper perspective. The impact of building orientation on site selection is discussed in more detail in Volumes I and IV.

**Elongated shapes**

Elongated shapes, such as (b) and (c) in Figure 1-6, are effective in all kinds of passive solar buildings, but especially daylighted buildings. *An elongated building can have as much as a 15-25%*

*reduction in energy use over a compact building of the same size, due to its greater ability to use daylight.*

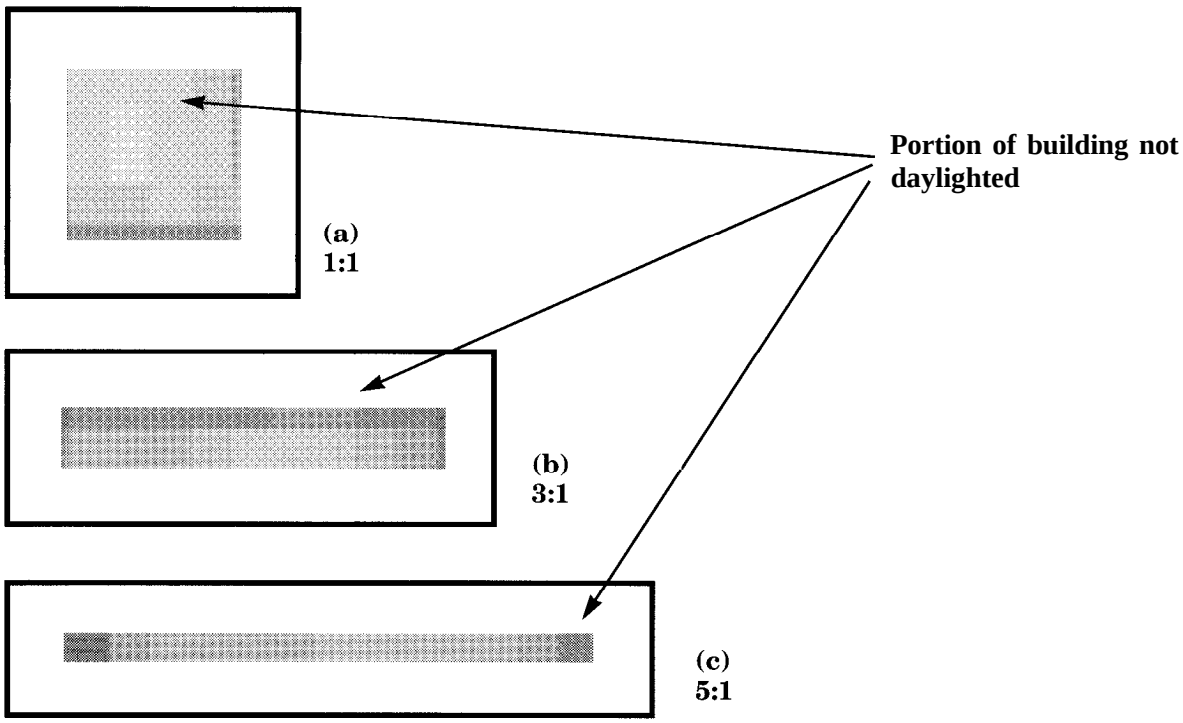



**Figure 1-6: Changing the building aspect ratio**

The buildings in Figure l-6 are assumed to have the same floor area, occupancy, and internal loads. The building with the 1:1 aspect ratio has a total energy use of 62,000 Btu per square foot per year (Btu/sf-yr). The building with the 3:1 aspect ratio has an energy use of 50,000 Btu/sf-yr and the building with the 5:1 aspect ratio has an energy use of 46,000 Btu/sf-yr. This example is for Climate Region 5 (Denver, Colorado). In most cases it will be easier to daylight a building that is 45 feet deep (5:1 aspect ratio) as opposed to one that is 100 feet deep (1:1 aspect ratio). Energy savings can vary from site to site, depending upon the climate region and the building type.

# 2.0 Energy and Buildings

## Introduction

A total of 18 different commercial-type buildings were analyzed for this handbook. A listing of these building types, in the order they appear in various charts and appendices throughout the handbook, is as follows:

*A. ADMIN, <5000 SF*
*B. ADMIN, >5000 SF*
*C. ADMIN, MULTISTORY*
*D. ADMIN, COMPUTER FACILITY*
*E. DINING FACILITY*
*F. DORMITORY*
*G. FIRE STATION*
*H. INDUSTRIAL FACILITY*
*I. MAINTENANCE, <5000 SF*
*J. MAINTENANCE, HIGH-BAY*
*K. MAINTENANCE, AIR CONDITIONED*
*L. MAINTENANCE, LOW-BAY*
*M. TRAINING, AUDITORIUM*
*N. TRAINING, <5000 SF*
*O. TRAINING, >5000 SF*
*P. TRAINING, MULTISTORY*
*Q. TRAINING, GYMNASIUM*
*R. WAREHOUSE*

These buildings represent general categories of commercial-type buildings and do not describe specific buildings as found in the USAF building-type category codes. For example, a law office, building code 610-112, would be an administrative building, but it could be less than 5000 square feet (<5000 sf), greater than 5000 square feet (>5000 sf), or multistory.

**Appendix B: USAF Building-Type Codes**

*Appendix B lists all of the USAF building-type category codes and the building types they represent.*

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## Climate and Buildings

To determine the energy use in commercial-type buildings, four climate variables are used to establish climate regions:

- Heating Degree Days (HDD)
- Cooling Degree Days (CDD)
- Latent Enthalpy Hours (LEH)
- Cloudiness Index (RAD)

Using these four climate variables results in twelve climate regions, worldwide, for use in planning commercial-type USAF buildings. *These variables are discussed in more detail in Volume I: Introduction To Passive Solar Concepts, and the charts presented in Appendix A.*

**Appendix A: USAF Climate Regions**

## Energy Responsive Buildings

This handbook guides the planning and design of "climate adapted" buildings, as opposed to "climate rejecting" buildings. A climate rejecting building isolates the building energy use from interaction with the surrounding environment. It uses large mechanical and electrical systems to heat, cool, and light the building, regardless of the possibilities of using the environmental conditions to best advantage.

**Climate Adapting**
**Climate Rejecting**

The concept of climate adapted or climate rejecting buildings represents the extremes of possible solutions: one uses the climate while the other isolates the building from it. In reality, solutions to real building energy problems lie somewhere between the two. Energy use and energy economics may make some passive concepts attractive and others impractical when considered within the constraints of real project needs, fuel availability, and budgetary requirements. Therefore, some compromise is expected and the planner should keep in mind that not all passive systems will work in all buildings, and the final solution may be a combination of climate adapted and rejecting concepts.

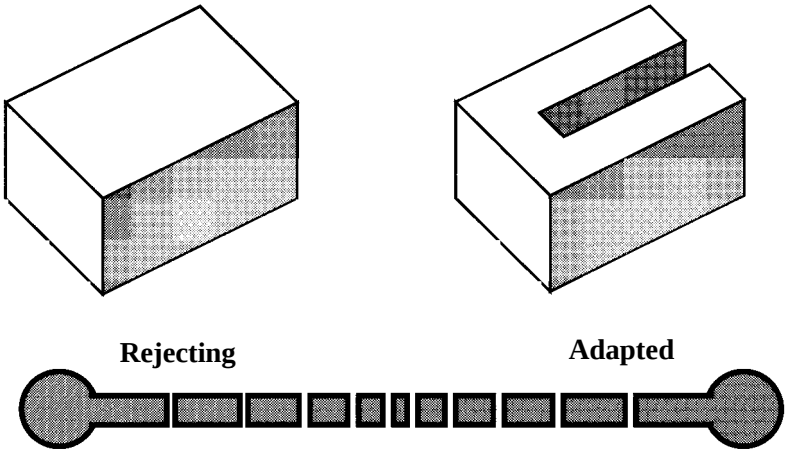



**Figure 2-1: Climate Rejecting vs. Climate Adapted**

Commercial-type buildings have two categories of loads:

(1) *envelope loads*
(2) *internal loads*

*Envelope loads* are associated with energy transfer through the building shell. In some building types, such as single family detached housing or a warehouse, envelope loads are often the single dominant energy use.

**Envelope Loads**

**Internal Loads**

*Internal loads* can be divided into two subcategories: (1) those due to occupancy, and (2) those due to lighting and process energy use. It is primarily the variation in internal load characteristics that determines which passive solar systems will be most effective in commercial-type buildings.

**Occupancy Characteristics:**
**People load**
**Period of operation**
**Hours of operation**
**Schedule**

Each building type has specific *occupancy characteristics* that can be expressed in terms of people loads, period of operation, hours of operation, and schedules. The *people load* is an estimate of the number of people in the building. This varies considerably from one building type to another. For example, an administration building is assumed to house one person per 65 square feet while a warehouse typically has one person per 4,000 square feet. The *period of operation* is a designation of whether the building is open during the daytime, at night, or both. An administration building is usually open during the day, while a warehouse may be used day and night. The *hours of operation* are the average number of hours per day that the building is occupied, while the *schedule* is the number of days per week that the building is occupied. An administration building is typically occupied 10 hours a day, 5 days a week, while a warehouse may be occupied 24 hours a day, 7 days a week.

Energy use associated with lighting and process loads (coffee pots, vending machines, etc.) makes up the second major internal load category. In most commercial-type buildings, these loads are assumed to be continuous during the occupied period of each day. One example of a continuous lighting load is the electric lights which are turned on in the morning and off at night and stay on all day long. It is the continuous nature of these internal loads that make them so critical in impacting the overall energy use and costs for the building.

## Energy Costs

Energy costs represent another way to consider the impact of energy use on buildings. The impact of different fuels used for heating (such as electricity, natural gas, or fuel oil), as well as the costs of electricity for cooling and lighting a building, can provide another important clue as to what kinds of passive concepts are most effective in commercial-type buildings.

**Cost per unit of area:**
**$/sf**

In this handbook, energy costs are considered in terms of dollars per square foot of building area per year. Thus, an energy cost of $1.00/sf-yr in a 10,000 sf building would mean that the building spends $10,000 per year on energy. Using a cost-per-unit-of-area measure allows one to easily compare the energy costs of different building types, or different sizes of the the same building type.

In large commercial-type buildings, no direct link exists between energy use and energy costs. Put another way, saving energy is not directly proportional to saving energy costs. This is a startling revelation to many people who are not familiar with energy costs in commercial-type buildings. For example, Figure 2-2 below illustrates the energy use and energy cost for a small administration building. Although heating is 28% of the energy use, it is only 7% of the costs. Cooling, which was 22% of the energy use, is 48% of the energy costs.

By knowing these data, building users and managers can make informed decisions about how the building should be designed and where it should be sited. For a more detailed explanation see Volumes I and IV.

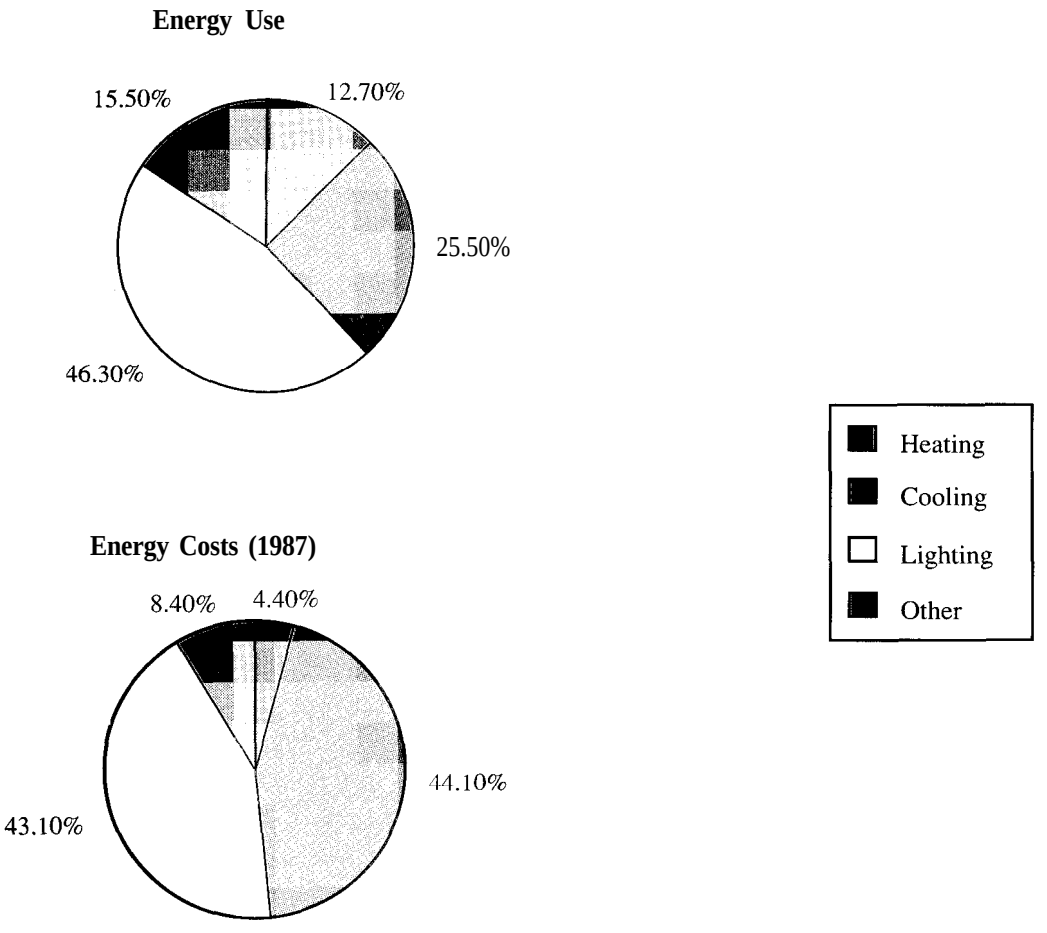



**Figure 2-2: Energy Use vs. Energy Costs**

# 3.0 Facility Energy Use

## Introduction

The remaining chapters of this volume present a step-by-step procedure for considering passive solar systems in the comprehensive planning process for commercial-type buildings.

**Steps in the comprehensive planning process for passive solar facilities.**

The comprehensive planning process for passive solar facilities consists of ten steps:

**Volume II**

*Step 1.* *Determine Air Force base climate region.*
*Step 2.* *Establish building type to be planned.*
*Step 3.* *Determine conventional building energy use and energy use priority.*
*Step 4.* *Determine conventional building electricity peak demand.*
*Step 5.* *Choose appropriate passive solar systems.*
*Step 6.* *Match energy use to passive solar systems.*
*Step 7.* *Determine passive building energy use and peak demand.*

**Volume III**

*Step 8.* *Determine energy costs of conventional and passive solar building.*
*Step 9.* *Determine HV or HVAC system size.*
*Step 10.* *Complete appropriate documentation.*

Steps 1 through 4 are discussed in this chapter; steps 5 and 6 are presented in Chapter 4; and steps 7 through 9 are presented in Chapter 5. Step 10 is presented in Volume III: Programming Guide.

## Step 1: Determine Climate Region

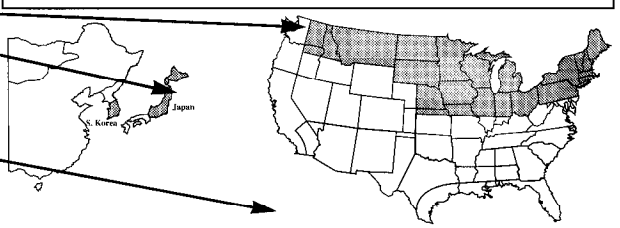
The climate region for a major air base is determined using *Appendix A.* The appropriate climate region for any facility not listed in Appendix A can be determined using a procedure discussed later in this chapter (page 23). *Once the climate region has been established, only data for that climate region is used throughout the planning process.* An example of Appendix A is shown in Figure 3-l.

**Geographic areas in climate region**

**Major USAF bases in region**

**Climate characteristics**

CLIMATE REGION 2 Appendix A




| Climate Characteristics | |
|---|---|
| HDD (Range) | 4,750 to 11,000 |
| CDD (Range) | 500 to 1250 |
| I.EH (Range) | 2,500 to 10,000 |
| RAD (Range) | 0.40 to 0.60 |

| U.S. Air Force Bases | | |
|---|---|---|
| CHANUTE | KUNSAN | OTIS |
| ELLSWORTH | LORING | PEASE |
| FAIRCHILD | MALMSTROM | PLATTSBURGH |
| GRAND FORKS | MCGUIRE | WILLOW GROVE |
| GRIFFISS | MINOT | WRIGHT- PATTERSON |
| GRISSOM | MISAWA | WURTSMITH |
| HANSCOM | OFFUTT | YOKOTA |
| K. I. SAWYER | OSAN | |

**Figure 3-1: Appendix A, Climate Region 2**

## Step 2: Establish Building Type

Select the appropriate building type from *Appendix B.* The building codes used in this handbook represent general categories of commercial-type buildings and do not represent specific buildings as found in the USAF building-type category code. For example, a law office, USAF building-type code 610-112, would be an administrative building type in this handbook, but could be <5000 sf, >5000 sf, or multistory; that is, building types A, B or C, respectively. *Multiuse buildings are not analyzed in this handbook.* Figure 3-2 is an example page from Appendix B.

**BUILDING-TYPE CATEGORY CODES** — Appendix B

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| A,B,C,D | 100-000 | C31 FACILITY |
| I,J,K,L | 111-000 | ACFT OPS/MAINT FACILITY |
| A,B,C | 120-000 | POL OPS FACILITY |
| NC | 121-111 | PETROLEUM OPS BUILDING |
| A,B | 121-120 | QUICK-TURN FACILITY |
| G | 130-142 | FIRE STATION |
| A,B,C | 130-833 | CENTRAL SECURITY CONTROL |
| A,B,C | 130-835 | SP OPERATIONS |
| D | 131-111 | TELECOMM CENTER |
| D | 131-118 | DIGITAL FACILITY |
| D | 131-132 | SATCOM GROUND TERMINAL |
| D | 131-134 | AIR COMM FACILITY |
| D | 131-136 | AIR COMM RELAY FACILITY |
| D | 131-138 | RECEIVER/TRANSMITTER FACILITY |
| D | 131-139 | MICROWAVE RELAY STATION |
| D | 131-143 | RADAR FACILITY |
| NC | 134-XXX | REMOTE CONTROL AND GROUND CONTROL FAC |
| NC | 134-375 | RAPCON |
| A,B,C | 140-000 | COMMAND POST |

**Building-Type Code Used In This Handbook**

| | |
|---|---|
| A. | ADMIN, <5000 SF |
| B. | ADMIN, >5000 SF |
| C. | ADMIN, MULTISTORY |
| D. | ADMIN, COMPUTER FACILITY |
| E. | DINING FACILITY |
| F. | DORMITORY |
| G. | FIRE STATION |
| H. | INDUSTRIAL FACILITY |
| I. | MAINTENANCE, <5000 SF |
| J. | MAINTENANCE, HIGH BAY |
| K. | MAINTENANCE, HVAC |
| L. | MAINTENANCE, LOW BAY |
| M. | TRAINING, AUDITORIUM |
| N. | TRAINING, <5000 SF |
| O. | TRAINING, >5000 SF |
| P. | TRAINING. MULTISTORY |
| Q. | TRAINING; GYMNASIUM |
| R. | WAREHOUSE |
| NC. | NO CURRENT BUILDING TYPE |

**Figure 3-2: Appendix B, Building-Type Category Codes**

## Step 3: Conventional Building Energy Use and Priority

*The conventional building is defined as the proposed building before any passive solar systems are considered.* It is the nonsolar building against which the performance of the solar building will be compared to ascertain whether the solar building is more (or less) energy efficient and saves energy costs. Figure 3-3, on the following page, illustrates an energy data sheet for Climate Region 2. A complete set of similar data sheets for all twelve climate regions can be found in *Appendix C.* A more detailed explanation of energy use, by building type, can be found in *Appendix E.*

The Appendix C data sheet contains the following information needed to complete Steps 3 and 4:

- *Climate region and building type*
- *Energy end use priority*
- *Building energy use and peak demand*

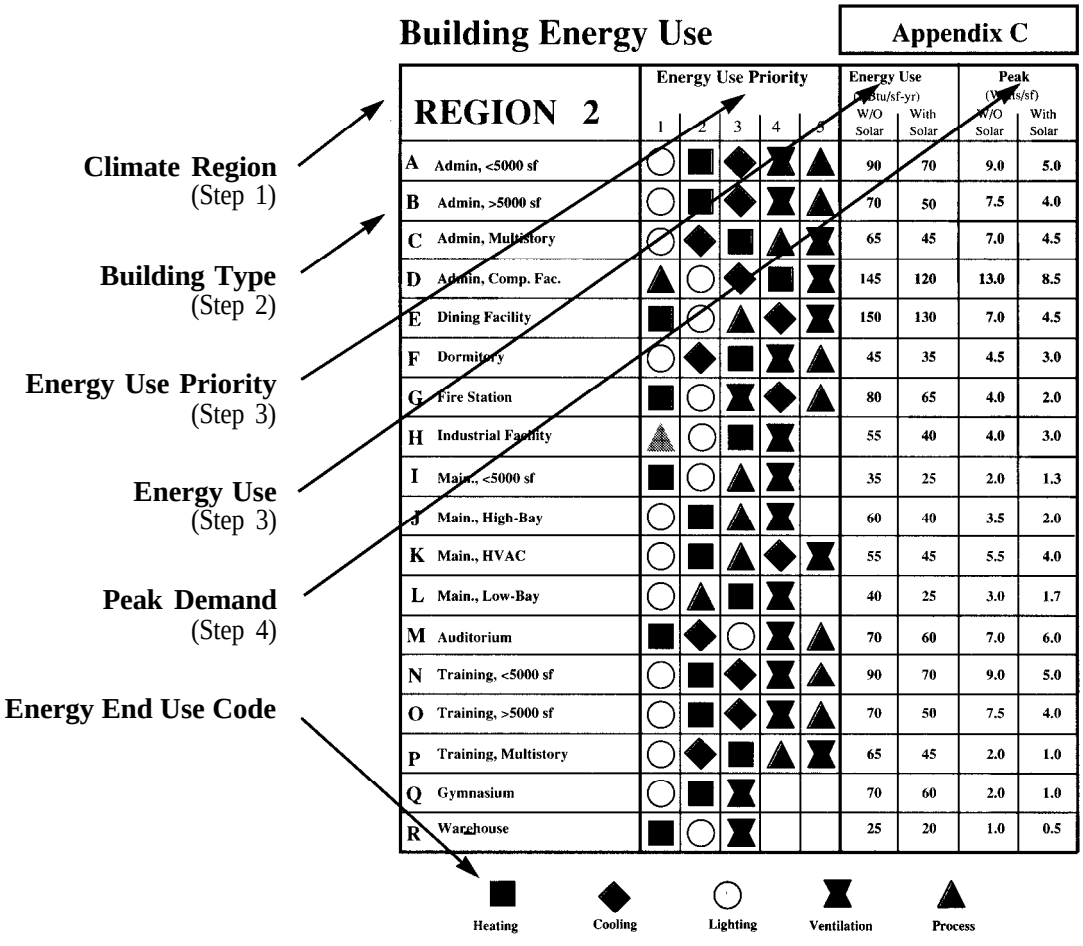



**Figure 3-3: Appendix C: Building Energy Data Sheet.**

**W/O Solar = conventional**

Energy use and peak demand data include both a conventional (W/O Solar) and a solar value for each building type. The conventional building value represents the performance of a typical building of the type being considered. For example, from Figure 3-4 on the following page, for an ADMIN, <5000 SF, the w/o solar energy use value is 90; that is, 90,000 Btu's per square foot per year. This means that most administration buildings of this size, in this climate region, use about 90,000 Btu/sf-yr of energy for all end uses combined. Specific real buildings may use more or less, but this is the average energy use value.

**With Solar = target**

The *target value* for the same building is 70, or 70,000 Btu's per square foot per year. *The target value represents the best performance achieved from any of the passive solar strategies analyzed*. This gives you some initial idea of the range of possible performance that can be expected from a passive

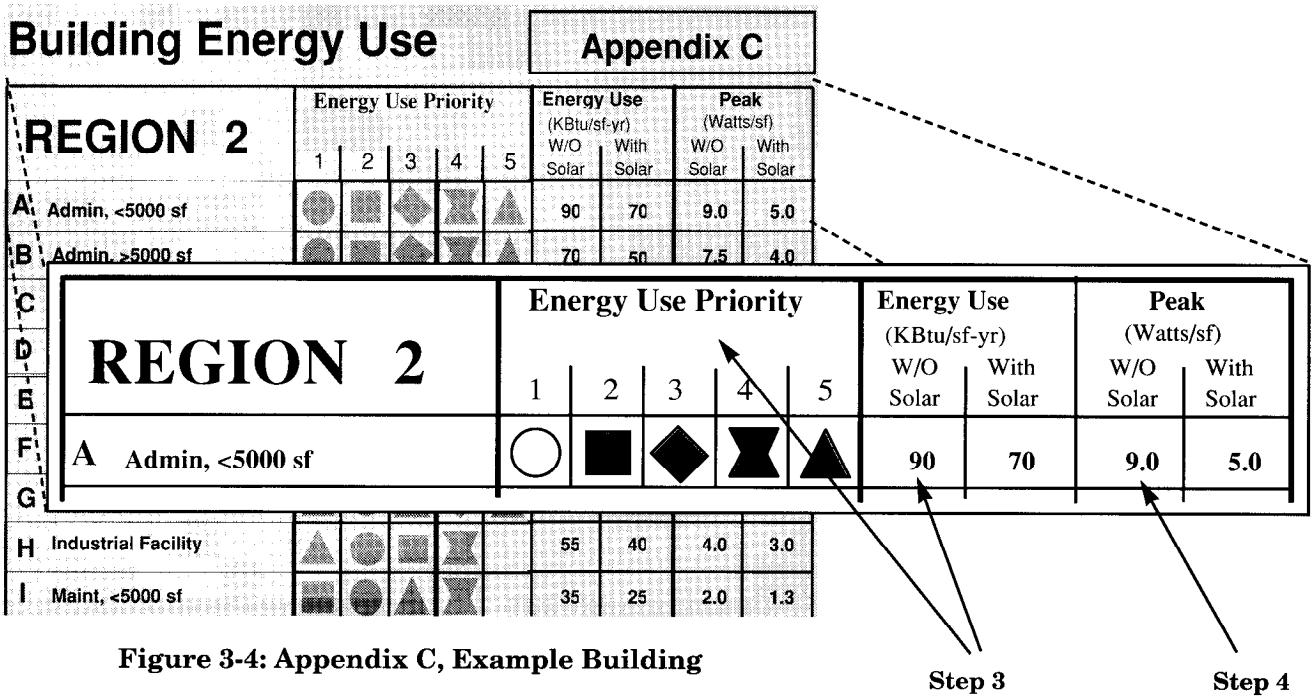



**Figure 3-4: Appendix C, Example Building**

solar thermal or daylighting system. This information is useful if the planner is required to suggest or document an energy goal for a project. Values for both the nonsolar and solar building have been rounded to the nearest 5000 Btu's (per sf-yr). See Figure 3-4. See Volume III for more details on how to use this information to document a proposed project.

**Energy Use Priority**

Energy use priority data provides a rank ordering of energy use by end use category. Five end use categories are considered:

- *Heating*
- *Cooling*
- *Lighting*
- *Ventilation*
- *Process*

These are rank ordered from largest energy end use category (1) to the smallest (5). For example, the small administration building (<5000 sf) in Figure 3-4 has the following energy use priority: (1) lighting, (2) heating, (3) cooling, (4) ventilation, and (5) process. This means that of the 90,000 Btu's per square foot per year for the nonsolar case energy use, lighting is the largest single end use, followed by heating, cooling, ventilation, and process loads, respectively Chapter 5 of this volume illustrates how to quantify the amount of energy use by end use category.

Some variation in energy use exists between building types in a climate region, or for one building type across several climate regions. Therefore, it is important to select the correct climate region and building energy use tables.

## Step 4: Determine Peak Demand

*Peak demand* is the maximum instantaneous and simultaneous usage of electricity by all end uses in the building. It is often used in calculating the electrical energy costs for a building. Reducing peak demand may be an important reason to use some passive solar concepts. Peak demand is explained in more detail in Volume I: Introduction to Passive Solar Concepts.

Conventional (w/o solar) and solar building *peak demand* values are provided. These represent an average conventional building and best case, or target, solar solution. Values are in watts per square foot. Therefore, a value of 9.0 equals 9 watts per square foot. Values are rounded to the nearest half of a watt. This information allows you to document peak demand targets as part of the overall energy savings goals for a particular project.

## Detailed Building Energy Use, Priority, and Peak Demand Information

For many projects, the simplified determination of the nonsolar building total energy use, and the rank ordering of energy end use categories determined in Steps 3 and 4, is sufficient for this phase of the comprehensive planning process. However, for some projects, the simplified information found in Appendix C will not be sufficient. In these cases, *Appendix E* can be used for a more detailed description of the energy use, energy cost, and peak demand characteristics of both conventional and solar buildings. An example of Appendix E for Climate Region 2 is shown in Figure 3-5 on the following page.

**Appendix E**

*Appendix E is the key technical appendix for this handbook.* It is used for detailed analysis of all nonsolar and solar buildings and is subdivided into four groups of data:

- *Energy Use*
- *Energy Costs*
- *HVAC System Size*
- *Peak Demand*

To calculate detailed energy use, energy priority, and peak demand targets, information from the sections entitled “Energy Use” and “Peak Demand” are used. The other portions of this chart will be explained in subsequent chapters of this volume as well as in Volume IV: Passive Solar Design.

In Figure 3-5, twelve lines of data are included for each building type. The top line of data, corresponding to the heading ADMIN, <5000 SF, represents the conventional nonsolar building. Subsequent lines of data represent different solar options for that particular building type. *The only row of data needed to determine energy use for the conventional nonsolar building is the top line for each building type.*

## CLIMATE REGION 2 — Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HV AC Heat (Btu/hr/sf) | HV AC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | ***ADMIN <5000 SF*** | **87635** | **29.0%** | **24.2%** | **32.6%** | **8.4%** | **5.8%** | **$1.56** | **11.4%** | **49.0%** | **33.0%** | **6.6%** | **37** | **46** | 8.8 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79906 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 39 | 29 | 5 |
| | (L) Monitor Ap. | 72461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 50 | 6.9 |
| B | ***ADMIN >5000 SF*** | **70708** | **22.7%** | **22.2%** | **40.6%** | **7.3%** | **7.3%** | **$1.29** | **8.7%** | **43.2%** | **40.1%** | **8.0%** | **25** | **34** | **7.1** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 70519 | 23.0% | 21.3% | 40.7% | 7.7% | 7.3% | $1.28 | 8.8% | 43.0% | 40.1% | 8.0% | 25 | 34 | 7 |
| | (C) Natural Vent | 68633 | 23.4% | 19.9% | 41.8% | 7.5% | 7.5% | $1.25 | 8.9% | 41.6% | 41.2% | 8.2% | 25 | 34 | 7.3 |
| | (L) Windows | 62015 | 30.0% | 21.6% | 34.0% | 6.2% | 8.3% | $1.02 | 12.4% | 43.3% | 34.2% | 10.1% | 26 | 23 | 4.9 |
| | (L) Skylights | 55356 | 46.6% | 19.7% | 15.7% | 8.8% | 9.3% | $0.86 | 20.5% | 49.3% | 18.2% | 11.9% | 22 | 31 | 4.3 |
| | (L) Sawtooth Ap | 53916 | 45.9% | 25.2% | 11.1% | 8.3% | 9.5% | $0.92 | 18.3% | 54.9% | 15.6% | 11.2% | 32 | 26 | 4.8 |
| | (L) Monitor Ap. | 60025 | 42.0% | 25.2% | 16.4% | 7.8% | 8.5% | $0.97 | 17.7% | 54.8% | 16.9% | 10.6% | 34 | 27 | 4.8 |
| | (L) Atrium | 57750 | 39.5% | 23.8% | 19.1% | 8.8% | 8.9% | $0.92 | 17.2% | 53.1% | 18.5% | 11.2% | 25 | 33 | 4.6 |

**Figure 3-5: Appendix E: Detailed Building Energy Data**

**Energy Use** (Step 3)

**Peak Demand** (Step 4)

For example, for a typical small administration building, the total building energy use is

*87,635 Btu/sf-yr*

This is determined from the ENERGY USE category of data under the heading "Bldg (Btu/sf-yr)." This is a more exact determination of the total energy use, per unit of area, for this type of building than that found in Appendix C. In the same data category is detailed information about the end use priority. Under the headings "QHeat (%)", "QCool (%)", and so on, is the percentage of the total energy use for each end use category. For example, heating is 29.0% of the total for the conventional nonsolar building.

To determine the average energy use by end use category, multiply the end use category percent, as a fraction, by the building total energy use. That is:

***End Use Energy Calculation***

*End Use Energy = End Use Fraction x Bldg. Energy Use*

For this example these values would be:

| | | | | |
|---|---|---|---|---|
| QHeat | = | 0.290 x 87,635 | = | 25,414 Btu/sf-yr |
| QCool | = | 0.242 x 87,635 | = | 21,208 Btu/sf-yr |
| QLite | = | 0.326 x 87,635 | = | 28,569 Btu/sf-yr |
| QVent | = | 0.084 x 87,635 | = | 7,361 Btu/sf-yr |
| QProc | = | 0.058 x 87,635 | = | 5,083 Btu/sf-yr |
| | | | | 87,635 Btu/sf-yr |

In this way a more detailed calculation of energy use by end use category can be determined.

**Peak Demand**

Similarly, the simultaneous peak demand can be determined from the category entitled "Peak Demand." For this example the conventional building peak demand is 8.8 watts per square foot. This is the maximum use of electricity, per square foot, for the building. The peak demand consists of three components:

*(1) lighting load*
*(2) process load*
*(3) HVAC cooling load*

These can be broken out of this total, if needed.

The lighting and process load portion of the total can be determined from Table 3-3 on page 42 of Volume I. For a small administrative building (<5000 sf), these values are 2.5 and 0.5 watts per square foot, respectively. The cooling portion of the simultaneous peak demand is:

**Cooling Peak Demand Calculation**

*Cooling Peak = Total Peak - (Lighting Peak + Process Peak)*

For this example the cooling peak is:

Cooling Peak = 8.8 - (2.5 + 0.5) = 5.8 watts/sf

This information may be critical if peak demand is a major part of the electricity costs for an air base. The information is also important for sizing HVAC systems as discussed in Volume IV.

## Example 1: A Credit Union

In the remainder of this chapter, two examples will be presented to demonstrate how to apply Steps 1 through 4 of the passive solar building comprehensive planning process. In this section a credit union will be analyzed; in the following section a warehouse will be analyzed. These two building types were chosen because they are quite different and will require different passive solar design solutions. Both examples will also be analyzed in Chapters 4 and 5.

**Step 1: Climate Region**

**Step 2: Building Type**

The example credit union (USAF code: 740-155) has a total usable floor area of 10,000 square feet. The shape of the building is not critical, and would not normally be known during this part of the comprehensive planning process. It is also assumed that the building is located on an unobstructed site on an air base in Climate Region 2. This data is sufficient to begin the planning process.

Energy information necessary to establish the conventional (nonsolar) case energy use pattern can be determined from either Appendix C or E for Climate Region 2. A copy of Appendix C is shown in Figure 3-6.

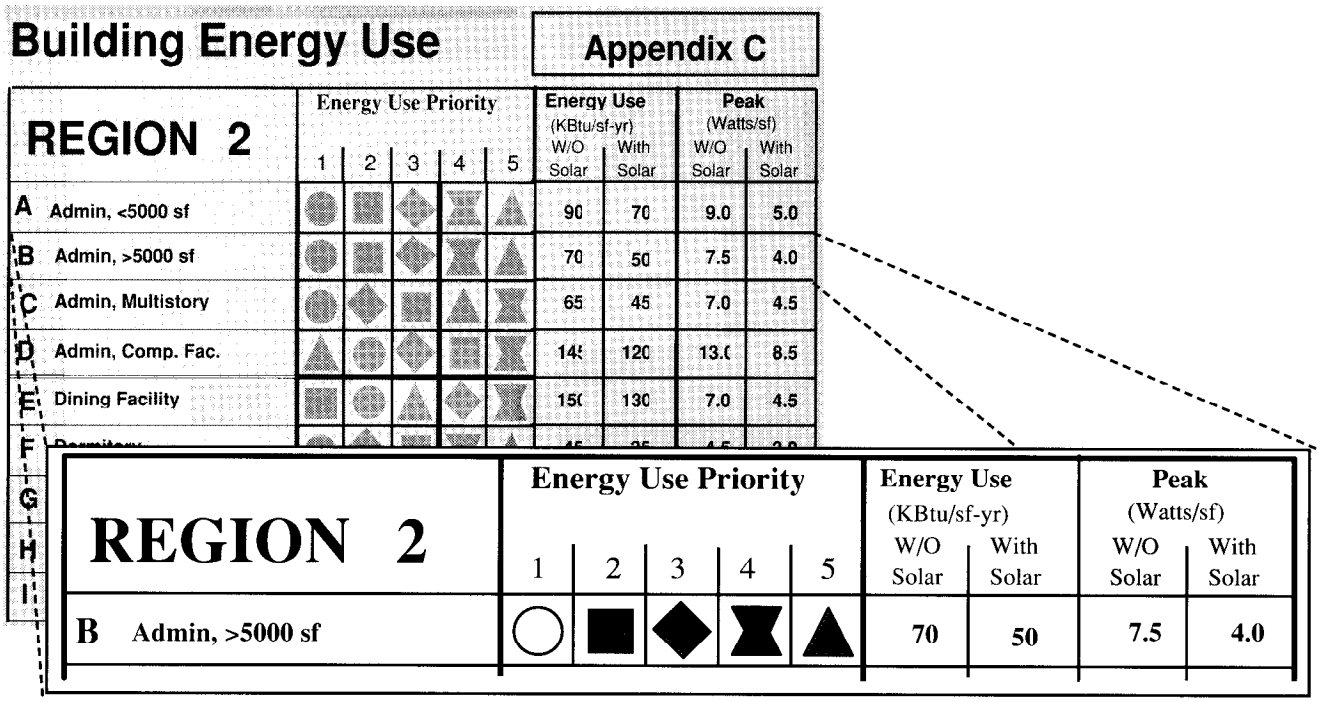



**Figure 3-6: Credit Union Example (Admin, >5000 sf)**

**Step 3:**
**Energy Use**
**Energy Use Priority**

The example credit union building falls into the category entitled *"B.* ADMIN, >5000 SF" From Figure 3-6 it can be determined that the conventional (w/o solar) energy use is approximately 70,000 Btu/sf-yr and the best savings from any of the passive solar systems would reduce it to about 50,000 Btu/sf-yr (Step 3). For this example the energy use priority is lighting, heating, cooling, ventilation, and process loads, respectively (also Step 3). This means that lighting is normally the largest energy end use, followed by heating and cooling.

**Step 4:**
**Peak Demand**

The typical peak demand would be 7.5 w/sf, or 75 kW (75,000 w) for the 10,000 sf building. It can be reduced to approximately 4.0 w/sf, or 40 kW. All of this information could be included in the descriptive material used in DD Form 1391, as discussed in Volume III: Programming Guide.

If more detail is desired or requested, this can be determined from Appendix E; a copy of the appropriate section is shown in Figure 3-7. Under the section entitled "ENERGY USE" can be found a breakdown of energy use by subcategory,

For an administration building that is 10,000 sf, the total building energy use is:

*o Bldg 70,708 Btu / sf-yr*

The various energy end use categories are the following percent of the total:

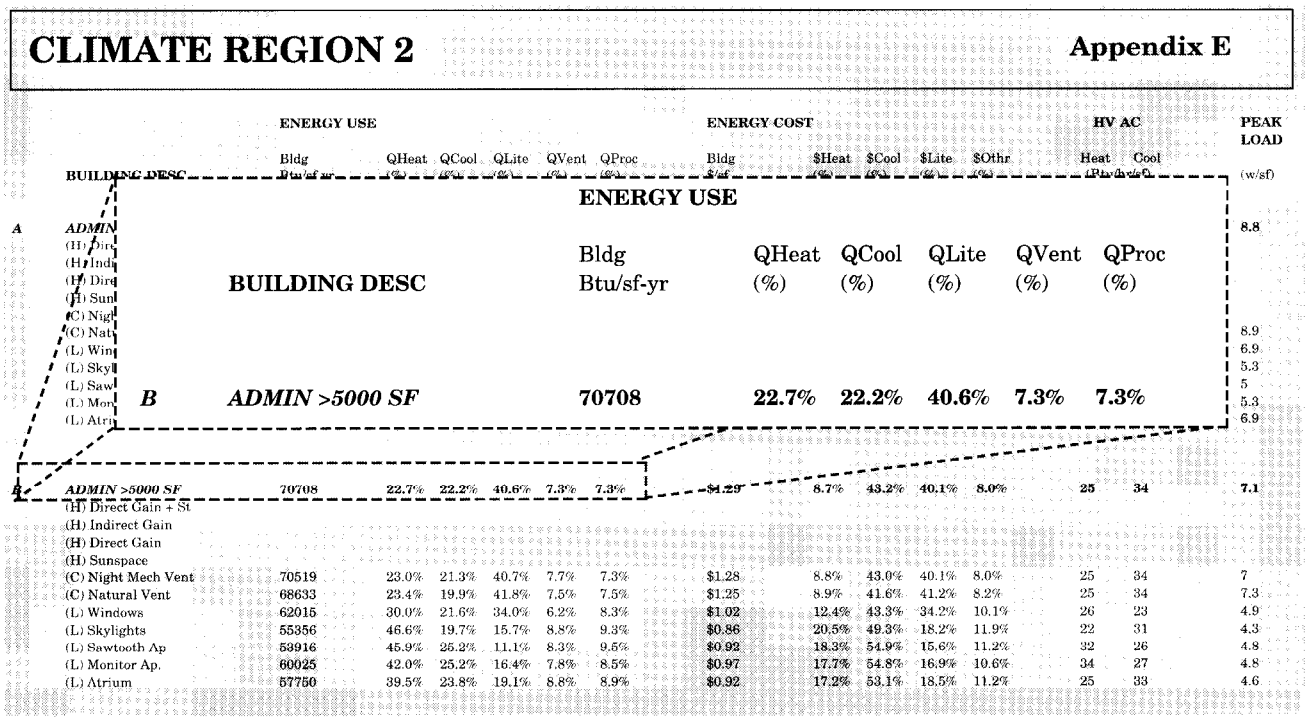
- o heating 22.7%
- o cooling 22.2%
- o lighting 40.6%
- o ventilation 7.3%
- o process 7.3%

By multiplying the percent, as a fraction, by the building total, it is possible to determine the energy use by end use category; that is:

- *o heating = 0.227 x 70708 = 16,051 Btu/sf-yr*
- *o cooling = 0.222 x 70708 = 15,697 Btu/sf-yr*
- *o lighting = 0.406 x 70708 = 28,707 Btu/sf-yr*
- *o ventilation = 0.073 x 70708 = 5,162 Btu/sf-yr*
- *o process = 0.073 x 70708 = 5,162 Btu/sf-yr*

*o Building total = 70,779 Btu/sf-yr*

The small difference (1%) between the total from the chart (70708) and the total from the above calculations (70779) is due to rounding error in the percent of energy in each end use category.



**CLIMATE REGION 2** **Appendix E**

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HV AC Heat (Btu/sf-yr) | HV AC Cool | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | ADMIN | | | | | | | | | | | | | | 8.8 |
| | (H) Dire | | | | | | | | | | | | | | |
| | (H) Indi | | | | | | | | | | | | | | |
| | (H) Dire | | | | | | | | | | | | | | |
| | (H) Sun | | | | | | | | | | | | | | |
| | (C) Nigl | | | | | | | | | | | | | | 8.9 |
| | (C) Nat | | | | | | | | | | | | | | 6.9 |
| | (L) Win | | | | | | | | | | | | | | 5.3 |
| | (L) Skyl | | | | | | | | | | | | | | 5 |
| | (L) Saw | | | | | | | | | | | | | | 5.3 |
| | (L) Mon | | | | | | | | | | | | | | 6.9 |
| | (L) Atri | | | | | | | | | | | | | | |
| B | *ADMIN >5000 SF* | 70708 | 22.7% | 22.2% | 40.6% | 7.3% | 7.3% | $1.29 | 8.7% | 43.2% | 40.1% | 8.0% | 25 | 34 | 7.1 |
| | (H) Direct Gain + Sl | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 70519 | 23.0% | 21.3% | 40.7% | 7.7% | 7.3% | $1.28 | 8.8% | 43.0% | 40.1% | 8.0% | 25 | 34 | 7 |
| | (C) Natural Vent | 68633 | 23.4% | 19.9% | 41.8% | 7.5% | 7.5% | $1.25 | 8.9% | 41.6% | 41.2% | 8.2% | 25 | 34 | 7.3 |
| | (L) Windows | 62015 | 30.0% | 21.6% | 34.0% | 6.2% | 8.3% | $1.02 | 12.4% | 43.3% | 34.2% | 10.1% | 26 | 23 | 4.9 |
| | (L) Skylights | 55356 | 46.6% | 19.7% | 15.7% | 8.8% | 9.3% | $0.86 | 20.5% | 49.3% | 18.2% | 11.9% | 22 | 31 | 4.3 |
| | (L) Sawtooth Ap | 53916 | 45.9% | 25.2% | 11.1% | 8.3% | 9.5% | $0.92 | 18.3% | 54.9% | 15.6% | 11.2% | 32 | 26 | 4.8 |
| | (L) Monitor Ap. | 60025 | 42.0% | 25.2% | 16.4% | 7.8% | 8.5% | $0.97 | 17.7% | 54.8% | 16.9% | 10.6% | 34 | 27 | 4.8 |
| | (L) Atrium | 57750 | 39.5% | 23.8% | 19.1% | 8.8% | 8.9% | $0.92 | 17.2% | 53.1% | 18.5% | 11.2% | 25 | 33 | 4.6 |

**Figure 3-7: Credit Union Detailed Energy Use**

## Example 2: A Warehouse

The example warehouse has a total usable floor area of 5,000 sf and is used as a range supply and equipment storage facility. It is assumed that this building is also located in Climate Region 2.

**Step 1: Climate Region**

Energy information necessary to establish the nonsolar building energy use pattern can be determined from either Appendix C or E for Climate Region 2.

**Step 2: Building Type**

This example building obviously falls into the category entitled "WAREHOUSE." From Figure 3-8, the average conventional building energy use is 25,000 Btu/sf-yr, and the best savings from any of the passive solar systems would reduce it to about 20,000 Btu/sf-yr. For this example, the order of the energy use priorities is heating, lighting, and ventilation, respectively. This means that heating is normally the largest energy use category, followed by lighting and then ventilation. Note that there are only three categories of energy end use rather than the five categories listed for the first example. This is because a warehouse normally does not have a cooling system and does not have any major process loads.

**Step 3: Energy Use Energy Use Priority**

It can be seen in Figure 3-8 that the normal peak demand would be 1.0 w/sf, or 5 kW (5,000 w) for the 5,000 sf warehouse. This can be reduced to approximately 0.5 w/sf, or 2.5 kW.

**Step 4: Peak Demand**

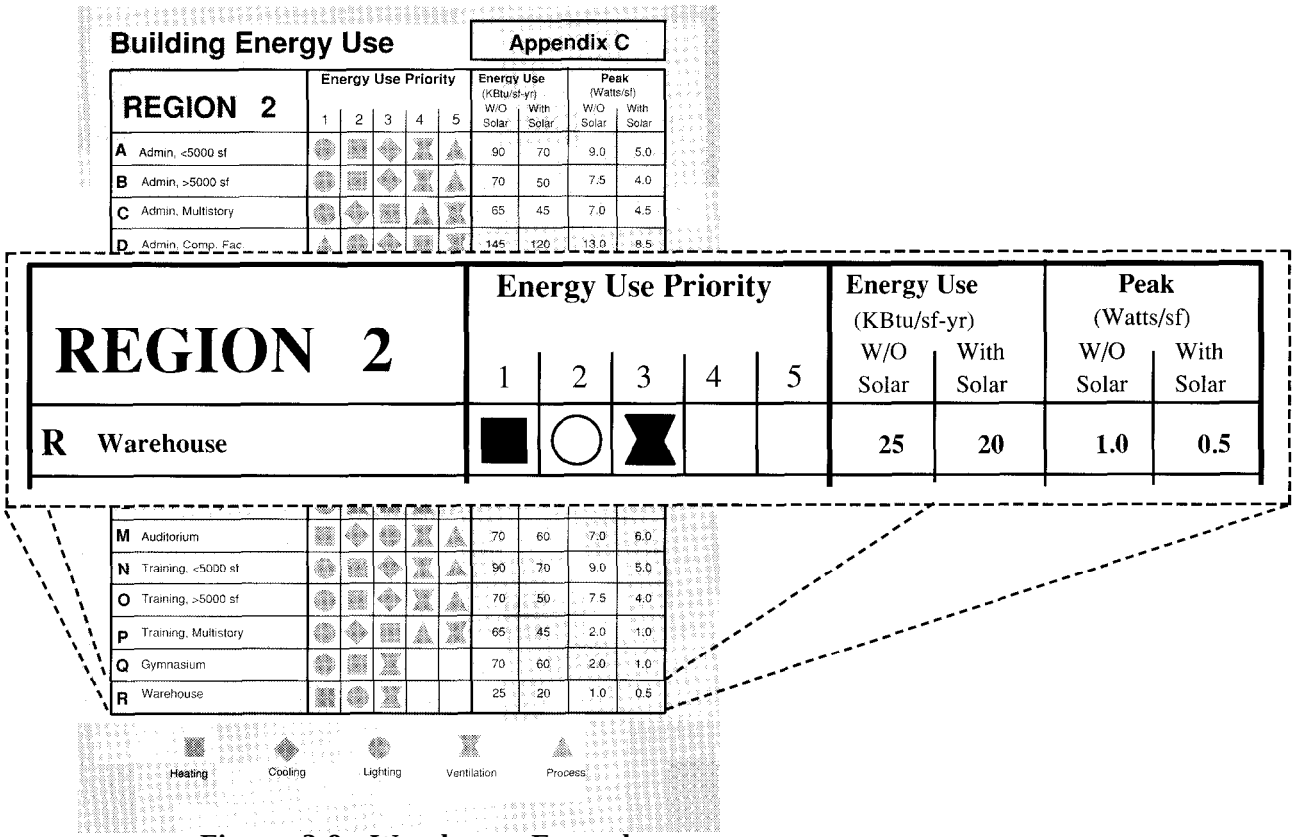
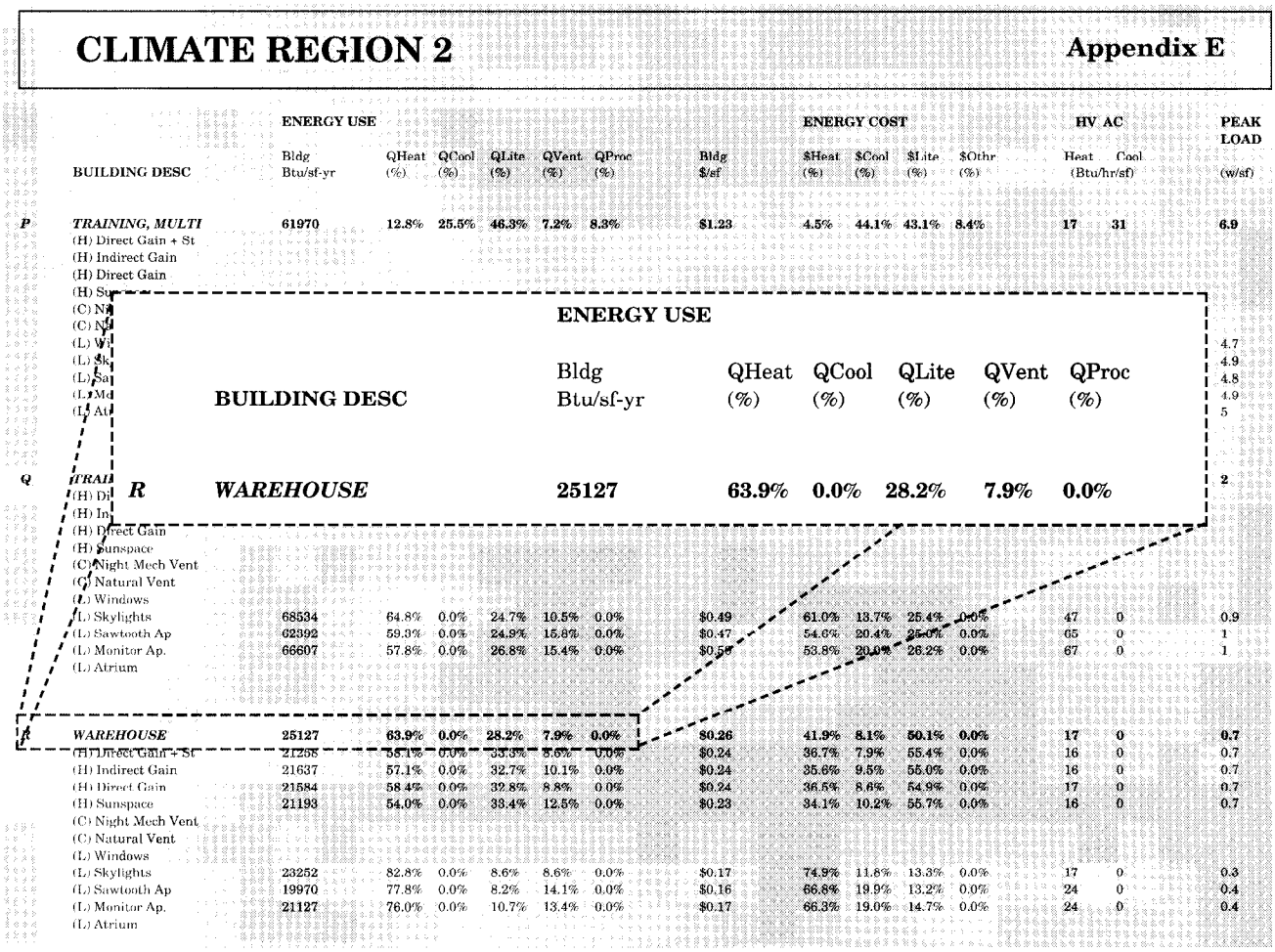



**Figure 3-8: Warehouse Example**

As in the previous example, if more detail is desired or requested, this can be determined from Appendix E. An example page from Appendix E is shown in Figure 3-9. Under the section entitled "ENERGY USE" can be found a breakdown of energy use by subcategory.



**CLIMATE REGION 2** — **Appendix E**

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | ENERGY COST $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HV AC Heat (Btu/hr/sf) | Cool | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | *TRAINING, MULTI* | 61970 | 12.8% | 25.5% | 46.3% | 7.2% | 8.3% | $1.23 | 4.5% | 44.1% | 43.1% | 8.4% | 17 | 31 | 6.9 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | 4.7 |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | 4.9 |
| | (L) Monitor Ap. | | | | | | | | | | | | | | 4.8 |
| | (L) Atrium | | | | | | | | | | | | | | 4.9 |
| | | | | | | | | | | | | | | | 5 |
| Q | *TRAI* | | | | | | | | | | | | | | |
| | (H) Di | | | | | | | | | | | | | | |
| | (H) In | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 68534 | 64.8% | 0.0% | 24.7% | 10.5% | 0.0% | $0.49 | 61.0% | 13.7% | 25.4% | 0.0% | 47 | 0 | 0.9 |
| | (L) Sawtooth Ap | 62392 | 59.3% | 0.0% | 24.9% | 15.8% | 0.0% | $0.47 | 54.6% | 20.4% | 25.0% | 0.0% | 65 | 0 | 1 |
| | (L) Monitor Ap. | 66607 | 57.8% | 0.0% | 26.8% | 15.4% | 0.0% | $0.50 | 53.8% | 20.0% | 26.2% | 0.0% | 67 | 0 | 1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| R | *WAREHOUSE* | 25127 | 63.9% | 0.0% | 28.2% | 7.9% | 0.0% | $0.26 | 41.9% | 8.1% | 50.1% | 0.0% | 17 | 0 | 0.7 |
| | (H) Direct Gain + St | 21265 | 55.1% | 0.0% | 33.3% | 8.6% | 0.0% | $0.24 | 36.7% | 7.9% | 55.4% | 0.0% | 16 | 0 | 0.7 |
| | (H) Indirect Gain | 21637 | 57.1% | 0.0% | 32.7% | 10.1% | 0.0% | $0.24 | 35.6% | 9.5% | 55.0% | 0.0% | 16 | 0 | 0.7 |
| | (H) Direct Gain | 21584 | 58.4% | 0.0% | 32.8% | 8.8% | 0.0% | $0.24 | 36.5% | 8.6% | 54.9% | 0.0% | 17 | 0 | 0.7 |
| | (H) Sunspace | 21193 | 54.0% | 0.0% | 33.4% | 12.5% | 0.0% | $0.23 | 34.1% | 10.2% | 55.7% | 0.0% | 16 | 0 | 0.7 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 23252 | 82.8% | 0.0% | 8.6% | 8.6% | 0.0% | $0.17 | 74.9% | 11.8% | 13.3% | 0.0% | 17 | 0 | 0.3 |
| | (L) Sawtooth Ap | 19970 | 77.8% | 0.0% | 8.2% | 14.1% | 0.0% | $0.16 | 66.8% | 19.9% | 13.2% | 0.0% | 24 | 0 | 0.4 |
| | (L) Monitor Ap. | 21127 | 76.0% | 0.0% | 10.7% | 13.4% | 0.0% | $0.17 | 66.3% | 19.0% | 14.7% | 0.0% | 24 | 0 | 0.4 |
| | (L) Atrium | | | | | | | | | | | | | | |

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|
| R | *WAREHOUSE* | 25127 | 63.9% | 0.0% | 28.2% | 7.9% | 0.0% | 2 |

**Figure 3-9: Warehouse Example, Detailed Energy Use**

For a warehouse, the total building energy use is:

- *Bldg 25,127 Btu/sf-yr*

The various energy end use categories are the following percent of the total:

- *heating 63.9%*
- *cooling 0.0%*
- *lighting 28.2%*
- *ventilation 7.9%*
- *process 0.0%*

By multiplying the percent by the building total, the energy use by end use category is:

- *heating = 0.639 x 25127 = 16,056 Btu/sf-yr*
- *cooling = 0.000 x 25127 = 0 Btu/sf-yr*
- *lighting = 0.282 x 25127 = 7,086 Btu/sf-yr*
- *ventilation = 0.079 x 25127 = 1,985 Btu/sf-yr*
- *process = 0.000 x 25127 = 0 Btu/sf-yr*

- *Building total = 25,127 Btu/sf-yr*

In this example, there is no rounding error.

It is also possible to estimate the total annual energy use using the building total energy use and the building area; that is:

**Annual Energy Use Calculation**

*Annual Energy Use = Building Energy Use x Building Area*

In this example the annual energy use would be:

*Annual Energy Use = 25,127 (Btu/sf-yr) x 5000 (sf)*

*= 125,635,000 Btu/yr*

$= 1.26 \times 10^8$ *Btu/yr*

This calculation can be done for any building or end use category given the area and annual energy use.

## Special Cases

The extended list of building types in Appendix B should enable you to plan a wide range of building types. However, special cases always exist. A few of these cases include:

- *Air Force base on the border between two regions.*
- *A building type not listed in the tables.*
- *The building type with / without an HVAC system.*
- *Multistory building.*
- *Excessive equipment loads.*

**Climate Region**

A great deal of care was taken to see that no major air base was located close to the border between two climate regions. However, if this handbook is used to plan buildings for the Air National Guard, the possibility exists that a locale will be close to the border between two regions.

To determine the climate region in which a particular locale should be placed, the following methods should be considered:

- *Known HDD, CDD, LEH, RAD.*
- *An air base listed in Appendix A is within 50 miles.*
- *Similar climate.*
- *Best judgment.*

If the HDD, CDD, LEH, and RAD values for a particular locale are known, then it is possible to use Table 3-2, page 38 in Volume I, to determine which climate region is appropriate to use. Methods for calculating the LEH values are discussed in Volume IV: Passive Solar Design.

If an Air Force base listed in Appendix A is within 50 miles of the locale, then it is reasonable to assume that the locale being considered is in the same climate region. If more than one base is within 50 miles of the locale, and they are in different climate regions, then pick the one with the most similar climate.

If there are no other air bases within 50 miles of the locale, then consider the climate characteristics of air bases within 100 miles, 150 miles, 200 miles, and so on, and find one with a similar climate. Air bases selected should be in the same or adjacent climate regions.

If none of the above procedures seem to work, then use your best judgment to select the climate region in which the locale should be placed. Check the detailed data in Appendix E for the particular building being planned. In some cases, for a specific building type, the variation in energy performance of the same building in two geographically adjacent climate regions is small.

*Regardless of the method used to ascertain the climate region of a locale, it is important to document the choice so that future planning decisions are consistent.*

**Different Building Types**

Many building types are not included in the eighteen studied for this handbook. Some of them have performance characteristics similar to buildings analyzed, others are quite different. The key consideration is usually the internal loads. If the building has internal loads similar to those listed for a building type in Table 3-1 on the following page, then use the data for that building type. For example, neither an Officers Club nor an NCO Club are specifically included in the eighteen building types. However, both function quite similarly to a DINING FACILITY and that category could be used to represent either of them. Similarly, a BOQ is not listed, but the category DORMITORY is similar. *Check Appendix B to see if the building type has already been given a designation.* Internal loads can be determined from Volume IV: Passive Solar Design.

In order to use a building type listed in Table 3-1, at least two of the three occupancy characteristics must be similar. In addition, both lighting and process loads must be less than or equal to those listed. *Unless both of these conditions are met, none of the information in this handbook can be used.*

**HVAC Systems**

In addition to matching internal loads, it is important to have the same set of thermal comfort systems, whether heating and ventilation (HV) or HVAC, which includes air conditioning. If the building type normally has an HVAC system, and the

proposed building only has an HV system, then this handbook can be used. However, you will have to assume that the cooling load is zero, and reduce the energy use and energy cost accordingly. The magnitude of the heating, lighting, venting, and process energy will not change. If the building normally has an HV system and an HVAC system is proposed, this handbook cannot be used to calculate energy use and costs.

| | | Operational Characteristics | | | Internal Load | | Thermal System |
|---|---|---|---|---|---|---|---|
| | | Day-Night | Hr/Day | Days/Week | Light (w/sf) | Process (w/sf) | |
| **A.** | ADMIN, <5000 SF | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **B.** | ADMIN, >5000 SF | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **C.** | ADMIN, MULTISTORY | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **D.** | ADMIN, COMPUTER FACILITY | D | 10 | 5 | 2.5 | 2.0 | HVAC |
| **E.** | DINING FACILITY | D+N | 14 | 7 | 1.3 | 2.8 | HVAC |
| **F.** | DORMITORY | D+N | 24 | 7 | 1.3 | 0.5 | HVAC |
| **G.** | FIRE STATION | D+N | 24 | 7 | 1.3 | 0.5 | HVAC |
| **H.** | INDUSTRIAL FACILITY | D | 10 | 5 | 1.7 | 2.0 | H V |
| **I.** | MAINTENANCE, <5000 SF | D | 10 | 5 | 1.0 | 0.5 | H V |
| **J.** | MAINTENANCE, HIGH-BAY | D | 10 | 5 | 2.1 | 1.0 | H V |
| **K.** | MAINTENANCE, AIR COND | D | 10 | 5 | 1.7 | 1.0 | HVAC |
| **L.** | MAINTENANCE, LOW-BAY | D | 10 | 5 | 1.7 | 1.0 | H V |
| **M.** | TRAINING, AUDITORIUM | D+N | 8 | 7 | 1.3 | 0.5 | HVAC |
| **N.** | TRAINING, <5000 SF | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **O.** | TRAINING, >5000 SF | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **P.** | TRAINING, MULTISTORY | D | 10 | 5 | 2.5 | 0.5 | HVAC |
| **Q.** | TRAINING, GYMNASIUM | D | 10 | 7 | 1.7 | 0.0 | H V |
| **R.** | WAREHOUSE | D | 10 | 7 | 1.7 | 0.0 | H V |

**Table 3-1: Internal Load Characteristics**

**Multistory Buildings**

The energy use patterns of some, but not all, building types are affected if they are multistory rather than single story buildings. The extent to which the energy use changes depends on how sensitive the energy consumption is to the envelope characteristics of the building. In general, the more a building is dominated by internal loads, the less sensitive it will be to the characteristics of the envelope. For example, a three-story administration building uses about 20% less energy per square foot than does a single story building of the same size. In using this handbook, it is assumed that a proposed building is single story except where specifically otherwise listed, i.e., ADMIN: MULTISTORY, TRAINING: MULTISTORY, and DORMITORY. Exceptions are as follows:

- *A dining facility can be single or multistory.*
- *The sleeping section of a fire station can be single or multistory.*

A dining facility can be single or multistory because the building is dominated by the process loads. The internal loads for a dining facility are 1.3 w/sf for lighting and 2.8 w/sf for process (food preparation, etc.) for a total of 4.1 w/sf. The only building type with greater internal loads is a computer facility with 4.5 w/sf. For the dining facility, the energy exchanges through the

envelope have a minimal impact on overall energy consumption. A multistory sleeping section of a fire station can be analyzed because the usage pattern is similar to a dormitory, which has been analyzed as a multistory building.

**Equipment**

Equipment loads in industrial or maintenance buildings have been purposely ignored in the analysis done for this handbook. The energy used and heat given off by heavy equipment such as electric welders, air compressors, process boilers, and so on, can overshadow the building's energy performance and dominate energy costs, if they are included in the cost of operating the building. Furthermore, passive solar systems are not capable of impacting these uses of energy. *In the one maintenance facility with air conditioning analyzed for this handbook, the assumption has been made that no heavy equipment is used in the building.* Increases in the internal loads of buildings from what were assumed in the analysis and shown in Table 3-1 will tend to shift the energy priorities toward increased cooling and ventilating requirements and away from heating requirements. This should be kept in mind when using the information in the handbook.

# Choosing Passive Solar Systems 4.0

## Introduction

This chapter presents Steps 5 and 6 of the comprehensive planning process as applied to passive solar buildings.

*Step 5: Choose appropriate passive solar systems.*
*Step 6: Match energy use to passive solar systems.*

Passive solar systems appropriate for each building type and climate zone have been preselected through building energy analysis. From the available set of passive solar systems, you must match high priority energy use categories with solar systems that address that particular energy end use. Much like the energy analyses carried out in the previous chapter, the determination of appropriate passive solar systems can be done in either a simplified or a detailed manner. The detailed calculation method is explained in Chapter 5.

## Step 5: Choosing Solar Energy Systems

Figure 4-1 on the following page is an example of an Energy Cost Savings data sheet for Climate Region 2. A complete set of similar data sheets for all twelve climate regions can be found in *Appendix D*. This data sheet, along with the results of the analysis in the previous chapter, are all that are needed to complete a simplified determination of appropriate passive solar system options (Step 5).

The Energy Cost Savings data sheet contains information about the anticipated annual cost savings associated with each passive solar system. The eleven passive solar technologies are abbreviated as follows:

| | | |
|---|---|---|
| *HEAT* | *D+S* | *Direct Gain plus Storage* |
| | *IND* | *Indirect Gain (plus Storage)* |
| | *DG* | *Direct Gain (without storage)* |
| | *SUN* | *Sunspace (plus storage)* |
| *COOL* | *NMV* | *Night Mechanical Ventilation* |
| | *NVN* | *Natural Ventilation* |
| *DAYLIGHT* | *WIN* | *Windows (sidelighting)* |
| | *SKY* | *Skylights (toplighting)* |
| | *SAW* | *Sawtooth apertures (toplighting)* |
| | *MON* | *Monitor apertures (toplighting)* |
| | *ATR* | *Atria (core daylighting)* |

For a detailed explanation of each passive solar system, see Volume I: Introduction To Passive Solar Concepts.

The information in Figure 4-l is coded for rapid identification of possible energy cost savings. The coding system uses “pies” to designate energy cost savings. The quarter-pie represents first year cost savings of 5% or less. The half-pie represents savings of 5 to 10%; the three-quarter pie represents savings from 10 to

15%, and the fully shaded pie represents energy cost savings the first year greater than 15%. *The blank pie indicates that a passive solar system is inappropriate for the specified building type.*

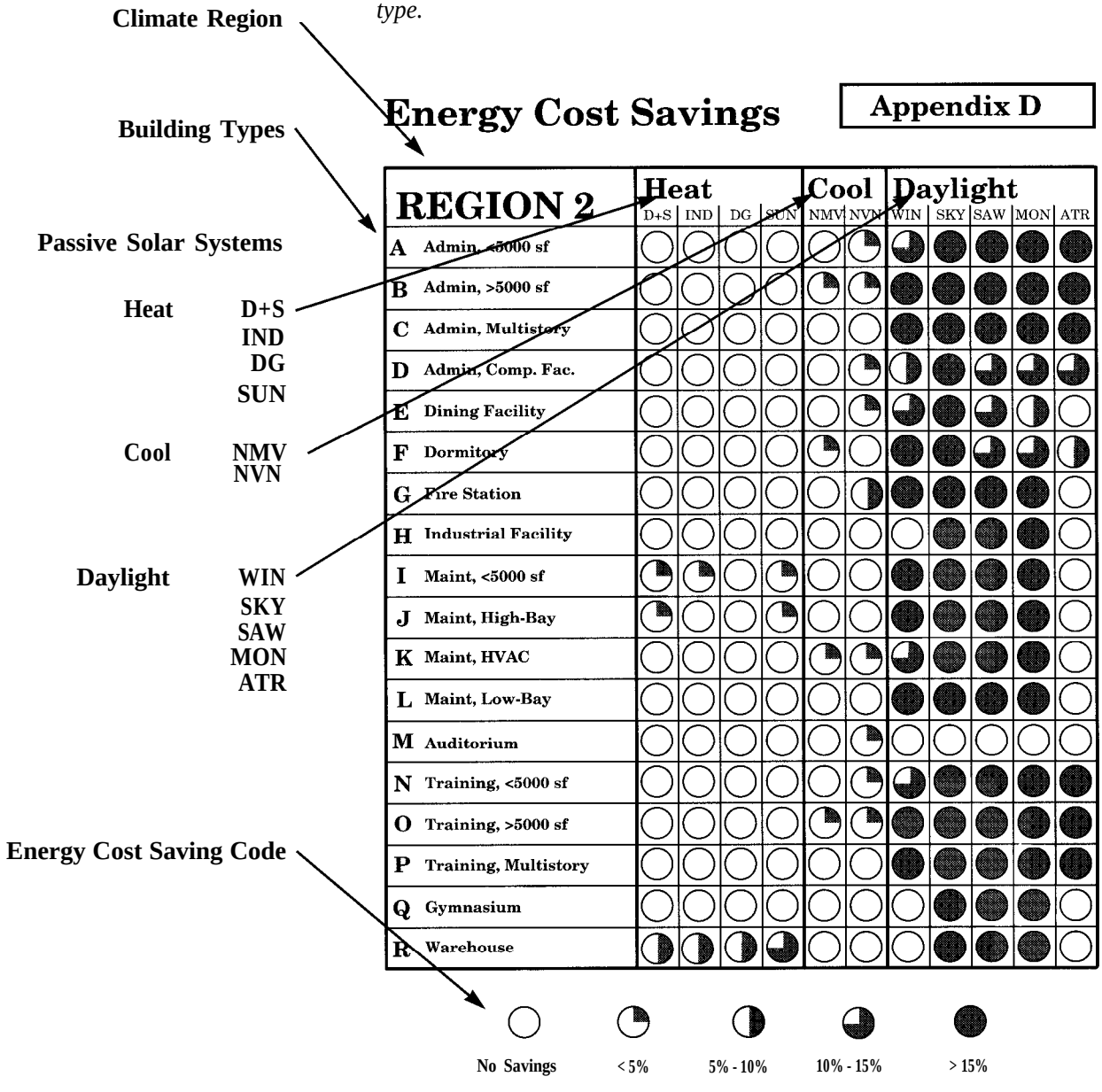



**Figure 4-1: Example Energy Cost Data Sheet, Appendix D**

For example, from Figure 4-1, for an ADMIN, <5000 SF, the following are passive solar systems that save energy costs:

| *System* | *Savings* | *Strategy* |
|---|---|---|
| *o natural ventilation* | *<5%* | *cooling* |
| *o windows* | *10 - 15%* | *lighting* |
| *o skylights* | *>15%* | *lighting* |
| *o sawtooth* | *>15%* | *lighting* |
| *o monitor* | *>15%* | *lighting* |
| *o atria* | *>15%* | *lighting* |

All of the remaining passive solar systems are inappropriate for an ADMIN, <5000 SF building type in Climate Region 2; none of them save an appreciable amount of energy cost. Looking at the charts in Appendix D and determining which passive solar systems are appropriate completes Step 5.

---

## Step 6: Match Energy Use and Solar Energy System

The next step is to match appropriate passive solar systems with the energy use characteristics of the building. For the ADMIN, <5000 SF in our example, the energy use priorities were:

*(1) lighting*
*(2) heating*
*(3) cooling*
*(4) ventilation*
*(5) process*

Five appropriate passive solar systems will reduce the lighting (and cooling) energy costs and one will reduce the cooling (and ventilation) energy costs. None are appropriate for reducing the heating costs.

Although heating is the second largest energy use, none of the passive solar systems will save any heating energy costs. *Therefore, it would be inappropriate to choose a passive heating system for this building type in this climate region if cost savings were the only criteria*. However, other design criteria might make one or more of the passive solar systems appropriate. For example, a demonstration project might allow you to plan for the use of a wider range of possible solar technologies in a building.

Five daylighting systems are appropriate for a small administration building. Since only one cooling strategy will work, only that one can be justified on the basis of energy cost savings. It would be appropriate to suggest a combination of lighting and cooling strategies, or only daylighting, or only the natural ventilation strategy.

Criteria such as site constraints and the solar envelope for the building might eliminate some of the options from further consideration. However, it is not necessary to eliminate any options at this stage of the planning process. When the building is designed using Volume IV, then an appropriate set of passive solar systems will be considered and analyzed.

**Example 1: A Credit Union**

The credit union example discussed in Chapter 3 has a total usable floor area of 10,000 square feet and is located in Climate Region 2.

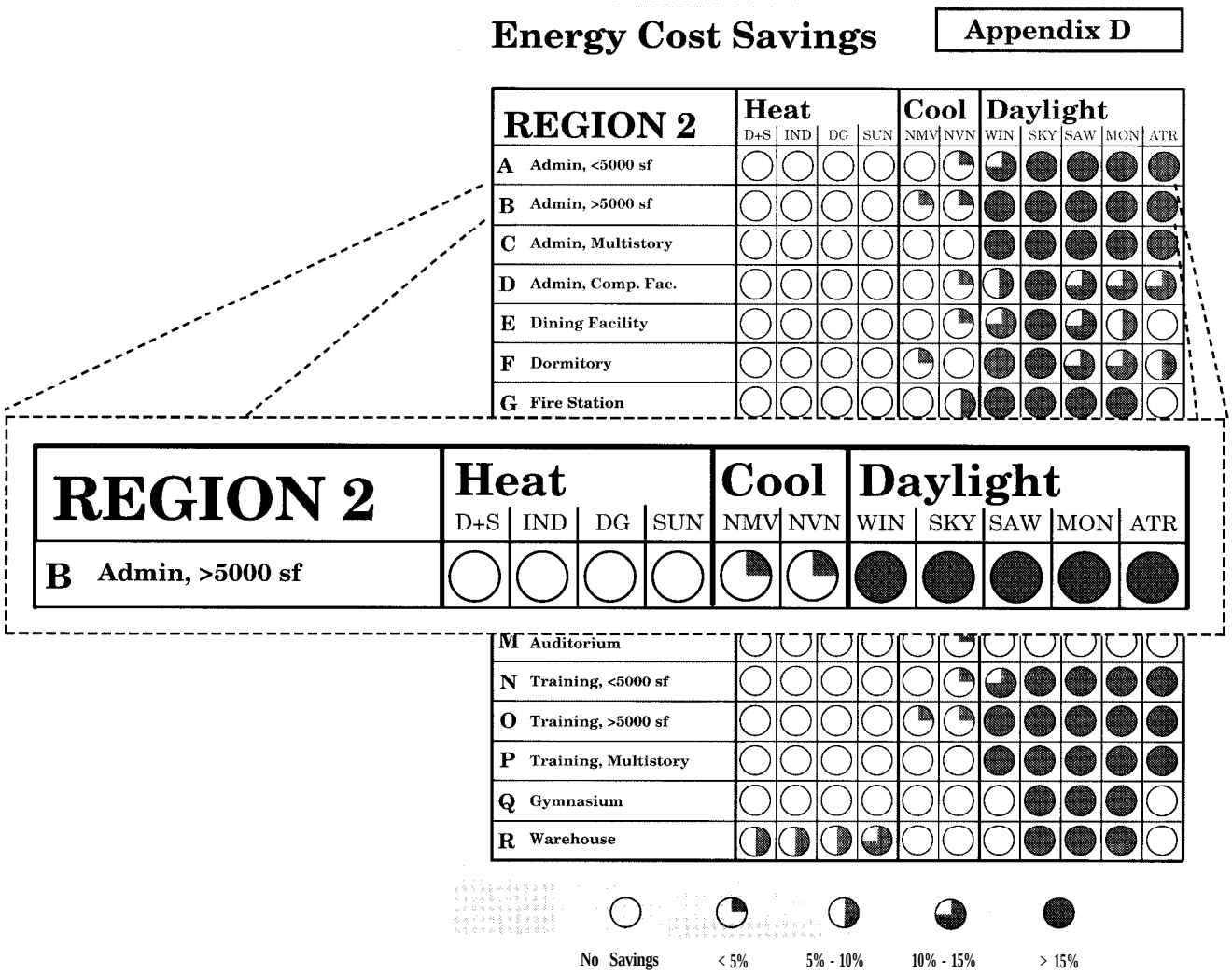



**Figure 4-2: Credit Union Example, Appendix D**

**Step 5**

Using Figure 4-2 from Appendix D, the following passive solar systems are appropriate for this building type and climate region:

| *Passive Solar System* | *Savings* | *Strategy* |
|---|---|---|
| *o Night Mech Vent* | *< 5%* | *cooling* |
| *o Natural Ventilation* | *< 5%* | *cooling* |
| *o Windows* | *> 15%* | *lighting* |
| *o Skylights* | *> 15%* | *lighting* |
| *o Sawtooth* | *> 15%* | *lighting* |
| *o Monitor* | *> 15%* | *lighting* |
| *o Atria* | *> 15%* | *lighting* |

The architectural impact of choosing a daylighted passive solar system for the credit union is conceptually illustrated in Figure 4-3. A building example is shown in Figure 4-4 on the following page.

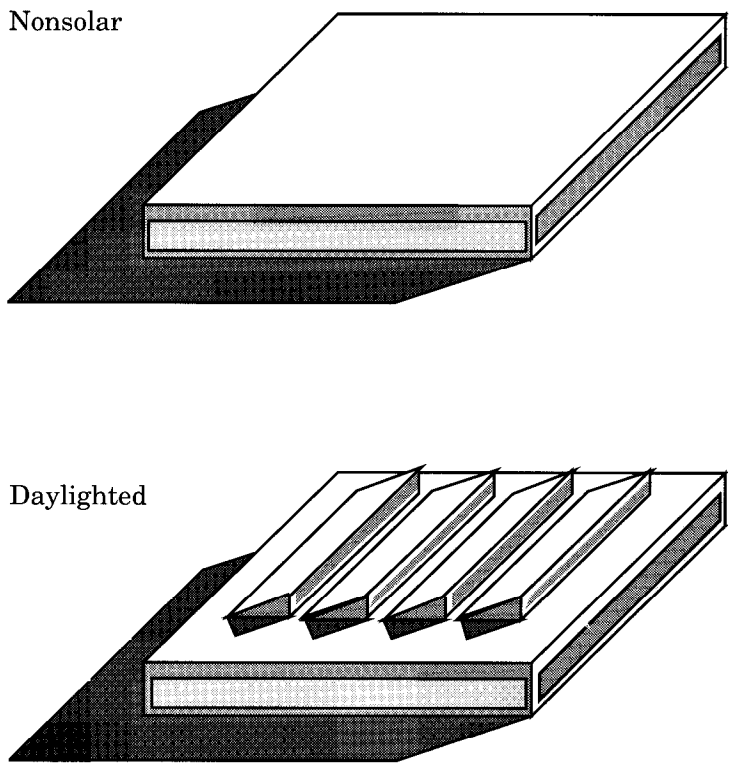



**Figure 4-3: Daylighted (SAW) Credit Union**

**Step 6**

The energy use priority for this building, as determined in Chapter 3, is:

*(1) lighting*
*(2) heating*
*(3) cooling*
*(4) ventilation*
*(5) process*

In comparing the list of appropriate passive solar systems with the energy use priority for the building, match-ups exist for lighting and cooling. *Although heating is the second largest energy use, no passive heating systems will save heating energy costs in this building type in this climate region.*

During the comprehensive planning process, it is not necessary to ascertain which daylighting and cooling systems are most appropriate. This is part of the design function of the

**DD Form 1391**
**CBD Announcement**

architectural/engineering team. However, it might be useful to list a variety of possible solutions in DD Form 1391 or a CBD announcement. These possibilities are discussed in Volume III.

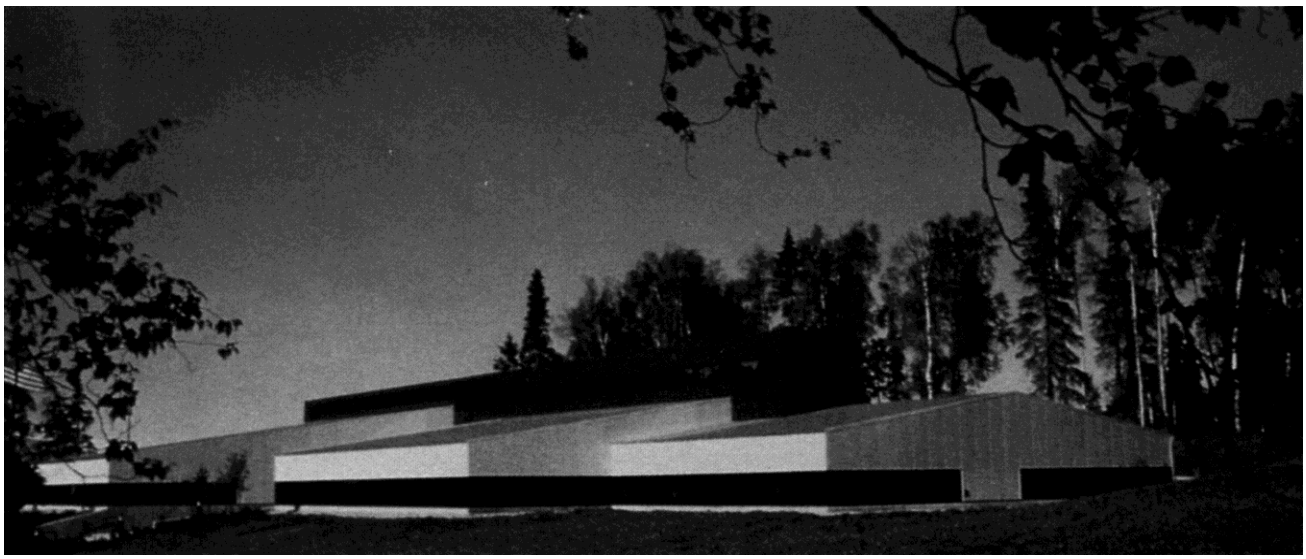


**Figure 4-4: Operations and Training Facility, Kulis A.N.G., Alaska**

## Example 2: A Warehouse

**Step 5**

The example warehouse has a total usable floor area of 5,000 sf and is one story in height. This building is also located in Climate Region 2.

Using Figure 4-5 on the following page from Appendix D, the following are appropriate passive solar systems for this building type:

| *Passive Solar System* | *Savings* | *Strategy* |
|---|---|---|
| *o Direct Gain + Storage* | *5-10%* | *heating* |
| *o Indirect Gain* | *5-10%* | *heating* |
| *o Direct Gain* | *5-10%* | *heating* |
| *o Sunspace* | *10-15%* | *heating* |
| *o Skylight* | *> 15%* | *lighting* |
| *o Sawtooth* | *> 15%* | *lighting* |
| *o Monitor* | *> 15%* | *lighting* |

The seven passive systems appropriate for the warehouse are quite different than those that were appropriate for the 10,000 sf administration building. Because of the moderate (1.5 w/sf internal loads in the warehouse, all of the passive heating strategies will work, as well as several of the daylighting

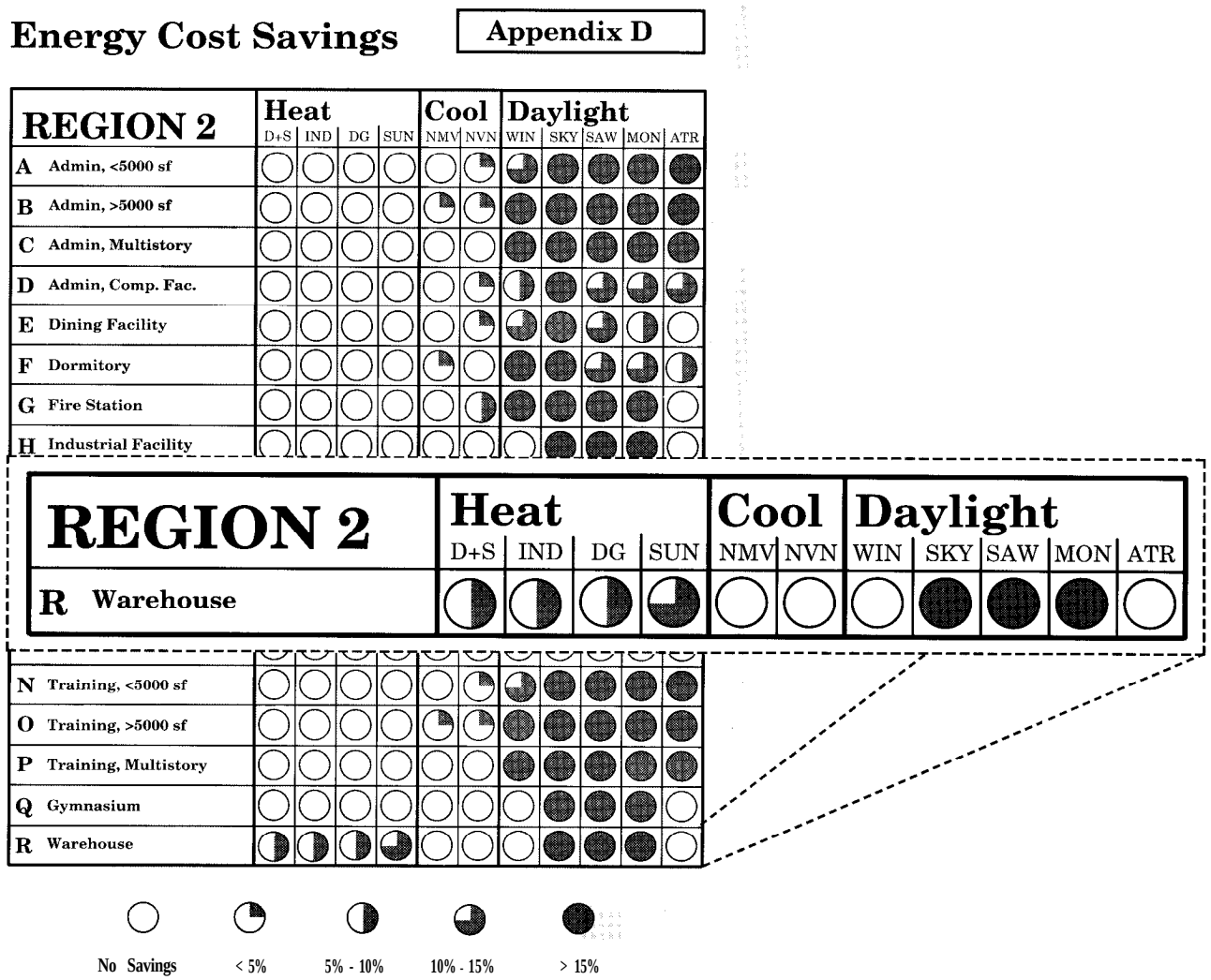



**Figure 4-5: Warehouse Example**

strategies.

**Step 6**

The energy use priority for this building, as determined in Chapter 4, is:

*(1) heating*
*(2) lighting*
*(3) ventilation*

In comparing the list of appropriate passive solar concepts with the energy use priority, match-ups exist for heating and lighting. Thus, these passive solar systems should be included in a facility programming document. See Volume III: Programming Guide.

# 5.0 Passive Solar System Performance

## Introduction

This chapter presents Steps 7, 8, and 9 of the passive solar building comprehensive planning process.

*Step 7. Determine passive building energy use and peak demand.*
*Step 8. Determine annual energy costs of conventional and passive solar buildings.*
*Step 9. Determine HV or HVAC system size.*

The detailed performance characteristics of the passive solar commercial-type building is determined in Steps 7 and 8. Step 9 determines first costs savings, if any, associated with the passive solar building. Incorporating the results of the comprehensive planning process for passive solar buildings is discussed in Volume III: Programming Guide. The energy use, energy costs, and HVAC system size calculations done in these three steps are comparisons with the conventional nonsolar building and are used to strengthen the documentation about the effectiveness of the passive building to reduce energy costs.

## Step 7: Determine Passive Building Energy Use and Peak Demand

Once a candidate passive solar system has been determined it is necessary to estimate the energy use by end use category of the passive building. This data can be compared with the conventional nonsolar building to illustrate the improved energy performance characteristics of the passive solar building.

If a single passive system is chosen, rather than a combination of two or more passive systems, then the performance can be taken directly from Appendix E. If a combination is chosen, then the data in Appendix E must be applied according to a set of guidelines discussed later in this chapter (page 44).

Data for Step 7 is obtained from Appendix E under the category heading "Energy Use." The calculation process is identical to the detailed energy analysis calculations done for the conventional nonsolar building.

For example, for an ADMIN, <5000 SF, the following passive solar systems save energy costs:

| *System* | *Savings* | *Strategy* |
|---|---|---|
| o *natural ventilation* | *< 5%* | *cooling* |
| o *windows* | *10 - 15%* | *lighting* |
| o *skylights* | *>15%* | *lighting* |
| o *sawtooth* | *>15%* | *lighting* |
| o *monitor* | *>15%* | *lighting* |
| o *atria* | *>15%* | *lighting* |

These were determined in Step 6 of the passive solar building comprehensive planning process.

Using Appendix E as shown in Figure 5-1, if windows are used for daylighting, the building total energy use is: **Step 7**

- 79,906 Btu/sf-yr

and the energy use by specific end use category is:

- heating = 36.3% x 79,906 = 29,006 (Btu/sf-yr)
- cooling = 26.0% x 79,906 = 20,776 (Btu/sf-yr)
- lighting = 23.3% x 79,906 = 18,618 (Btu/sf-yr)
- ventilation = 8.0% x 79,906 = 6,392 (Btu/sf-yr)
- process = 6.4% x 79,906 = 5,114 (Btu/sf-yr)

- building total = 79,906 (Btu/sf-yr)

**CLIMATE REGION 2** **Appendix E**

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HV AC Heat (Btu/hr/sf) | HV AC Cool | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | *ADMIN <5000 SF* | 87635 | 29.0% | 24.2% | 32.6% | 8.4% | 5.8% | $1.56 | 11.6% | 47.9% | 33.0% | 6.7% | 37 | 46 | 8.8 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79906 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 29 | 29 | 5 |
| | (L) Monitor Ap. | 72461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 30 | 6.9 |

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) |
|---|---|---|---|---|---|---|---|
| A | *ADMIN <5000 SF* | 87635 | 29.0% | 24.2% | 32.6% | 8.4% | 5.8% |
| | (H) Direct Gain + St | | | | | | |
| | (H) Indirect Gain | | | | | | |
| | (H) Direct Gain | | | | | | |
| | (H) Sunspace | | | | | | |
| | (C) Night Mech Vent | | | | | | |
| | (C) Natural Vent | 84509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% |
| | (L) Windows | 79906 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% |
| | (L) Skylights | 69920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% |
| | (L) Sawtooth Ap | 65917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% |
| | (L) Monitor Ap. | 72461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% |
| | (L) Atrium | 81420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% |

**Conventional non-solar building**
**Passive solar building**

**Figure 5-1: Admin, <5000 SF, Windows Case**

**% energy savings calculation**

The percent of energy savings is one minus the ratio of the passive building to the conventional nonsolar building. That is:

*% savings = (1 - [passive bldg / conventional bldg])*

For this example the percent of energy savings is:

% savings = (1 - [79906/87635]) = 0.088 = 8.8%

In a number of cases, the passive solar building may not use less energy than the conventional building. These are included because they save energy costs and the purpose of this handbook is to help reduce energy costs in commercial-type buildings. The reason that some cases do not save energy but save energy costs is directly related to the use of peak demand charges as part of the electric utility rate structure and trading off electricity for a different fuel. See Volume I: Introduction to Passive Solar Concepts.

**Peak Demand**

Peak demand can also be determined using Appendix E. For the daylighting case using windows, the peak demand is 6.9 watts per square foot. The peak demand in kilowatts (kW) is equal to the peak demand per square foot multiplied by the floor area of the building, then divided by 1,000 to convert it from watts to kilowatts.

*Peak Demand = [(watts per square feet) (area)]/ 1000*

For the ADMIN, <5000 SF building that is using windows for daylighting, the peak demand is:

Peak Demand = [(6.9) (5000)]/1000 = 35 kW

This compares well with the nonsolar conventional building that has a peak demand of 44 kW. The passive building has reduced peak demand by almost 25% over the nonsolar building.

Passive solar buildings do not necessarily save energy in all end use categories. Table 5-1 compares the nonsolar building and the passive solar building with windows for daylighting.

| Conventional Nonsolar Building | | Passive Solar Building (Windows) | |
|---|---|---|---|
| o heating | = 25,414 Btu/sf-yr | o heating | = 29,006 Btu/sf-yr |
| o cooling | = 21,208 Btu/sf-yr | o cooling | = 20,776 Btu/sf-yr |
| o lighting | = 28,569 Btu/sf-yr | o lighting | = 18,618 Btu/sf-yr |
| o ventilation | = 7,361 Btu/sf-yr | o ventilation | = 6,392 Btu/sf-yr |
| o process | = 5,083 Btu/sf-yr | o process | = 5,083 Btu/sf-yr |
| o building | = 87,635 Btu/sf-yr | o building | = 79,906 Btu/sf-yr |

**Table 5-1: Comparison of conventional and passive buildings energy end use (ADMIN, <5000SF)**

In Table 5-1, energy savings is achieved in three end use categories (cooling, lighting, and ventilation) but increases occur in heating energy use. It is typical in a daylighted building that the heating energy increases over a similar nonsolar building. The reason for this is that the electric lighting in the nonsolar building is helping to heat the building. In the daylighted building, the electric lighting system is controlled such that there is a reduction in the overall usage of the lighting system. By turning the electric lighting off (or dimming it), not as much heat is added to the building and the heating system must be used more.

## Step 8: Determine Energy Costs

Energy costs for the conventional nonsolar building, as well as all of the appropriate passive solar systems for a given building type and climate region, can be found in Appendix E. An example of this appendix section is shown in Figure 5-2. All energy costs are in 1987 dollars.

**CLIMATE REGION 2** **Appendix E**

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QMisc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HV AC Heat (Btu/hr/sf) | HV AC Cool | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | *ADMIN <5000 SF* | 87635 | 29.0% | 24.2% | 32.6% | 8.4% | 5.8% | $1.56 | 11.4% | 49.0% | 33.0% | 6.6% | 37 | 46 | 8.8 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84500 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79806 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 39 | 29 | 5 |
| | (L) Monitor Ap. | 72461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 50 | 6.9 |
| B | *ADMIN >* | | | | | | | | | | | | | | 7.1 |
| | (H) Direct | | | | | | | | | | | | | | |
| | (H) Indirec | | | | | | | | | | | | | | |
| | (H) Direct | | | | | | | | | | | | | | |
| | (H) Sunsp | | | | | | | | | | | | | | 7 |
| | (C) Night | | | | | | | | | | | | | | 7.3 |
| | (C) Natura | | | | | | | | | | | | | | 4.9 |
| | (L) Windo | | | | | | | | | | | | | | 4.3 |
| | (L) Skyligl | | | | | | | | | | | | | | 4.8 |
| | (L) Sawtoo | | | | | | | | | | | | | | 4.8 |
| | (L) Monito | | | | | | | | | | | | | | 4.6 |
| | (L) Atrium | | | | | | | | | | | | | | |

| BUILDING DESC | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) |
|---|---|---|---|---|---|
| ***ADMIN <5000 SF*** | **$1.56** | **11.4%** | **49.0%** | **33.0%** | **6.6%** |
| (H) Direct Gain + St | | | | | |
| (H) Indirect Gain | | | | | |
| (H) Direct Gain | | | | | |
| (H) Sunspace | | | | | |
| (C) Night Mech Vent | | | | | |
| (C) Natural Vent | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% |
| (L) Windows | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% |
| (L) Skylights | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% |
| (L) Sawtooth Ap | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% |
| (L) Monitor Ap. | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% |
| (L) Atrium | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% |

**Figure 5-2: Appendix E: Energy cost data**

Energy costs are listed in two ways: (1) total energy costs for the building, per square foot per year, and (2) cost by end use category as a percent of the total. End use categories are:

- *$Heat = heating (including parasitic electricity)*
- *$Cool = cooling (including ventilation)*
- *$Lite = lighting*
- *$Othr = process*

Energy costs for electricity include peak demand as well as consumption costs.

The data in Appendix E are used: (1) to calculate an estimate of the total energy costs, in 1987 dollars, for the first year of operation, and (2) to calculate the cost by end use category.

From Figure 5-2, the total energy cost of a conventional ADMIN, <5000 SF building is $1.56 per square foot per year (in 1987 dollars). The total energy costs for the building would be $7,800 if the building were 5000 sf; that is:

**Annual Energy Cost Calculation**

*$Total Energy = Area x ($ / sf)*

In this case

$Total Energy = 5000 x 1.56 = $7,800

The fraction of the total energy cost for each end use category is:

- $Heat = 11.4%
- $Cool = 49.0%
- $Lite = 33.0%
- $Othr = 6.6%

The cost by end use, in dollars per square foot or dollars per (1987) year, would be:

**End Use Energy Cost Calculation**

*$End Use = $Total x %End Use*

For the above set of end use data, the resulting costs for an administration building of 5000 square feet in Climate Region 2 are:

$Heat = 1.56 x 0.114 = $.178/sf-yr or 7,800 x 0.114
= $ 889/yr

$Cool = 1.56 x 0.490 = $.764/sf-yr or 7,800 x 0.490
= $3,822/yr

$Lite = 1.56 x 0.330 = $.515/sf-yr or 7,800 x 0.330
= $2,574/yr

$Othr = 1.56 x 0.066 = $.103/sf-yr or 7,800 x 0.066
= $ 515/yr

Energy cost data can be used in a detailed comparison of the conventional nonsolar building and a passive solar building. Comparing the previous cost data for a conventional ADMIN, <5000 SF building with the same building daylighted using sawtooth apertures (SAW), the passive solar building energy costs are:

$Tot = 1.02 x 5000 = $5,100/yr

$Heat = 1.02 x 0.220 = $.224/sf-yr or 5,100 x 0.220
= $1,122/yr

$Cool = 1.02 x 0.527 = $.538/sf-yr or 5,100 x 0.527
= $2,688/yr

$Lite = 1.02 x 0.152 = $.155/sf-yr or 5,100 x 0.150
= $ 775/yr

$Othr = 1.02 x 0.101 = $.103/sf-yr or 5,100 x 0.101
= $ 515/yr

and the savings, by end use category are:

| | Conventional | Passive | Savings |
|---|---|---|---|
| $Tot = | $7,800/yr | $5,100/yr | $2,700/yr |
| $Heat = | $ 889/yr | $1,122/yr | - 233/yr |
| $Cool = | $3,822/yr | $2,688/yr | $1,134/yr |
| $Lite = | $2,574/yr | $ 775/yr | $1,799/yr |
| $Othr = | $ 515/yr | $ 515/yr | 0/yr |

It is relatively easy to make end use cost comparisons, or comparisons of the total energy costs, for the nonsolar and solar buildings. For this example the cost savings is 34.6% (conventional nonsolar case vs. sawtooth case), or $0.54 per square foot for the first year of operation.

Turning off the electric lighting impacts not only the lighting energy use but also the heating and cooling energy use. Electric lighting, at best, is only about 25 - 30% efficient. That is, only about 25% of the input energy is converted to light, the rest is converted to heat. During the winter heating season this extra heat helps offset heating fuel usage; during summer it increases the need for cooling. When daylighting is used and the electric lighting is turned off, there is a decrease in lighting energy use, a decrease in cooling energy use, and an increase in heating energy use. The net result should be a decrease in both energy use and costs, as long as electricity is not used as a heating fuel. This can be seen in the conventional nonsolar building and the daylighted building (sawtooth) for the small administration building example discussed above.

## Step 9: HVAC System Analysis

Most passive heating and cooling concepts reduce energy use and cost but do not impact the size (capacity) of the HVAC or HV system. However, the use of daylighting may impact both the heating and cooling components of an HVAC or HV system. The net result is usually an increase in the heating plant size and a decrease in the cooling plant size.

In an HVAC system, it is usually advantageous to trade off heating capacity for cooling capacity, primarily because heating systems are only about one-tenth as expensive, per Btu/hr of capacity, as cooling systems. In this step, the impact of the passive solar strategy on the actual size of the HVAC or HV system will be considered.

**CLIMATE REGION 2** **Appendix E**

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Ltg (%) | $Othr (%) | HV AC Heat (Btu/hr/sf) | HV AC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | *ADMIN <5000 SF* | 87635 | 29.0% | 24.2% | 32.6% | 8.4% | 5.8% | $1.56 | 11.4% | 49.0% | 33.0% | 6.6% | 37 | 46 | 8.8 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79906 | 36.3% | 26.0% | 22.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 39 | 29 | 5 |
| | (L) Monitor Ap. | 72461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 50 | 6.9 |
| B | *ADMIN >5000 SF* | | | | | | | | | | | | 25 | 34 | 7.1 |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | 25 | 34 | 7 |
| | (L) Windows | | | | | | | | | | | | 25 | 34 | 7.3 |
| | (L) Skylights | | | | | | | | | | | | 26 | 23 | 4.9 |
| | (L) Sawtooth Ap | | | | | | | | | | | | 22 | 31 | 4.3 |
| | (L) Monitor Ap. | | | | | | | | | | | | 32 | 29 | 4.8 |
| | (L) Atrium | | | | | | | | | | | | 34 | 27 | 4.8 |
| | | | | | | | | | | | | | 25 | 39 | 4.6 |

| | BUILDING DESC | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) |
|---|---|---|---|
| A | *ADMIN <5000 SF* | 37 | 46 |
| | (H) Direct Gain + St | | |
| | (H) Indirect Gain | | |
| | (H) Direct Gain | | |
| | (H) Sunspace | | |
| | (C) Night Mech Vent | | |
| | (C) Natural Vent | 37 | 46 |
| | (L) Windows | 40 | 40 |
| | (L) Skylights | 30 | 38 |
| | (L) Sawtooth Ap | 39 | 29 |
| | (L) Monitor Ap. | 43 | 31 |
| | (L) Atrium | 37 | 50 |

**Figure 5-3: HVAC System Analysis**

Thermal system size, per square foot of floor area, can be determined from Appendix E in the section entitled "HVAC" as illustrated in Figure 5-3.

For the small administration building, the nonsolar building thermal system sizes are:

- o 37 Btu/hr/sf, heating
- o 46 Btu/hr/sf, cooling

The daylighted building, using sawtooth apertures, requires the following thermal systems:

- o 39 Btu/hr/sf, heating
- o 29 Btu/hr/sf, cooling

This represents a slight increase in the heating capacity and a substantial reduction in cooling capacity. The actual size of the thermal system will vary depending upon the floor area. For example, if the building is 2000 sf, the nonsolar case and daylighted case thermal capacity is:

| | Nonsolar Case | Daylighted Case |
|---|---|---|
| Heating | 74,000 Btu/hr | 78,000 Btu/hr |
| Cooling | 92,000 Btu/hr | 58,000 Btu/hr |

**HVAC Plant Size**

Sometimes it is useful to convert the cooling capacity to tons of cooling. One ton of cooling is equal to approximately 12,000 Btu/hr. Therefore, 92,000 Btu/hr equals 7.6 tons and 58,000 Btu/hr is 4.8 tons of cooling, respectively. *These calculations are useful only for planning purposes and cannot be used to size an actual HVAC system.*

Knowing the approximate size of the plant is not as critical as showing a change in the size was achieved using passive solar systems. For most HVAC systems, the reduced cost of the cooling component will more than offset the increased cost of the heating component. In an HV system the increased cost of the heating component is usually very minor.

When documenting changes in the size of the heating or cooling equipment, it is best to denote the change as a percentage rather than as an absolute value, because this is not an engineering calculation of an HVAC system. Thus, a reduction in cooling capacity of 37%, or an increase in heating capacity of 5% may be more useful than stating that it is anticipated that the passive system will reduce the cooling plant from 78,000 Btu/hr to 58,000 Btu/hr. When the first cost of the HVAC system in a passive solar building is less than the HVAC system in the nonsolar building, it provides further justification for the use of the passive solar system.

## Example 1: A Credit Union

As the previous discussion shows, determining performance characteristics for a given passive solar building follows much the same process used to determine the detailed nonsolar building performance. The purpose of doing a detailed passive building performance analysis is to document the energy and energy cost savings associated with the passive building.

**Step 7**

The total energy use, energy use priority, and peak demand for the example 10,000 sf administration building using sawtooth apertures for daylighting, as compared with the conventional nonsolar building, are as follows:

o Total energy use:

*Nonsolar Bldg = 70,708 Btu / sf-yr*
*Passive Solar Bldg = 53,916 Btu / sf-yr*

o Energy use priority (in Btu/sf-yr):

| Nonsolar Building | Passive Solar Building |
|---|---|
| *QHeat = 16,050* | *QHeat = 24,747* |
| *QCool = 15,697* | *QCool = 13,587* |
| *QLite = 28,707* | *QLite = 5,985* |
| *QVent = 5,161* | *QVent = 4,475* |
| *QProc = 5,161* | *QProc = 5,161* |

o Peak Demand (w/sf):

*Nonsolar Peak = 7.1 (w/sf)*
*Solar Peak = 4.8 (w/sf)*

From the above information, the solar building uses 23.7% less energy than does the nonsolar building. This decrease is primarily in lighting (79% reduction) and cooling (13% reduction), with an offsetting increase in heating (54% increase) energy use. Peak demand is 71 kW for the nonsolar case and 48 kW for the passive solar case, a savings of 32% in needed utility capacity. Figure 5-4 is representative of a small administrative building employing a daylighting passive system.

**Annual Energy Use**

Total energy use per year can also be calculated from the total energy per square foot data. For the conventional nonsolar building, the total energy use is approximately 707,000,000 Btu's per year (10,000 sf x 70708 Btu/sf-yr); for the passive solar building, it is 539,000,000 Btu's per year. This is a savings of 168,000,000 Btu's per year.

**Step 8**

Energy costs comparisons are as follows:

o Total energy costs:

*Nonsolar Bldg = $1.29 per sf-yr*
*Passive Solar Bldg = $0.92 per sf-yr*

o Energy cost priority (in $/sf-yr):

| Nonsolar Building | | Passive Solar Building | |
|---|---|---|---|
| *$Heat* | *= 0.112* | *$Heat* | *= 0.168* |
| *$Cool* | *= 0.557* | *$Cool* | *= 0.505* |
| *$Lite* | *= 0.517* | *$Lite* | *= 0.114* |
| *$Othr* | *= 0.103* | *$Othr* | *= 0.103* |

Energy cost savings (1987 dollars) are approximately 28% in the passive solar building. Total energy costs would be $12,900 for the conventional nonsolar building, as compared with $9,200 for the passive solar building.

The HVAC equipment comparisons are as follows: **Step 9**

o Heating Plant:

*Nonsolar = 250,000 Btu/hr*
*Solar = 320,000 Btu/hr*

o Cooling Plant

*Nonsolar = 340,000 Btu/hr* *Solar = 260,000 Btu/hr*
*Nonsolar = 28 tons* *Solar = 22 tons*

The heating plant has increased 28% in size, the cooling plant decreased 21%. The net impact is likely to be reduced first costs in the passive solar building. The impact of the HVAC system size changes on the economics of the building construction are discussed in Volume IV: Passive Solar Design.

**Figure 5-4: Security State Bank, Wells, Minnesota**

## Combinations Of Passive Solar Systems

In the credit union example, a single daylighting concept was analyzed. In many cases, combinations of passive solar options must be considered. The data in Appendix E was not intended to provide information about combinations of passive solar systems. Therefore, a set of guidelines has been developed to help you document the impact of combined passive systems.

There are five passive solar system combination guidelines:

1. *Passive heating plus passive cooling.*

**Heating + Cooling**

Use the heating (energy use, energy cost, HVAC system) values for the passive heating system, plus the lighting, cooling, ventilation, and process energy values from the passive cooling system.

2. *Passive heating plus daylighting.*

**Heating + Daylighting**

Determine the net heating value from the combination of passive heating and daylighting, plus the lighting, cooling, ventilation, and process energy values from the daylighting system.

3. *Passive cooling plus daylighting.*

**Cooling + Daylighting**

Determine the net cooling value from the combination of passive cooling and daylighting, plus the values for lighting, heating, ventilation, and process energy from the daylighting system performance data.

4. *Passive heating, cooling, and daylighting.*

**Heating, Cooling, and Daylighting**

Determine the net heating from the passive heating and daylighting system performance, the net cooling from the combination of passive cooling and daylighting. Determine all other values from the daylighting system performance data.

5. *Converting an HVAC system to an HV system.*

**HVAC systems**

Set the cooling load to 0.0 for both the base and passive cases. Recalculate total energy use. Set cooling cost to 0.0 and recalculate values for all other uses. Add 6% to represent ventilation energy costs. Set cooling peak demand and HVAC system size to 0.0.

To illustrate the application of these rules, imagine a case in which natural ventilation in combination with daylighting is to be analyzed (Combination Guideline 3: Passive Cooling plus Daylighting). If the cooling energy uses are 21,208 (Btu/sf-yr), 18,085 (Btu/sf-yr), and 13,005 (Btu/sf-yr) for the conventional nonsolar building, a naturally ventilated building, and a daylighted building, respectively, then the net cooling energy use

is determined in three operations:

*(1) determine net cooling savings from natural ventilation.*
*(2) determine net cooling savings from daylighting.*
*(3) determine net cooling savings from combined systems.*

That is:

**Example Use Of Guidelines**

Ventilation savings = Conventional - NVent = 21,208 - 18,085
= 3,123 Btu/sf-yr

Daylight savings = Conventional - Daylt = 21,208 - 13,005
= 8,203 Btu/sf-yr

Net savings = Conventional - (net vent + net daylt)
= 21,208 - (3,123 + 8,203)
= 9,882 Btu/sf-yr

The procedure for determining net heating savings is similar. Given a combined passive heating plus daylighting system (Combination Guideline 2), if the conventional nonsolar building heating energy use is 17,464 Btu/sf-yr, the passive heating system heating energy use is 12,403 Btu/sf-yr and the daylighting system heating use is 19,710 Btu/sf-yr, then the net energy use would be:

Heating savings = Conventional - Heating = 17,464 - 12,403
= 5,067 Btu/sf-yr

Daylight savings = Conventional - Daylt = 17,464 - 19,710
= -2,246 Btu/sf-yr

Net savings = Conventional - (Net Heating + Net Daylt)
= 17,464 - (5,067 - 2,246) = 14,649 Btu/sf-yr

Note that the combined effect of the daylighting plus passive heating produces a net energy savings for heating as opposed to the increase produced by the daylighting system alone.

These guidelines for combining the results of several cases provide a manual method for approximating the net result of a combination of two or more passive solar features. The same basic rules are used to calculate net energy use, net energy costs, peak demand, and HVAC system size.

A majority of the buildings ultimately constructed as a result of the recommendations in this handbook will make use of a variety of appropriate passive concepts. Therefore, we believe that it is important that you learn how to calculate the impact of combined systems on energy use and costs.

## Example 2: A Warehouse

This building will be assumed to have two passive solar features, direct gain (DG) for heating and skylights (SKY) for daylighting. The building is located in Climate Region 2. Data is from Appendix E. Figure 5-5 is representative of a warehouse employing daylight and direct gain passive solar features.

The total energy use, energy use priority, and peak demand for the example 5,000 sf warehouse using both direct gain and skylights as compared with the conventional nonsolar building are as follows:

**Step 7**

o Total energy use:

Nonsolar building = 25,127 Btu/sf-yr

Solar, direct gain = 21,584 Btu/sf-yr
Solar, daylighting = 23,252 Btu/sf-yr

Combined Solar = 19,801 Btu/sf-yr (see below)

o Energy use priority (in Btu/sf-yr):

Nonsolar building:

QHeat = 16,056
QLite = 7,086
QVen = 1,985

| Solar, direct gain | Solar, daylighting |
|---|---|
| QHeat = 12,605 | QHeat = 19,252<br>QLite = 2,000<br>QVent = 2,000 |

Direct gain savings = 16,056 - 12,605 = 3,451

Daylighting savings = 16,056 - 19,252 = -3,196

Net QHeat = 16,056 - (3,451 - 3,196) = 15,801

Combined Solar Energy Use:

QHeat = 15,801
QLite = 2,000
QVent = 2,000

QTot = 19,801 Btu/sf-yr

o Peak Demand (w/sf):

| Nonsolar building | Solar, daylighting |
|---|---|
| Peak = 0.7 | Peak = 0.3 |

From this information, it is shown that the solar building uses 21.1% less energy than does the nonsolar building. Energy use reductions are primarily in lighting (28% reduction) and heating (2% reduction).

Total energy use per year can also be calculated from the total per square foot data. For the conventional nonsolar building the total energy use is approximately 125,000,000 Btu's per year (5,000 sf x 25127 Btu/sf-yr); for the passive building it is 99,000,000 Btu's per year. This is a savings of 26,000,000 Btu's per year.

Peak demand is 3.5kW for the nonsolar building and 1.5kW for the passive building, a savings of 57% in needed utility capacity.

**Step 8**

Energy cost comparisons are as follows:

o Total energy costs:

| | |
|---|---|
| Nonsolar building | = $0.26 per sf-yr |
| Solar, heat | = $0.24 per sf-yr |
| Solar, daylight | = $0.17 per sf-yr |
| Solar, combined | = $0.15 per sf-yr (see below) |

o Energy cost priority (in $/sf-yr):

Nonsolar building:

$Heat = 0.109
$Cool = 0.021
$Lite = 0.130
$Othr = 0.000

| Solar, direct gain | Solar, daylighting |
|---|---|
| $Heat = 0.088 | $Heat = 0.127<br>$Lite = 0.023<br>$Cool = 0.020 |

Direct gain savings = 0.109 - 0.088 = 0.021

Daylighting savings = 0.109 - 0.127 = -0.018

Net $Heat savings = 0.109- (0.021-0.018) = 0.106

Combined Solar Energy Costs:

$Heat = 0.106
$Lite = 0.023
$Cool = 0.020
$Othr = 0.000
$Tot = 0.149 $/sf-yr

Energy cost savings (1987 dollars) are approximately 43% in the passive solar building. Total energy costs would be $1,300 for the conventional nonsolar building as compared with $745 for the passive solar building.

No net savings are achieved in heating energy costs; however, this is an improvement over the performance characteristics of most daylighting systems when used alone. Lighting energy costs are reduced 82% and cooling costs remain unchanged. The cooling energy costs are to ventilate the building using an HV system.

**Step 9**

The HV equipment comparisons are as follows:

o Heating Plant:

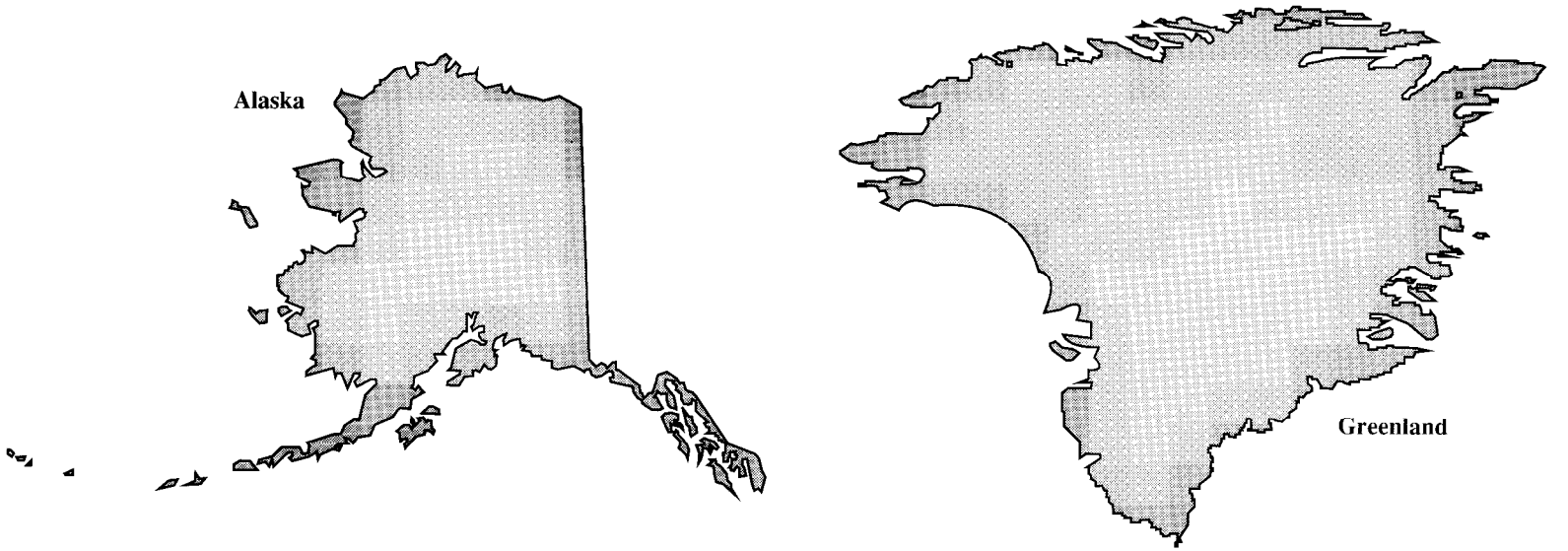
Nonsolar = 85,000 Btu/hr Solar = 85,000 Btu/hr

The detailed calculations shown in this section can provide justification for the use of passive solar systems in the proposed warehouse.

**Figure 5-5: McCaffrey Warehouse, Fort Collins, Colorado**

# CLIMATE REGION 1

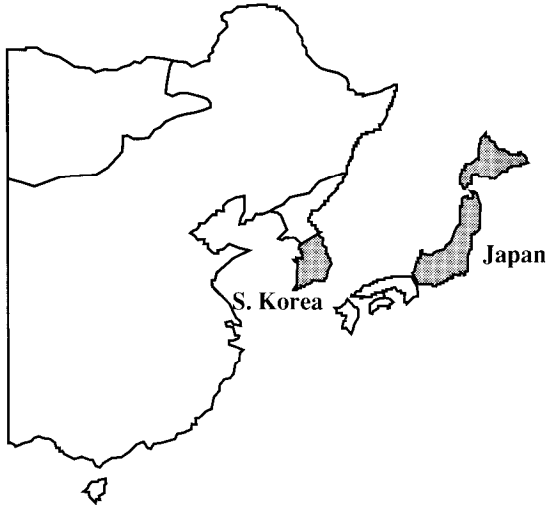
**Appendix A**

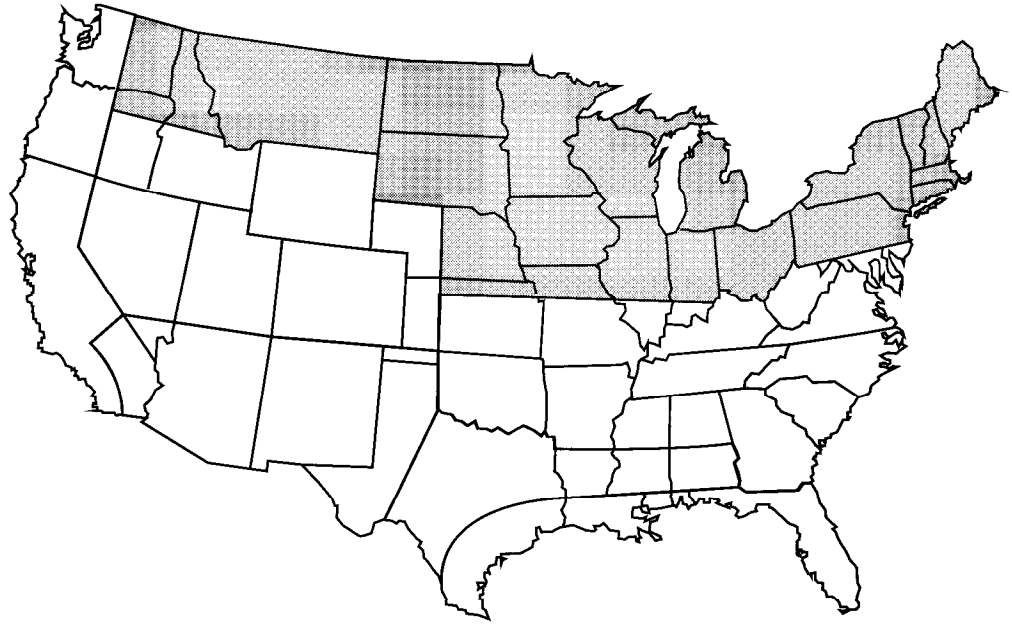



| Climate Characteristics | | U.S. Air Force Bases |
|---|---|---|
| HDD (Range) | 7,000 to 21,000 | CLEAR |
| CDD (Range) | 0 to 50 | EIELSON |
| LEH (Range) | 0 to 100 | ELMENDORF |
| RAD (Range) | 0.35 to 0.50 | KING SALMON |
| | | SHEMYA |
| | | SONDRESTROM |
| | | THULE |

# CLIMATE REGION 2

**Appendix A**



| Climate Characteristics | |
|---|---|
| HDD (Range) | 4,750 to 11,000 |
| CDD (Range) | 500 to 1250 |
| LEH (Range) | 2,500 to 10,000 |
| RAD (Range) | 0.40 to 0.60 |

| U.S. Air Force Bases | | |
|---|---|---|
| CHANUTE | KUNSAN | OTIS |
| ELLSWORTH | LORING | PEASE |
| FAIRCHILD | MALMSTROM | PLATTSBURGH |
| GRAND FORKS | MCGUIRE | WILLOW GROVE |
| GRIFFISS | MINOT | WRIGHT-PATTERSON |
| GRISSOM | MISAWA | WURTSMITH |
| HANSCOM | OFFUTT | YOKOTA |
| K. I. SAWYER | OSAN | |

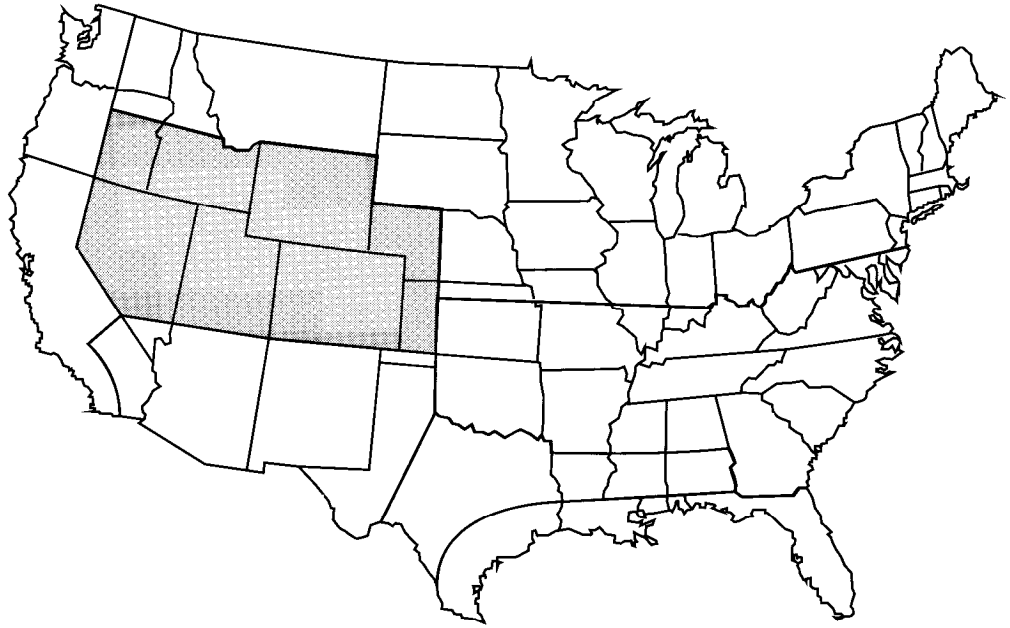
# CLIMATE REGION 3



| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | 1,250 to 6,000 | BEALE | NORTON |
| CDD (Range) | 0 to 2,250 | CASTLE | ONIZUKA |
| LEH (Range) | 0 to 3,000 | GEORGE | TRAVIS |
| RAD (Range) | 0.40 to 0.70 | MARCH | VANDENBERG |
| | | MATHER | |
| | | MCCLELLAN | |
| | | MCCHORD | |

# CLIMATE REGION 4

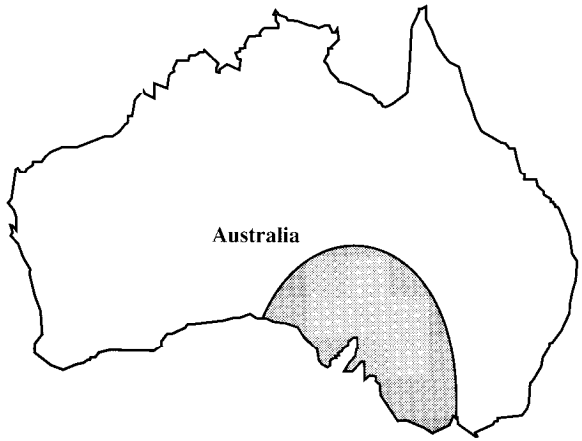
**Appendix A**

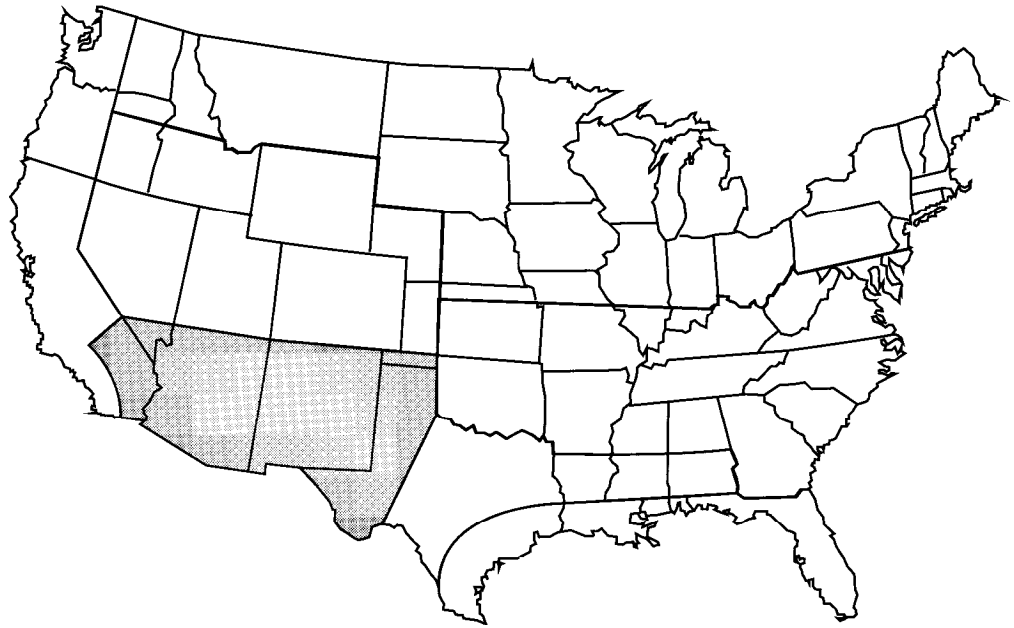


| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| **HDD (Range)** | 4,500 to 10,000 | FALCON | PETERSEN |
| **CDD (Range)** | 0 to 1,500 | F.E. WARREN | USAF ACADEMY |
| **LEH (Range)** | 0 to 1,000 | HILL | |
| **RAD (Range)** | 0.50 to 0.70 | INDIAN SPRINGS | |
| | | LOWRY | |
| | | MOUNTAIN HOME | |
| | | NELLIS | |

# CLIMATE REGION 5

**Appendix A**

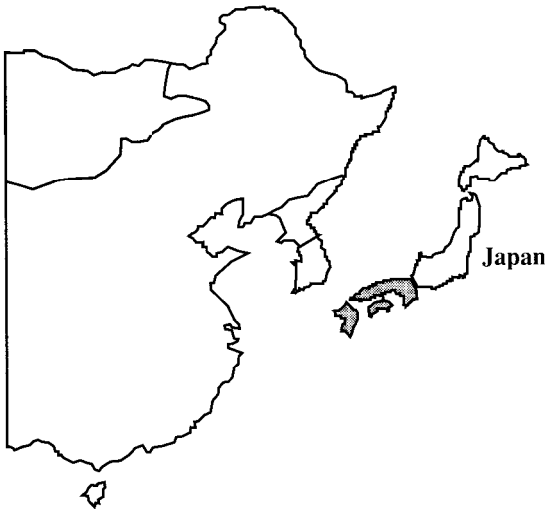


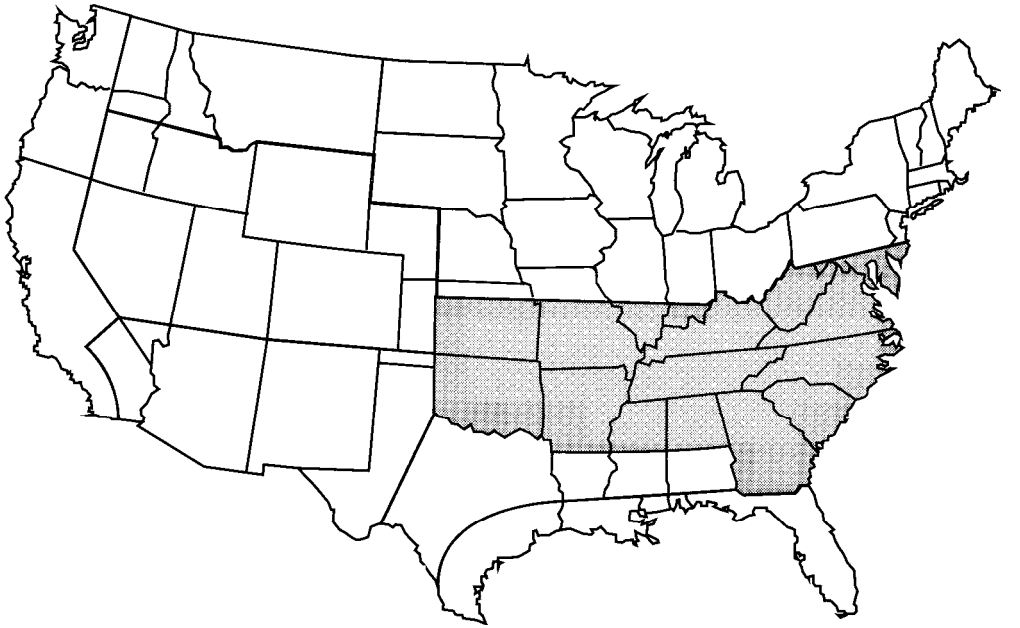



| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | 1,000 to 6,000 | CANNON | WILLIAMS |
| CDD (Range) | 250 to 2,250 | DAVIS-MONTHAN | WOOMERA |
| LEH (Range) | 5,000 to 15,000 | EDWARDS | |
| RAD (Range) | 0.60 to 0.75 | HOLLOMAN | |
| | | KIRTLAND | |
| | | LUKE | |
| | | REESE | |

# CLIMATE REGION 6

**Appendix A**



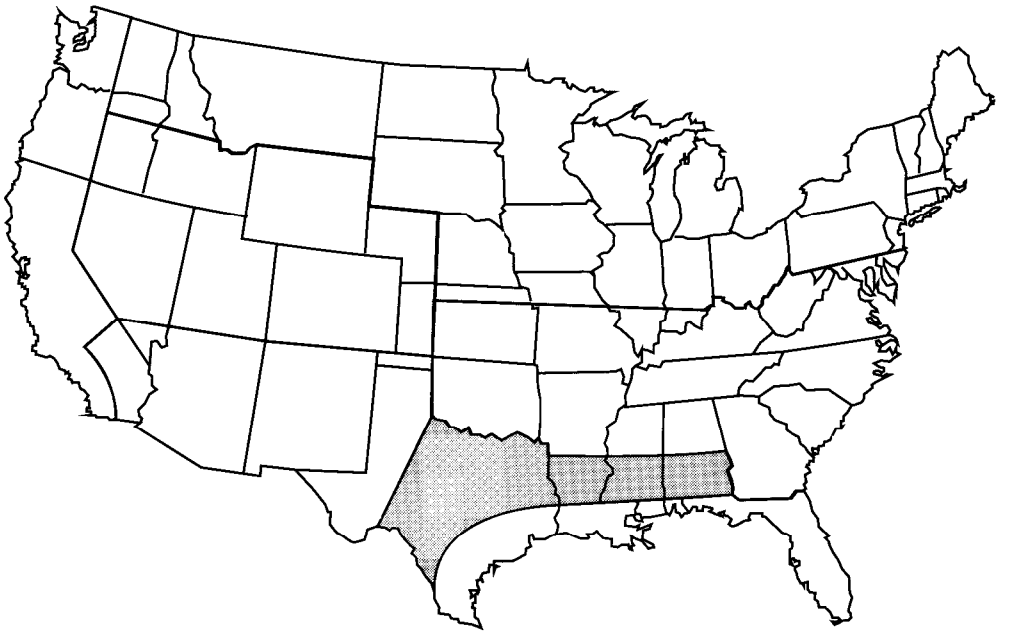



| Climate Characteristics | |
|---|---|
| **HDD (Range)** | 1,750 to 5,000 |
| **CDD (Range)** | 650 to 2,500 |
| **LEH (Range)** | 10,000 to 20,000 |
| **RAD (Range)** | 0.45 to 0.60 |

| U.S. Air Force Bases | | |
|---|---|---|
| ALTUS | EAKER | SEYMOUR JOHNSON |
| ANDREWS | LANGLEY | SHAW |
| ARNOLD | LITTLE ROCK | TINKER |
| BOLLING | MCCONNELL | WHITEMAN |
| CHARLESTON | POPE | WHITEMAN |
| DOBBINS | ROBINS | SHAW |
| DOVER | SCOTT | WHITEMAN |

# CLIMATE REGION 7

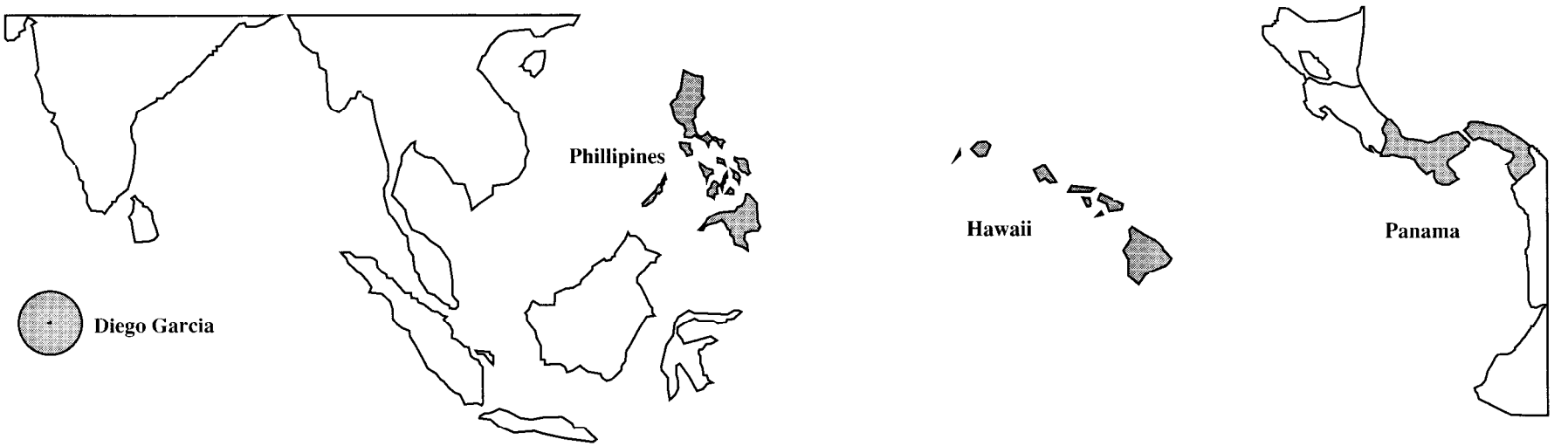
**Appendix A**



| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | 1,500 to 4,000 | BERGSTROM | KELLY |
| CDD (Range) | 1,750 to 3,500 | BROOKS | LACKLAND |
| LEH (Range) | 15,000 to 27,500 | CARSWELL | LAUGHLIN |
| RAD (Range) | 0.45 to 0.60 | COLUMBUS | MAXWELL |
| | | DYESS | RANDOLPH |
| | | GOODFELLOW | SHEPPARD |
| | | GUNTER | VANCE |

# CLIMATE REGION 8






| Climate Characteristics | | U.S. Air Force Bases |
|---|---|---|
| HDD (Range) | 0 | ANDERSON |
| | | ASCENSION (EQUATORIAL ATLANTIC OCEAN - Not Shown) |
| CDD (Range) | 2,500 to 5,000 | CLARK |
| | | DIEGO GARCIA |
| LEH (Range) | 17,500 to 30,000 | HICKAM |
| | | HOWARD |
| RAD (Range) | 0.40 to 0.60 | WHEELER |

# CLIMATE REGION 9

**Appendix A**


| Climate Characteristics | | U.S. Air Force Bases | | |
|---|---|---|---|---|
| HDD (Range) | 1,500 to 4,000 | ABINGDON | GREENHAM COMMON | WETHERSFIELD |
| CDD (Range) | 0 to 500 | ALCONBURY | HIGH WYCOMBE | WOODBRIDGE |
| LEH (Range) | 0 to 500 | BENTWATERS | LAKENHEATH | |
| RAD (Range) | 0.40 to 0.55 | CHICKSANDS | MILDENHALL | |
| | | C.N.A. (SOESTERBURG) | MOLESWORTH | |
| | | CROUGHTON | SCULTHORPE | |
| | | FLORENNES | UPPER HEYFORD | |

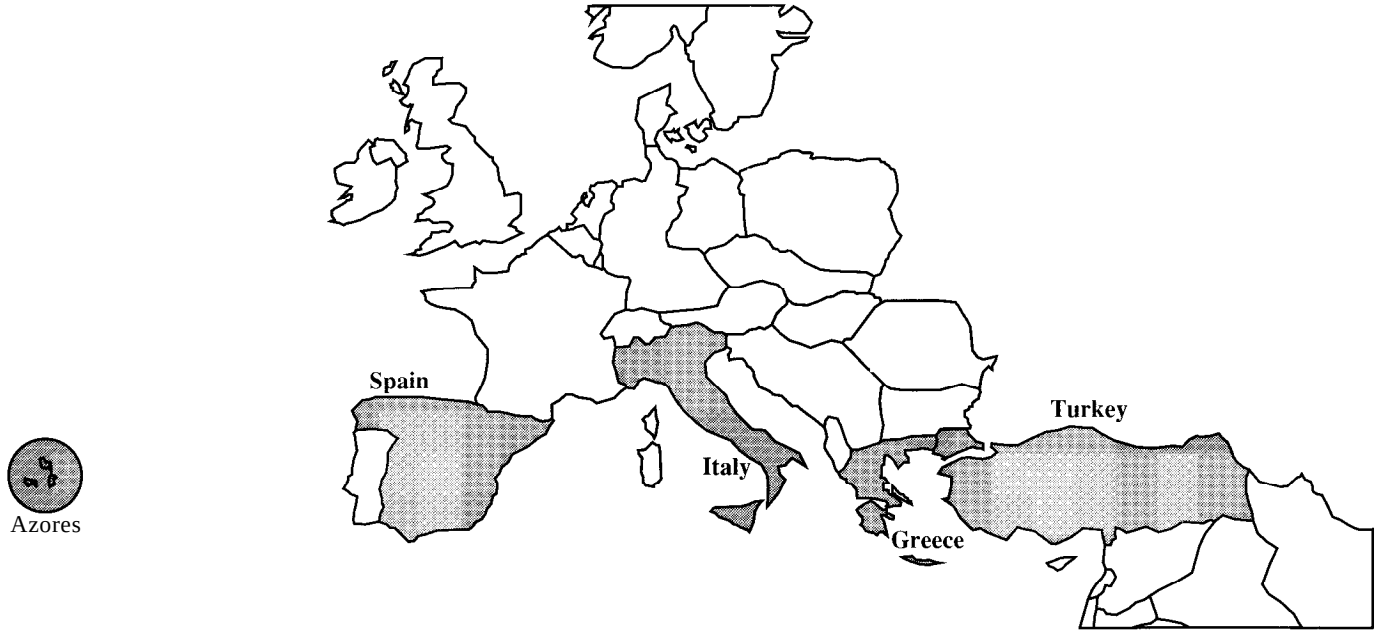
# CLIMATE REGION 10

**Appendix A**


| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | 4,000 to 7,500 | BITBURG | RHINE ORDINANCE |
| CDD (Range) | 0 to 1,000 | HAHN | SEMBACH |
| LEH (Range) | 500 to 2,000 | HESSISCH-OLDENDORF | SPANGDAHLEM |
| RAD (Range) | 0.40 to 0.55 | KAPAUN | VOGELWEH |
| | | LANDSTUHL | WERSCHEIM |
| | | RAMSTEIN | |
| | | RHEIN MAIN | |

# CLIMATE REGION 11

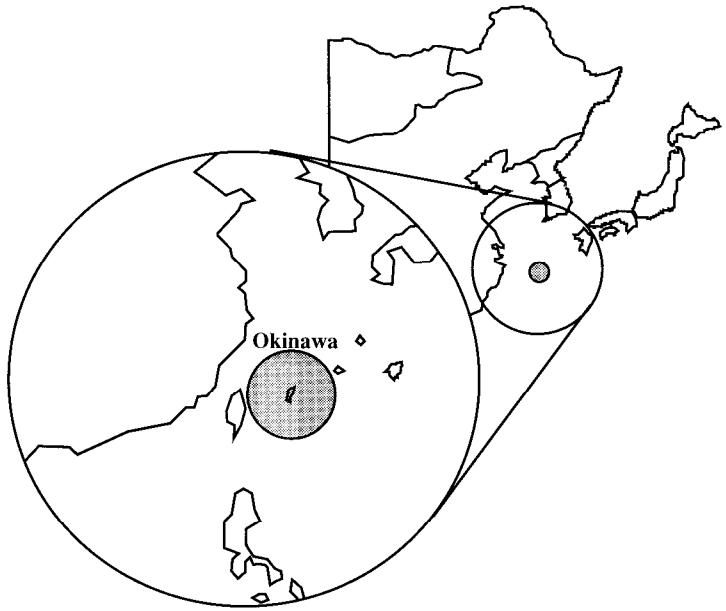
**Appendix A**

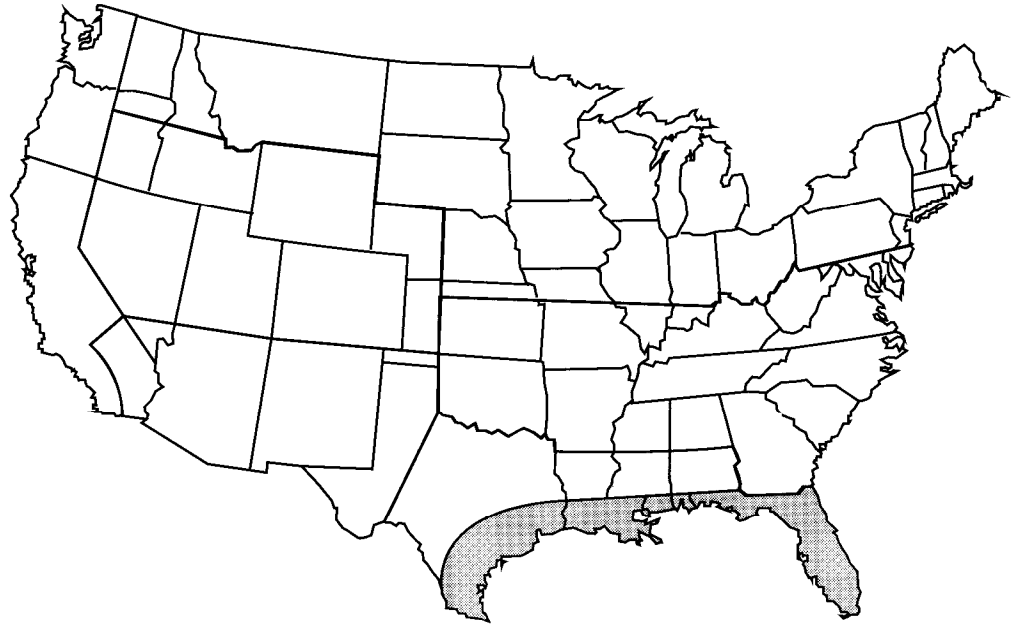



| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | 2,000 to 6,500 | ANKARA | IZMIR |
| CDD (Range) | 1,000 to 2,500 | AVIANO | LAJES FIELD |
| LEH (Range) | 1,000 to 7,500 | COMISO | SAN VITO |
| RAD (Range) | 0.45 to 0.60 | CRETONE | TORREJON |
| | | HELLENIKON | ZARAGOZA |
| | | INCIRLIK | |
| | | IRAKLION | |

# CLIMATE REGION 12

**Appendix A**



| Climate Characteristics | | U.S. Air Force Bases | |
|---|---|---|---|
| HDD (Range) | O to 1,750 | BARKSDALE | MACDILL |
| CDD (Range) | 2,250 to 4,500 | EGLIN | MOODY |
| LEH (Range) | 15,OOO to 27,500 | ENGLAND | PATRICK |
| RAD (Range) | 0.45 to 0.55 | HOMESTEAD | TYNDALL |
| | | HURLBURT | |
| | | KADENA | |
| | | KEESLER | |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| A,B,C,D | 100-000 | C31 FACILITY |
| I,J,K,L | 111-000 | ACFT OPS/MAINT FACILITY |
| A,B,C | 120-000 | POL OPS FACILITY |
| A,B | 121-111 | PETROLEUM OPS BUILDING |
| NC | 121-120 | QUICK-TURN FACILITY |
| G | 130-142 | FIRE STATION |
| A,B,C | 130-833 | CENTRAL SECURITY CONTROL |
| A,B,C | 130-835 | SP OPERATIONS |
| D | 131-111 | TELECOMM CENTER |
| D | 131-118 | DIGITAL FACILITY |
| D | 131-132 | SATCOM GROUND TERMINAL |
| D | 131-134 | AIR COMM FACILITY |
| D | 131-136 | AIR COMM RELAY FACILITY |
| D | 131-138 | RECEIVER/TRANSMITTER FACILITY |
| D | 131-139 | MICROWAVE RELAY STATION |
| D | 131-143 | RADAR FACILITY |
| NC | 134-XXX | REMOTE CONTROL AND GROUND CONTROL FAC |
| NC | 134-375 | RAPCON |
| A,B,C | 140-000 | COMMAND POST |
| A,B,C | 140-453 | MOBILITY READINESS FACILITY |
| A,B,C | 140-454 | ORDINANCE CONTROL |
| NC | 140-459 | CREW READINESS/COMBAT CONTROL FAC |
| A,B,C | 140-461 | USAF COMMAND POST |
| A,B,C | 140-753 | SQ OPERATIONS |
| A,B,C | 140-763 | INTEGRATION SUP FAC |
| A,B,C | 140-764 | INTEGRATION SUP FAC |
| A,B | 141-000 | COMMAND POST |
| R | 141-132 | STORAGE FACILITY |
| G | 141-165 | EXPLOSIVE ORDINANCE DISPOSAL |
| J | 141-181 | AIRCRAFT SHELTER |
| J | 141-182 | AIRCRAFT SHELTER |
| R | 141-185 | STORAGE FACILITY |
| D | 141-383 | AUDIO-VISUAL FACILITY |
| NC | 141-389 | TV PRODUCTION FACILITY |
| A,B | 141-451 | COMPUTER FACILITY |
| A,B,C | 141-453 | BASE OPERATIONS |
| D | 141-454 | MOBILITY READINESS FACILITY |
| A,B | 141-455 | ORDINANCE CONTROL |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
| K | Maintenance Facility, with HVAC |
| L | Maintenance Facility, Low-Bay |
| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| NC | 141-626 | CONTROL TOWER |
| NC | 141-629 | WEATHER OBSERVATION FACILITY |
| NC | 141-743 | BASE PHOTO LAB |
| NC | 141-745 | COMBAT TARGET CTR |
| NC | 141-747 | PPIF FACILITY |
| NC | 141-748 | PASSENGER TERMINALS |
| A,B,C,D | 141-750 | TECH OPERATIONS FAC |
| NC | 141-766 | CHEMICAL LABORATORY |
| R | 141-782 | AIR FREIGHT TERMINAL |
| R | 141-783 | AIR FREIGHT TERMINAL PART (ONLY) |
| NC | 141-784 | AIR PASSENGER TERMINALS |
| NC | 149-962 | TRAFFIC CONTROL TOWER |
| D | 171-152 | COMBAT MANEUV INSTRU FACILITY |
| N,O,P | 171-158 | BAND CTR |
| N,O,P | 171-211 | FLYING TRAINING CLASSROOM |
| D | 171-212 | FLIGHT SIMULATOR TRAINING |
| N,O,P | 171-213 | FLIGHT TRAINING UNIT |
| N,O,P | 171-214 | PHYSIOLOGICAL TRAINING |
| A,B,C | 171-356 | HISTORICAL RESEARCH CENTER |
| A,B,C | 171-445 | SQUAD OPS FACILITY |
| R | 171-472 | RANGE SUPPLY AND EQUIPMENT STORAGE |
| L,R | 171-473 | RANGE TARGET STORAGE AND REPAIR |
| NC | 171-475 | INDOOR SMALL-ARMS RANGE |
| NC | 171-476 | SMALL-ARMS MARKSMANSHIP TRAINING |
| D | 171-611 | SCIENTIFIC FACILITY |
| N,O,P | 171-618 | FIELD TRAINING FACILITY |
| A,B,C,D | 171-620 | COMBAT LOGISTICS SUPPORT FACILITY |
| D | 171-621 | TECH TRAINING FACILITY |
| N,O,P | 171-623 | TECH TRAINING LAB/SHOP |
| N,O,P | 171-623 | AVIONICS ACADEMIC CLASSROOMS |
| NC | 171-625 | LIQ FUELS TRAINING FAC |
| J | 171-625 | HIGH-BAY TECH TRAINING FAC |
| N,O,P | 171-712 | TARGET INTELLIGENCE TRAINING |
| D | 171-810 | RADAR BOMB-SCORE FACILITY |
| N,O,P | 171-813 | SAFETY EDUCATION FACILITY |
| N,O,P | 171-815 | NCO PME CENTER |
| N,O,P | 171-851 | LEADERSHIP DEV COMPLEX |
| N,O,P | 171-873 | AERIAL PORT |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
| K | Maintenance Facility, with HVAC |
| L | Maintenance Facility, Low-Bay |
| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| N,O,P | 171-875 | MUNITIONS LOAD-REW TRAINING FAC |
| NC | 179-475 | SMALL ARMS TRAINING |
| I,J,K,L | 200-000 | ACFT MAINTENANCE & MGMT FAC |
| I,J,K,L,R | 210-000 | MUNI MAINTENANCE/STORAGE FAC |
| I,K,L | 210-000 | MUNITIONS MAINT FAC |
| L | 211-XXX | LOW-BAY INSTRU/ELECT EQUIP MAINT SHOP |
| I,J,K,L | 211-000 | MAINTENANCE COMPLEX |
| J | 211-111 | HANGAR |
| NC | 211-111 | FUEL SYSTEMS MAINT DOCK |
| NC | 211-133 | FUEL ACCESSORIES TEST FACILITY |
| I,K,L,R | 211-147 | AIRCRAFT WEAPONS CAL SHELTER |
| I,J,L | 211-152 | ACFT MAINTENANCE |
| NC | 211-152 | LOW-BAY |
| J | 211-152 | MAINTENANCE HANGAR |
| NC | 211-153 | NDI LAB |
| I,J,K,L | 211-154 | MAINTENANCE COMPLEX |
| J | 211-154 | HIGH-BAY FACILITY |
| I,J,K,L | 211-157 | GENERAL PURPOSE/NDI/ACFT ORG MAINT SHOP |
| J | 211-159 | CORROSION CONTROL FAC |
| J | 211-159 | CORROSION CONTROL FACILITY |
| I,J,K | 211-179 | FUEL SYSTEMS MAINT FACILITY |
| NC | 211-179 | FUEL SYST MAINT FACILITY |
| NC | 211-183 | SOUND-SUPPRESSOR SUP FAC |
| NC | 211-193 | SOUND-SUPPRESSOR SUP FAC |
| NC | 211-254 | CONSOLIDATED FUEL CONTROL FACILITY |
| NC | 211-271 | DEPOT INSTRUMENT OH SHOP |
| I,J,K,L | 211-271 | DEPOT INSTN OVERHAUL SHOP |
| R | 212-213 | MUNITIONS MAINT AND STORAGE |
| L,R | 212-213 | MUNITIONS MAINTENANCE/STORAGE |
| I,J,K,L | 212-216 | MISSILE MAINTENANCE SHOP |
| I,J,K,L | 213-XXX | TACTICAL MISSILE/GUIDE WEAPON MAINT SHOP |
| I,J,K,L | 213-636 | MARINE MAINT SHOP |
| NC | 214-425 | VEHICLE MAINTENANCE FACILITY |
| I,J,K,L | 214-425 | VEHICLE MAINT SHOP |
| R | 214-425 | VEHICLE OPERATION HEATED-PARKING SHED |
| R | 214-426 | VEHICLE OPERATION HEATED-PARKING SHED |
| R | 214-428 | VEHICLE OPERATION HEATED-PARKING SHED |
| I,J,K,L | 214-467 | VEHICLE MAINT SHOP |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| **A** | Administration, <5000 SF |
| **B** | Administration, >5000 SF |
| **C** | Administration, Multistory |
| **D** | Administration, Computer Facility |
| **E** | Dining or Food Service Facility |
| **F** | Dormitory |
| **G** | Fire Station |
| **H** | Industrial Facility |
| **I** | Maintenance Facility, <5000 SF |
| **J** | Maintenance Facility, High-Bay |
| **K** | Maintenance Facility, with HVAC |
| **L** | Maintenance Facility, Low-Bay |
| **M** | Auditorium, Cinema, Theatre |
| **N** | Training Facility, School, <5000 SF |
| **0** | Training Facility, School, >5000 SF |
| **P** | Training Facility, Multistory |
| **Q** | Gymnasium |
| **R** | Warehouse, Storage Facility |
| **NC** | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| I,J,K,L | 215-XXX | WEAPONS & MUNITIONS MAINT SHOP |
| I,J,K,L | 216-642 | AMMO MAINT SHOP |
| I,J,K,L | 217-000 | VEHICLE MAINT FAC |
| NC | 217-000 | MAINT/STORAGE AND VEH PARKING FAC |
| K | 217-712 | AVIONICS REPAIR FAC |
| I,J,K,L | 217-713 | AIRCRAFT EQM POD SHOP |
| I,J,L,R | 217-713 | POD SHOP AND STORAGE |
| K | 217-713 | HAVAIDS COMM MAINT SHOP |
| I,J,K,L | 217-735 | ENGINEERING TEST FAC |
| I,J,K,L | 217-812 | EW MAINT FAC |
| I,J,K,L | 218-712 | SPECIAL EQUIPMENT SHOP |
| A,B,C,D | 218-712 | ACFT SUP EQUIP FAC |
| L | 217-762 | HVACAIDS COMM MAINT SHOP |
| I,J,K,L | 218-852 | PARACHUTE-EGRESS FACILITY |
| NC | 218-868 | PRECISION MEASUREMENT LAB |
| I,J,K,L | 219-000 | BCE COMPLEX |
| R | 219-422 | STORAGE FACILITY |
| I,J,K,L | 219-900 | BCE MAINT COMPLEX |
| I,J,K,L | 219-940 | BCE MAINT COMPLEX |
| I,J,K,L | 219-943 | BCE MAINT SHOP |
| I,J,K,L | 219-944 | BCE MAINT SHOP |
| R | 219-946 | STORAGE FACILITY |
| R | 219-947 | STORAGE FACILITY |
| H | 220-XXX | PRODUCTION |
| D | 310-916 | COMPUTER SERVICE CTR |
| NC | 310-921 | BIOCOMMUNICATIONS LAB |
| NC | 310-922 | OPTICAL SYS LAB |
| NC | 310-926 | MICROWAVE LAB |
| A,B,C,D | 311-173 | ACFT SYS ENG FAC |
| I,J,K,L | 311-174 | TEST & EVALUATION FAC |
| I,J,K,L | 315-236 | GUIDED WEAPON & EVAL FAC |
| I,J,K,L | 317-311 | ELECT TEC/RESEARCH LAB |
| I,J,K,L | 317-315 | SYS MGT ENG FAC |
| I,J,K,L | 317-932 | AVIONICS RESEARCH LAB |
| I,J,K,L | 318-612 | ACFT FIRE PROT/EXPL RES FAC |
| R | 318-612 | PROPANE LAB STORAGE |
| I,J,K,L | 319-946 | HAZARDOUS-MATTER EVAL FAC |
| NC | 319-951 | TEST TRACK FACILITY |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
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| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| A,B,C | 400-000 | COMMAND POST, SUPPORT |
| NC | 411-135 | HYDRANT FUEL SYSTEM AND STORAGE |
| R | 411-628 | TOOLING SHED |
| R | 422-250 | OPS/MUNITIONS STORAGE FAC |
| R | 422-258 | MUNITIONS STORAGE FACILITY |
| R | 422-264 | MUNITIONS STORAGE IGLOOS |
| R | 422-275 | MUNITIONS PRELOAD COMPLEX |
| R | 441-758 | DEPOT WAREHOUSE |
| R | 442-000 | RRR EQUIPMENT STORAGE |
| NC | 442-257 | BASE HAZARDOUS-MATERIAL STORAGE |
| NC | 442-275 | ANCILLARY EXPLOSIVE COMPLEX |
| NC | 442-515 | MEDICAL STORAGE |
| NC | 442-628 | BASE HAZARDOUS-MATERIAL STORAGE |
| NC | 442-750 | RESOURCE MANAGEMENT COMPLEX |
| J,R | 442-758 | AIRCRAFT WAREHOUSE/RRR EQUIP STORAGE |
| R | 442-765 | TROOP SUBSISTENCE WAREHOUSE |
| R | 442-768 | FORMS/PUBLICATIONS WAREHOUSE |
| R | 442-769 | HOUSING SUPPLY/STORAGE FACILITY |
| NC | 510-XXX | HOSPITAL BUILDING |
| NC | 510-001 | DENTAL CLINIC |
| NC | 510-411 | DISPENSARIES |
| NC | 510-713 | MEDICAL LOGISTICS FACILITY |
| NC | 530-XXX | LABORATORIES |
| NC | 540-243 | DENTAL CLINIC |
| NC | 550-XXX | DISPENSARIES |
| A,B,C | 610-000 | CONSOLIDATED SUPPORT CENTER/LOG FAC |
| A,B,C,I | 610-100 | ACFT MAINTENANCE MGMT FAC |
| A,B,C | 610-111 | AREA DEFENSE OFFICE |
| A,B,C | 610-112 | LAW OFFICE |
| A,B,C | 610-119 | FAMILY-HOUSING MGMT OFFICE |
| A,B,C | 610-121 | VOA |
| A,B,C | 610-122 | BSA |
| A,B,C | 610-127 | BASE ENGINEERING ADMIN |
| A,B,C | 610-128 | BASE PERSONNEL OFFICE |
| A,B,C | 610-129 | WEAPONS SYS MUNITIONS MGMT FAC |
| A,B,C | 610-142 | TRAFFIC MGMT FAC |
| A,B,C | 610-144 | MUNITIONS MAINT ADMIN |
| A,B,C | 610-200 | CONSOLIDATED SUP FAC |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
| K | Maintenance Facility, with HVAC |
| L | Maintenance Facility, Low-Bay |
| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| F | 610-241 | ORDERLY ROOM, DORMATORY |
| A,B,C | 610-243 | AEROMED EVAC AIRLIFT SQ/ACB FAC |
| A,B,C | 610-249 | WING HEADQUARTERS |
| D | 610-281 | COMPUTER FACILITY |
| A,B,C | 610-282 | SUPPORT OFFICE |
| A,B,C | 610-284 | RECRUITING GROUP FAC |
| A,B,C | 610-285 | COMBAT CONTROL OFFICE |
| A,B,C | 610-286 | AIR DIV HEADQUARTERS |
| N,O,P | 610-287 | INSTRUCTIONAL FAC |
| A,B,C | 610-675 | SUPPORT CENTER |
| D | 610-711 | COMPUTER FACILITY |
| A,B,C | 610-915 | OSA BUILDING |
| F | 720-000 | UPH |
| E,F | 721-215 | DINING HALL IN DORMITORY |
| F | 721-311 | RECRUITS DORMITORY |
| F | 721-312 | AIRMEN PERMANENT PARTY/PCS-STUDENT DORM |
| F | 721-315 | VISITING AIRMEN QUARTERS DORM |
| E | 722-351 | AIRMEN DETACHED DINING HALL |
| E | 722-356 | OFFICERS DINING HALL |
| NC | 723-XXX | KITCHEN |
| F | 724-415 | UOPH |
| F | 724-417 | TRANSIENT BILLETING |
| F | 730-XXX | CONFINEMENT FACILITY (STOCKADE) |
| G | 730-142 | FIRE STATION/CRASH RESCUE OFFICE |
| NC | 730-182 | BREAD BAKERY |
| NC | 730-186 | PASTRY BAKERY |
| N,O,P | 730-441 | EDUCATION CENTER |
| NC | 730-443 | POST OFFICE |
| NC | 730-717 | CLOTHING STORE |
| NC | 730-771 | CHAPEL |
| N,O,P | 730-772 | RELIGIOUS EDUCATION CENTER |
| N,O | 730-772 | CHAPEL CENTER |
| N,O | 730-773 | CHAPEL CENTER |
| N,O | 730-774 | HOSPITAL CHAPEL |
| E | 730-781 | DEPENDENT BOARDING SCHOOL DINING HALL |
| NC | 730-782 | DEPENDENT ELEMENTARY SCHOOL |
| F | 730-782 | DEPENDENT BOARDING FACILITY |
| NC | 730-785 | DEPENDENT HIGH SCHOOL |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
| K | Maintenance Facility, with HVAC |
| L | Maintenance Facility, Low-Bay |
| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| Building Code | USAF Category Code | Building Description |
|---|---|---|
| NC | 730-821 | MATERIAL PROCESSING DEPOT |
| A,B,C | 730-832 | SECURITY POLICE CONTROL & IDENT |
| A,B,C | 730-833 | SP CENTRAL CONTROL |
| A,B,C | 730-835 | SP CENTRAL OP |
| NC | 730-836 | RESERVE FIRE TRAINING FAC |
| D | 730-838 | MASTER SURVEILLANCE & CONTROL FAC |
| A | 730-839 | GUARD HOUSE |
| NC | 730-842 | SECURITY POLICE KENNEL SUPPORT |
| A,B,C | 740-000 | CONSOLIDATED PERSONNEL SUP CTR |
| A,B,C | 740-155 | CREDIT UNIONS |
| A,B,C | 740-153 | BRANCH BANKS |
| A,B,C | 740-171 | RED CROSS OFFICE |
| A,B,C | 740-253 | FAMILY SERVICES CENTER |
| NC | 740-255 | THRIFT SHOP |
| NC | 740-266 | STORE |
| K | 740-266 | COMMISSARY STORE |
| K | 740-269 | BASE PACKAGE STORE |
| E | 740-315 | ROD AND GUN CLUB |
| E | 740-316 | RECREATION CENTER |
| E | 740-317 | AERO CLUB |
| NC | 740-379 | BX AMUSEMENT TR |
| E | 740-381 | BX CAFETERIA AND SNACK BAR |
| NC | 740-382 | BRANCH BASE EXCHANGE |
| I,J,K,L | 740-385 | BX MAINT SHOP |
| A,B,C | 740-386 | BX ADMIN |
| NC | 740-388 | BASE EXCHANGE |
| K | 740-389 | SERVICE OUTLET |
| F | 740-443 | TLF |
| E | 740-615 | CONSOLIDATED OPEN MESS |
| E | 740-617 | OFFICERS CLUB |
| E | 740-618 | NCO CLUB |
| E | 740-62X | AIRMEN OPEN MESS |
| E | 740-732 | RESTAURANT |
| E | 740-735 | BASE RESTAURANT |
| N,O | 740-644 | ARTS & CRAFTS CTR |
| L | 740-665 | AUTO HOBBY SHOP |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| A | Administration, <5000 SF |
| B | Administration, >5000 SF |
| C | Administration, Multistory |
| D | Administration, Computer Facility |
| E | Dining or Food Service Facility |
| F | Dormitory |
| G | Fire Station |
| H | Industrial Facility |
| I | Maintenance Facility, <5000 SF |
| J | Maintenance Facility, High-Bay |
| K | Maintenance Facility, with HVAC |
| L | Maintenance Facility, Low-Bay |
| M | Auditorium, Cinema, Theatre |
| N | Training Facility, School, <5000 SF |
| O | Training Facility, School, >5000 SF |
| P | Training Facility, Multistory |
| Q | Gymnasium |
| R | Warehouse, Storage Facility |
| NC | No current building type category |

# BUILDING-TYPE CATEGORY CODES

**Appendix B**

| | | |
|---|---|---|
| **F** | 740-666 | RECREATION SITE LODGING |
| **NC** | 740-668 | MISCELLANEOUS RECREATION BLDG |
| **A,B,C** | 740-669 | COMPOSITE RECREATION BLDG |
| **Q** | 740-673 | FIELD HOUSE |
| **Q** | 740-674 | GYMNASIUM |
| **A,B,C** | 740-675 | LIBRARY |
| **NC** | 740-677 | INDOOR SWIMMING POOL |
| **R** | 740-733 | STORAGE FACILITY |
| **M** | 740-873 | BASE THEATRE |
| **NC** | 740-883 | YOUTH CLUB |
| **N,O,P** | 740-884 | CHILD CARE CENTER |
| **NC** | 760-XXX | MUSEUMS AND MEMORIALS |
| **H** | 890-XXX | OTHER |

## BUILDING TYPE CATEGORY LIST

| | |
|---|---|
| **A** | Administration, <5000 SF |
| **B** | Administration, >5000 SF |
| **C** | Administration, Multistory |
| **D** | Administration, Computer Facility |
| **E** | Dining or Food Service Facility |
| **F** | Dormitory |
| **G** | Fire Station |
| **H** | Industrial Facility |
| **I** | Maintenance Facility, <5000 SF |
| **J** | Maintenance Facility, High-Bay |
| **K** | Maintenance Facility, with HVAC |
| **L** | Maintenance Facility, Low-Bay |
| **M** | Auditorium, Cinema, Theatre |
| **N** | Training Facility, School, <5000 SF |
| **0** | Training Facility, School, >5000 SF |
| **P** | Training Facility, Multistory |
| **Q** | Gymnasium |
| **R** | Warehouse, Storage Facility |
| **NC** | No current building type category |

# Building Energy Use

**Appendix C**

| REGION 1 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ■ | ○ | ⧗ | ▲ | ◆ | 165 | 155 | 7.0 | 4.0 |
| B Admin, >5000 sf | ■ | ○ | ⧗ | ▲ | ◆ | 120 | 115 | 6.0 | 3.0 |
| C Admin, Multistory | ■ | ○ | ▲ | ◆ | ⧗ | 85 | 75 | 6.0 | 4.0 |
| D Admin, Comp. Fac. | ■ | ▲ | ○ | ⧗ | ◆ | 205 | 190 | 11.0 | 8.0 |
| E Dining Facility | ■ | ○ | ▲ | ⧗ | ◆ | 320 | 300 | 5.0 | 2.5 |
| F Dormitory | ■ | ○ | ⧗ | ▲ | ◆ | 75 | 65 | 3.5 | 2.0 |
| G Fire Station | ■ | ⧗ | ○ | ▲ | ◆ | 190 | 180 | 4.0 | 2.5 |
| H Industrial Facility | ■ | ▲ | ○ | ⧗ | | 95 | 90 | 4.0 | 3.0 |
| I Main., <5000 sf | ■ | ○ | ⧗ | ▲ | | 120 | 100 | 2.5 | 2.0 |
| J Main., High-Bay | ■ | ○ | ▲ | ⧗ | | 150 | 125 | 3.5 | 2.5 |
| K Main., HVAC | ■ | ○ | ▲ | ⧗ | ◆ | 90 | 80 | 5.0 | 3.0 |
| L Main., Low-Bay | ■ | ○ | ▲ | ⧗ | | 75 | 70 | 3.0 | 2.0 |
| M Auditorium | ■ | ○ | ⧗ | ▲ | ◆ | 150 | 140 | 5.0 | 3.0 |
| N Training, <5000 sf | ■ | ○ | ⧗ | ▲ | ◆ | 165 | 155 | 7.0 | 4.0 |
| O Training, >5000 sf | ■ | ○ | ⧗ | ▲ | ◆ | 120 | 115 | 6.0 | 3.0 |
| P Training, Multistory | ■ | ○ | ▲ | ◆ | | 85 | 75 | 6.0 | 4.0 |
| Q Gymnasium | ■ | ○ | ⧗ | | | 205 | 175 | 2.5 | 2.0 |
| R Warehouse | ■ | ○ | ⧗ | | | 80 | 70 | 1.5 | 1.0 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 2 | Energy Use Priority 1 | 2 | 3 | 4 | 5 | Energy Use (KBtu/sf-yr) W/O Solar | With Solar | Peak (Watts/sf) W/O Solar | With Solar |
|---|---|---|---|---|---|---|---|---|---|
| A Admin, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 90 | 70 | 9.0 | 5.0 |
| B Admin, >5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 50 | 7.5 | 4.0 |
| C Admin, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 65 | 45 | 7.0 | 4.5 |
| D Admin, Comp. Fac. | ▲ | ○ | ◆ | ■ | ⧗ | 145 | 120 | 13.0 | 8.5 |
| E Dining Facility | ■ | ○ | ▲ | ◆ | ⧗ | 150 | 130 | 7.0 | 4.5 |
| F Dormitory | ○ | ◆ | ■ | ⧗ | ▲ | 45 | 35 | 4.5 | 3.0 |
| G Fire Station | ■ | ○ | ⧗ | ◆ | ▲ | 80 | 65 | 4.0 | 2.0 |
| H Industrial Facility | ▲ | ○ | ■ | ⧗ | | 55 | 40 | 4.0 | 3.0 |
| I Main., <5000 sf | ■ | ○ | ▲ | ⧗ | | 35 | 25 | 2.0 | 1.3 |
| J Main., High-Bay | ○ | ■ | ▲ | ⧗ | | 60 | 40 | 3.5 | 2.0 |
| K Main., HVAC | ○ | ■ | ▲ | ◆ | ⧗ | 55 | 45 | 5.5 | 4.0 |
| L Main., Low-Bay | ○ | ▲ | ■ | ⧗ | | 40 | 25 | 3.0 | 1.7 |
| M Auditorium | ■ | ◆ | ○ | ⧗ | ▲ | 70 | 60 | 7.0 | 6.0 |
| N Training, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 90 | 70 | 9.0 | 5.0 |
| O Training, >5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 50 | 7.5 | 4.0 |
| P Training, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 65 | 45 | 2.0 | 1.0 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 70 | 60 | 2.0 | 1.0 |
| R Warehouse | ■ | ○ | ⧗ | | | 25 | 20 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 3 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ○ | ◆ | ■ | ⧗ | ▲ | 75 | 50 | 9.0 | 5.5 |
| B Admin, >5000 sf | ○ | ◆ | ■ | ▲ | ⧗ | 65 | 40 | 7.0 | 4.5 |
| C Admin, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 60 | 40 | 7.0 | 5.0 |
| D Admin, Comp. Fac. | ▲ | ◆ | ○ | ⧗ | ■ | 140 | 100 | 12.5 | 9.5 |
| E Dining Facility | ○ | ▲ | ◆ | ■ | ⧗ | 105 | 80 | 6.5 | 4.0 |
| F Dormitory | ○ | ◆ | ⧗ | ▲ | ■ | 40 | 30 | 4.0 | 3.0 |
| G Fire Station | ○ | ■ | ◆ | ⧗ | ▲ | 45 | 30 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ⧗ | ■ | | 45 | 30 | 4.0 | 2.5 |
| I Main., <5000 sf | ○ | ▲ | ■ | ⧗ | | 25 | 15 | 2.0 | 1.0 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 45 | 25 | 35 | 2.0 |
| K Main., HVAC | ○ | ▲ | ◆ | ■ | ⧗ | 50 | 35 | 5.5 | 4.0 |
| L Main., Low-Bay | ○ | ▲ | ⧗ | ■ | | 35 | 15 | 3.0 | 1.7 |
| M Auditorium | ◆ | ○ | ⧗ | ■ | ▲ | 50 | 40 | 6.5 | 5.0 |
| N Training, <5000 sf | ○ | ◆ | ■ | ⧗ | ▲ | 75 | 50 | 9.0 | 5.5 |
| O Training, >5000 sf | ○ | ◆ | ■ | ▲ | ⧗ | 65 | 40 | 7.0 | 4.5 |
| P Training, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 60 | 40 | 7.0 | 5.0 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 45 | 25 | 2.0 | 1.0 |
| R Warehouse | ○ | ■ | ⧗ | | | 15 | 10 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 4 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 80 | 60 | 8.5 | 4.5 |
| B Admin, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 65 | 45 | 6.5 | 4.0 |
| C Admin, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 80 | 45 | 6.5 | 4.5 |
| D Admin, Comp. Fac. | ▲ | ○ | ◆ | ■ | ⧗ | 135 | 115 | 11.5 | 9.0 |
| E Dining Facility | ■ | ○ | ▲ | ◆ | ⧗ | 125 | 110 | 5.5 | 3.0 |
| F Dormitory | ○ | ◆ | ⧗ | ■ | ▲ | 40 | 30 | 4.0 | 2.5 |
| G Fire Station | ■ | ○ | ⧗ | ▲ | ◆ | 65 | 50 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ■ | ⧗ | | 50 | 40 | 4.0 | 2.5 |
| I Main., <5000 sf | ■ | ○ | ▲ | ⧗ | | 35 | 25 | 2.0 | 1.2 |
| J Main., High-Bay | ○ | ■ | ▲ | ⧗ | | 55 | 40 | 3.5 | 2.2 |
| K Main., HVAC | ○ | ▲ | ■ | ◆ | ⧗ | 55 | 40 | 5.0 | 3.5 |
| L Main., Low-Bay | ○ | ▲ | ■ | ⧗ | | 40 | 25 | 3.0 | 2.0 |
| M Auditorium | ■ | ○ | ◆ | ▲ | ⧗ | 60 | 50 | 5.5 | 4.5 |
| N Training, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 80 | 60 | 8.5 | 4.5 |
| O Training, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 65 | 45 | 6.5 | 4.0 |
| P Training, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 60 | 45 | 6.5 | 4.5 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 65 | 50 | 2.0 | 1.2 |
| R Warehouse | ■ | ○ | ⧗ | | | 25 | 15 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 5 | Energy Use Priority 1 | 2 | 3 | 4 | 5 | Energy Use (KBtu/sf-yr) W/O Solar | With Solar | Peak (Watts/sf) W/O Solar | With Solar |
|---|---|---|---|---|---|---|---|---|---|
| A Admin, <5000 sf | ◆ | ○ | ⧗ | ■ | ▲ | 90 | 55 | 9.5 | 5.5 |
| B Admin, >5000 sf | ◆ | ○ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.5 |
| C Admin, Multistory | ◆ | ○ | ▲ | ⧗ | ■ | 70 | 50 | 7.5 | 5.5 |
| D Admin, Comp. Fac. | ◆ | ▲ | ○ | ⧗ | ■ | 155 | 120 | 13.0 | 10.0 |
| E Dining Facility | ◆ | ▲ | ⧗ | ○ | ■ | 135 | 85 | 11.0 | 5.0 |
| F Dormitory | ◆ | ○ | ⧗ | ▲ | ■ | 55 | 45 | 4.5 | 3.0 |
| G Fire Station | ◆ | ○ | ⧗ | ▲ | ■ | 50 | 35 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ⧗ | ■ | | 45 | 30 | 4.0 | 2.5 |
| I Main., <5000 sf | ○ | ▲ | ⧗ | ■ | | 20 | 12 | 2.0 | 1.0 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 40 | 20 | 3.5 | 2.0 |
| K Main., HVAC | ○ | ◆ | ▲ | ⧗ | ■ | 55 | 40 | 6.0 | 4.5 |
| L Main., Low-Bay | ○ | ▲ | ⧗ | ■ | | 35 | 15 | 3.0 | 1.5 |
| M Auditorium | ◆ | ○ | ⧗ | ▲ | ■ | 65 | 55 | 7.5 | 6.5 |
| N Training, <5000 sf | ◆ | ○ | ⧗ | ■ | ▲ | 90 | 55 | 9.5 | 5.5 |
| O Training, >5000 sf | ◆ | ○ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.5 |
| P Training, Multistory | ◆ | ○ | ▲ | ⧗ | ■ | 70 | 50 | 7.5 | 5.5 |
| Q Gymnasium | ○ | ⧗ | ■ | | | 70 | 50 | 7.5 | 5.0 |
| R Warehouse | ○ | ■ | ⧗ | | | 10 | 7 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 6 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| **A** Admin, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 85 | 55 | 9.5 | 5.5 |
| **B** Admin, >5000 sf | ○ | ◆ | ■ | ⧗ | ▲ | 70 | 45 | 7.5 | 4.5 |
| **C** Admin, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 65 | 45 | 7.0 | 5.0 |
| **D** Admin, Comp. Fac. | ▲ | ◆ | ○ | ■ | ⧗ | 150 | 120 | 13.0 | 10.0 |
| **E** Dining Facility | ○ | ▲ | ◆ | ■ | ⧗ | 130 | 105 | 7.0 | 4.5 |
| **F** Dormitory | ◆ | ○ | ⧗ | ▲ | ■ | 50 | 40 | 4.5 | 3.0 |
| **G** Fire Station | ■ | ○ | ◆ | ⧗ | ▲ | 60 | 50 | 3.5 | 2.0 |
| **H** Industrial Facility | ▲ | ○ | ■ | ⧗ | | 50 | 35 | 4.0 | 3.0 |
| **I** Main., <5000 sf | ○ | ■ | ▲ | ⧗ | | 30 | 20 | 2.0 | 1.2 |
| **J** Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 50 | 35 | 4.0 | 3.0 |
| **K** Main., HVAC | ○ | ◆ | ▲ | ■ | ⧗ | 55 | 40 | 6.0 | 4.0 |
| **L** Main., Low-Bay | ○ | ▲ | ■ | ⧗ | | 35 | 20 | 3.0 | 2.0 |
| **M** Auditorium | ◆ | ○ | ■ | ⧗ | ▲ | 65 | 55 | 7.0 | 6.0 |
| **N** Training, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 85 | 55 | 9.5 | 5.5 |
| **O** Training, >5000 sf | ○ | ◆ | ■ | ⧗ | ▲ | 70 | 45 | 7.5 | 4.5 |
| **P** Training, Multistory | ○ | ◆ | ■ | ⧗ | ▲ | 65 | 45 | 7.0 | 5.0 |
| **Q** Gymnasium | ○ | ■ | ⧗ | | | 55 | 40 | 2.0 | 1.0 |
| **R** Warehouse | ■ | ○ | ⧗ | | | 20 | 10 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 7 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 90 | 55 | 9.5 | 5.5 |
| B Admin, >5000 sf | ○ | ◆ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.0 |
| C Admin, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 70 | 50 | 7.0 | 5.0 |
| D Admin, Comp. Fac. | ▲ | ◆ | ○ | ⧗ | ■ | 150 | 120 | 13.0 | 10.0 |
| E Dining Facility | ◆ | ○ | ▲ | ■ | ⧗ | 120 | 100 | 7.5 | 5.0 |
| F Dormitory | ◆ | ○ | ⧗ | ▲ | ■ | 55 | 45 | 4.5 | 3.0 |
| G Fire Station | ○ | ◆ | ■ | ⧗ | ▲ | 55 | 40 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ⧗ | ■ | | 45 | 30 | 4.0 | 2.5 |
| I Main., <5000 sf | ○ | ▲ | ■ | ⧗ | | 25 | 15 | 2.0 | 1.0 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 45 | 25 | 3.5 | 2.0 |
| K Main., HVAC | ○ | ◆ | ▲ | ■ | ⧗ | 60 | 40 | 6.0 | 4.5 |
| L Main., Low-Bay | ○ | ▲ | ⧗ | ■ | | 35 | 20 | 3.0 | 2.0 |
| M Auditorium | ◆ | ○ | ■ | ⧗ | ▲ | 65 | 55 | 7.5 | 6.5 |
| N Training, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 90 | 55 | 9.5 | 5.5 |
| O Training, >5000 sf | ○ | ◆ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.0 |
| P Training, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 70 | 50 | 7.0 | 5.0 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 50 | 30 | 2.0 | 1.0 |
| R Warehouse | ○ | ■ | ⧗ | | | 15 | 8 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 8 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ◆ | ○ | ⧗ | ▲ | | 100 | 60 | 9.0 | 5.5 |
| B Admin, >5000 sf | ◆ | ○ | ▲ | ⧗ | | 80 | 50 | 7.5 | 5.0 |
| C Admin, Multistory | ◆ | ○ | ▲ | ⧗ | | 80 | 55 | 7.5 | 5.5 |
| D Admin, Comp. Fac. | ◆ | ▲ | ○ | ⧗ | | 165 | 130 | 13.0 | 10.0 |
| E Dining Facility | ◆ | ○ | ▲ | ⧗ | | 125 | 105 | 7.0 | 4.5 |
| F Dormitory | ◆ | ○ | ⧗ | ▲ | | 70 | 60 | 4.5 | 3.5 |
| G Fire Station | ◆ | ○ | ▲ | ⧗ | | 50 | 35 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ⧗ | | | 45 | 25 | 4.0 | 2.5 |
| I Main., <5000 sf | ○ | ▲ | ⧗ | | | 20 | 10 | 2.0 | 1.0 |
| J Main., High-Bay | ○ | ▲ | ⧗ | | | 40 | 20 | 3.0 | 1.5 |
| K Main., HVAC | ◆ | ○ | ▲ | ⧗ | | 60 | 45 | 5.5 | 4.5 |
| L Main., Low-Bay | ○ | ▲ | ⧗ | | | 35 | 15 | 3.0 | 1.5 |
| M Auditorium | ◆ | ○ | ⧗ | ▲ | | 70 | 60 | 7.0 | 6.0 |
| N Training, <5000 sf | ◆ | ○ | ⧗ | ▲ | | 100 | 60 | 9.0 | 5.5 |
| O Training, >5000 sf | ◆ | ○ | ▲ | ⧗ | | 80 | 50 | 7.5 | 5.0 |
| P Training, Multistory | ◆ | ○ | ▲ | ⧗ | | 80 | 55 | 7.5 | 5.5 |
| Q Gymnasium | ○ | ⧗ | | | | 80 | 55 | 7.5 | 5.0 |
| R Warehouse | ○ | ⧗ | | | | 10 | 5 | 1.0 | 0.4 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 9 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 45 | 8.0 | 4.5 |
| B Admin, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 55 | 35 | 6.5 | 4.0 |
| C Admin, Multistory | ○ | ◆ | ▲ | ■ | ⧗ | 55 | 40 | 6.5 | 4.5 |
| D Admin, Comp. Fac. | ▲ | ○ | ◆ | ■ | ⧗ | 125 | 100 | 12.0 | 9.5 |
| E Dining Facility | ▲ | ○ | ■ | ◆ | ⧗ | 110 | 95 | 5.5 | 3.0 |
| F Dormitory | ○ | ▲ | ◆ | ■ | ⧗ | 35 | 25 | 4.5 | 3.0 |
| G Fire Station | ■ | ○ | ⧗ | ▲ | ◆ | 55 | 45 | 3.5 | 1.5 |
| H Industrial Facility | ▲ | ○ | ■ | ⧗ | | 50 | 35 | 4.0 | 3.0 |
| I Main., <5000 sf | ○ | ■ | ▲ | ⧗ | | 30 | 20 | 2.0 | 1.2 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 50 | 30 | 3.5 | 2.0 |
| K Main., HVAC | ○ | ▲ | ■ | ◆ | ⧗ | 50 | 35 | 5.0 | 2.5 |
| L Main., Low-Bay | ○ | ▲ | ■ | ⧗ | | 35 | 20 | 3.0 | 2.0 |
| M Auditorium | ■ | ○ | ◆ | ▲ | ⧗ | 50 | 40 | 5.5 | 4.0 |
| N Training, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 45 | 8.0 | 4.5 |
| O Training, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 55 | 35 | 6.5 | 4.0 |
| P Training, Multistory | ○ | ■ | ◆ | ▲ | ⧗ | 55 | 40 | 6.5 | 4.5 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 55 | 35 | 6.5 | 4.0 |
| R Warehouse | ■ | ○ | ⧗ | | | 20 | 10 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 10 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 50 | 8.0 | 4.5 |
| B Admin, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 60 | 40 | 6.5 | 4.0 |
| C Admin, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 55 | 40 | 6.5 | 4.0 |
| D Admin, Comp. Fac. | ▲ | ○ | ◆ | ■ | ⧗ | 125 | 100 | 12.0 | 9.5 |
| E Dining Facility | ■ | ○ | ▲ | ⧗ | ◆ | 110 | 95 | 5.5 | 3.0 |
| F Dormitory | ○ | ■ | ⧗ | ◆ | ▲ | 3.5 | 25 | 4.5 | 3.0 |
| G Fire Station | ■ | ○ | ⧗ | ▲ | ◆ | 55 | 45 | 3.5 | 1.5 |
| H Industrial Facility | ▲ | ○ | ■ | ⧗ | | 50 | 35 | 4.0 | 3.0 |
| I Main., <5000 sf | ○ | ■ | ▲ | ⧗ | | 30 | 20 | 2.0 | 1.2 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 50 | 30 | 3.5 | 2.0 |
| K Main., HVAC | ○ | ▲ | ■ | ◆ | ⧗ | 50 | 35 | 5.0 | 3.5 |
| L Main., Low-Bay | ○ | ▲ | ■ | ⧗ | | 35 | 20 | 3.0 | 2.0 |
| M Auditorium | ■ | ○ | ◆ | ▲ | ⧗ | 50 | 40 | 5.5 | 4.0 |
| N Training, <5000 sf | ○ | ■ | ◆ | ⧗ | ▲ | 70 | 45 | 8.0 | 4.5 |
| O Training, >5000 sf | ○ | ■ | ◆ | ▲ | ⧗ | 55 | 35 | 6.5 | 4.0 |
| P Training, Multistory | ○ | ◆ | ■ | ▲ | ⧗ | 55 | 40 | 6.5 | 4.5 |
| Q Gymnasium | ○ | ■ | ⧗ | | | 55 | 35 | 6.5 | 4.0 |
| R Warehouse | ■ | ○ | ⧗ | | | 20 | 10 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 11 | Energy Use Priority 1 | 2 | 3 | 4 | 5 | Energy Use (KBtu/sf-yr) W/O Solar | With Solar | Peak (Watts/sf) W/O Solar | With Solar |
|---|---|---|---|---|---|---|---|---|---|
| **A** Admin, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 80 | 50 | 9.0 | 6.0 |
| **B** Admin, >5000 sf | ○ | ◆ | ■ | ▲ | ⧗ | 70 | 40 | 7.5 | 5.0 |
| **C** Admin, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 65 | 45 | 7.0 | 5.0 |
| **D** Admin, Comp. Fac. | ▲ | ◆ | ○ | ⧗ | ■ | 145 | 110 | 13.0 | 10.0 |
| **E** Dining Facility | ○ | ▲ | ◆ | ■ | ⧗ | 115 | 90 | 7.0 | 5.0 |
| **F** Dormitory | ◆ | ○ | ⧗ | ▲ | ■ | 45 | 40 | 5.0 | 3.5 |
| **G** Fire Station | ○ | ◆ | ■ | ⧗ | ▲ | 50 | 35 | 3.5 | 2.0 |
| **H** Industrial Facility | ▲ | ○ | ⧗ | ■ | | 45 | 30 | 4.0 | 2.5 |
| **I** Main., <5000 sf | ○ | ▲ | ■ | ⧗ | | 25 | 15 | 2.0 | 1.0 |
| **J** Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 45 | 25 | 3.5 | 2.0 |
| **K** Main., HVAC | ○ | ◆ | ▲ | ■ | ⧗ | 55 | 35 | 5.5 | 4.0 |
| **L** Main., Low-Bay | ○ | ▲ | ⧗ | ■ | | 35 | 20 | 3.0 | 1.5 |
| **M** Auditorium | ◆ | ○ | ■ | ⧗ | ▲ | 60 | 50 | 7.0 | 6.0 |
| **N** Training, <5000 sf | ◆ | ○ | ■ | ⧗ | ▲ | 80 | 50 | 9.0 | 6.0 |
| **O** Training, >5000 sf | ○ | ◆ | ■ | ▲ | ⧗ | 70 | 40 | 7.5 | 5.0 |
| **P** Training, Multistory | ○ | ◆ | ▲ | ⧗ | ■ | 65 | 45 | 7.0 | 5.0 |
| **Q** Gymnasium | ○ | ■ | ⧗ | | | 65 | 45 | 7.0 | 5.5 |
| **R** Warehouse | ○ | ■ | ⧗ | | | 15 | 8 | 1.0 | 0.5 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Building Energy Use

**Appendix C**

| REGION 12 | Energy Use Priority | | | | | Energy Use (KBtu/sf-yr) | | Peak (Watts/sf) | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | W/O Solar | With Solar | W/O Solar | With Solar |
| A Admin, <5000 sf | ◆ | ○ | ⧗ | ▲ | ■ | 90 | 50 | 9.5 | 5.5 |
| B Admin, >5000 sf | ◆ | ○ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.0 |
| C Admin, Multistory | ◆ | ○ | ▲ | ⧗ | ■ | 70 | 50 | 7.0 | 5.0 |
| D Admin, Comp. Fac. | ◆ | ▲ | ○ | ⧗ | ■ | 160 | 120 | 13.0 | 10.0 |
| E Dining Facility | ◆ | ○ | ▲ | ⧗ | ■ | 120 | 90 | 7.5 | 5.0 |
| F Dormitory | ◆ | ○ | ⧗ | ▲ | ■ | 60 | 50 | 4.5 | 3.0 |
| G Fire Station | ◆ | ○ | ▲ | ⧗ | ■ | 50 | 35 | 3.5 | 2.0 |
| H Industrial Facility | ▲ | ○ | ⧗ | ■ | | 45 | 30 | 4.0 | 2.5 |
| I Main., <5000 sf | ○ | ▲ | ■ | ⧗ | | 20 | 10 | 2.0 | 1.0 |
| J Main., High-Bay | ○ | ▲ | ■ | ⧗ | | 45 | 25 | 3.5 | 2.0 |
| K Main., HVAC | ◆ | ○ | ▲ | ⧗ | ■ | 60 | 40 | 5.5 | 4.0 |
| L Main., Low-Bay | ○ | ▲ | ⧗ | ■ | | 35 | 20 | 3.0 | 1.5 |
| M Auditorium | ◆ | ○ | ⧗ | ▲ | ■ | 65 | 60 | 7.5 | 7.0 |
| N Training, <5000 sf | ◆ | ○ | ⧗ | ▲ | ■ | 90 | 50 | 9.5 | 5.5 |
| O Training, >5000 sf | ◆ | ○ | ▲ | ⧗ | ■ | 75 | 45 | 7.5 | 5.0 |
| P Training, Multistory | ◆ | ○ | ▲ | ⧗ | ■ | 70 | 50 | 7.0 | 5.0 |
| Q Gymnasium | ○ | ⧗ | ■ | | | 70 | 50 | 7.0 | 5.0 |
| R Warehouse | ○ | ■ | ⧗ | | | 10 | 5 | 1.0 | .03 |

■ Heating ◆ Cooling ○ Lighting ⧗ Ventilation ▲ Process

# Energy Cost Savings

**Appendix D**

| REGION 1 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | | | | | | | | | | | |
| **B** Admin, >5000 sf | | | | | | | | | | | |
| **C** Admin, Multistory | | | | | | | | | | | |
| **D** Admin, Comp. Fac. | | | | | | | | | | | |
| **E** Dining Facility | | | | | | | | | | | |
| **F** Dormitory | | | | | | | | | | | |
| **G** Fire Station | | | | | | | | | | | |
| **H** Industrial Facility | | | | | | | | | | | |
| **I** Maint, <5000 sf | | | | | | | | | | | |
| **J** Maint, High-Bay | | | | | | | | | | | |
| **K** Maint, HVAC | | | | | | | | | | | |
| **L** Maint, Low-Bay | | | | | | | | | | | |
| **M** Auditorium | | | | | | | | | | | |
| **N** Training, <5000 sf | | | | | | | | | | | |
| **O** Training, >5000 sf | | | | | | | | | | | |
| **P** Training, Multistory | | | | | | | | | | | |
| **Q** Gymnasium | | | | | | | | | | | |
| **R** Warehouse | | | | | | | | | | | |

No Savings | < 5% | 5% - 10% | 10% - 15% | > 15%

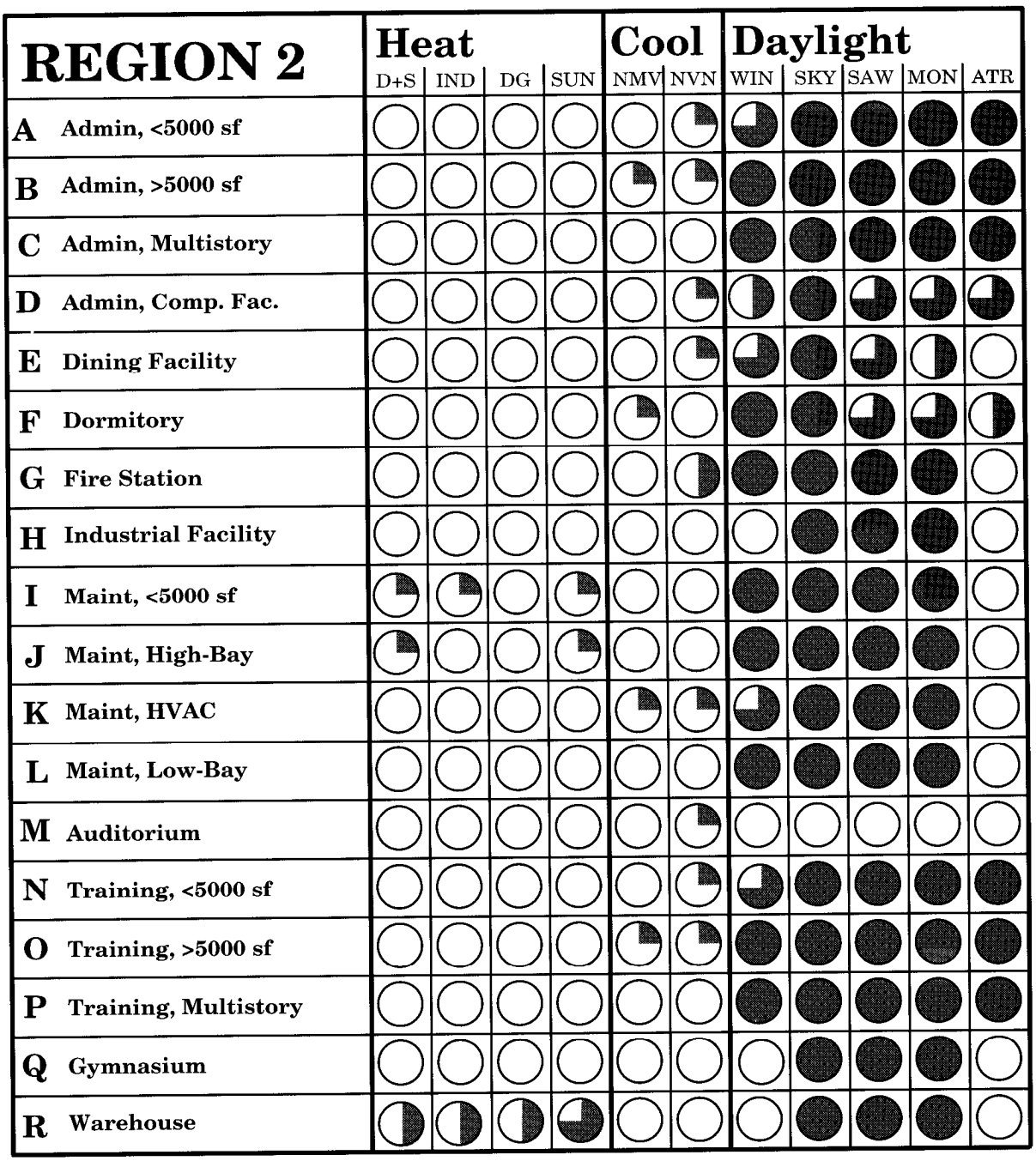
**Heat**
- **D+S** = Direct Gain with Storage
- **IND** = Indirect Gain
- **DG** = Direct Gain
- **SUN** = Sunspace

**Cool**
- **NMV** = Night Mechanical Ventilation
- **NVN** = Natural Ventilation

**Daylight**
- **WIN** = Window(s)
- **SKY** = Skylights
- **SAW** = Sawtooth
- **MON** = Monitor
- **ATR** = Atrium

# Energy Cost Savings

**Appendix D**




No Savings | < 5% | 5% - 10% | 10% - 15% | > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 3 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◑ | ◕ | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ○ | ◔ | ◑ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◑ | ● | ● | ● | ◕ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ○ | ◑ | ◕ | ◑ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◑ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ◑ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◑ | ◕ | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ◑ | ◑ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
- **D+S** = Direct Gain with Storage
- **IND** = Indirect Gain
- **DG** = Direct Gain
- **SUN** = Sunspace

**Cool**
- **NMV** = Night Mechanical Ventilation
- **NVN** = Natural Ventilation

**Daylight**
- **WIN** = Window(s)
- **SKY** = Skylights
- **SAW** = Sawtooth
- **MON** = Monitor
- **ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 4 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ○ | ○ | ◑ | ● | ● | ◔ | ◔ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ◔ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ◔ | ◑ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◑ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ◔ | ◔ | ○ | ◔ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ◔ | ○ | ◔ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ○ | ◔ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ◑ | ◑ | ◑ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 5 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ◔ | ◔ | ◑ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ◕ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ◔ | ◑ | ◑ | ○ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ◔ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ◔ | ◕ | ● | ○ | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ◔ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ○ | ○ | ◑ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION6 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ◔ | ◔ | ◑ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ◕ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ◔ | ○ | ◔ | ◔ | ◔ | ◑ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◑ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ◕ | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ◔ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ○ | ◔ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ◔ | ○ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ◔ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ○ | ◑ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION7 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ◔ | ◔ | ◕ | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ◔ | ◔ | ◑ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ◕ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ◔ | ◔ | ◑ | ○ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ○ | ◕ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ◔ | ◕ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ◔ | ◔ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ◔ | ◔ | ◕ | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ◔ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ○ | ◑ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 8 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ◕ | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ◔ | ○ | ◕ | ● | ● | ◔ | ◔ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ○ | ◕ | ● | ● | ● | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ◔ | ○ | ◑ | ○ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ○ | ◕ | ● | ○ | ○ | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

No Savings | < 5% | 5% - 10% | 10% - 15% | > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION9 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ○ | ○ | ◑ | ● | ● | ◔ | ● |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ◔ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ○ | ◔ | ◔ | ◔ | ● | ◔ | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ◔ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ○ | ◑ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
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**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 10 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ○ | ◔ | ◑ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ◕ | ◑ | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ○ | ◔ | ◑ | ○ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ◕ | ◕ | ◑ | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ◕ | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ◔ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◔ | ○ | ◔ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** Monitor
**ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 11 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ◔ | ○ | ◑ | ● | ● | ◔ | ◔ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ○ | ◕ | ● | ● | ● | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ◑ | ○ | ◑ | ○ | ○ | ○ | ○ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ◕ | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ◔ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ◔ | ○ | ◕ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ◔ | ○ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ◔ | ○ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ◑ | ○ | ◑ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
- **D+S** = Direct Gain with Storage
- **IND** = Indirect Gain
- **DG** = Direct Gain
- **SUN** = Sunspace

**Cool**
- **NMV** = Night Mechanical Ventilation
- **NVN** = Natural Ventilation

**Daylight**
- **WIN** = Window(s)
- **SKY** = Skylights
- **SAW** = Sawtooth
- **MON** = Monitor
- **ATR** = Atrium

# Energy Cost Savings

**Appendix D**

| REGION 12 | Heat | | | | Cool | | Daylight | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D+S | IND | DG | SUN | NMV | NVN | WIN | SKY | SAW | MON | ATR |
| **A** Admin, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **B** Admin, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **C** Admin, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **D** Admin, Comp. Fac. | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ◕ | ◕ |
| **E** Dining Facility | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ○ |
| **F** Dormitory | ○ | ○ | ○ | ○ | ○ | ○ | ◕ | ◕ | ◕ | ◑ | ◔ |
| **G** Fire Station | ○ | ○ | ○ | ○ | ○ | ◑ | ● | ● | ● | ● | ○ |
| **H** Industrial Facility | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **I** Maint, <5000 sf | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **J** Maint, High-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **K** Maint, HVAC | ○ | ○ | ○ | ○ | ○ | ◔ | ◕ | ● | ● | ● | ○ |
| **L** Maint, Low-Bay | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ○ |
| **M** Auditorium | ○ | ○ | ○ | ○ | ○ | ◔ | ○ | ○ | ○ | ○ | ○ |
| **N** Training, <5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **O** Training, >5000 sf | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **P** Training, Multistory | ○ | ○ | ○ | ○ | ○ | ◔ | ● | ● | ● | ● | ● |
| **Q** Gymnasium | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |
| **R** Warehouse | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ○ |

○ No Savings ◔ < 5% ◑ 5% - 10% ◕ 10% - 15% ● > 15%

**Heat**
**D+S** = Direct Gain with Storage
**IND** = Indirect Gain
**DG** = Direct Gain
**SUN** = Sunspace

**Cool**
**NMV** = Night Mechanical Ventilation
**NVN** = Natural Ventilation

**Daylight**
**WIN** = Window(s)
**SKY** = Skylights
**SAW** = Sawtooth
**MON** = Monitor
**ATR** = Atrium

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***162,058*** | ***70.2%*** | ***3.0%*** | ***17.6%*** | ***6.0%*** | ***3.2%*** | ***$2.15*** | ***39.2%*** | ***11.5%*** | ***41.8%*** | ***7.5%*** | ***64*** | ***38*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 161,157 | 70.6% | 2.5% | 17.7% | 6.1% | 3.2% | $2.12 | 39.8% | 10.3% | 42.4% | 7.6% | 64 | 38 | 7.1 |
| | (L) Windows | 162,862 | 74.3% | 2.7% | 13.3% | 6.6% | 3.1% | $1.99 | 45.7% | 11.9% | 34.3% | 8.1% | 70 | 31 | 6.0 |
| | (L) Skylights | 163,416 | 82.0% | 1.5% | 8.4% | 5.0% | 3.1% | $1.67 | 56.7% | 7.6% | 26.0% | 9.6% | 52 | 29 | 3.8 |
| | (L) Sawtooth Ap | 156,687 | 80.4% | 1.5% | 8.1% | 6.8% | 3.3% | $1.67 | 57.2% | 9.4% | 23.8% | 9.7% | 69 | 21 | 4.0 |
| | (L) Monitor Ap. | 171,179 | 79.8% | 1.7% | 8.8% | 6.8% | 3.0% | $1.85 | 55.7% | 10.0% | 25.6% | 8.7% | 74 | 22 | 4.2 |
| | (L) Atrium | 183,256 | 81.5% | 2.4% | 7.9% | 5.5% | 2.8% | $1.89 | 56.2% | 11.4% | 23.9% | 8.5% | 64 | 41 | 4.9 |
| ***B*** | ***ADMIN >5000 SF*** | ***116,253*** | ***62.0%*** | ***3.5%*** | ***24.7%*** | ***5.5%*** | ***4.4%*** | ***$1.79*** | ***29.6%*** | ***11.0%*** | ***50.4%*** | ***9.0%*** | ***43*** | ***27*** | ***5.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 115,844 | 62.2% | 3.2% | 24.8% | 5.5% | 4.4% | $1.78 | 29.8% | 10.4% | 50.8% | 9.1% | 43 | 27 | 5.9 |
| | (L) Windows | 114,288 | 67.0% | 2.5% | 20.1% | 6.0% | 4.5% | $1.61 | 35.3% | 9.8% | 44.9% | 10.0% | 46 | 17 | 4.2 |
| | (L) Skylights | 119,740 | 77.1% | 1.7% | 11.9% | 5.0% | 4.3% | $1.37 | 47.7% | 8.0% | 32.5% | 11.7% | 38 | 24 | 3.3 |
| | (L) Sawtooth Ap | 121,650 | 78.7% | 2.1% | 8.2% | 6.9% | 4.2% | $1.35 | 53.3% | 11.4% | 23.2% | 12.0% | 56 | 20 | 3.6 |
| | (L) Monitor Ap. | 132,577 | 76.0% | 2.2% | 11.2% | 6.7% | 3.9% | $1.56 | 48.5% | 11.1% | 30.1% | 10.4% | 59 | 20 | 3.8 |
| | (L) Atrium | 120,722 | 74.5% | 2.2% | 13.0% | 6.0% | 4.2% | $1.47 | 45.3% | 10.0% | 33.6% | 11.0% | 43 | 26 | 3.7 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***81,268*** | ***46.5%*** | ***6.0%*** | ***35.3%*** | ***5.9%*** | ***6.3%*** | ***$1.58*** | ***18.1%*** | ***14.4%*** | ***57.2%*** | ***10.2%*** | ***29*** | ***27*** | ***5.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 80,865 | 46.7% | 5.6% | 35.5% | 5.9% | 6.3% | $1.56 | 18.3% | 13.7% | 57.7% | 10.3% | 29 | 27 | 5.9 |
| | (L) Windows | 79,654 | 54.1% | 5.0% | 28.8% | 5.6% | 6.4% | $1.39 | 23.1% | 13.2% | 52.0% | 11.6% | 32 | 17 | 4.1 |
| | (L) Skylights | 81,349 | 58.9% | 4.6% | 24.5% | 5.7% | 6.3% | $1.32 | 26.8% | 13.3% | 47.7% | 12.3% | 29 | 22 | 4.2 |
| | (L) Sawtooth Ap | 79,681 | 60.4% | 4.9% | 22.1% | 6.1% | 6.4% | $1.26 | 28.5% | 14.6% | 44.1% | 12.8% | 35 | 20 | 4.1 |
| | (L) Monitor Ap. | 83,481 | 59.9% | 5.0% | 22.8% | 6.1% | 6.1% | $1.33 | 28.1% | 14.6% | 45.1% | 12.1% | 36 | 20 | 4.2 |
| | (L) Atrium | 84,579 | 60.9% | 4.6% | 21.8% | 6.7% | 6.1% | $1.33 | 29.6% | 14.5% | 43.7% | 12.2% | 32 | 27 | 4.3 |

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***201,937*** | ***48.1%*** | ***4.2%*** | ***16.2%*** | ***5.8%*** | ***25.7%*** | ***$3.83*** | ***18.5%*** | ***12.1%*** | ***26.8%*** | ***42.5%*** | ***60*** | ***40*** | ***11.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 201,962 | 48.3% | 4.0% | 16.2% | 5.8% | 25.7% | $3.82 | 18.7% | 11.8% | 26.9% | 42.6% | 60 | 40 | 1.0 |
| | (L) Windows | 202,365 | 51.2% | 4.7% | 13.3% | 5.2% | 25.6% | $3.68 | 20.4% | 12.2% | 23.0% | 44.3% | 62 | 30 | 9.4 |
| | (L) Skylights | 203,023 | 57.7% | 3.0% | 8.0% | 5.7% | 25.5% | $3.35 | 25.2% | 10.8% | 15.3% | 48.7% | 54 | 37 | 8.4 |
| | (L) Sawtooth Ap | 205,938 | 59.9% | 3.4% | 5.4% | 6.1% | 25.2% | $3.28 | 27.6% | 12.0% | 10.7% | 49.7% | 72 | 33 | 8.4 |
| | (L) Monitor Ap. | 214,763 | 57.4% | 3.7% | 8.7% | 6.0% | 24.1% | $3.56 | 25.4% | 12.1% | 16.6% | 45.8% | 74 | 34 | 9.0 |
| | (L) Atrium | 206,002 | 56.4% | 3.3% | 8.5% | 6.6% | 25.2% | $3.47 | 25.0% | 12.0% | 16.0% | 47.0% | 62 | 42 | 9.1 |
| ***E*** | ***DINING FACILITY*** | ***316,734*** | ***73.0%*** | ***0.9%*** | ***9.9%*** | ***6.2%*** | ***9.9%*** | ***$3.24*** | ***53.2%*** | ***8.3%*** | ***30.6%*** | ***7.9%*** | ***127*** | ***264.9*** | |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 315,482 | 73.3% | 0.5% | 10.0% | 6.3% | 9.9% | $3.20 | 53.9% | 7.2% | 31.0% | 8.0% | 127 | 26 | 4.9 |
| | (L) Windows | 323,382 | 75.8% | 0.9% | 7.1% | 6.6% | 9.7% | $3.09 | 59.4% | 9.0% | 23.3% | 8.2% | 134 | 26 | 3.7 |
| | (L) Skylights | 314,979 | 77.8% | 0.5% | 5.6% | 6.1% | 9.9% | $2.82 | 64.5% | 6.7% | 19.8% | 9.0% | 122 | 19 | 2.6 |
| | (L) Sawtooth Ap | 332,072 | 77.6% | 0.8% | 5.5% | 6.7% | 9.4% | $3.04 | 63.8% | 8.8% | 19.0% | 8.4% | 139 | 21 | 3.7 |
| | (L) Monitor Ap. | 344,213 | 77.2% | 0.9% | 6.1% | 6.8% | 9.1% | $3.21 | 62.4% | 9.3% | 20.4% | 7.9% | 145 | 22 | 3.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***73,139*** | ***63.8%*** | ***3.2%*** | ***20.2%*** | ***7.3%*** | ***5.5%*** | ***$1.09*** | ***32.3%*** | ***13.4%*** | ***42.6%*** | ***11.7%*** | ***27*** | ***193.4*** | |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 72,445 | 64.5% | 2.2% | 20.4% | 7.3% | 5.6% | $1.07 | 32.9% | 11.6% | 43.5% | 11.9% | 27 | 19 | 3.3 |
| | (L) Windows | 74,894 | 66.7% | 3.0% | 17.0% | 7.8% | 5.4% | $1.06 | 35.9% | 14.3% | 37.8% | 12.0% | 30 | 16 | 2.5 |
| | (L) Skylights | 81,413 | 70.5% | 3.0% | 15.0% | 6.5% | 5.0% | $1.07 | 38.6% | 13.7% | 35.8% | 11.9% | 27 | 18 | 2.3 |

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***189,956*** | ***73.5%*** | ***0.7%*** | ***8.4%*** | ***14.6%*** | ***2.9%*** | ***$2.36*** | ***65.4%*** | ***6.1%*** | ***21.2%*** | ***7.3%*** | ***204*** | ***14*** | ***3.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 189,793 | 73.6% | 0.7% | 8.4% | 14.5% | 2.9% | $2.35 | 64.0% | 7.5% | 21.3% | 7.3% | 204 | 14 | 3.0 |
| | (C) Natural Vent | 188,813 | 74.0% | 0.1% | 8.4% | 14.7% | 2.9% | $2.32 | 66.4% | 4.7% | 21.5% | 7.4% | 204 | 14 | 2.8 |
| | (L) Windows | 192,752 | 75.8% | 0.7% | 5.9% | 14.9% | 2.8% | $2.28 | 70.7% | 6.2% | 15.6% | 7.5% | 208 | 11 | 2.9 |
| | (L) Skylights | 186,906 | 75.0% | 0.5% | 5.9% | 15.7% | 2.9% | $2.25 | 70.4% | 6.5% | 15.5% | 7.6% | 197 | 8 | 2.8 |
| | (L) Sawtooth Ap | 206,517 | 78.4% | 0.4% | 5.1% | 13.5% | 2.6% | $2.30 | 73.7% | 4.6% | 14.3% | 7.4% | 219 | 7 | 2.9 |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***92,238*** | ***48.0%*** | ***0.0%*** | ***21.5%*** | ***5.2%*** | ***25.3%*** | ***$1.75*** | ***19.1%*** | ***3.5%*** | ***35.6%*** | ***41.9%*** | ***36*** | ***0*** | ***3.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 98,815 | 62.0% | 0.0% | 9.7% | 4.7% | 23.6% | $1.52 | 28.8% | 3.1% | 19.8% | 48.3% | 34 | 0 | 3.9 |
| | (L) Sawtooth Ap | 119,315 | 66.6% | 0.0% | 6.2% | 7.7% | 19.6% | $1.69 | 36.2% | 6.7% | 13.7% | 43.4% | 65 | 0 | 4.1 |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***115,932*** | ***78.9%*** | ***0.0%*** | ***9.8%*** | ***6.9%*** | ***4.4%*** | ***$1.28*** | ***53.4%*** | ***6.1%*** | ***28.0%*** | ***12.5%*** | ***57*** | ***0*** | ***2.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 114,954 | 80.6% | 0.0% | 8.0% | 7.0% | 4.4% | $1.21 | 57.2% | 5.9% | 23.8% | 13.1% | 57 | 0 | 2.1 |
| | (L) Skylights | 122,212 | 86.0% | 0.0% | 4.5% | 5.4% | 4.1% | $1.12 | 66.4% | 4.0% | 15.4% | 14.2% | 46 | 0 | 2.0 |
| | (L) Sawtooth Ap | 118,705 | 84.1% | 0.0% | 4.2% | 7.4% | 4.3% | $1.14 | 66.1% | 6.3% | 13.7% | 13.9% | 62 | 0 | 2.1 |
| | (L) Monitor Ap. | 129,063 | 84.1% | 0.0% | 4.6% | 7.4% | 3.9% | $1.25 | 65.8% | 6.4% | 15.1% | 12.8% | 66 | 0 | 2.1 |

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HIGH-BAY*** | ***150,970*** | ***69.7%*** | ***0.0%*** | ***16.2%*** | ***6.4%*** | ***7.7%*** | ***$2.02*** | ***39.1%*** | ***4.6%*** | ***38.1%*** | ***18.2%*** | ***67*** | ***0*** | ***3.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 154,453 | 74.7% | 0.0% | 10.8% | 6.9% | 7.6% | $1.87 | 46.8% | 5.4% | 28.1% | 19.7% | 74 | 0 | 3.6 |
| | (L) Skylights | 159,331 | 79.8% | 0.0% | 7.4% | 5.5% | 7.3% | $1.72 | 53.4% | 3.5% | 21.7% | 21.4% | 60 | 0 | 3.5 |
| | (L) Sawtooth Ap | 171,304 | 80.0% | 0.0% | 5.3% | 7.9% | 6.8% | $1.84 | 57.4% | 7.0% | 15.6% | 20.0% | 91 | 0 | 3.7 |
| | (L) Monitor Ap. | 177,180 | 79.1% | 0.0% | 6.7% | 7.6% | 6.6% | $1.94 | 55.4% | 6.4% | 19.2% | 18.9% | 91 | 0 | 3.7 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***90,486*** | ***57.8%*** | ***2.5%*** | ***21.9%*** | ***4.8%*** | ***12.9%*** | ***$1.49*** | ***25.4%*** | ***8.1%*** | ***41.9%*** | ***24.6%*** | ***31*** | ***16*** | ***4.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 90,134 | 58.1% | 2.1% | 22.0% | 4.8% | 12.9% | $1.48 | 25.6% | 7.4% | 42.2% | 24.8% | 31 | 16 | 4.6 |
| | (L) Windows | 93,185 | 63.1% | 2.3% | 16.8% | 5.3% | 12.5% | $1.41 | 30.4% | 8.6% | 34.9% | 26.1% | 35 | 15 | 4.0 |
| | (L) Skylights | 97,220 | 72.2% | 1.5% | 9.8% | 4.5% | 12.0% | $1.24 | 39.6% | 6.5% | 24.3% | 29.6% | 30 | 17 | 2.9 |
| | (L) Sawtooth Ap | 105,524 | 73.6% | 2.1% | 7.0% | 6.3% | 11.1% | $1.31 | 43.8% | 10.4% | 17.7% | 28.1% | 45 | 17 | 3.4 |
| | (L) Monitor Ap. | 109,075 | 72.3% | 2.1% | 8.8% | 6.1% | 10.7% | $1.39 | 41.9% | 10.0% | 21.7% | 26.5% | 45 | 17 | 3.4 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***71,770*** | ***50.9%*** | ***0.0%*** | ***27.6%*** | ***5.2%*** | ***16.3%*** | ***$1.31*** | ***21.0%*** | ***3.4%*** | ***47.6%*** | ***28.0%*** | ***29*** | ***0*** | ***2.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 72,839 | 56.8% | 0.0% | 21.4% | 5.8% | 16.0% | $1.22 | 25.6% | 4.1% | 40.2% | 30.1% | 32 | 0 | 2.9 |
| | (L) Skylights | 73,361 | 66.0% | 0.0% | 13.0% | 5.0% | 15.9% | $1.05 | 33.4% | 3.1% | 28.6% | 34.9% | 28 | 0 | 2.9 |
| | (L) Sawtooth Ap | 78,731 | 68.7% | 0.0% | 9.4% | 7.1% | 14.8% | $1.07 | 38.3% | 5.9% | 21.6% | 34.2% | 42 | 0 | 3.0 |
| | (L) Monitor Ap. | 81,967 | 67.3% | 0.0% | 11.7% | 6.9% | 14.2% | $1.15 | 36.5% | 5.4% | 26.2% | 31.9% | 42 | 0 | 3.0 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***146,718*** | ***78.0%*** | ***1.9%*** | ***9.9%*** | ***6.8%*** | ***3.4%*** | ***$1.65*** | ***52.4%*** | ***10.3%*** | ***27.8%*** | ***9.5%*** | ***67*** | ***27*** | ***4.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 145,903 | 78.4% | 1.4% | 10.0% | 6.8% | 3.4% | $1.62 | 53.3% | 8.8% | 28.2% | 9.7% | 67 | 27 | 4.8 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***162,058*** | ***70.2%*** | ***3.0%*** | ***17.6%*** | ***6.0%*** | ***3.2%*** | ***$2.15*** | ***39.2%*** | ***11.5%*** | ***41.8%*** | ***7.5%*** | ***64*** | ***38*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 161,157 | 70.6% | 2.5% | 17.7% | 6.1% | 3.2% | $2.12 | 39.8% | 10.3% | 42.4% | 7.6% | 64 | 38 | 7.1 |
| | (L) Windows | 162,862 | 74.3% | 2.7% | 13.3% | 6.6% | 3.1% | $1.99 | 45.7% | 11.9% | 34.3% | 8.1% | 70 | 31 | 6.0 |
| | (L) Skylights | 163,416 | 82.0% | 1.5% | 8.4% | 5.0% | 3.1% | $1.67 | 56.7% | 7.6% | 26.0% | 9.6% | 52 | 29 | 3.8 |
| | (L) Sawtooth Ap | 156,687 | 80.4% | 1.5% | 8.1% | 6.8% | 3.3% | $1.67 | 57.2% | 9.4% | 23.8% | 9.7% | 69 | 21 | 4.0 |
| | (L) Monitor Ap | 171,179 | 79.8% | 1.7% | 8.8% | 6.8% | 3.0% | $1.85 | 55.7% | 10.0% | 25.6% | 8.7% | 74 | 22 | 4.2 |
| | (L) Atrium | 183,256 | 81.5% | 2.4% | 7.9% | 5.5% | 2.8% | $1.89 | 56.2% | 11.4% | 23.9% | 8.5% | 64 | 41 | 4.9 |
| ***O*** | ***TRAINING >5000*** | ***116,253*** | ***62.0%*** | ***3.5%*** | ***24.7%*** | ***5.5%*** | ***4.4%*** | ***$1.79*** | ***29.6%*** | ***11.0%*** | ***50.4%*** | ***9.0%*** | ***43*** | ***27*** | ***5.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 115,844 | 62.2% | 3.2% | 24.8% | 5.5% | 4.4% | $1.78 | 29.8% | 10.4% | 50.8% | 9.1% | 43 | 27 | 5.9 |
| | (L) Windows | 114,288 | 67.0% | 2.5% | 20.1% | 6.0% | 4.5% | $1.61 | 35.3% | 9.8% | 44.9% | 10.0% | 46 | 17 | 4.2 |
| | (L) Skylights | 119,740 | 77.1% | 1.7% | 11.9% | 5.0% | 4.3% | $1.37 | 47.7% | 8.0% | 32.5% | 11.7% | 38 | 24 | 3.3 |
| | (L) Sawtooth Ap | 121,650 | 78.7% | 2.1% | 8.2% | 6.9% | 4.2% | $1.35 | 53.3% | 11.4% | 23.2% | 12.0% | 56 | 20 | 3.6 |
| | (L) Monitor Ap. | 132,577 | 76.0% | 2.2% | 11.2% | 6.7% | 3.9% | $1.56 | 48.5% | 11.1% | 30.1% | 10.4% | 59 | 20 | 3.8 |
| | (L) Atrium | 120,722 | 74.5% | 2.2% | 13.0% | 6.0% | 4.2% | $1.47 | 45.3% | 10.0% | 33.6% | 11.0% | 43 | 26 | 3.7 |

# CLIMATE REGION 1

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTI STORY*** | ***81,268*** | ***46.5%*** | ***6.0%*** | ***35.3%*** | ***5.9%*** | ***6.3%*** | ***$1.58*** | ***18.1%*** | ***14.4%*** | ***57.2%*** | ***10.2%*** | ***29*** | ***27*** | ***5.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 80,865 | 46.7% | 5.6% | 35.5% | 5.9% | 6.3% | $1.56 | 18.3% | 13.7% | 57.7% | 10.3% | 29 | 27 | 5.9 |
| | (L) Windows | 79,654 | 54.1% | 5.0% | 28.8% | 5.6% | 6.4% | $1.39 | 23.1% | 13.2% | 52.0% | 11.6% | 32 | 17 | 4.1 |
| | (L) Skylights | 81,349 | 58.9% | 4.6% | 24.5% | 5.7% | 6.3% | $1.32 | 26.8% | 13.3% | 47.7% | 12.3% | 29 | 22 | 4.2 |
| | (L) Sawtooth Ap | 79,681 | 60.4% | 4.9% | 22.1% | 6.1% | 6.4% | $1.26 | 28.5% | 14.6% | 44.1% | 12.8% | 35 | 20 | 4.1 |
| | (L) Monitor Ap. | 83,481 | 59.9% | 5.0% | 22.8% | 6.1% | 6.1% | $1.33 | 28.1% | 14.6% | 45.1% | 12.1% | 36 | 20 | 4.2 |
| | (L) Atrium | 84,579 | 60.9% | 4.6% | 21.8% | 6.7% | 6.1% | $1.33 | 29.6% | 14.5% | 43.7% | 12.2% | 32 | 27 | 4.3 |
| ***Q*** | ***TRAINING, GYM*** | ***203,662*** | ***75.3%*** | ***0.0%*** | ***17.5%*** | ***7.2%*** | ***0.0%*** | ***$2.43*** | ***47.2%*** | ***6.8%*** | ***46.0%*** | ***0.0%*** | ***92*** | ***0*** | ***2.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 229,830 | 84.4% | 0.0% | 9.5% | 6.2% | 0.0% | $2.20 | 63.0% | 6.0% | 31.0% | 0.0% | 87 | 0 | 2.3 |
| | (L) Sawtooth Ap | 233,184 | 83.6% | 0.0% | 8.0% | 8.3% | 0.0% | $2.28 | 64.6% | 9.5% | 25.9% | 0.0% | 118 | 0 | 2.5 |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***77,886*** | ***85.3%*** | ***0.0%*** | ***9.1%*** | ***5.6%*** | ***0.0%*** | ***$0.73*** | ***66.7%*** | ***2.6%*** | ***30.7%*** | ***0.0%*** | ***32*** | ***0*** | ***0.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 83,168 | 90.6% | 0.0% | 4.1% | 5.3% | 0.0% | $0.66 | 81.2% | 2.5% | 16.2% | 0.0% | 32 | 0 | 0.8 |
| | (L) Sawtooth Ap | 88,363 | 90.0% | 0.0% | 3.0% | 7.0% | 0.0% | $0.72 | 81.9% | 6.6% | 11.5% | 0.0% | 45 | 0 | 0.9 |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 2

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | ***ADMIN <5000 SF*** | ***87,635*** | ***29.0%*** | ***24.2%*** | ***32.6%*** | ***8.4%*** | ***5.8%*** | ***$1.56*** | ***11.4%*** | ***49.0%*** | ***33.0%*** | ***6.6%*** | ***37*** | ***46*** | ***8.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84,509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79,906 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69,920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65,917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 39 | 29 | 5.0 |
| | (L) Monitor Ap. | 72,461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81,420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 50 | 6.9 |
| B | ***ADMIN >5000 SF*** | ***70.708*** | ***22.7%*** | ***22.2%*** | ***40.6%*** | ***7.3%*** | ***7.3%*** | ***$1.29*** | ***8.7%*** | ***43.2%*** | ***40.1%*** | ***8.0%*** | ***25*** | ***34*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 70,519 | 23.0% | 21.3% | 40.7% | 7.7% | 7.3% | $1.28 | 8.8% | 43.0% | 40.1% | 8.0% | 25 | 34 | 7.0 |
| | (C) Natural Vent | 68,633 | 23.4% | 19.9% | 41.8% | 7.5% | 7.5% | $1.25 | 8.9% | 41.6% | 41.2% | 8.2% | 25 | 34 | 7.3 |
| | (L) Windows | 62,015 | 30.0% | 21.6% | 34.0% | 6.2% | 8.3% | $1.02 | 12.4% | 43.3% | 34.2% | 10.1% | 26 | 23 | 4.9 |
| | (L) Skylights | 55,356 | 46.6% | 19.7% | 15.7% | 8.8% | 9.3% | $0.86 | 20.5% | 49.3% | 18.2% | 11.9% | 22 | 31 | 4.3 |
| | (L) Sawtooth Ap | 53,916 | 45.9% | 25.2% | 11.1% | 8.3% | 9.5% | $0.92 | 18.3% | 54.9% | 15.6% | 11.2% | 32 | 26 | 4.8 |
| | (L) Monitor Ap. | 60,025 | 42.0% | 25.2% | 16.4% | 7.8% | 8.5% | $0.97 | 17.7% | 54.8% | 16.9% | 10.6% | 34 | 27 | 4.8 |
| | (L) Atrium | 57,750 | 39.5% | 23.8% | 19.1% | 8.8% | 8.9% | $0.92 | 17.2% | 53.1% | 18.5% | 11.2% | 25 | 33 | 4.6 |
| C | ***ADMIN, MULTISTORY*** | ***61,970*** | ***12.8%*** | ***25.5%*** | ***46.3%*** | ***7.2%*** | ***8.3%*** | ***$1.23*** | ***4.5%*** | ***44.1%*** | ***43.1%*** | ***8.4%*** | ***17*** | ***31*** | ***6.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 53,559 | 18.2% | 27.1% | 39.4% | 5.8% | 9.6% | $0.95 | 7.1% | 44.4% | 37.7% | 10.9% | 18 | 21 | 4.7 |
| | (L) Skylights | 50,505 | 21.7% | 27.1% | 33.2% | 7.8% | 10.2% | $0.94 | 8.1% | 50.0% | 31.0% | 10.9% | 17 | 27 | 4.9 |
| | (L) Sawtooth Ap | 48,322 | 23.2% | 28.9% | 30.0% | 7.3% | 10.6% | $0.93 | 8.3% | 50.4% | 30.2% | 11.1% | 20 | 24 | 4.8 |
| | (L) Monitor Ap. | 50,396 | 23.1% | 28.7% | 30.9% | 7.2% | 10.2% | $0.95 | 8.4% | 50.8% | 30.0% | 10.8% | 21 | 24 | 4.9 |
| | (L) Atrium | 51,895 | 22.4% | 30.4% | 28.6% | 8.7% | 9.9% | $0.96 | 8.5% | 55.3% | 25.4% | 10.7% | 18 | 31 | 5.0 |

# CLIMATE REGION 2

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***144,634*** | ***14.9%*** | ***19.5%*** | ***22.6%*** | ***7.1%*** | ***35.8%*** | ***$2.44*** | ***6.1%*** | ***35.8%*** | ***22.0%*** | ***36.1%*** | ***35*** | ***50*** | ***12.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 141,762 | 15.3% | 17.8% | 23.1% | 7.3% | 36.6% | $2.39 | 6.3% | 34.5% | 22.4% | 36.8% | 35 | 50 | 12.6 |
| | (L) Windows | 136,883 | 18.4% | 19.5% | 18.3% | 6.0% | 37.9% | $2.22 | 7.7% | 36.0% | 16.7% | 39.7% | 36 | 40 | 10.6 |
| | (L) Skylights | 128,817 | 26.4% | 17.6% | 7.8% | 7.9% | 40.2% | $2.01 | 11.5% | 36.6% | 8.2% | 43.8% | 32 | 48 | 9.9 |
| | (L) Sawtooth Ap | 126,819 | 26.0% | 20.0% | 5.2% | 7.9% | 40.9% | $2.09 | 10.8% | 40.1% | 7.0% | 42.2% | 42 | 43 | 10.0 |
| | (L) Monitor Ap. | 134,320 | 23.3% | 20.3% | 10.3% | 7.5% | 38.6% | $2.15 | 9.9% | 40.6% | 8.6% | 40.9% | 43 | 45 | 10.2 |
| | (L) Atrium | 131,848 | 22.4% | 20.6% | 9.2% | 8.4% | 39.3% | $2.12 | 9.6% | 40.6% | 8.3% | 41.5% | 36 | 53 | 10.4 |
| ***E*** | ***DINING FACILITY*** | ***149,723*** | ***38.2%*** | ***12.0%*** | ***21.0%*** | ***7.9%*** | ***20.9%*** | ***$1.64*** | ***24.1%*** | ***37.6%*** | ***24.9%*** | ***13.4%*** | ***72*** | ***39*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 147,220 | 38.8% | 10.5% | 21.4% | 8.0% | 21.3% | $1.62 | 24.4% | 36.9% | 25.2% | 13.5% | 72 | 39 | 7.1 |
| | (L) Windows | 142,360 | 43.2% | 13.0% | 13.2% | 8.5% | 22.0% | $1.45 | 29.2% | 44.4% | 11.3% | 15.1% | 76 | 39 | 5.8 |
| | (L) Skylights | 138,676 | 51.7% | 8.4% | 9.6% | 7.7% | 22.6% | $1.27 | 38.5% | 36.1% | 8.2% | 17.2% | 69 | 32 | 4.5 |
| | (L) Sawtooth Ap | 142,603 | 47.3% | 12.2% | 10.4% | 8.1% | 22.0% | $1.43 | 32.2% | 44.7% | 7.8% | 15.3% | 79 | 34 | 4.9 |
| | (L) Monitor Ap. | 147,890 | 45.9% | 12.9% | 11.8% | 8.2% | 21.2% | $1.49 | 31.2% | 45.7% | 8.4% | 14.7% | 82 | 35 | 5.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***45,678*** | ***15.7%*** | ***30.9%*** | ***32.3%*** | ***12.2%*** | ***8.9%*** | ***$0.74*** | ***7.2%*** | ***42.2%*** | ***37.3%*** | ***13.2%*** | ***16*** | ***23*** | ***4.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 44,596 | 17.0% | 28.6% | 33.1% | 12.2% | 9.1% | $0.73 | 7.7% | 41.4% | 37.6% | 13.3% | 16 | 23 | 4.2 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 44,242 | 19.6% | 32.1% | 28.5% | 10.6% | 9.2% | $0.61 | 10.1% | 50.5% | 23.6% | 15.8% | 17 | 19 | 3.2 |
| | (L) Skylights | 47,160 | 23.9% | 30.8% | 25.6% | 11.2% | 8.6% | $0.62 | 13.0% | 52.3% | 19.1% | 15.6% | 16 | 22 | 3.2 |
| | (L) Sawtooth Ap | 45,324 | 22.0% | 32.6% | 26.2% | 10.3% | 8.9% | $0.63 | 11.1% | 54.9% | 18.6% | 15.4% | 19 | 19 | 3.3 |
| | (L) Monitor Ap. | 46,867 | 22.5% | 32.4% | 26.3% | 10.1% | 8.6% | $0.65 | 11.5% | 55.0% | 18.5% | 15.0% | 20 | 19 | 3.3 |
| | (L) Atrium | 51,379 | 24.6% | 32.9% | 22.4% | 12.3% | 7.9% | $0.67 | 13.5% | 59.0% | 13.1% | 14.4% | 17 | 26 | 3.6 |

# CLIMATE REGION 2

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***76,596*** | ***45.7%*** | ***10.2%*** | ***20.7%*** | ***16.3%*** | ***7.1%*** | ***$0.89*** | ***29.3%*** | ***32.8%*** | ***31.5%*** | ***6.4%*** | ***112*** | ***16*** | ***3.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 71,915 | 48.6% | 4.4% | 22.1% | 17.3% | 7.6% | $0.83 | 31.4% | 28.0% | 33.8% | 6.8% | 112 | 16 | 3.6 |
| | (L) Windows | 71,639 | 51.6% | 10.1% | 14.3% | 16.4% | 7.6% | $0.74 | 37.2% | 44.3% | 10.9% | 7.6% | 115 | 13 | 2.5 |
| | (L) Skylights | 72,924 | 54.5% | 7.7% | 13.6% | 16.8% | 7.5% | $0.71 | 42.2% | 38.6% | 11.2% | 8.0% | 109 | 10 | 2.2 |
| | (L) Sawtooth Ap | 69,500 | 56.0% | 7.4% | 13.7% | 15.1% | 7.8% | $0.69 | 41.7% | 38.8% | 11.2% | 8.2% | 121 | 9 | 2.2 |
| | (L) Monitor Ap. | 74,388 | 55.8% | 8.1% | 13.9% | 14.9% | 7.3% | $0.74 | 41.1% | 40.3% | 11.0% | 7.6% | 124 | 10 | 2.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***51.184*** | ***11.3%*** | ***0.0%*** | ***38.8%*** | ***4.3%*** | ***45.6%*** | ***$0.86*** | ***4.7%*** | ***3.3%*** | ***42.1%*** | ***49.9%*** | ***20*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 40,936 | 24.1% | 0.0% | 13.7% | 5.1% | 57.1% | $0.58 | 11.6% | 4.2% | 11.0% | 73.2% | 18 | 0 | 2.7 |
| | (L) Sawtooth Ap | 45,006 | 28.9% | 0.0% | 10.2% | 9.1% | 51.9% | $0.63 | 14.3% | 8.2% | 9.3% | 68.2% | 36 | 0 | 2.8 |
| | (L) Monitor Ap. | 45,589 | 23.1% | 0.0% | 18.3% | 7.5% | 51.2% | $0.62 | 11.7% | 6.9% | 12.7% | 68.8% | 30 | 0 | 2.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***35,247*** | ***43.5%*** | ***0.0%*** | ***32.1%*** | ***10.1%*** | ***14.4%*** | ***$0.49*** | ***21.6%*** | ***8.3%*** | ***49.2%*** | ***20.9%*** | ***30*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | 33,742 | 41.5% | 0.0% | 33.5% | 9.9% | 15.0% | $0.48 | 20.0% | 8.4% | 50.3% | 21.3% | 29 | 0 | 1.9 |
| | (H) Indirect Gain | 33,737 | 40.3% | 0.0% | 33.5% | 11.2% | 15.0% | $0.48 | 19.6% | 8.8% | 50.3% | 21.3% | 29 | 0 | 1.9 |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | 32,993 | 37.2% | 0.0% | 34.3% | 13.1% | 15.3% | $0.48 | 18.2% | 9.3% | 50.9% | 21.6% | 29 | 0 | 1.9 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 32,932 | 48.9% | 0.0% | 24.9% | 10.8% | 15.4% | $0.41 | 27.1% | 9.8% | 38.2% | 24.9% | 30 | 0 | 1.6 |
| | (L) Skylights | 33,651 | 66.7% | 0.0% | 9.5% | 8.7% | 15.0% | $0.33 | 46.5% | 9.5% | 12.6% | 31.4% | 24 | 0 | 1.1 |
| | (L) Sawtooth Ap | 30,375 | 59.7% | 0.0% | 10.8% | 12.8% | 16.7% | $0.31 | 40.1% | 13.8% | 13.3% | 32.7% | 33 | 0 | 1.1 |
| | (L) Monitor Ap. | 32,551 | 59.2% | 0.0% | 12.2% | 13.0% | 15.6% | $0.33 | 40.7% | 14.3% | 13.8% | 31.2% | 35 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 2

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***J*** | ***MAINT, HI-BAY*** | ***58,022*** | ***30.1%*** | ***0.0%*** | ***42.3%*** | ***7.5%*** | ***20.1%*** | ***$0.83*** | ***14.6%*** | ***5.9%*** | ***53.8%*** | ***25.7%*** | ***36*** | ***0*** | ***3.3*** |
| | (H) Direct Gain + St | 56,523 | 29.0% | 0.0% | 43.4% | 7.0% | 20.7% | $0.82 | 13.7% | 5.8% | 54.5% | 26.0% | 35 | 0 | 3.3 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | 54,637 | 22.7% | 0.0% | 44.9% | 11.0% | 21.4% | $0.81 | 11.0% | 7.1% | 55.4% | 26.5% | 35 | 0 | 3.3 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 49,523 | 39.8% | 0.0% | 26.9% | 9.8% | 23.6% | $0.60 | 22.8% | 9.1% | 32.6% | 35.5% | 40 | 0 | 2.4 |
| | (L) Skylights | 48,705 | 53.6% | 0.0% | 14.3% | 8.2% | 24.0% | $0.51 | 34.8% | 8.2% | 15.5% | 41.6% | 33 | 0 | 1.9 |
| | (L) Sawtooth Ap | 47,779 | 50.9% | 0.0% | 11.8% | 12.8% | 24.4% | $0.52 | 32.4% | 13.0% | 13.8% | 40.8% | 50 | 0 | 2.0 |
| | (L) Monitor Ap. | 50,097 | 48.9% | 0.0% | 15.5% | 12.2% | 23.3% | $0.54 | 31.9% | 12.6% | 15.6% | 39.8% | 50 | 0 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***55,918*** | ***21.1%*** | ***17.1%*** | ***35.5%*** | ***5.5%*** | ***20.9%*** | ***$1.01*** | ***8.0%*** | ***35.1%*** | ***35.7%*** | ***21.2%*** | ***18*** | ***21*** | ***5.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 55,741 | 21.5% | 16.1% | 35.6% | 5.9% | 20.9% | $1.00 | 8.1% | 34.8% | 35.8% | 21.2% | 18 | 21 | 5.4 |
| | (C) Natural Vent | 54,783 | 21.5% | 15.4% | 36.2% | 5.7% | 21.3% | $0.99 | 8.1% | 34.0% | 36.3% | 21.5% | 18 | 21 | 5.4 |
| | (L) Windows | 51,811 | 25.8% | 19.5% | 26.5% | 5.7% | 22.5% | $0.89 | 10.2% | 40.7% | 25.0% | 24.1% | 20 | 20 | 4.5 |
| | (L) Skylights | 47,297 | 39.6% | 16.6% | 11.9% | 7.2% | 24.7% | $0.74 | 17.4% | 44.9% | 8.7% | 29.0% | 17 | 22 | 4.0 |
| | (L) Sawtooth Ap | 50,055 | 37.5% | 23.5% | 9.1% | 6.6% | 23.3% | $0.83 | 15.3% | 51.9% | 7.1% | 25.8% | 26 | 22 | 4.0 |
| | (L) Monitor Ap. | 51,966 | 36.2% | 22.9% | 12.1% | 6.3% | 22.4% | $0.83 | 15.3% | 50.7% | 8.2% | 25.8% | 26 | 22 | 3.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***37,699*** | ***11.9%*** | ***0.0%*** | ***52.6%*** | ***4.6%*** | ***30.9%*** | ***$0.63*** | ***5.0%*** | ***3.5%*** | ***57.5%*** | ***34.0%*** | ***15*** | ***0*** | ***2.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 32,550 | 16.2% | 0.0% | 42.1% | 5.9% | 35.8% | $0.50 | 7.4% | 5.0% | 44.7% | 43.0% | 17 | 0 | 2.3 |
| | (L) Skylights | 27,510 | 31.1% | 0.0% | 20.4% | 6.1% | 42.4% | $0.36 | 16.5% | 5.5% | 18.0% | 60.0% | 15 | 0 | 1.7 |
| | (L) Sawtooth Ap | 26,909 | 30.3% | 0.0% | 17.0% | 9.4% | 43.3% | $0.36 | 15.7% | 8.8% | 16.2% | 59.3% | 23 | 0 | 1.7 |
| | (L) Monitor Ap. | 28,665 | 28.5% | 0.0% | 22.0% | 8.8% | 40.7% | $0.37 | 15.3% | 8.6% | 18.3% | 57.8% | 23 | 0 | 1.7 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 2

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***68,663*** | ***40.5%*** | ***22.1%*** | ***21.2%*** | ***8.9%*** | ***7.3%*** | ***$1.14*** | ***17.0%*** | ***50.8%*** | ***23.1%*** | ***9.0%*** | ***38*** | ***39*** | ***6.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 66,239 | 42.0% | 19.2% | 22.0% | 9.2% | 7.6% | $1.10 | 17.6% | 49.3% | 23.9% | 9.3% | 38 | 39 | 6.8 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***87,635*** | ***29.0%*** | ***24.2%*** | ***32.6%*** | ***8.4%*** | ***5.8%*** | ***$1.56*** | ***11.4%*** | ***49.0%*** | ***33.0%*** | ***6.6%*** | ***37*** | ***46*** | ***8.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84,509 | 30.0% | 21.4% | 33.8% | 8.7% | 6.0% | $1.53 | 11.6% | 47.9% | 33.8% | 6.7% | 37 | 46 | 8.9 |
| | (L) Windows | 79,906 | 36.3% | 26.0% | 23.3% | 8.0% | 6.4% | $1.36 | 14.7% | 53.5% | 24.2% | 7.6% | 40 | 40 | 6.9 |
| | (L) Skylights | 69,920 | 53.6% | 18.6% | 11.6% | 8.9% | 7.3% | $1.03 | 24.9% | 50.2% | 14.9% | 10.0% | 30 | 38 | 5.3 |
| | (L) Sawtooth Ap | 65,917 | 50.3% | 21.4% | 12.6% | 7.9% | 7.7% | $1.02 | 22.0% | 52.7% | 15.2% | 10.1% | 39 | 29 | 5.0 |
| | (L) Monitor Ap. | 72,461 | 48.5% | 22.7% | 13.9% | 7.8% | 7.0% | $1.10 | 21.6% | 54.2% | 14.9% | 9.3% | 43 | 31 | 5.3 |
| | (L) Atrium | 81,420 | 46.6% | 26.3% | 10.7% | 10.1% | 6.3% | $1.28 | 20.7% | 58.9% | 12.3% | 8.1% | 37 | 50 | 6.9 |
| ***O*** | ***TRAINING >5000*** | ***70,708*** | ***22.7%*** | ***22.2%*** | ***40.6%*** | ***7.3%*** | ***7.3%*** | ***$1.29*** | ***8.7%*** | ***43.2%*** | ***40.1%*** | ***8.0%*** | ***25*** | ***34*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 70,519 | 23.0% | 21.3% | 40.7% | 7.7% | 7.3% | $1.28 | 8.8% | 43.0% | 40.1% | 8.0% | 25 | 34 | 7.0 |
| | (C) Natural Vent | 68,633 | 23.4% | 19.9% | 41.8% | 7.5% | 7.5% | $1.25 | 8.9% | 41.6% | 41.2% | 8.2% | 25 | 34 | 7.3 |
| | (L) Windows | 62,015 | 30.0% | 21.6% | 34.0% | 6.2% | 8.3% | $1.02 | 12.4% | 43.3% | 34.2% | 10.1% | 26 | 23 | 4.9 |
| | (L) Skylights | 55,356 | 46.6% | 19.7% | 15.7% | 8.8% | 9.3% | $0.86 | 20.5% | 49.3% | 18.2% | 11.9% | 22 | 31 | 4.3 |
| | (L) Sawtooth Ap | 53,916 | 45.9% | 25.2% | 11.1% | 8.3% | 9.5% | $0.92 | 18.3% | 54.9% | 15.6% | 11.2% | 32 | 26 | 4.8 |
| | (L) Monitor Ap. | 60,025 | 42.0% | 25.2% | 16.4% | 7.8% | 8.5% | $0.97 | 17.7% | 54.8% | 16.9% | 10.6% | 34 | 27 | 4.8 |
| | (L) Atrium | 57,750 | 39.5% | 23.8% | 19.1% | 8.8% | 8.9% | $0.92 | 17.2% | 53.1% | 18.5% | 11.2% | 25 | 33 | 4.6 |

# CLIMATE REGION 2

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***P*** | ***TRAINING, MULTI STORY*** | ***61,970*** | ***12.8%*** | ***25.5%*** | ***46.3%*** | ***7.2%*** | ***8.3%*** | ***$1.23*** | ***4.5%*** | ***44.1%*** | ***43.1%*** | ***8.4%*** | ***17*** | ***31*** | ***6.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 53,559 | 18.2% | 27.1% | 39.4% | 5.8% | 9.6% | $0.95 | 7.1% | 44.4% | 37.7% | 10.9% | 18 | 21 | 4.7 |
| | (L) Skylights | 50,505 | 21.7% | 27.1% | 33.2% | 7.8% | 10.2% | $0.94 | 8.1% | 50.0% | 31.0% | 10.9% | 17 | 27 | 4.9 |
| | (L) Sawtooth Ap | 48,322 | 23.2% | 28.9% | 30.0% | 7.3% | 10.6% | $0.93 | 8.3% | 50.4% | 30.2% | 11.1% | 20 | 24 | 4.8 |
| | (L) Monitor Ap. | 50,396 | 23.1% | 28.7% | 30.9% | 7.2% | 10.2% | $0.95 | 8.4% | 50.8% | 30.0% | 10.8% | 21 | 24 | 4.9 |
| | (L) Atrium | 51,895 | 22.4% | 30.4% | 28.6% | 8.7% | 9.9% | $0.96 | 8.5% | 55.3% | 25.4% | 10.7% | 18 | 31 | 5.0 |
| ***Q*** | ***TRAINING, GYM*** | ***70,845*** | ***39.2%*** | ***0.0%*** | ***50.2%*** | ***10.6%*** | ***0.0%*** | ***$0.71*** | ***27.0%*** | ***10.4%*** | ***62.6%*** | ***0.0%*** | ***50*** | ***0*** | ***2.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 68,534 | 64.8% | 0.0% | 24.7% | 10.5% | 0.0% | $0.49 | 61.0% | 13.7% | 25.4% | 0.0% | 47 | 0 | 0.9 |
| | (L) Sawtooth Ap | 62,392 | 59.3% | 0.0% | 24.9% | 15.8% | 0.0% | $0.47 | 54.6% | 20.4% | 25.0% | 0.0% | 65 | 0 | 1.0 |
| | (L) Monitor Ap. | 66,607 | 57.8% | 0.0% | 26.8% | 15.4% | 0.0% | $0.50 | 53.8% | 20.0% | 26.2% | 0.0% | 67 | 0 | 1.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***25,127*** | ***63.9%*** | ***0.0%*** | ***28.2%*** | ***7.9%*** | ***0.0%*** | ***$0.26*** | ***41.9%*** | ***8.1%*** | ***50.1%*** | ***0.0%*** | ***17*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 21,258 | 58.1% | 0.0% | 33.3% | 8.6% | 0.0% | $0.24 | 36.7% | 7.9% | 55.4% | 0.0% | 16 | 0 | 0.7 |
| | (H) Indirect Gain | 21,637 | 57.1% | 0.0% | 32.7% | 10.1% | 0.0% | $0.24 | 35.6% | 9.5% | 55.0% | 0.0% | 16 | 0 | 0.7 |
| | (H) Direct Gain | 21,584 | 58.4% | 0.0% | 32.8% | 8.8% | 0.0% | $0.24 | 36.5% | 8.6% | 54.9% | 0.0% | 17 | 0 | 0.7 |
| | (H) Sunspace | 21,193 | 54.0% | 0.0% | 33.4% | 12.5% | 0.0% | $0.23 | 34.1% | 10.2% | 55.7% | 0.0% | 16 | 0 | 0.7 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 23,252 | 82.8% | 0.0% | 8.6% | 8.6% | 0.0% | $0.17 | 74.9% | 11.8% | 13.3% | 0.0% | 17 | 0 | 0.3 |
| | (L) Sawtooth Ap | 19,970 | 77.8% | 0.0% | 8.2% | 14.1% | 0.0% | $0.16 | 66.8% | 19.9% | 13.2% | 0.0% | 24 | 0 | 0.4 |
| | (L) Monitor Ap. | 21.127 | 76.0% | 0.0% | 10.7% | 13.4% | 0.0% | $0.17 | 66.3% | 19.0% | 14.7% | 0.0% | 24 | 0 | 0.4 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 3

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***A*** | ***ADMIN <5000 SF*** | ***74,573*** | ***12.4%*** | ***33.9%*** | ***38.3%*** | ***8.6%*** | ***6.8%*** | ***$0.98*** | ***5.9%*** | ***49.6%*** | ***37.4%*** | ***7.1%*** | ***22*** | ***46*** | ***8.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 71,392 | 12.9% | 30.9% | 40.0% | 9.0% | 7.2% | $0.93 | 6.2% | 47.1% | 39.3% | 7.4% | 22 | 46 | 8.7 |
| | (L) Windows | 64,265 | 15.9% | 39.2% | 28.3% | 8.6% | 7.9% | $0.84 | 7.4% | 56.1% | 28.3% | 8.2% | 24 | 40 | 7.1 |
| | (L) Skylights | 47,011 | 25.9% | 36.4% | 15.4% | 11.4% | 10.9% | $0.60 | 12.8% | 57.5% | 18.2% | 11.5% | 18 | 38 | 5.5 |
| | (L) Sawtooth Ap | 45,921 | 26.7% | 36.4% | 16.8% | 8.9% | 11.1% | $0.59 | 12.2% | 56.7% | 19.3% | 11.7% | 24 | 29 | 5.2 |
| | (L) Monitor Ap. | 51,289 | 25.4% | 38.2% | 17.8% | 8.7% | 10.0% | $0.65 | 11.8% | 58.2% | 19.3% | 10.7% | 26 | 31 | 5.7 |
| | (L) Atrium | 59,942 | 20.6% | 45.8% | 13.1% | 11.9% | 8.5% | $0.77 | 10.3% | 65.8% | 14.9% | 9.0% | 22 | 50 | 6.9 |
| ***B*** | ***ADMIN >5000 SF*** | ***62,000*** | ***8.5%*** | ***29.6%*** | ***46.3%*** | ***7.4%*** | ***8.3%*** | ***$0.82*** | ***4.0%*** | ***42.8%*** | ***44.8%*** | ***8.5%*** | ***15*** | ***34*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 52,002 | 11.4% | 32.4% | 40.1% | 6.3% | 9.9% | $0.66 | 5.4% | 44.8% | 39.5% | 10.4% | 16 | 24 | 5.1 |
| | (L) Skylights | 38,722 | 20.0% | 36.3% | 19.4% | 11.1% | 13.2% | $0.51 | 9.5% | 55.3% | 21.8% | 13.5% | 13 | 31 | 4.5 |
| | (L) Sawtooth Ap | 39,295 | 21.6% | 41.7% | 14.4% | 9.2% | 13.1% | $0.54 | 9.2% | 59.8% | 18.0% | 12.9% | 19 | 26 | 5.0 |
| | (L) Monitor Ap. | 44,687 | 19.4% | 40.6% | 20.1% | 8.5% | 11.5% | $0.59 | 8.6% | 58.3% | 21.2% | 11.8% | 20 | 27 | 5.1 |
| | (L) Atrium | 43,901 | 15.7% | 38.8% | 23.6% | 10.2% | 11.7% | $0.57 | 7.5% | 56.7% | 23.7% | 12.1% | 15 | 33 | 4.8 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***59,554*** | ***4.5%*** | ***31.8%*** | ***48.2%*** | ***6.9%*** | ***8.6%*** | ***$0.81*** | ***2.0%*** | ***43.4%*** | ***46.0%*** | ***8.6%*** | ***10*** | ***31*** | ***6.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 57,641 | 4.7% | 29.5% | 49.8% | 7.2% | 8.9% | $0.78 | 2.1% | 41.5% | 47.6% | 8.9% | 10 | 31 | 6.6 |
| | (L) Windows | 49,809 | 6.6% | 35.6% | 41.9% | 5.6% | 10.3% | $0.65 | 3.0% | 45.3% | 41.0% | 10.7% | 11 | 21 | 4.9 |
| | (L) Skylights | 45,366 | 7.6% | 37.2% | 36.0% | 7.9% | 11.3% | $0.62 | 3.4% | 50.7% | 34.7% | 11.2% | 10 | 27 | 5.1 |
| | (L) Sawtooth Ap | 43,352 | 8.4% | 39.7% | 32.6% | 7.5% | 11.8% | $0.60 | 3.6% | 52.2% | 32.6% | 11.5% | 12 | 24 | 5.2 |
| | (L) Monitor Ap. | 45,067 | 8.6% | 39.5% | 33.3% | 7.3% | 11.4% | $0.62 | 3.7% | 52.1% | 33.0% | 11.2% | 12 | 24 | 5.3 |
| | (L) Atrium | 46,771 | 7.6% | 41.9% | 30.7% | 8.8% | 11.0% | $0.64 | 3.4% | 56.5% | 29.3% | 10.9% | 11 | 31 | 5.3 |

# CLIMATE REGION 3

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMPUTER FAC*** | ***134,427*** | ***4.9%*** | ***24.9%*** | ***24.3%*** | ***7.3%*** | ***38.6%*** | ***$1.68*** | ***2.4%*** | ***35.6%*** | ***23.7%*** | ***38.3%*** | ***21*** | ***51*** | ***12.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 131,892 | 5.0% | 23.5% | 24.8% | 7.4% | 39.3% | $1.65 | 2.5% | 34.2% | 24.2% | 39.1% | 21 | 51 | 12.3 |
| | (L) Windows | 124,685 | 6.0% | 26.3% | 19.9% | 6.2% | 41.6% | $1.54 | 3.0% | 36.2% | 19.1% | 41.7% | 21 | 41 | 10.6 |
| | (L) Skylights | 107,842 | 9.0% | 25.8% | 8.0% | 9.1% | 48.1% | $1.35 | 4.5% | 38.9% | 9.0% | 47.6% | 19 | 48 | 9.9 |
| | (L) Sawtooth Ap | 107,854 | 9.4% | 28.4% | 5.9% | 8.3% | 48.1% | $1.37 | 4.4% | 41.3% | 7.4% | 46.9% | 25 | 43 | 10.2 |
| | (L) Monitor Ap. | 117,122 | 8.4% | 28.3% | 11.4% | 7.7% | 44.3% | $1.45 | 4.0% | 40.7% | 11.0% | 44.2% | 26 | 45 | 10.3 |
| | (L) Atrium | 114,821 | 7.1% | 28.6% | 9.9% | 9.3% | 45.2% | $1.44 | 3.5% | 41.9% | 10.0% | 44.6% | 21 | 53 | 10.4 |
| ***E*** | ***DINING FACILITY*** | ***103,560*** | ***11.7%*** | ***19.3%*** | ***30.4%*** | ***8.3%*** | ***30.3%*** | ***$0.98*** | ***8.9%*** | ***37.5%*** | ***35.3%*** | ***18.3%*** | ***38*** | ***39*** | ***6.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 99,979 | 12.1% | 16.4% | 31.5% | 8.6% | 31.3% | $0.93 | 9.4% | 34.4% | 37.0% | 19.2% | 38 | 39 | 6.3 |
| | (L) Windows | 92,338 | 14.4% | 22.8% | 19.5% | 9.5% | 33.9% | $0.83 | 11.5% | 45.8% | 21.2% | 21.6% | 40 | 39 | 5.2 |
| | (L) Skylights | 82,424 | 21.4% | 16.3% | 15.1% | 9.2% | 38.0% | $0.68 | 17.8% | 38.2% | 17.6% | 26.4% | 37 | 33 | 4.2 |
| | (L) Sawtooth Ap | 88,955 | 17.9% | 22.1% | 15.8% | 9.0% | 35.2% | $0.79 | 13.6% | 47.1% | 16.7% | 22.6% | 42 | 34 | 4.8 |
| | (L) Monitor Ap. | 94,046 | 17.2% | 23.0% | 17.7% | 8.9% | 33.3% | $0.84 | 13.1% | 47.4% | 18.2% | 21.3% | 44 | 35 | 4.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***38,866*** | ***1.3%*** | ***35.9%*** | ***38.0%*** | ***14.3%*** | ***10.4%*** | ***$0.49*** | ***0.8%*** | ***48.0%*** | ***38.9%*** | ***12.2%*** | ***9*** | ***23*** | ***4.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 35,031 | 1.5% | 28.9% | 42.2% | 15.9% | 11.6% | $0.45 | 0.9% | 43.6% | 42.2% | 13.3% | 9 | 23 | 4.2 |
| | (L) Windows | 36,523 | 2.6% | 39.5% | 33.9% | 12.9% | 11.1% | $0.44 | 1.5% | 54.3% | 30.4% | 13.8% | 10 | 19 | 3.1 |
| | (L) Skylights | 38,265 | 3.9% | 40.9% | 30.8% | 13.8% | 10.6% | $0.45 | 2.3% | 57.7% | 26.6% | 13.3% | 9 | 22 | 3.1 |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 3

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***G*** | ***FIRE STATION*** | ***45,065*** | ***20.2%*** | ***18.7%*** | ***35.2%*** | ***13.8%*** | ***12.1%*** | ***$0.48*** | ***11.1%*** | ***35.9%*** | ***41.7%*** | ***11.4%*** | ***55*** | ***16*** | ***3.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 43,868 | 20.8% | 16.8% | 36.2% | 13.9% | 12.4% | $0.47 | 11.2% | 33.9% | 43.1% | 11.8% | 55 | 16 | 3.0 |
| | (C) Natural Vent | 41,045 | 22.2% | 10.7% | 38.7% | 15.2% | 13.2% | $0.44 | 12.2% | 29.3% | 45.9% | 12.5% | 55 | 16 | 3.1 |
| | (L) Windows | 38,258 | 24.8% | 21.1% | 25.6% | 14.4% | 14.2% | $0.39 | 14.5% | 47.4% | 24.1% | 14.0% | 57 | 13 | 2.2 |
| | (L) Skylights | 39,084 | 32.0% | 15.9% | 24.4% | 13.8% | 13.9% | $0.38 | 19.7% | 41.0% | 24.6% | 14.6% | 54 | 10 | 2.0 |
| | (L) Sawtooth Ap | 33,681 | 26.2% | 15.9% | 27.2% | 14.5% | 16.1% | $0.33 | 16.6% | 40.1% | 26.8% | 16.4% | 60 | 9 | 1.8 |
| | (L) Monitor Ap. | 36,828 | 26.2% | 17.5% | 27.0% | 14.5% | 14.8% | $0.37 | 16.8% | 42.4% | 25.9% | 14.8% | 62 | 10 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***44,778*** | ***1.1%*** | ***0.0%*** | ***44.3%*** | ***2.5%*** | ***52.2%*** | ***$0.57*** | ***0.7%*** | ***1.9%*** | ***44.6%*** | ***52.7%*** | ***10*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 30,508 | 3.6% | 0.0% | 16.4% | 3.4% | 76.6% | $0.38 | 2.1% | 2.6% | 15.6% | 79.7% | 10 | 0 | 2.8 |
| | (L) Sawtooth Ap | 31,965 | 7.7% | 0.0% | 13.2% | 6.1% | 73.1% | $0.39 | 4.4% | 4.7% | 13.5% | 77.5% | 18 | 0 | 2.8 |
| | (L) Monitor Ap. | 34,235 | 5.0% | 0.0% | 22.0% | 4.8% | 68.2% | $0.41 | 3.0% | 3.8% | 19.5% | 73.6% | 15 | 0 | 2.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***21,432*** | ***15.6%*** | ***0.0%*** | ***52.8%*** | ***8.0%*** | ***23.6%*** | ***$0.26*** | ***8.4%*** | ***5.7%*** | ***59.9%*** | ***26.0%*** | ***16*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 18,301 | 19.0% | 0.0% | 44.0% | 9.3% | 27.7% | $0.22 | 10.7% | 7.0% | 50.5% | 31.9% | 16 | 0 | 1.5 |
| | (L) Skylights | 13,797 | 32.3% | 0.0% | 20.8% | 10.2% | 36.7% | $0.14 | 20.3% | 7.0% | 25.1% | 47.6% | 13 | 0 | 1.1 |
| | (L) Sawtooth Ap | 14,280 | 30.0% | 0.0% | 21.4% | 13.1% | 35.5% | $0.15 | 18.8% | 10.5% | 25.2% | 45.6% | 17 | 0 | 1.1 |
| | (L) Monitor Ap. | 15,310 | 30.1% | 0.0% | 23.6% | 13.2% | 33.1% | $0.16 | 19.5% | 10.5% | 26.7% | 43.3% | 19 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 3

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***42,339*** | ***9.6%*** | ***0.0%*** | ***57.9%*** | ***4.9%*** | ***27.6%*** | ***$0.51*** | ***5.2%*** | ***3.6%*** | ***61.7%*** | ***29.4%*** | ***19*** | ***0*** | ***3.2*** |
| | (H) Direct Gain + St | 40,462 | 5.7% | 0.0% | 60.6% | 4.8% | 28.9% | $0.50 | 3.3% | 3.6% | 63.0% | 30.1% | 18 | 0 | 3.2 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 31,190 | 14.3% | 0.0% | 40.9% | 7.3% | 37.4% | $0.35 | 8.3% | 5.7% | 43.6% | 42.4% | 21 | 0 | 2.4 |
| | (L) Skylights | 24,899 | 20.6% | 0.0% | 24.9% | 7.7% | 46.9% | $0.27 | 12.7% | 5.2% | 26.8% | 55.3% | 18 | 0 | 2.0 |
| | (L) Sawtooth Ap | 25,693 | 23.3% | 0.0% | 20.3% | 11.0% | 45.4% | $0.28 | 14.1% | 8.7% | 23.3% | 53.9% | 26 | 0 | 2.1 |
| | (L) Monitor Ap. | 27,436 | 21.4% | 0.0% | 25.8% | 10.3% | 42.6% | $0.29 | 13.2% | 8.3% | 27.3% | 51.2% | 26 | 0 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT AIR COND*** | ***48,156*** | ***6.7%*** | ***22.0%*** | ***41.2%*** | ***5.9%*** | ***24.2%*** | ***$0.64*** | ***3.1%*** | ***33.5%*** | ***39.9%*** | ***23.5%*** | ***11*** | ***21*** | ***5.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 46,817 | 6.9% | 19.8% | 42.4% | 6.1% | 24.9% | $0.62 | 3.2% | 31.4% | 41.2% | 24.3% | 11 | 21 | 5.3 |
| | (L) Windows | 43,065 | 8.7% | 26.8% | 31.2% | 6.2% | 27.1% | $0.56 | 3.9% | 39.9% | 29.5% | 26.6% | 12 | 20 | 4.5 |
| | (L) Skylights | 34,353 | 14.4% | 28.2% | 14.6% | 8.9% | 34.0% | $0.44 | 7.1% | 45.8% | 13.3% | 33.9% | 10 | 23 | 4.0 |
| | (L) Sawtooth Ap | 38,397 | 14.7% | 36.4% | 11.0% | 7.6% | 30.4% | $0.51 | 6.3% | 54.0% | 10.3% | 29.4% | 15 | 22 | 4.3 |
| | (L) Monitor Ap. | 39,801 | 14.2% | 34.9% | 14.4% | 7.3% | 29.3% | $0.51 | 6.3% | 51.8% | 12.6% | 29.2% | 15 | 22 | 4.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***32,664*** | ***1.0%*** | ***0.0%*** | ***60.7%*** | ***2.6%*** | ***35.7%*** | ***$0.42*** | ***0.6%*** | ***2.1%*** | ***61.2%*** | ***36.1%*** | ***8*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 26,386 | 1.4% | 0.0% | 50.8% | 3.6% | 44.2% | $0.33 | 0.9% | 3.0% | 50.5% | 45.6% | 9 | 0 | 2.3 |
| | (L) Skylights | 18,253 | 4.2% | 0.0% | 27.4% | 4.5% | 63.9% | $0.22 | 2.6% | 3.2% | 26.5% | 67.7% | 8 | 0 | 1.8 |
| | (L) Sawtooth Ap | 17,996 | 4.9% | 0.0% | 23.5% | 6.8% | 64.8% | $0.22 | 2.9% | 5.6% | 23.6% | 67.9% | 11 | 0 | 1.8 |
| | (L) Monitor Ap. | 19,550 | 4.8% | 0.0% | 29.3% | 6.3% | 59.7% | $0.23 | 2.9% | 5.2% | 27.7% | 64.2% | 11 | 0 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 3

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***50,245*** | ***17.7%*** | ***32.6%*** | ***28.9%*** | ***10.7%*** | ***10.0%*** | ***$0.65*** | ***8.5%*** | ***52.2%*** | ***28.7%*** | ***10.5%*** | ***23*** | ***39*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 47,737 | 18.6% | 29.1% | 30.5% | 11.3% | 10.5% | $0.61 | 9.0% | 49.6% | 30.3% | 11.1% | 23 | 39 | 6.4 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***74,573*** | ***12.4%*** | ***33.9%*** | ***38.3%*** | ***8.6%*** | ***6.8%*** | ***$0.98*** | ***5.9%*** | ***49.6%*** | ***37.4%*** | ***7.1%*** | ***22*** | ***46*** | ***8.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 71,392 | 12.9% | 30.9% | 40.0% | 9.0% | 7.2% | $0.93 | 6.2% | 47.1% | 39.3% | 7.4% | 22 | 46 | 8.7 |
| | (L) Windows | 64,265 | 15.9% | 39.2% | 28.3% | 8.6% | 7.9% | $0.84 | 7.4% | 56.1% | 28.3% | 8.2% | 24 | 40 | 7.1 |
| | (L) Skylights | 47,011 | 25.9% | 36.4% | 15.4% | 11.4% | 10.9% | $0.60 | 12.8% | 57.5% | 18.2% | 11.5% | 18 | 38 | 5.5 |
| | (L) Sawtooth Ap | 45,921 | 26.7% | 36.4% | 16.8% | 8.9% | 11.1% | $0.59 | 12.2% | 56.7% | 19.3% | 11.7% | 24 | 29 | 5.2 |
| | (L) Monitor Ap. | 51,289 | 25.4% | 38.2% | 17.8% | 8.7% | 10.0% | $0.65 | 11.8% | 58.2% | 19.3% | 10.7% | 26 | 31 | 5.7 |
| | (L) Atrium | 59,942 | 20.6% | 45.8% | 13.1% | 11.9% | 8.5% | $0.77 | 10.3% | 65.8% | 14.9% | 9.0% | 22 | 50 | 6.9 |
| ***O*** | ***TRAINING >5000*** | ***62,000*** | ***8.5%*** | ***29.6%*** | ***46.3%*** | ***7.4%*** | ***8.3%*** | ***$0.82*** | ***4.0%*** | ***42.8%*** | ***44.8%*** | ***8.5%*** | ***15*** | ***34*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 52,002 | 11.4% | 32.4% | 40.1% | 6.3% | 9.9% | $0.66 | 5.4% | 44.8% | 39.5% | 10.4% | 16 | 24 | 5.1 |
| | (L) Skylights | 38,722 | 20.0% | 36.3% | 19.4% | 11.1% | 13.2% | $0.51 | 9.5% | 55.3% | 21.8% | 13.5% | 13 | 31 | 4.5 |
| | (L) Sawtooth Ap | 39,295 | 21.6% | 41.7% | 14.4% | 9.2% | 13.1% | $0.54 | 9.2% | 59.8% | 18.0% | 12.9% | 19 | 26 | 5.0 |
| | (L) Monitor Ap. | 44,687 | 19.4% | 40.6% | 20.1% | 8.5% | 11.5% | $0.59 | 8.6% | 58.3% | 21.2% | 11.8% | 20 | 27 | 5.1 |
| | (L) Atrium | 43,901 | 15.7% | 38.8% | 23.6% | 10.2% | 11.7% | $0.57 | 7.5% | 56.7% | 23.7% | 12.1% | 15 | 33 | 4.8 |

# CLIMATE REGION 3

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTI STORY*** | ***59,554*** | ***4.5%*** | ***31.8%*** | ***48.2%*** | ***6.9%*** | ***8.6%*** | ***$0.81*** | ***2.0%*** | ***43.4%*** | ***46.0%*** | ***8.6%*** | ***10*** | ***31*** | ***6.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 57,641 | 4.7% | 29.5% | 49.8% | 7.2% | 8.9% | $0.78 | 2.1% | 41.5% | 47.6% | 8.9% | 10 | 31 | 6.6 |
| | (L) Windows | 49,809 | 6.6% | 35.6% | 41.9% | 5.6% | 10.3% | $0.65 | 3.0% | 45.3% | 41.0% | 10.7% | 11 | 21 | 4.9 |
| | (L) Skylights | 45,366 | 7.6% | 37.2% | 36.0% | 7.9% | 11.3% | $0.62 | 3.4% | 50.7% | 34.7% | 11.2% | 10 | 27 | 5.1 |
| | (L) Sawtooth Ap | 43,352 | 8.4% | 39.7% | 32.6% | 7.5% | 11.8% | $0.60 | 3.6% | 52.2% | 32.6% | 11.5% | 12 | 24 | 5.2 |
| | (L) Monitor Ap. | 45,067 | 8.6% | 39.5% | 33.3% | 7.3% | 11.4% | $0.62 | 3.7% | 52.1% | 33.0% | 11.2% | 12 | 24 | 5.3 |
| | (L) Atrium | 46,771 | 7.6% | 41.9% | 30.7% | 8.8% | 11.0% | $0.64 | 3.4% | 56.5% | 29.3% | 10.9% | 11 | 31 | 5.3 |
| ***Q*** | ***TRAINING, GYM*** | ***44,718*** | ***12.0%*** | ***0.0%*** | ***79.6%*** | ***8.5%*** | ***0.0%*** | ***$0.45*** | ***8.4%*** | ***6.6%*** | ***85.0%*** | ***0.0%*** | ***25*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 27,729 | 28.9% | 0.0% | 58.0% | 13.0% | 0.0% | $0.23 | 25.1% | 8.8% | 66.1% | 0.0% | 24 | 0 | 0.9 |
| | (L) Sawtooth Ap | 28,282 | 29.7% | 0.0% | 53.2% | 17.1% | 0.0% | $0.24 | 24.9% | 15.2% | 59.9% | 0.0% | 33 | 0 | 0.9 |
| | (L) Monitor Ap. | 30,717 | 28.2% | 0.0% | 55.4% | 16.4% | 0.0% | $0.26 | 23.5% | 14.8% | 61.7% | 0.0% | 34 | 0 | 1.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***11,517*** | ***30.0%*** | ***0.0%*** | ***61.5%*** | ***8.4%*** | ***0.0%*** | ***$0.12*** | ***18.6%*** | ***5.5%*** | ***75.9%*** | ***0.0%*** | ***9*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 9,818 | 18.4% | 0.0% | 72.2% | 9.4% | 0.0% | $0.11 | 10.9% | 7.1% | 82.0% | 0.0% | 9 | 0 | 0.7 |
| | (H) Indirect Gain | 10,114 | 17.0% | 0.0% | 70.1% | 13.0% | 0.0% | $0.11 | 11.2% | 8.7% | 80.1% | 0.0% | 9 | 0 | 0.7 |
| | (H) Direct Gain | 10,400 | 22.8% | 0.0% | 68.1% | 9.1% | 0.0% | $0.11 | 13.2% | 7.1% | 79.8% | 0.0% | 9 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 7,118 | 61.2% | 0.0% | 25.1% | 13.7% | 0.0% | $0.05 | 49.3% | 12.2% | 38.5% | 0.0% | 9 | 0 | 0.3 |
| | (L) Sawtooth Ap | 6,073 | 52.9% | 0.0% | 24.8% | 22.3% | 0.0% | $0.05 | 40.2% | 23.0% | 36.8% | 0.0% | 13 | 0 | 0.3 |
| | (L) Monitor Ap. | 6.688 | 49.2% | 0.0% | 30.6% | 20.2% | 0.0% | $0.06 | 37.5% | 20.9% | 41.6% | 0.0% | 13 | 0 | 0.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 4

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***80,036*** | ***28.2%*** | ***21.9%*** | ***35.7%*** | ***7.8%*** | ***6.4%*** | ***$1.36*** | ***7.1%*** | ***47.7%*** | ***37.7%*** | ***7.5%*** | ***37*** | ***41*** | ***8.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 79,094 | 28.5% | 21.0% | 36.1% | 7.9% | 6.5% | $1.35 | 7.2% | 47.3% | 38.0% | 7.5% | 37 | 41 | 8.2 |
| | (L) Windows | 71,986 | 35.8% | 24.2% | 25.5% | 7.4% | 7.1% | $1.17 | 9.2% | 52.7% | 29.4% | 8.7% | 40 | 34 | 6.4 |
| | (L) Skylights | 59,370 | 52.1% | 18.5% | 12.1% | 8.7% | 8.6% | $0.84 | 15.7% | 50.4% | 21.7% | 12.2% | 30 | 32 | 4.6 |
| | (L) Sawtooth Ap | 56,558 | 49.9% | 18.5% | 13.6% | 9.0% | 9.0% | $0.84 | 14.1% | 51.6% | 22.1% | 12.2% | 39 | 24 | 4.5 |
| | (L) Monitor Ap. | 63,302 | 48.8% | 19.6% | 14.8% | 8.8% | 8.1% | $0.91 | 14.2% | 53.1% | 21.5% | 11.2% | 42 | 26 | 4.8 |
| | (L) Atrium | 71,391 | 45.6% | 26.0% | 11.1% | 10.1% | 7.2% | $1.10 | 12.8% | 60.9% | 17.0% | 9.3% | 37 | 44 | 6.5 |
| ***B*** | ***ADMIN >5000 SF*** | ***64,904*** | ***21.1%*** | ***20.1%*** | ***44.2%*** | ***6.7%*** | ***7.9%*** | ***$1.14*** | ***5.1%*** | ***40.8%*** | ***45.1%*** | ***8.9%*** | ***25*** | ***29*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 56,217 | 28.1% | 19.7% | 37.2% | 5.9% | 9.1% | $0.90 | 7.3% | 40.7% | 40.7% | 11.3% | 26 | 19 | 4.6 |
| | (L) Skylights | 46,870 | 45.0% | 19.5% | 15.9% | 8.7% | 10.9% | $0.72 | 12.4% | 47.9% | 25.5% | 14.2% | 22 | 27 | 4.0 |
| | (L) Sawtooth Ap | 46,472 | 45.3% | 23.3% | 11.7% | 8.7% | 11.0% | $0.76 | 11.4% | 52.7% | 22.5% | 13.4% | 32 | 22 | 4.4 |
| | (L) Monitor Ap. | 52,803 | 42.0% | 22.5% | 17.5% | 8.2% | 9.7% | $0.82 | 11.2% | 52.7% | 23.7% | 12.4% | 34 | 23 | 4.5 |
| | (L) Atrium | 50,126 | 37.4% | 22.9% | 20.7% | 8.8% | 10.2% | $0.80 | 10.0% | 51.9% | 25.3% | 12.8% | 25 | 29 | 4.3 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***58,464*** | ***11.8%*** | ***23.6%*** | ***49.1%*** | ***6.8%*** | ***8.8%*** | ***$1.14*** | ***2.6%*** | ***41.8%*** | ***46.6%*** | ***9.0%*** | ***17*** | ***28*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 58,357 | 12.3% | 22.7% | 49.1% | 7.1% | 8.8% | $1.13 | 2.7% | 41.7% | 46.6% | 9.0% | 17 | 28 | 6.4 |
| | (C) Natural Vent | 57,961 | 11.9% | 23.0% | 49.5% | 6.8% | 8.8% | $1.13 | 2.6% | 41.6% | 46.7% | 9.0% | 17 | 28 | 6.6 |
| | (L) Windows | 50,184 | 17.1% | 25.7% | 41.6% | 5.3% | 10.2% | $0.88 | 4.1% | 41.5% | 42.8% | 11.6% | 18 | 18 | 4.5 |
| | (L) Skylights | 46,404 | 20.4% | 25.9% | 35.3% | 7.3% | 11.1% | $0.87 | 4.6% | 47.5% | 36.1% | 11.8% | 17 | 24 | 4.7 |
| | (L) Sawtooth Ap | 44,284 | 21.8% | 27.8% | 31.9% | 6.9% | 11.6% | $0.85 | 4.7% | 47.8% | 35.4% | 12.1% | 20 | 21 | 4.7 |
| | (L) Monitor Ap. | 46,396 | 22.0% | 27.4% | 32.8% | 6.7% | 11.1% | $0.87 | 4.9% | 48.0% | 35.3% | 11.8% | 21 | 22 | 4.8 |
| | (L) Atrium | 47,549 | 21.4% | 29.2% | 30.2% | 8.4% | 10.8% | $0.89 | 4.9% | 52.9% | 30.6% | 11.5% | 18 | 28 | 5.0 |

# CLIMATE REGION 4

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***D*** | ***ADMIN, COMP FAC*** | ***135,267*** | ***12.8%*** | ***18.0%*** | ***24.2%*** | ***6.7%*** | ***38.3%*** | ***$2.26*** | ***3.3%*** | ***33.9%*** | ***23.8%*** | ***39.0%*** | ***35*** | ***44*** | ***11.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 128,140 | 15.4% | 19.0% | 19.4% | 5.8% | 40.5% | $2.06 | 4.0% | 34.2% | 19.0% | 42.8% | 36 | 34 | 9.8 |
| | (L) Skylights | 115,824 | 23.2% | 16.9% | 7.4% | 7.9% | 44.8% | $1.83 | 6.2% | 35.2% | 10.4% | 48.2% | 32 | 41 | 9.0 |
| | (L) Sawtooth Ap | 115,513 | 23.1% | 18.7% | 5.3% | 8.0% | 44.9% | $1.88 | 6.0% | 37.8% | 9.3% | 46.8% | 42 | 36 | 9.4 |
| | (L) Monitor Ap. | 124,032 | 20.9% | 18.8% | 11.0% | 7.5% | 41.8% | $1.97 | 5.6% | 38.5% | 11.2% | 44.7% | 43 | 38 | 9.5 |
| | (L) Atrium | 120,415 | 19.7% | 19.2% | 9.5% | 8.6% | 43.1% | $1.95 | 5.3% | 38.9% | 10.6% | 45.2% | 36 | 46 | 9.8 |
| ***E*** | ***DINING FACILITY*** | ***124,015*** | ***30.9%*** | ***10.1%*** | ***25.4%*** | ***8.3%*** | ***25.3%*** | ***$1.20*** | ***14.3%*** | ***38.7%*** | ***34.9%*** | ***12.1%*** | ***72*** | ***31*** | ***5.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 123,262 | 31.1% | 9.5% | 25.5% | 8.4% | 25.4% | $1.19 | 14.4% | 38.3% | 35.1% | 12.2% | 72 | 31 | 5.8 |
| | (L) Windows | 116,194 | 36.5% | 11.3% | 15.8% | 9.4% | 27.0% | $1.02 | 18.6% | 48.6% | 18.5% | 14.3% | 76 | 31 | 4.5 |
| | (L) Skylights | 111,658 | 44.8% | 7.1% | 11.1% | 8.9% | 28.1% | $0.81 | 27.3% | 39.3% | 15.5% | 17.9% | 69 | 24 | 3.2 |
| | (L) Sawtooth Ap | 115,510 | 40.6% | 10.4% | 11.9% | 10.0% | 27.1% | $1.00 | 20.9% | 51.1% | 13.4% | 14.6% | 79 | 26 | 3.9 |
| | (L) Monitor Ap. | 122,068 | 39.8% | 10.9% | 13.7% | 9.9% | 25.7% | $1.05 | 20.5% | 51.3% | 14.4% | 13.8% | 82 | 27 | 4.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***36,894*** | ***11.4%*** | ***24.1%*** | ***40.0%*** | ***13.5%*** | ***11.0%*** | ***$0.63*** | ***3.1%*** | ***38.6%*** | ***43.2%*** | ***15.0%*** | ***16*** | ***20*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 35,688 | 15.6% | 26.8% | 34.6% | 11.6% | 11.3% | $0.54 | 4.6% | 48.0% | 29.7% | 17.8% | 17 | 17 | 2.8 |
| | (L) Skylights | 37,820 | 18.3% | 27.5% | 31.1% | 12.4% | 10.7% | $0.55 | 5.6% | 52.7% | 24.5% | 17.2% | 16 | 19 | 2.8 |
| | (L) Sawtooth Ap | 36,924 | 18.7% | 27.9% | 31.3% | 11.1% | 11.0% | $0.56 | 5.3% | 53.7% | 24.0% | 17.1% | 19 | 17 | 2.9 |
| | (L) Monitor Ap. | 38,426 | 19.5% | 27.8% | 31.4% | 10.8% | 10.5% | $0.57 | 5.6% | 53.8% | 23.9% | 16.6% | 20 | 17 | 3.0 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 4

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***61,635*** | ***39.0%*** | ***8.5%*** | ***25.7%*** | ***18.0%*** | ***8.8%*** | ***$0.71*** | ***16.3%*** | ***36.1%*** | ***39.3%*** | ***8.3%*** | ***112*** | ***14*** | ***3.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 61,033 | 39.3% | 7.7% | 26.0% | 18.0% | 8.9% | $0.70 | 16.3% | 35.4% | 39.9% | 8.4% | 112 | 14 | 3.3 |
| | (C) Natural Vent | 59,401 | 40.4% | 5.1% | 26.7% | 18.6% | 9.2% | $0.67 | 17.3% | 32.4% | 41.6% | 8.8% | 112 | 14 | 3.5 |
| | (L) Windows | 56,350 | 45.3% | 9.3% | 17.4% | 18.4% | 9.6% | $0.60 | 21.8% | 51.4% | 16.9% | 9.9% | 115 | 11 | 2.4 |
| | (L) Skylights | 58,733 | 48.3% | 6.9% | 16.2% | 19.3% | 9.3% | $0.57 | 25.8% | 46.5% | 17.3% | 10.4% | 109 | 8 | 2.2 |
| | (L) Sawtooth Ap | 52,904 | 48.0% | 6.6% | 17.2% | 17.9% | 10.3% | $0.53 | 24.9% | 45.7% | 18.2% | 11.2% | 121 | 8 | 2.1 |
| | (L) Monitor Ap. | 58,762 | 49.0% | 7.2% | 17.0% | 17.6% | 9.3% | $0.58 | 25.4% | 46.8% | 17.6% | 10.2% | 124 | 9 | 2.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***49,678*** | ***8.7%*** | ***0.0%*** | ***40.0%*** | ***4.3%*** | ***47.0%*** | ***$0.83*** | ***2.3%*** | ***3.4%*** | ***43.2%*** | ***51.1%*** | ***20*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 37,962 | 20.0% | 0.0% | 13.1% | 5.4% | 61.5% | $0.57 | 5.9% | 4.3% | 14.6% | 75.2% | 18 | 0 | 2.9 |
| | (L) Sawtooth Ap | 42,974 | 26.8% | 0.0% | 9.6% | 9.3% | 54.3% | $0.60 | 8.4% | 8.3% | 12.8% | 70.5% | 36 | 0 | 3.0 |
| | (L) Monitor Ap. | 43,390 | 21.0% | 0.0% | 17.5% | 7.6% | 53.8% | $0.61 | 6.5% | 7.1% | 16.3% | 70.1% | 30 | 0 | 3.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***32,155*** | ***38.4%*** | ***0.0%*** | ***35.2%*** | ***10.6%*** | ***15.7%*** | ***$0.44*** | ***12.5%*** | ***9.4%*** | ***54.8%*** | ***23.3%*** | ***30*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | 29,585 | 33.7% | 0.0% | 38.3% | 10.9% | 17.1% | $0.43 | 10.3% | 9.6% | 56.2% | 23.9% | 29 | 0 | 1.9 |
| | (H) Indirect Gain | 29,405 | 31.7% | 0.0% | 38.5% | 12.6% | 17.2% | $0.43 | 9.9% | 10.1% | 56.1% | 23.9% | 29 | 0 | 1.9 |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | 28,245 | 26.9% | 0.0% | 40.1% | 15.1% | 17.9% | $0.42 | 8.3% | 11.1% | 56.6% | 24.1% | 29 | 0 | 1.9 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 29,576 | 43.9% | 0.0% | 27.4% | 11.6% | 17.1% | $0.36 | 15.9% | 11.2% | 44.9% | 28.1% | 30 | 0 | 1.6 |
| | (L) Skylights | 27,940 | 61.6% | 0.0% | 10.2% | 10.1% | 18.1% | $0.26 | 28.7% | 11.3% | 21.0% | 39.0% | 24 | 0 | 1.2 |
| | (L) Sawtooth Ap | 26,623 | 55.5% | 0.0% | 11.5% | 13.9% | 19.0% | $0.27 | 24.5% | 16.3% | 21.0% | 38.2% | 33 | 0 | 1.3 |
| | (L) Monitor Ap. | 29,036 | 55.8% | 0.0% | 12.8% | 14.0% | 17.4% | $0.28 | 25.5% | 16.8% | 21.4% | 36.3% | 35 | 0 | 1.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 4

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***55,088*** | ***26.8%*** | ***0.0%*** | ***44.5%*** | ***7.5%*** | ***21.2%*** | ***$0.77*** | ***8.4%*** | ***6.4%*** | ***57.7%*** | ***27.5%*** | ***36*** | ***0*** | ***3.3*** |
| | (H) Direct Gain + St | 51,567 | 22.4% | 0.0% | 47.6% | 7.4% | 22.6% | $0.76 | 6.8% | 6.2% | 58.9% | 28.1% | 35 | 0 | 3.3 |
| | (H) Indirect Gain | 51,229 | 20.1% | 0.0% | 47.9% | 9.3% | 22.8% | $0.76 | 6.4% | 6.8% | 58.8% | 28.1% | 35 | 0 | 3.3 |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | 49,043 | 14.0% | 0.0% | 50.0% | 12.2% | 23.8% | $0.75 | 4.5% | 8.1% | 59.2% | 28.3% | 35 | 0 | 3.3 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 45,894 | 36.2% | 0.0% | 28.3% | 10.1% | 25.4% | $0.55 | 13.1% | 9.9% | 38.5% | 38.4% | 40 | 0 | 2.6 |
| | (L) Skylights | 42,149 | 48.7% | 0.0% | 14.6% | 9.0% | 27.7% | $0.45 | 20.2% | 9.0% | 23.0% | 47.8% | 33 | 0 | 2.2 |
| | (L) Sawtooth Ap | 44,217 | 48.7% | 0.0% | 11.5% | 13.4% | 26.4% | $0.47 | 20.1% | 14.5% | 20.4% | 45.1% | 50 | 0 | 2.3 |
| | (L) Monitor Ap. | 46,450 | 46.6% | 0.0% | 15.5% | 12.7% | 25.1% | $0.49 | 19.7% | 14.0% | 22.5% | 43.8% | 50 | 0 | 2.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***51,085*** | ***18.6%*** | ***14.8%*** | ***38.8%*** | ***5.0%*** | ***22.8%*** | ***$0.90*** | ***4.4%*** | ***32.3%*** | ***39.8%*** | ***23.6%*** | ***18*** | ***18*** | ***5.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 51,131 | 19.1% | 14.0% | 38.8% | 5.2% | 22.8% | $0.89 | 4.5% | 31.5% | 40.2% | 23.8% | 18 | 18 | 4.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 46,881 | 23.5% | 17.6% | 28.9% | 5.1% | 24.9% | $0.79 | 5.7% | 38.3% | 29.2% | 26.8% | 20 | 17 | 4.1 |
| | (L) Skylights | 40,517 | 36.1% | 16.0% | 12.3% | 6.9% | 28.8% | $0.62 | 9.9% | 42.6% | 13.3% | 34.2% | 17 | 19 | 3.6 |
| | (L) Sawtooth Ap | 44,036 | 35.3% | 21.9% | 9.4% | 7.0% | 26.5% | $0.71 | 8.9% | 50.4% | 10.9% | 29.9% | 26 | 19 | 3.8 |
| | (L) Monitor Ap. | 45,967 | 34.6% | 20.6% | 12.7% | 6.8% | 25.4% | $0.72 | 9.1% | 49.0% | 12.3% | 29.7% | 26 | 18 | 3.7 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***36,316*** | ***8.6%*** | ***0.0%*** | ***54.6%*** | ***4.7%*** | ***32.1%*** | ***$0.61*** | ***2.4%*** | ***3.6%*** | ***59.0%*** | ***35.0%*** | ***15*** | ***0*** | ***2.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 30,786 | 12.1% | 0.0% | 43.8% | 6.2% | 37.9% | $0.49 | 3.4% | 5.2% | 47.6% | 43.8% | 17 | 0 | 2.4 |
| | (L) Skylights | 24,362 | 25.0% | 0.0% | 20.4% | 6.7% | 47.9% | $0.34 | 8.0% | 5.6% | 24.2% | 62.2% | 15 | 0 | 1.9 |
| | (L) Sawtooth Ap | 24,522 | 25.5% | 0.0% | 16.8% | 10.1% | 47.6% | $0.35 | 7.8% | 9.3% | 22.1% | 60.8% | 23 | 0 | 2.0 |
| | (L) Monitor Ap. | 26,452 | 24.5% | 0.0% | 22.0% | 9.4% | 44.1% | $0.36 | 7.8% | 9.0% | 24.3% | 58.9% | 23 | 0 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 4

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***57,354*** | ***39.0%*** | ***18.7%*** | ***25.4%*** | ***8.2%*** | ***8.7%*** | ***$0.88*** | ***10.8%*** | ***47.9%*** | ***29.8%*** | ***11.5%*** | ***38*** | ***31*** | ***5.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***80,036*** | ***28.2%*** | ***21.9%*** | ***35.7%*** | ***7.8%*** | ***6.4%*** | ***$1.36*** | ***7.1%*** | ***47.7%*** | ***37.7%*** | ***7.5%*** | ***37*** | ***41*** | ***8.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 79,094 | 28.5% | 21.0% | 36.1% | 7.9% | 6.5% | $1.35 | 7.2% | 47.3% | 38.0% | 7.5% | 37 | 41 | 8.2 |
| | (L) Windows | 71,986 | 35.8% | 24.2% | 25.5% | 7.4% | 7.1% | $1.17 | 9.2% | 52.7% | 29.4% | 8.7% | 40 | 34 | 6.4 |
| | (L) Skylights | 59,370 | 52.1% | 18.5% | 12.1% | 8.7% | 8.6% | $0.84 | 15.7% | 50.4% | 21.7% | 12.2% | 30 | 32 | 4.6 |
| | (L) Sawtooth Ap | 56,558 | 49.9% | 18.5% | 13.6% | 9.0% | 9.0% | $0.84 | 14.1% | 51.6% | 22.1% | 12.2% | 39 | 24 | 4.5 |
| | (L) Monitor Ap. | 63,302 | 48.8% | 19.6% | 14.8% | 8.8% | 8.1% | $0.91 | 14.2% | 53.1% | 21.5% | 11.2% | 42 | 26 | 4.8 |
| | (L) Atrium | 71,391 | 45.6% | 26.0% | 11.1% | 10.1% | 7.2% | $1.10 | 12.8% | 60.9% | 17.0% | 9.3% | 37 | 44 | 6.5 |
| ***O*** | ***TRAINING >5000*** | ***64,904*** | ***21.1%*** | ***20.1%*** | ***44.2%*** | ***6.7%*** | ***7.9%*** | ***$1.14*** | ***5.1%*** | ***40.8%*** | ***45.1%*** | ***8.9%*** | ***25*** | ***29*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 56,217 | 28.1% | 19.7% | 37.2% | 5.9% | 9.1% | $0.90 | 7.3% | 40.7% | 40.7% | 11.3% | 26 | 19 | 4.6 |
| | (L) Skylights | 46,870 | 45.0% | 19.5% | 15.9% | 8.7% | 10.9% | $0.72 | 12.4% | 47.9% | 25.5% | 14.2% | 22 | 27 | 4.0 |
| | (L) Sawtooth Ap | 46,472 | 45.3% | 23.3% | 11.7% | 8.7% | 11.0% | $0.76 | 11.4% | 52.7% | 22.5% | 13.4% | 32 | 22 | 4.4 |
| | (L) Monitor Ap. | 52,803 | 42.0% | 22.5% | 17.5% | 8.2% | 9.7% | $0.82 | 11.2% | 52.7% | 23.7% | 12.4% | 34 | 23 | 4.5 |
| | (L) Atrium | 50,126 | 37.4% | 22.9% | 20.7% | 8.8% | 10.2% | $0.80 | 10.0% | 51.9% | 25.3% | 12.8% | 25 | 29 | 4.3 |

# CLIMATE REGION 4

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***P*** | ***TRAINING, MULTI STORY*** | ***58,464*** | ***11.8%*** | ***23.6%*** | ***49.1%*** | ***6.8%*** | ***8.8%*** | ***$1.14*** | ***2.6%*** | ***41.8%*** | ***46.6%*** | ***9.0%*** | ***17*** | ***28*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 58,357 | 12.3% | 22.7% | 49.1% | 7.1% | 8.8% | $1.13 | 2.7% | 41.7% | 46.6% | 9.0% | 17 | 28 | 6.4 |
| | (C) Natural Vent | 57,961 | 11.9% | 23.0% | 49.5% | 6.8% | 8.8% | $1.13 | 2.6% | 41.6% | 46.7% | 9.0% | 17 | 28 | 6.6 |
| | (L) Windows | 50,184 | 17.1% | 25.7% | 41.6% | 5.3% | 10.2% | $0.88 | 4.1% | 41.5% | 42.8% | 11.6% | 18 | 18 | 4.5 |
| | (L) Skylights | 46,404 | 20.4% | 25.9% | 35.3% | 7.3% | 11.1% | $0.87 | 4.6% | 47.5% | 36.1% | 11.8% | 17 | 24 | 4.7 |
| | (L) Sawtooth Ap | 44,284 | 21.8% | 27.8% | 31.9% | 6.9% | 11.6% | $0.85 | 4.7% | 47.8% | 35.4% | 12.1% | 20 | 21 | 4.7 |
| | (L) Monitor Ap. | 46,396 | 22.0% | 27.4% | 32.8% | 6.7% | 11.1% | $0.87 | 4.9% | 48.0% | 35.3% | 11.8% | 21 | 22 | 4.8 |
| | (L) Atrium | 47,549 | 21.4% | 29.2% | 30.2% | 8.4% | 10.8% | $0.89 | 4.9% | 52.9% | 30.6% | 11.5% | 18 | 28 | 5.0 |
| ***Q*** | ***TRAINING, GYM*** | ***62,330*** | ***30.9%*** | ***0.0%*** | ***57.1%*** | ***12.0%*** | ***0.0%*** | ***$0.62*** | ***14.1%*** | ***12.3%*** | ***73.6%*** | ***0.0%*** | ***50*** | ***0*** | ***2.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 54,263 | 57.2% | 0.0% | 29.6% | 13.2% | 0.0% | $0.36 | 38.8% | 18.6% | 42.6% | 0.0% | 47 | 0 | 1.1 |
| | (L) Sawtooth Ap | 53,105 | 53.4% | 0.0% | 28.1% | 18.5% | 0.0% | $0.37 | 34.5% | 26.6% | 39.0% | 0.0% | 65 | 0 | 1.2 |
| | (L) Monitor Ap. | 57,320 | 52.2% | 0.0% | 29.9% | 17.8% | 0.0% | $0.40 | 34.2% | 25.7% | 40.0% | 0.0% | 67 | 0 | 1.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***21,667*** | ***58.4%*** | ***0.0%*** | ***32.7%*** | ***8.9%*** | ***0.0%*** | ***$0.20*** | ***27.2%*** | ***9.4%*** | ***63.4%*** | ***0.0%*** | ***17*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 16,955 | 47.6% | 0.0% | 41.8% | 10.6% | 0.0% | $0.19 | 19.1% | 11.2% | 69.6% | 0.0% | 17 | 0 | 0.7 |
| | (H) Indirect Gain | 17,136 | 46.3% | 0.0% | 41.3% | 12.4% | 0.0% | $0.19 | 19.2% | 11.7% | 69.1% | 0.0% | 17 | 0 | 0.7 |
| | (H) Direct Gain | 17,991 | 50.4% | 0.0% | 39.4% | 10.3% | 0.0% | $0.19 | 20.5% | 11.3% | 68.1% | 0.0% | 17 | 0 | 0.7 |
| | (H) Sunspace | 15,444 | 36.9% | 0.0% | 45.9% | 17.3% | 0.0% | $0.18 | 15.4% | 13.5% | 71.0% | 0.0% | 16 | 0 | 0.7 |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 18,563 | 80.0% | 0.0% | 9.6% | 10.4% | 0.0% | $0.11 | 56.2% | 17.3% | 26.4% | 0.0% | 17 | 0 | 0.4 |
| | (L) Sawtooth Ap | 15,859 | 73.7% | 0.0% | 9.3% | 17.0% | 0.0% | $0.11 | 46.4% | 28.4% | 25.3% | 0.0% | 24 | 0 | 0.5 |
| | (L) Monitor Ap. | 17,222 | 72.1% | 0.0% | 12.1% | 15.8% | 0.0% | $0.12 | 47.0% | 26.0% | 27.0% | 0.0% | 24 | 0 | 0.5 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 5

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***88,660*** | ***5.8%*** | ***48.7%*** | ***32.2%*** | ***7.5%*** | ***5.8%*** | ***$1.23*** | ***2.8%*** | ***58.6%*** | ***32.7%*** | ***6.0%*** | ***21*** | ***49*** | ***9.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84,319 | 6.1% | 46.1% | 33.9% | 7.9% | 6.1% | $1.18 | 2.9% | 56.8% | 34.1% | 6.3% | 21 | 49 | 9.3 |
| | (L) Windows | 77,015 | 7.6% | 55.0% | 23.3% | 7.5% | 6.6% | $1.06 | 3.5% | 65.5% | 24.1% | 7.0% | 23 | 43 | 7.6 |
| | (L) Skylights | 54,978 | 12.0% | 56.7% | 11.9% | 10.1% | 9.3% | $0.75 | 5.9% | 70.8% | 13.5% | 9.9% | 18 | 41 | 6.5 |
| | (L) Sawtooth Ap | 54,387 | 12.5% | 56.5% | 13.7% | 8.0% | 9.4% | $0.74 | 5.6% | 69.3% | 15.1% | 10.0% | 23 | 32 | 5.8 |
| | (L) Monitor Ap. | 60,101 | 12.3% | 57.3% | 14.1% | 7.8% | 8.5% | $0.81 | 5.6% | 70.0% | 15.3% | 9.1% | 25 | 34 | 6.2 |
| | (L) Atrium | 73,247 | 9.6% | 63.6% | 9.9% | 9.8% | 7.0% | $1.00 | 4.7% | 77.0% | 10.9% | 7.4% | 21 | 53 | 7.8 |
| ***B*** | ***ADMIN >5000 SF*** | ***72,962*** | ***3.8%*** | ***43.2%*** | ***39.3%*** | ***6.6%*** | ***7.0%*** | ***$1.02*** | ***1.8%*** | ***51.4%*** | ***39.5%*** | ***7.3%*** | ***14*** | ***36*** | ***7.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 70,054 | 4.0% | 40.9% | 40.9% | 6.9% | 7.3% | $0.99 | 1.9% | 49.7% | 40.9% | 7.5% | 14 | 36 | 7.5 |
| | (L) Windows | 60,088 | 5.5% | 45.7% | 34.5% | 5.8% | 8.5% | $0.83 | 2.5% | 53.6% | 34.9% | 9.0% | 15 | 26 | 5.5 |
| | (L) Skylights | 46,192 | 8.8% | 55.7% | 14.7% | 9.7% | 11.1% | $0.64 | 4.2% | 68.1% | 16.2% | 11.5% | 13 | 34 | 5.6 |
| | (L) Sawtooth Ap | 48,193 | 9.9% | 60.1% | 11.3% | 8.0% | 10.6% | $0.67 | 4.3% | 71.5% | 13.1% | 11.0% | 18 | 29 | 5.4 |
| | (L) Monitor Ap. | 53,363 | 9.1% | 58.1% | 15.7% | 7.5% | 9.6% | $0.74 | 4.0% | 69.1% | 16.8% | 10.1% | 19 | 30 | 5.6 |
| | (L) Atrium | 53,615 | 6.9% | 56.1% | 18.6% | 8.8% | 9.6% | $0.74 | 3.3% | 67.7% | 19.1% | 10.0% | 14 | 35 | 5.9 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***69,879*** | ***2.1%*** | ***43.4%*** | ***41.0%*** | ***6.2%*** | ***7.3%*** | ***$0.99*** | ***0.9%*** | ***50.6%*** | ***41.0%*** | ***7.5%*** | ***10*** | ***33*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 67,114 | 2.1% | 41.0% | 42.7% | 6.4% | 7.6% | $0.96 | 1.0% | 48.9% | 42.4% | 7.7% | 10 | 33 | 7.1 |
| | (L) Windows | 56,877 | 3.2% | 46.0% | 36.5% | 5.3% | 9.0% | $0.79 | 1.4% | 52.5% | 36.7% | 9.4% | 10 | 23 | 5.2 |
| | (L) Skylights | 54,485 | 3.4% | 50.8% | 29.5% | 6.9% | 9.4% | $0.77 | 1.5% | 59.1% | 29.7% | 9.6% | 10 | 28 | 5.5 |
| | (L) Sawtooth Ap | 51,893 | 3.9% | 52.8% | 26.8% | 6.6% | 9.9% | $0.74 | 1.7% | 60.7% | 27.6% | 10.0% | 11 | 26 | 5.5 |
| | (L) Monitor Ap. | 53,638 | 4.0% | 52.4% | 27.6% | 6.4% | 9.6% | $0.76 | 1.7% | 60.3% | 28.2% | 9.8% | 12 | 26 | 5.6 |
| | (L) Atrium | 57,415 | 3.4% | 55.6% | 24.5% | 7.5% | 8.9% | $0.81 | 1.5% | 64.7% | 24.6% | 9.2% | 10 | 33 | 5.9 |

# CLIMATE REGION 5

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***153,058*** | ***2.4%*** | ***35.6%*** | ***21.4%*** | ***6.8%*** | ***33.9%*** | ***$2.10*** | ***1.1%*** | ***43.0%*** | ***21.5%*** | ***34.3%*** | ***20*** | ***55*** | ***12.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 151,603 | 2.5% | 34.8% | 21.6% | 6.9% | 34.2% | $2.08 | 1.2% | 42.5% | 21.7% | 34.6% | 20 | 55 | 12.6 |
| | (C) Natural Vent | 148,247 | 2.5% | 33.5% | 22.0% | 7.0% | 35.0% | $2.04 | 1.2% | 41.5% | 22.1% | 35.3% | 20 | 55 | 12.6 |
| | (L) Windows | 140,131 | 3.0% | 36.4% | 17.6% | 5.9% | 37.0% | $1.92 | 1.4% | 43.4% | 17.6% | 37.6% | 20 | 45 | 11.2 |
| | (L) Skylights | 122,708 | 4.1% | 38.8% | 6.3% | 8.4% | 42.3% | $1.68 | 2.0% | 48.1% | 6.9% | 43.0% | 18 | 52 | 10.2 |
| | (L) Sawtooth Ap | 124,251 | 4.6% | 41.1% | 4.9% | 7.6% | 41.7% | $1.71 | 2.1% | 50.1% | 5.6% | 42.1% | 24 | 47 | 10.9 |
| | (L) Monitor Ap | 133,365 | 4.2% | 40.5% | 9.3% | 7.2% | 38.9% | $1.82 | 1.9% | 49.1% | 9.4% | 39.6% | 25 | 49 | 11.0 |
| | (L) Atrium | 133,981 | 3.4% | 41.3% | 8.2% | 8.4% | 38.7% | $1.83 | 1.7% | 50.7% | 8.3% | 39.3% | 20 | 57 | 11.0 |
| ***E*** | ***DINING FACILITY*** | ***115,243*** | ***5.8%*** | ***31.7%*** | ***27.3%*** | ***7.9%*** | ***27.2%*** | ***$1.26*** | ***4.3%*** | ***47.9%*** | ***33.0%*** | ***14.8%*** | ***36*** | ***44*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 110,600 | 6.1% | 28.9% | 28.5% | 8.3% | 28.3% | $1.20 | 4.5% | 45.5% | 34.5% | 15.5% | 36 | 44 | 6.9 |
| | (L) Windows | 103,745 | 7.1% | 36.9% | 16.9% | 8.9% | 30.2% | $1.09 | 5.4% | 57.4% | 20.1% | 17.1% | 38 | 44 | 5.7 |
| | (L) Skylights | 86,379 | 9.9% | 30.7% | 13.8% | 9.4% | 36.3% | $0.85 | 8.0% | 52.7% | 17.4% | 21.9% | 35 | 37 | 5.1 |
| | (L) Sawtooth Ap | 99,166 | 9.0% | 37.2% | 13.6% | 8.6% | 31.6% | $1.03 | 6.6% | 59.2% | 16.1% | 18.1% | 40 | 39 | 5.4 |
| | (L) Monitor Ap | 104,816 | 8.7% | 37.6% | 15.5% | 8.4% | 29.9% | $1.10 | 6.3% | 58.8% | 18.0% | 16.9% | 42 | 40 | 5.5 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***53,575*** | ***0.5%*** | ***53.4%*** | ***27.6%*** | ***11.0%*** | ***7.6%*** | ***$0.73*** | ***0.3%*** | ***62.4%*** | ***28.8%*** | ***8.5%*** | ***9*** | ***24*** | ***4.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 52,707 | 0.7% | 52.6% | 28.0% | 11.0% | 7.7% | $0.72 | 0.4% | 61.8% | 29.3% | 8.6% | 9 | 24 | 4.2 |
| | (C) Natural Vent | 48,441 | 0.5% | 48.5% | 30.5% | 12.2% | 8.4% | $0.67 | 0.3% | 59.2% | 31.3% | 9.2% | 9 | 24 | 5.0 |
| | (L) Windows | 50,685 | 0.9% | 56.9% | 24.2% | 10.0% | 8.0% | $0.67 | 0.5% | 66.7% | 23.7% | 9.1% | 10 | 21 | 3.4 |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 5

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***46,997*** | ***7.3%*** | ***35.5%*** | ***33.8%*** | ***11.9%*** | ***11.6%*** | ***$0.60*** | ***3.8%*** | ***47.9%*** | ***36.8%*** | ***11.4%*** | ***52*** | ***17*** | ***3.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 45,196 | 7.6% | 33.3% | 35.1% | 12.0% | 12.0% | $0.59 | 3.8% | 46.6% | 37.9% | 11.7% | 52 | 17 | 3.3 |
| | (C) Natural Vent | 42,374 | 8.1% | 28.5% | 37.4% | 13.2% | 12.8% | $0.54 | 4.3% | 41.9% | 41.1% | 12.7% | 52 | 17 | 3.3 |
| | (L) Windows | 39,589 | 9.3% | 40.6% | 24.2% | 12.2% | 13.7% | $0.50 | 5.0% | 57.1% | 24.0% | 13.9% | 53 | 14 | 2.3 |
| | (L) Skylights | 37,392 | 14.5% | 34.8% | 24.9% | 11.3% | 14.5% | $0.45 | 7.6% | 51.5% | 25.7% | 15.2% | 50 | 11 | 2.1 |
| | (L) Sawtooth Ap | 34,007 | 10.7% | 34.5% | 26.3% | 12.5% | 16.0% | $0.42 | 6.1% | 50.8% | 26.7% | 16.4% | 56 | 10 | 1.9 |
| | (L) Monitor Ap. | 37,487 | 11.1% | 36.1% | 25.9% | 12.4% | 14.5% | $0.46 | 6.3% | 52.7% | 26.1% | 14.9% | 57 | 11 | 2.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***44,363*** | ***0.3%*** | ***0.0%*** | ***44.7%*** | ***2.3%*** | ***52.6%*** | ***$0.62*** | ***0.3%*** | ***1.7%*** | ***45.0%*** | ***53.0%*** | ***10*** | ***0*** | ***3.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 29,211 | 1.2% | 0.0% | 15.5% | 3.3% | 80.0% | $0.41 | 0.9% | 2.2% | 15.4% | 81.4% | 9 | 0 | 2.8 |
| | (L) Sawtooth Ap | 30,178 | 3.6% | 0.0% | 13.0% | 6.0% | 77.4% | $0.42 | 2.5% | 4.7% | 13.3% | 79.5% | 17 | 0 | 2.8 |
| | (L) Monitor Ap | 32,831 | 2.0% | 0.0% | 22.2% | 4.7% | 71.1% | $0.45 | 1.4% | 4.0% | 21.1% | 73.5% | 14 | 0 | 2.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***19,580*** | ***8.1%*** | ***0.0%*** | ***57.8%*** | ***8.2%*** | ***25.9%*** | ***$0.27*** | ***5.1%*** | ***5.5%*** | ***62.1%*** | ***27.3%*** | ***15*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | 18,642 | 3.8% | 0.0% | 60.7% | 8.3% | 27.2% | $0.26 | 2.7% | 5.5% | 63.7% | 28.0% | 14 | 0 | 1.8 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 16,377 | 10.5% | 0.0% | 48.8% | 9.8% | 30.9% | $0.22 | 7.0% | 6.3% | 53.0% | 33.6% | 15 | 0 | 1.5 |
| | (L) Skylights | 11,296 | 20.4% | 0.0% | 23.0% | 11.8% | 44.8% | $0.14 | 13.2% | 6.4% | 27.0% | 53.3% | 12 | 0 | 1.1 |
| | (L) Sawtooth Ap | 11,986 | 18.5% | 0.0% | 24.6% | 14.7% | 42.2% | $0.15 | 11.9% | 11.7% | 27.4% | 48.9% | 16 | 0 | 1.1 |
| | (L) Monitor Ap. | 12,848 | 19.7% | 0.0% | 26.1% | 14.8% | 39.4% | $0.16 | 12.6% | 11.9% | 29.1% | 46.5% | 18 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 5

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***J*** | ***MAINT, HI-BAY*** | ***40,147*** | ***5.0%*** | ***0.0%*** | ***61.1%*** | ***4.9%*** | ***29.1%*** | ***$0.55*** | ***3.0%*** | ***3.6%*** | ***63.2%*** | ***30.1%*** | ***18*** | ***0*** | ***3.2*** |
| | (H) Direct Gain + St | 38,768 | 1.9% | 0.0% | 63.3% | 4.7% | 30.1% | $0.54 | 1.6% | 3.7% | 64.2% | 30.6% | 17 | 0 | 3.2 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 28,726 | 8.3% | 0.0% | 43.6% | 7.4% | 40.6% | $0.38 | 5.0% | 5.8% | 45.6% | 43.6% | 20 | 0 | 2.4 |
| | (L) Skylights | 21,784 | 12.5% | 0.0% | 25.8% | 8.2% | 53.6% | $0.28 | 7.9% | 5.6% | 27.6% | 58.9% | 17 | 0 | 2.0 |
| | (L) Sawtooth Ap | 22,824 | 16.1% | 0.0% | 21.3% | 11.5% | 51.2% | $0.29 | 9.7% | 9.2% | 23.8% | 57.4% | 24 | 0 | 2.1 |
| | (L) Monitor Ap. | 24,468 | 14.6% | 0.0% | 26.9% | 10.7% | 47.7% | $0.31 | 8.8% | 8.6% | 28.9% | 53.7% | 24 | 0 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***55,881*** | ***2.8%*** | ***35.4%*** | ***35.5%*** | ***5.5%*** | ***20.9%*** | ***$0.79*** | ***1.3%*** | ***42.3%*** | ***35.5%*** | ***20.9%*** | ***10*** | ***23*** | ***5.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 55,396 | 3.0% | 34.1% | 35.8% | 6.1% | 21.1% | $0.78 | 1.4% | 41.6% | 35.9% | 21.1% | 10 | 23 | 5.7 |
| | (C) Natural Vent | 53,777 | 2.9% | 32.9% | 36.9% | 5.7% | 21.7% | $0.76 | 1.3% | 40.4% | 36.7% | 21.6% | 10 | 23 | 5.7 |
| | (L) Windows | 50,833 | 3.6% | 41.6% | 26.2% | 5.7% | 22.9% | $0.71 | 1.6% | 49.2% | 26.0% | 23.2% | 11 | 22 | 4.9 |
| | (L) Skylights | 40,611 | 6.0% | 46.2% | 11.2% | 7.9% | 28.7% | $0.57 | 2.8% | 57.2% | 11.0% | 29.0% | 10 | 24 | 4.4 |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | 47,654 | 6.3% | 51.5% | 11.2% | 6.5% | 24.5% | $0.66 | 2.7% | 61.3% | 10.9% | 25.1% | 15 | 24 | 4.5 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***32,373*** | ***0.2%*** | ***0.0%*** | ***61.3%*** | ***2.5%*** | ***36.0%*** | ***$0.45*** | ***0.2%*** | ***1.9%*** | ***61.6%*** | ***36.3%*** | ***7*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 25,904 | 0.3% | 0.0% | 51.2% | 3.4% | 45.0% | $0.36 | 0.4% | 2.3% | 51.4% | 45.9% | 8 | 0 | 2.3 |
| | (L) Skylights | 17,171 | 1.2% | 0.0% | 26.4% | 4.5% | 67.9% | $0.24 | 1.1% | 2.8% | 26.4% | 69.7% | 7 | 0 | 1.8 |
| | (L) Sawtooth Ap | 16,987 | 1.5% | 0.0% | 23.1% | 6.8% | 68.7% | $0.24 | 1.1% | 5.5% | 23.4% | 70.0% | 11 | 0 | 1.8 |
| | (L) Monitor Ap. | 18,405 | 1.4% | 0.0% | 28.9% | 6.3% | 63.4% | $0.25 | 1.2% | 4.6% | 28.6% | 65.6% | 11 | 0 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 5

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***61,129*** | ***7.7%*** | ***50.8%*** | ***23.8%*** | ***9.6%*** | ***8.2%*** | ***$0.84*** | ***3.6%*** | ***63.4%*** | ***24.3%*** | ***8.6%*** | ***22*** | ***44*** | ***7.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 57,640 | 8.1% | 47.8% | 25.2% | 10.1% | 8.7% | $0.80 | 3.8% | 61.5% | 25.6% | 9.1% | 22 | 44 | 7.2 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***88,660*** | ***5.8%*** | ***48.7%*** | ***32.2%*** | ***7.5%*** | ***5.8%*** | ***$1.23*** | ***2.8%*** | ***58.6%*** | ***32.7%*** | ***6.0%*** | ***21*** | ***49*** | ***9.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 84,319 | 6.1% | 46.1% | 33.9% | 7.9% | 6.1% | $1.18 | 2.9% | 56.8% | 34.1% | 6.3% | 21 | 49 | 9.3 |
| | (L) Windows | 77,015 | 7.6% | 55.0% | 23.3% | 7.5% | 6.6% | $1.06 | 3.5% | 65.5% | 24.1% | 7.0% | 23 | 43 | 7.6 |
| | (L) Skylights | 54,978 | 12.0% | 56.7% | 11.9% | 10.1% | 9.3% | $0.75 | 5.9% | 70.8% | 13.5% | 9.9% | 18 | 41 | 6.5 |
| | (L) Sawtooth Ap | 54,387 | 12.5% | 56.5% | 13.7% | 8.0% | 9.4% | $0.74 | 5.6% | 69.3% | 15.1% | 10.0% | 23 | 32 | 5.8 |
| | (L) Monitor Ap. | 60,101 | 12.3% | 57.3% | 14.1% | 7.8% | 8.5% | $0.81 | 5.6% | 70.0% | 15.3% | 9.1% | 25 | 34 | 6.2 |
| | (L) Atrium | 73,247 | 9.6% | 63.6% | 9.9% | 9.8% | 7.0% | $1.00 | 4.7% | 77.0% | 10.9% | 7.4% | 21 | 53 | 7.8 |
| ***0*** | ***TRAINING >5000*** | ***72,962*** | ***3.8%*** | ***43.2%*** | ***39.3%*** | ***6.6%*** | ***7.0%*** | ***$1.02*** | ***1.8%*** | ***51.4%*** | ***39.5%*** | ***7.3%*** | ***14*** | ***36*** | ***7.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 70,054 | 4.0% | 40.9% | 40.9% | 6.9% | 7.3% | $0.99 | 1.9% | 49.7% | 40.9% | 7.5% | 14 | 36 | 7.5 |
| | (L) Windows | 60,088 | 5.5% | 45.7% | 34.5% | 5.8% | 8.5% | $0.83 | 2.5% | 53.6% | 34.9% | 9.0% | 15 | 26 | 5.5 |
| | (L) Skylights | 46,192 | 8.8% | 55.7% | 14.7% | 9.7% | 11.1% | $0.64 | 4.2% | 68.1% | 16.2% | 11.5% | 13 | 34 | 5.6 |
| | (L) Sawtooth Ap | 48,193 | 9.9% | 60.1% | 11.3% | 8.0% | 10.6% | $0.67 | 4.3% | 71.5% | 13.1% | 11.0% | 18 | 29 | 5.4 |
| | (L) Monitor Ap. | 53,363 | 9.1% | 58.1% | 15.7% | 7.5% | 9.6% | $0.74 | 4.0% | 69.1% | 16.8% | 10.1% | 19 | 30 | 5.6 |
| | (L) Atrium | 53,615 | 6.9% | 56.1% | 18.6% | 8.8% | 9.6% | $0.74 | 3.3% | 67.7% | 19.1% | 10.0% | 14 | 35 | 5.9 |

# CLIMATE REGION 5

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTI STORY*** | ***69,879*** | ***2.1%*** | ***43.4%*** | ***41.0%*** | ***6.2%*** | ***7.3%*** | ***$0.99*** | ***0.9%*** | ***50.6%*** | ***41.0%*** | ***7.5%*** | ***10*** | ***33*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 67,114 | 2.1% | 41.0% | 42.7% | 6.4% | 7.6% | $0.96 | 1.0% | 48.9% | 42.4% | 7.7% | 10 | 33 | 7.1 |
| | (L) Windows | 56,877 | 3.2% | 46.0% | 36.5% | 5.3% | 9.0% | $0.79 | 1.4% | 52.5% | 36.7% | 9.4% | 10 | 23 | 5.2 |
| | (L) Skylights | 54,485 | 3.4% | 50.8% | 29.5% | 6.9% | 9.4% | $0.77 | 1.5% | 59.1% | 29.7% | 9.6% | 10 | 28 | 5.5 |
| | (L) Sawtooth Ap | 51,893 | 3.9% | 52.8% | 26.8% | 6.6% | 9.9% | $0.74 | 1.7% | 60.7% | 27.6% | 10.0% | 11 | 26 | 5.5 |
| | (L) Monitor Ap. | 53,638 | 4.0% | 52.4% | 27.6% | 6.4% | 9.6% | $0.76 | 1.7% | 60.3% | 28.2% | 9.8% | 12 | 26 | 5.6 |
| | (L) Atrium | 57,415 | 3.4% | 55.6% | 24.5% | 7.5% | 8.9% | $0.81 | 1.5% | 64.7% | 24.6% | 9.2% | 10 | 33 | 5.9 |
| ***Q*** | ***TRAINING, GYM*** | ***42,022*** | ***6.9%*** | ***0.0%*** | ***84.7%*** | ***8.4%*** | ***0.0%*** | ***$0.52*** | ***5.4%*** | ***5.6%*** | ***89.0%*** | ***0.0%*** | ***24*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 23,514 | 19.7% | 0.0% | 65.9% | 14.3% | 0.0% | $0.26 | 15.3% | 10.8% | 73.9% | 0.0% | 23 | 0 | 0.9 |
| | (L) Sawtooth Ap | 24,550 | 21.9% | 0.0% | 59.7% | 18.4% | 0.0% | $0.27 | 16.4% | 15.8% | 67.7% | 0.0% | 30 | 0 | 0.9 |
| | (L) Monitor Ap. | 26,724 | 20.7% | 0.0% | 61.8% | 17.5% | 0.0% | $0.29 | 15.5% | 15.1% | 69.4% | 0.0% | 31 | 0 | 0.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***9,283*** | ***13.8%*** | ***0.0%*** | ***76.3%*** | ***9.8%*** | ***0.0%*** | ***$0.12*** | ***9.0%*** | ***6.9%*** | ***84.1%*** | ***0.0%*** | ***8*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 8,394 | 5.1% | 0.0% | 84.4% | 10.5% | 0.0% | $0.11 | 3.7% | 7.9% | 88.4% | 0.0% | 8 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 8,723 | 8.6% | 0.0% | 81.2% | 10.2% | 0.0% | $0.11 | 5.8% | 6.5% | 87.7% | 0.0% | 8 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 4,192 | 39.6% | 0.0% | 38.7% | 21.8% | 0.0% | $0.04 | 30.3% | 16.9% | 52.9% | 0.0% | 8 | 0 | 0.3 |
| | (L) Sawtooth Ap | 3,946 | 32.4% | 0.0% | 35.5% | 32.1% | 0.0% | $0.04 | 25.0% | 28.2% | 46.8% | 0.0% | 12 | 0 | 0.3 |
| | (L) Monitor Ap. | 4,534 | 30.1% | 0.0% | 42.0% | 27.9% | 0.0% | $0.05 | 22.4% | 24.7% | 52.9% | 0.0% | 12 | 0 | 0.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***85,124*** | ***16.9%*** | ***35.0%*** | ***33.6%*** | ***8.5%*** | ***6.0%*** | ***$1.70*** | ***4.4%*** | ***55.4%*** | ***33.6%*** | ***6.5%*** | ***33*** | ***49*** | ***9.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 75,063 | 21.5% | 38.8% | 24.6% | 8.4% | 6.8% | $1.46 | 5.5% | 61.5% | 25.4% | 7.6% | 35 | 43 | 7.6 |
| | (L) Skylights | 59,235 | 33.4% | 34.4% | 13.3% | 10.3% | 8.6% | $1.05 | 9.8% | 62.6% | 17.0% | 10.6% | 27 | 41 | 5.8 |
| | (L) Sawtooth Ap | 57,756 | 32.6% | 36.1% | 14.2% | 8.3% | 8.8% | $1.06 | 8.6% | 63.7% | 17.2% | 10.5% | 36 | 32 | 5.9 |
| | (L) Monitor Ap. | 63,593 | 31.3% | 37.3% | 15.3% | 8.1% | 8.0% | $1.14 | 8.4% | 64.8% | 17.2% | 9.7% | 39 | 34 | 6.2 |
| | (L) Atrium | 71,985 | 27.6% | 42.6% | 11.7% | 11.1% | 7.1% | $1.34 | 7.9% | 70.2% | 13.7% | 8.2% | 33 | 53 | 7.3 |
| ***B*** | ***ADMIN >5000 SF*** | ***69,682*** | ***12.4%*** | ***31.7%*** | ***41.2%*** | ***7.4%*** | ***7.4%*** | ***$1.41*** | ***3.2%*** | ***48.4%*** | ***40.5%*** | ***7.8%*** | ***22*** | ***36*** | ***7.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 58,929 | 16.8% | 32.5% | 35.6% | 6.4% | 8.7% | $1.13 | 4.3% | 50.2% | 35.6% | 9.8% | 23 | 26 | 5.4 |
| | (L) Skylights | 48,625 | 27.1% | 34.9% | 17.5% | 9.9% | 10.5% | $0.91 | 7.5% | 60.0% | 20.3% | 12.2% | 20 | 34 | 4.7 |
| | (L) Sawtooth Ap | 48,357 | 28.5% | 40.4% | 12.0% | 8.5% | 10.6% | $0.96 | 6.8% | 65.3% | 16.4% | 11.5% | 29 | 29 | 5.5 |
| | (L) Monitor Ap. | 54,267 | 25.6% | 39.5% | 17.6% | 7.9% | 9.5% | $1.03 | 6.4% | 63.9% | 18.9% | 10.7% | 30 | 30 | 5.5 |
| | (L) Atrium | 52,701 | 22.1% | 38.2% | 20.5% | 9.5% | 9.7% | $1.00 | 6.0% | 62.0% | 20.8% | 11.1% | 22 | 35 | 5.1 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***64,209*** | ***7.0%*** | ***33.4%*** | ***44.7%*** | ***7.0%*** | ***8.0%*** | ***$1.37*** | ***1.7%*** | ***47.7%*** | ***42.6%*** | ***8.1%*** | ***15*** | ***33*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 63,701 | 7.3% | 32.1% | 45.0% | 7.5% | 8.1% | $1.36 | 1.7% | 47.3% | 42.9% | 8.1% | 15 | 33 | 6.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 53,937 | 10.0% | 35.8% | 38.8% | 5.8% | 9.5% | $1.08 | 2.5% | 49.2% | 38.0% | 10.3% | 16 | 23 | 5.1 |
| | (L) Skylights | 50,561 | 11.6% | 37.6% | 32.9% | 7.7% | 10.1% | $1.05 | 2.8% | 54.9% | 31.8% | 10.5% | 15 | 28 | 5.3 |
| | (L) Sawtooth Ap | 48,254 | 12.7% | 39.5% | 29.8% | 7.4% | 10.6% | $1.03 | 2.9% | 56.2% | 30.2% | 10.7% | 18 | 26 | 5.4 |
| | (L) Monitor Ap. | 50,233 | 12.7% | 39.3% | 30.7% | 7.2% | 10.2% | $1.05 | 2.9% | 56.0% | 30.5% | 10.5% | 18 | 26 | 5.5 |
| | (L) Atrium | 52,119 | 11.9% | 41.5% | 28.1% | 8.6% | 9.8% | $1.08 | 2.9% | 60.2% | 26.6% | 10.3% | 16 | 33 | 5.5 |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool (Btu/hr/sf) | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***145,776*** | ***7.4%*** | ***27.2%*** | ***22.4%*** | ***7.3%*** | ***35.6%*** | ***$2.79*** | ***2.0%*** | ***40.2%*** | ***22.0%*** | ***35.7%*** | ***30*** | ***54*** | ***12.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 144,738 | 7.7% | 26.5% | 22.6% | 7.4% | 35.8% | $2.77 | 2.1% | 39.9% | 22.1% | 35.9% | 30 | 54 | 12.9 |
| | (C) Natural Vent | 142,022 | 7.7% | 25.3% | 23.0% | 7.5% | 36.5% | $2.76 | 2.1% | 39.7% | 22.2% | 36.1% | 30 | 54 | 12.9 |
| | (L) Windows | 135,398 | 9.2% | 27.7% | 18.4% | 6.3% | 38.3% | $2.54 | 2.5% | 40.8% | 17.5% | 39.3% | 32 | 44 | 11.1 |
| | (L) Skylights | 122,524 | 13.7% | 27.3% | 8.0% | 8.7% | 42.3% | $2.24 | 3.8% | 43.0% | 8.8% | 44.4% | 28 | 52 | 10.3 |
| | (L) Sawtooth Ap | 121,186 | 14.2% | 29.6% | 5.4% | 8.0% | 42.8% | $2.31 | 3.7% | 46.2% | 7.1% | 43.0% | 37 | 47 | 10.9 |
| | (L) Monitor Ap. | 130,237 | 12.5% | 29.5% | 10.5% | 7.6% | 39.8% | $2.42 | 3.3% | 45.8% | 9.8% | 41.1% | 38 | 49 | 11.2 |
| | (L) Atrium | 128,245 | 11.1% | 30.1% | 9.3% | 9.0% | 40.4% | $2.40 | 3.1% | 46.3% | 9.1% | 41.4% | 32 | 56 | 11.0 |
| ***E*** | ***DINING FACILITY*** | ***126,196*** | ***19.4%*** | ***22.0%*** | ***24.9%*** | ***8.9%*** | ***24.8%*** | ***$1.61*** | ***8.5%*** | ***50.2%*** | ***31.4%*** | ***10.0%*** | ***59*** | ***44*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 116,141 | 22.8% | 24.4% | 16.0% | 9.8% | 27.0% | $1.39 | 10.5% | 60.4% | 17.6% | 11.5% | 62 | 44 | 6.0 |
| | (L) Skylights | 107,540 | 30.4% | 18.8% | 12.3% | 9.4% | 29.1% | $1.14 | 15.3% | 55.7% | 14.8% | 14.1% | 57 | 37 | 4.8 |
| | (L) Sawtooth Ap | 113,821 | 26.5% | 23.6% | 12.9% | 9.4% | 27.5% | $1.34 | 12.0% | 62.3% | 13.7% | 12.0% | 66 | 39 | 5.5 |
| | (L) Monitor Ap. | 118,767 | 25.4% | 24.3% | 14.5% | 9.4% | 26.4% | $1.42 | 11.3% | 62.6% | 14.8% | 11.3% | 69 | 40 | 5.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***48,375*** | ***5.4%*** | ***43.5%*** | ***30.5%*** | ***12.2%*** | ***8.4%*** | ***$0.89*** | ***1.8%*** | ***53.2%*** | ***33.8%*** | ***11.2%*** | ***14*** | ***24*** | ***4.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 46,316 | 6.0% | 41.0% | 31.9% | 12.4% | 8.7% | $0.87 | 1.9% | 51.9% | 34.7% | 11.4% | 14 | 24 | 4.1 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 46,154 | 7.4% | 45.7% | 27.3% | 10.9% | 8.8% | $0.78 | 2.4% | 60.0% | 24.8% | 12.8% | 15 | 21 | 3.2 |
| | (L) Skylights | 47,742 | 8.8% | 45.8% | 25.2% | 11.7% | 8.5% | $0.78 | 3.1% | 62.4% | 21.8% | 12.7% | 14 | 23 | 3.2 |
| | (L) Sawtooth Ap | 47,002 | 9.1% | 46.5% | 25.2% | 10.6% | 8.6% | $0.79 | 2.8% | 63.3% | 21.3% | 12.6% | 17 | 20 | 3.4 |
| | (L) Monitor Ap. | 48,350 | 9.5% | 46.3% | 25.4% | 10.5% | 8.4% | $0.81 | 3.0% | 63.4% | 21.3% | 12.3% | 17 | 21 | 3.5 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***58,890*** | ***29.3%*** | ***19.4%*** | ***26.9%*** | ***15.2%*** | ***9.2%*** | ***$0.84*** | ***11.2%*** | ***42.2%*** | ***37.4%*** | ***9.1%*** | ***90*** | ***17*** | ***3.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 57,157 | 30.2% | 17.1% | 27.8% | 15.4% | 9.5% | $0.82 | 11.3% | 41.2% | 38.2% | 9.3% | 90 | 17 | 3.5 |
| | (C) Natural Vent | 53,588 | 32.2% | 11.4% | 29.6% | 16.7% | 10.1% | $0.77 | 12.3% | 36.8% | 41.0% | 10.0% | 90 | 17 | 3.8 |
| | (L) Windows | 52,305 | 34.7% | 20.0% | 19.2% | 15.7% | 10.4% | $0.68 | 15.5% | 54.3% | 19.0% | 11.2% | 92 | 14 | 2.5 |
| | (L) Skylights | 52,919 | 39.5% | 16.0% | 18.7% | 15.6% | 10.3% | $0.63 | 19.2% | 48.4% | 20.3% | 12.1% | 88 | 11 | 2.2 |
| | (L) Sawtooth Ap | 48,344 | 37.9% | 16.0% | 19.3% | 15.6% | 11.2% | $0.60 | 18.3% | 48.5% | 20.5% | 12.7% | 97 | 10 | 2.1 |
| | (L) Monitor Ap. | 51,958 | 37.6% | 16.8% | 19.7% | 15.5% | 10.5% | $0.66 | 17.8% | 50.5% | 20.1% | 11.6% | 100 | 11 | 2.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***47,394*** | ***4.9%*** | ***0.0%*** | ***41.9%*** | ***3.9%*** | ***49.3%*** | ***$0.91*** | ***1.4%*** | ***3.2%*** | ***43.7%*** | ***51.7%*** | ***17*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 34,419 | 11.1% | 0.0% | 15.9% | 5.2% | 67.9% | $0.61 | 3.6% | 3.9% | 15.2% | 77.3% | 16 | 0 | 2.8 |
| | (L) Sawtooth Ap | 37,060 | 16.2% | 0.0% | 11.9% | 8.9% | 63.0% | $0.63 | 5.1% | 7.6% | 12.9% | 74.4% | 30 | 0 | 2.9 |
| | (L) Monitor Ap. | 39,267 | 12.1% | 0.0% | 21.4% | 7.1% | 59.5% | $0.66 | 3.8% | 6.4% | 18.5% | 71.4% | 26 | 0 | 2.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***26,384*** | ***26.9%*** | ***0.0%*** | ***42.9%*** | ***11.0%*** | ***19.2%*** | ***$0.44*** | ***8.7%*** | ***8.9%*** | ***57.6%*** | ***24.8%*** | ***26*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 23,524 | 31.5% | 0.0% | 34.6% | 12.3% | 21.5% | $0.36 | 11.0% | 10.8% | 47.9% | 30.3% | 26 | 0 | 1.6 |
| | (L) Skylights | 20,408 | 48.0% | 0.0% | 15.3% | 11.9% | 24.8% | $0.25 | 20.5% | 12.0% | 23.3% | 44.3% | 22 | 0 | 1.1 |
| | (L) Sawtooth Ap | 20,220 | 43.1% | 0.0% | 16.1% | 15.8% | 25.0% | $0.26 | 18.1% | 16.4% | 22.9% | 42.6% | 29 | 0 | 1.2 |
| | (L) Monitor Ap. | 21,574 | 42.7% | 0.0% | 17.8% | 15.9% | 23.5% | $0.27 | 18.1% | 17.2% | 24.1% | 40.6% | 31 | 0 | 1.2 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***48,235*** | ***17.5%*** | ***0.0%*** | ***50.8%*** | ***7.5%*** | ***24.2%*** | ***$0.83*** | ***5.5%*** | ***6.0%*** | ***59.9%*** | ***28.6%*** | ***32*** | ***0*** | ***3.3*** |
| | (H) Direct Gain + St | 46,072 | 14.3% | 0.0% | 53.2% | 7.2% | 25.3% | $0.81 | 4.4% | 5.8% | 60.8% | 29.0% | 30 | 0 | 3.3 |
| | (H) Indirect Gain | 46,450 | 12.8% | 0.0% | 52.8% | 9.3% | 25.1% | $0.82 | 4.3% | 6.8% | 60.2% | 28.7% | 30 | 0 | 3.3 |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 37,969 | 24.4% | 0.0% | 34.5% | 10.4% | 30.8% | $0.58 | 8.5% | 9.4% | 41.3% | 40.8% | 35 | 0 | 2.5 |
| | (L) Skylights | 33,068 | 34.2% | 0.0% | 20.5% | 10.0% | 35.3% | $0.45 | 13.3% | 9.1% | 25.4% | 52.2% | 30 | 0 | 2.1 |
| | (L) Sawtooth Ap | 33,615 | 34.5% | 0.0% | 16.2% | 14.6% | 34.7% | $0.47 | 13.3% | 14.4% | 21.7% | 50.6% | 43 | 0 | 2.1 |
| | (L) Monitor Ap. | 35,598 | 32.3% | 0.0% | 21.1% | 13.8% | 32.8% | $0.49 | 12.7% | 13.8% | 25.1% | 48.4% | 43 | 0 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***54,718*** | ***11.5%*** | ***25.2%*** | ***36.2%*** | ***5.8%*** | ***21.3%*** | ***$1.11*** | ***2.8%*** | ***39.8%*** | ***36.0%*** | ***21.3%*** | ***16*** | ***23*** | ***5.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 54,293 | 11.8% | 23.9% | 36.5% | 6.3% | 21.5% | $1.10 | 2.9% | 39.2% | 36.4% | 21.5% | 16 | 23 | 5.7 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 49,973 | 14.1% | 29.1% | 27.4% | 6.0% | 23.3% | $0.98 | 3.5% | 45.9% | 26.5% | 24.1% | 18 | 22 | 4.8 |
| | (L) Skylights | 42,128 | 22.3% | 29.0% | 13.0% | 8.1% | 27.7% | $0.79 | 6.1% | 52.6% | 11.7% | 29.7% | 16 | 24 | 4.2 |
| | (L) Sawtooth Ap | 46,052 | 21.7% | 36.2% | 9.6% | 7.2% | 25.3% | $0.89 | 5.3% | 59.2% | 9.2% | 26.4% | 23 | 24 | 4.6 |
| | (L) Monitor Ap | 47,835 | 20.9% | 35.1% | 12.7% | 6.9% | 24.4% | $0.90 | 5.2% | 57.6% | 11.0% | 26.2% | 23 | 23 | 4.5 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***34,616*** | ***4.8%*** | ***0.0%*** | ***57.3%*** | ***4.2%*** | ***33.7%*** | ***$0.67*** | ***1.4%*** | ***3.3%*** | ***59.8%*** | ***35.4%*** | ***14*** | ***0*** | ***2.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 28,830 | 6.7% | 0.0% | 47.3% | 5.6% | 40.5% | $0.53 | 2.1% | 4.6% | 48.8% | 44.5% | 15 | 0 | 2.3 |
| | (L) Skylights | 21,607 | 14.1% | 0.0% | 25.3% | 6.5% | 54.0% | $0.36 | 4.9% | 5.1% | 25.4% | 64.6% | 13 | 0 | 1.8 |
| | (L) Sawtooth Ap | 21,497 | 15.6% | 0.0% | 20.5% | 9.7% | 54.3% | $0.37 | 4.9% | 8.5% | 22.3% | 64.3% | 19 | 0 | 1.8 |
| | (L) Monitor Ap | 23,194 | 14.5% | 0.0% | 26.2% | 9.0% | 50.3% | $0.38 | 4.8% | 8.1% | 25.7% | 61.4% | 19 | 0 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***62.804*** | ***23.1%*** | ***35.8%*** | ***23.2%*** | ***10.0%*** | ***8.0%*** | ***$1.21*** | ***6.4%*** | ***60.5%*** | ***24.1%*** | ***9.0%*** | ***34*** | ***44*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 62,436 | 23.5% | 34.4% | 23.3% | 10.8% | 8.0% | $1.20 | 6.5% | 60.2% | 24.2% | 9.1% | 34 | 44 | 7.1 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***85,124*** | ***16.9%*** | ***35.0%*** | ***33.6%*** | ***8.5%*** | ***6.0%*** | ***$1.70*** | ***4.4%*** | ***55.4%*** | ***33.6%*** | ***6.5%*** | ***33*** | ***49*** | ***9.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 75,063 | 21.5% | 38.8% | 24.6% | 8.4% | 6.8% | $1.46 | 5.5% | 61.5% | 25.4% | 7.6% | 35 | 43 | 7.6 |
| | (L) Skylights | 59,235 | 33.4% | 34.4% | 13.3% | 10.3% | 8.6% | $1.05 | 9.8% | 62.6% | 17.0% | 10.6% | 27 | 41 | 5.8 |
| | (L) Sawtooth Ap | 57,756 | 32.6% | 36.1% | 14.2% | 8.3% | 8.8% | $1.06 | 8.6% | 63.7% | 17.2% | 10.5% | 36 | 32 | 5.9 |
| | (L) Monitor Ap. | 63,593 | 31.3% | 37.3% | 15.3% | 8.1% | 8.0% | $1.14 | 8.4% | 64.8% | 17.2% | 9.7% | 39 | 34 | 6.2 |
| | (L) Atrium | 71,985 | 27.6% | 42.6% | 11.7% | 11.1% | 7.1% | $1.34 | 7.9% | 70.2% | 13.7% | 8.2% | 33 | 53 | 7.3 |
| ***O*** | ***TRAINING >5000*** | ***69,682*** | ***12.4%*** | ***31.7%*** | ***41.2%*** | ***7.4%*** | ***7.4%*** | ***$1.41*** | ***3.2%*** | ***48.4%*** | ***40.5%*** | ***7.8%*** | ***22*** | ***36*** | ***7.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 58,929 | 16.8% | 32.5% | 35.6% | 6.4% | 8.7% | $1.13 | 4.3% | 50.2% | 35.6% | 9.8% | 23 | 26 | 5.4 |
| | (L) Skylights | 48,625 | 27.1% | 34.9% | 17.5% | 9.9% | 10.5% | $0.91 | 7.5% | 60.0% | 20.3% | 12.2% | 20 | 34 | 4.7 |
| | (L) Sawtooth Ap | 48,357 | 28.5% | 40.4% | 12.0% | 8.5% | 10.6% | $0.96 | 6.8% | 65.3% | 16.4% | 11.5% | 29 | 29 | 5.5 |
| | (L) Monitor Ap. | 54,267 | 25.6% | 39.5% | 17.6% | 7.9% | 9.5% | $1.03 | 6.4% | 63.9% | 18.9% | 10.7% | 30 | 30 | 5.5 |
| | (L) Atrium | 52,701 | 22.1% | 38.2% | 20.5% | 9.5% | 9.7% | $1.00 | 6.0% | 62.0% | 20.8% | 11.1% | 22 | 35 | 5.1 |

# CLIMATE REGION 6

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***64,209*** | ***7.0%*** | ***33.4%*** | ***44.7%*** | ***7.0%*** | ***8.0%*** | ***$1.37*** | ***1.7%*** | ***47.7%*** | ***42.6%*** | ***8.1%*** | ***15*** | ***33*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 63,701 | 7.3% | 32.1% | 45.0% | 7.5% | 8.1% | $1.36 | 1.7% | 47.3% | 42.9% | 8.1% | 15 | 33 | 6.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 53,937 | 10.0% | 35.8% | 38.8% | 5.8% | 9.5% | $1.08 | 2.5% | 49.2% | 38.0% | 10.3% | 16 | 23 | 5.1 |
| | (L) Skylights | 50,561 | 11.6% | 37.6% | 32.9% | 7.7% | 10.1% | $1.05 | 2.8% | 54.9% | 31.8% | 10.5% | 15 | 28 | 5.3 |
| | (L) Sawtooth Ap | 48,254 | 12.7% | 39.5% | 29.8% | 7.4% | 10.6% | $1.03 | 2.9% | 56.2% | 30.2% | 10.7% | 18 | 26 | 5.4 |
| | (L) Monitor Ap. | 50,233 | 12.7% | 39.3% | 30.7% | 7.2% | 10.2% | $1.05 | 2.9% | 56.0% | 30.5% | 10.5% | 18 | 26 | 5.5 |
| | (L) Atrium | 52,119 | 11.9% | 41.5% | 28.1% | 8.6% | 9.8% | $1.08 | 2.9% | 60.2% | 26.6% | 10.3% | 16 | 33 | 5.5 |
| ***Q*** | ***TRAINING, GYM*** | ***53,519*** | ***21.8%*** | ***0.0%*** | ***66.5%*** | ***11.8%*** | ***0.0%*** | ***$0.70*** | ***9.2%*** | ***11.1%*** | ***79.7%*** | ***0.0%*** | ***42*** | ***0*** | ***2.0*** |
| | (H) Direct Gain + St | 52,040 | 19.9% | 0.0% | 68.4% | 11.7% | 0.0% | $0.69 | 8.3% | 11.0% | 80.6% | 0.0% | 41 | 0 | 2.0 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 41,170 | 44.6% | 0.0% | 40.8% | 14.6% | 0.0% | $0.37 | 26.1% | 18.2% | 55.7% | 0.0% | 40 | 0 | 1.0 |
| | (L) Sawtooth Ap | 39,448 | 40.6% | 0.0% | 38.8% | 20.5% | 0.0% | $0.38 | 23.1% | 26.2% | 50.7% | 0.0% | 54 | 0 | 1.1 |
| | (L) Monitor Ap. | 42,606 | 39.1% | 0.0% | 41.2% | 19.7% | 0.0% | $0.41 | 22.3% | 25.2% | 52.5% | 0.0% | 56 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***16,204*** | ***45.9%*** | ***0.0%*** | ***43.7%*** | ***10.4%*** | ***0.0%*** | ***$0.20*** | ***19.3%*** | ***9.5%*** | ***71.1%*** | ***0.0%*** | ***15*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 14,049 | 38.2% | 0.0% | 50.4% | 11.3% | 0.0% | $0.19 | 15.1% | 10.3% | 74.6% | 0.0% | 15 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 14,320 | 39.2% | 0.0% | 49.5% | 11.3% | 0.0% | $0.19 | 15.2% | 10.7% | 74.1% | 0.0% | 15 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 12,532 | 71.0% | 0.0% | 15.6% | 13.4% | 0.0% | $0.10 | 46.5% | 19.3% | 34.2% | 0.0% | 15 | 0 | 0.4 |
| | (L) Sawtooth Ap | 10,925 | 64.5% | 0.0% | 14.4% | 21.1% | 0.0% | $0.10 | 38.4% | 31.3% | 30.3% | 0.0% | 21 | 0 | 0.4 |
| | (L) Monitor Ap. | 11,696 | 61.7% | 0.0% | 18.6% | 19.8% | 0.0% | $0.10 | 36.9% | 28.9% | 34.2% | 0.0% | 21 | 0 | 0.4 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 7

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| A | ***ADMIN <5000 SF*** | ***86,538*** | ***9.5%*** | ***43.5%*** | ***33.0%*** | ***8.1%*** | ***5.9%*** | ***$1.74*** | ***4.0%*** | ***55.5%*** | ***34.2%*** | ***6.3%*** | ***29*** | ***50*** | ***9.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 86,385 | 9.6% | 42.5% | 33.1% | 9.0% | 5.9% | $1.73 | 4.1% | 55.4% | 34.2% | 6.3% | 29 | 50 | 9.3 |
| | (C) Natural Vent | 82,442 | 10.0% | 40.7% | 34.6% | 8.5% | 6.2% | $1.68 | 4.2% | 53.9% | 35.4% | 6.5% | 29 | 50 | 9.3 |
| | (L) Windows | 75,301 | 12.4% | 48.4% | 24.3% | 8.0% | 6.8% | $1.48 | 5.1% | 61.8% | 25.8% | 7.3% | 31 | 43 | 7.7 |
| | (L) Skylights | 55,603 | 20.1% | 46.9% | 13.3% | 10.6% | 9.2% | $1.05 | 9.1% | 65.0% | 15.5% | 10.4% | 24 | 41 | 6.1 |
| | (L) Sawtooth Ap | 54,802 | 19.5% | 48.0% | 14.7% | 8.4% | 9.3% | $1.04 | 7.9% | 64.8% | 16.8% | 10.5% | 31 | 32 | 5.8 |
| | (L) Monitor Ap. | 60,438 | 19.1% | 48.8% | 15.5% | 8.2% | 8.5% | $1.14 | 7.7% | 65.3% | 17.3% | 9.6% | 34 | 34 | 6.1 |
| | (L) Atrium | 70,958 | 16.1% | 54.6% | 11.4% | 10.8% | 7.2% | $1.37 | 7.2% | 72.2% | 12.7% | 7.9% | 29 | 53 | 7.7 |
| B | ***ADMIN >5000 SF*** | ***71,835*** | ***6.7%*** | ***39.3%*** | ***39.9%*** | ***6.9%*** | ***7.1%*** | ***$1.46*** | ***2.8%*** | ***49.0%*** | ***40.8%*** | ***7.5%*** | ***19*** | ***36*** | ***7.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 71,330 | 6.8% | 38.0% | 40.2% | 7.8% | 7.2% | $1.45 | 2.8% | 48.6% | 41.1% | 7.5% | 19 | 36 | 7.3 |
| | (C) Natural Vent | 68,648 | 7.0% | 36.5% | 41.8% | 7.3% | 7.5% | $1.41 | 2.8% | 47.3% | 42.1% | 7.7% | 19 | 36 | 7.6 |
| | (L) Windows | 59,125 | 9.4% | 40.3% | 35.4% | 6.2% | 8.7% | $1.17 | 3.7% | 50.3% | 36.7% | 9.3% | 20 | 26 | 5.5 |
| | (L) Skylights | 46,697 | 15.6% | 46.6% | 16.8% | 10.0% | 11.0% | $0.91 | 6.7% | 62.6% | 18.7% | 12.0% | 17 | 34 | 5.1 |
| | (L) Sawtooth Ap | 47,074 | 16.6% | 51.9% | 12.2% | 8.5% | 10.9% | $0.92 | 6.3% | 67.5% | 14.4% | 11.8% | 25 | 29 | 5.4 |
| | (L) Monitor Ap. | 53,019 | 15.1% | 50.1% | 17.3% | 7.8% | 9.7% | $1.03 | 5.8% | 64.7% | 18.9% | 10.6% | 26 | 30 | 5.5 |
| | (L) Atrium | 52,544 | 12.3% | 48.6% | 20.1% | 9.3% | 9.8% | $1.04 | 5.1% | 63.3% | 21.1% | 10.5% | 19 | 35 | 5.3 |
| C | ***ADMIN, MULTISTORY*** | ***67,819*** | ***3.7%*** | ***40.0%*** | ***42.3%*** | ***6.5%*** | ***7.6%*** | ***$1.41*** | ***1.4%*** | ***48.4%*** | ***42.5%*** | ***7.7%*** | ***13*** | ***33*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 67,127 | 3.7% | 38.7% | 42.7% | 7.2% | 7.6% | $1.40 | 1.5% | 47.8% | 42.9% | 7.8% | 13 | 33 | 6.9 |
| | (C) Natural Vent | 64,482 | 3.8% | 36.9% | 44.5% | 6.8% | 8.0% | $1.36 | 1.5% | 46.4% | 44.1% | 8.0% | 13 | 33 | 7.3 |
| | (L) Windows | 55,259 | 5.5% | 41.8% | 37.9% | 5.6% | 9.3% | $1.12 | 2.1% | 49.7% | 38.5% | 9.7% | 14 | 23 | 5.2 |
| | (L) Skylights | 52,784 | 6.2% | 45.7% | 31.2% | 7.2% | 9.7% | $1.08 | 2.4% | 55.9% | 31.7% | 10.1% | 13 | 28 | 5.4 |
| | (L) Sawtooth Ap | 50,061 | 6.9% | 47.4% | 28.5% | 7.0% | 10.2% | $1.03 | 2.6% | 57.4% | 29.5% | 10.6% | 15 | 26 | 5.4 |
| | (L) Monitor Ap. | 52,012 | 6.9% | 47.0% | 29.4% | 6.8% | 9.9% | $1.07 | 2.6% | 56.9% | 30.2% | 10.2% | 16 | 26 | 5.5 |
| | (L) Atrium | 54,785 | 6.3% | 49.9% | 26.4% | 8.0% | 9.4% | $1.12 | 2.5% | 61.1% | 26.7% | 9.7% | 14 | 33 | 5.6 |

# CLIMATE REGION 7

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***150,807*** | ***4.0%*** | ***33.0%*** | ***21.7%*** | ***7.0%*** | ***34.4%*** | ***$3.04*** | ***1.7%*** | ***41.4%*** | ***21.9%*** | ***35.0%*** | ***26*** | ***55*** | ***13.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 149,206 | 4.1% | 32.1% | 21.9% | 7.2% | 34.7% | $3.01 | 1.7% | 40.8% | 22.2% | 35.4% | 26 | 55 | 13.0 |
| | (C) Natural Vent | 144,789 | 4.2% | 30.1% | 22.6% | 7.3% | 35.8% | $2.94 | 1.7% | 39.4% | 22.7% | 36.2% | 26 | 55 | 13.0 |
| | (L) Windows | 138,531 | 5.0% | 33.4% | 18.0% | 6.1% | 37.4% | $2.77 | 2.0% | 41.4% | 18.1% | 38.5% | 27 | 45 | 11.4 |
| | (L) Skylights | 123,265 | 7.6% | 34.5% | 7.3% | 8.6% | 42.1% | $2.43 | 3.2% | 45.2% | 7.8% | 43.8% | 24 | 52 | 10.6 |
| | (L) Sawtooth Ap | 122,345 | 7.9% | 36.6% | 5.2% | 7.9% | 42.4% | $2.43 | 3.1% | 47.2% | 5.9% | 43.7% | 32 | 47 | 11.1 |
| | (L) Monitor Ap. | 132,172 | 7.0% | 36.2% | 10.2% | 7.4% | 39.2% | $2.62 | 2.8% | 46.2% | 10.3% | 40.7% | 33 | 49 | 11.1 |
| | (L) Atrium | 131,620 | 6.0% | 37.1% | 8.8% | 8.7% | 39.4% | $2.62 | 2.5% | 47.9% | 9.0% | 40.6% | 27 | 57 | 11.2 |
| ***E*** | ***DINING FACILITY*** | ***120,611*** | ***11.1%*** | ***28.2%*** | ***26.1%*** | ***8.6%*** | ***26.0%*** | ***$1.85*** | ***7.0%*** | ***47.2%*** | ***33.4%*** | ***12.4%*** | ***50*** | ***44*** | ***7.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 117,442 | 11.4% | 26.3% | 26.8% | 8.9% | 26.7% | $1.81 | 7.2% | 46.2% | 34.0% | 12.6% | 50 | 44 | 7.6 |
| | (L) Windows | 109,495 | 13.3% | 31.8% | 16.7% | 9.6% | 28.6% | $1.60 | 8.6% | 55.8% | 21.3% | 14.3% | 53 | 44 | 6.3 |
| | (L) Skylights | 96,896 | 19.0% | 25.9% | 13.1% | 9.7% | 32.3% | $1.29 | 13.0% | 51.1% | 18.2% | 17.7% | 49 | 37 | 5.0 |
| | (L) Sawtooth Ap | 105,408 | 16.0% | 31.3% | 13.6% | 9.4% | 29.7% | $1.50 | 10.1% | 56.9% | 17.7% | 15.3% | 56 | 39 | 5.5 |
| | (L) Monitor Ap. | 110,515 | 15.1% | 31.9% | 15.4% | 9.3% | 28.3% | $1.60 | 9.4% | 56.9% | 19.4% | 14.3% | 58 | 40 | 5.7 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***52,572*** | ***2.3%*** | ***50.7%*** | ***28.1%*** | ***11.2%*** | ***7.7%*** | ***$1.05*** | ***1.0%*** | ***61.0%*** | ***29.4%*** | ***8.6%*** | ***12*** | ***24*** | ***4.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 50,413 | 2.6% | 48.7% | 29.3% | 11.4% | 8.0% | $1.01 | 1.1% | 59.5% | 30.5% | 8.9% | 12 | 24 | 4.2 |
| | (C) Natural Vent | 49,405 | 2.4% | 47.5% | 29.9% | 12.0% | 8.2% | $1.02 | 1.1% | 59.8% | 30.3% | 8.8% | 12 | 24 | 5.0 |
| | (L) Windows | 49,719 | 3.4% | 53.2% | 25.1% | 10.2% | 8.1% | $0.97 | 1.5% | 64.3% | 24.9% | 9.3% | 13 | 21 | 3.4 |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 7

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool (Btu/hr/sf) | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***53,119*** | ***19.2%*** | ***27.3%*** | ***29.9%*** | ***13.4%*** | ***10.2%*** | ***$0.93*** | ***8.7%*** | ***45.0%*** | ***35.3%*** | ***11.1%*** | ***75*** | ***17*** | ***3.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 47,538 | 21.4% | 18.8% | 33.4% | 15.0% | 11.4% | $0.83 | 9.8% | 38.0% | 39.7% | 12.5% | 75 | 17 | 3.7 |
| | (L) Windows | 45,760 | 23.3% | 29.3% | 21.6% | 14.0% | 11.9% | $0.77 | 11.7% | 50.8% | 24.0% | 13.5% | 77 | 14 | 2.5 |
| | (L) Skylights | 44,549 | 27.6% | 24.8% | 21.6% | 13.8% | 12.2% | $0.71 | 14.4% | 45.8% | 25.3% | 14.5% | 73 | 11 | 2.2 |
| | (L) Sawtooth Ap | 40,972 | 25.9% | 24.4% | 22.3% | 14.1% | 13.3% | $0.67 | 14.1% | 45.2% | 25.3% | 15.3% | 81 | 10 | 2.1 |
| | (L) Monitor Ap. | 44,098 | 25.3% | 25.6% | 22.7% | 14.1% | 12.3% | $0.73 | 13.7% | 46.6% | 25.6% | 14.2% | 83 | 11 | 2.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***45,882*** | ***2.5%*** | ***0.0%*** | ***43.3%*** | ***3.4%*** | ***50.9%*** | ***$0.94*** | ***1.1%*** | ***2.9%*** | ***44.1%*** | ***51.9%*** | ***14*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 31,937 | 6.2% | 0.0% | 16.1% | 4.6% | 73.1% | $0.63 | 2.8% | 3.7% | 16.3% | 77.2% | 14 | 0 | 2.8 |
| | (L) Sawtooth Ap | 33,684 | 10.0% | 0.0% | 12.7% | 8.0% | 69.3% | $0.65 | 4.5% | 6.9% | 13.4% | 75.2% | 25 | 0 | 2.8 |
| | (L) Monitor Ap. | 36,225 | 7.1% | 0.0% | 22.1% | 6.3% | 64.5% | $0.70 | 3.1% | 5.6% | 21.9% | 69.4% | 21 | 0 | 2.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***22,695*** | ***17.3%*** | ***0.0%*** | ***49.9%*** | ***10.5%*** | ***22.3%*** | ***$0.42*** | ***8.1%*** | ***8.6%*** | ***57.8%*** | ***25.5%*** | ***22*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 19,654 | 20.8% | 0.0% | 41.3% | 12.2% | 25.8% | $0.35 | 10.2% | 10.3% | 48.9% | 30.6% | 22 | 0 | 1.5 |
| | (L) Skylights | 15,248 | 34.5% | 0.0% | 19.2% | 13.1% | 33.2% | $0.24 | 19.4% | 9.4% | 25.4% | 45.8% | 18 | 0 | 1.1 |
| | (L) Sawtooth Ap | 15,717 | 30.7% | 0.0% | 20.4% | 16.7% | 32.2% | $0.25 | 17.0% | 15.1% | 25.5% | 42.5% | 24 | 0 | 1.1 |
| | (L) Monitor Ap. | 16,731 | 30.6% | 0.0% | 22.2% | 16.9% | 30.3% | $0.26 | 16.8% | 14.5% | 27.9% | 40.8% | 26 | 0 | 1.2 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 7

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***J*** | ***MAINT, HI-BAY*** | ***43,682*** | ***10.4%*** | ***0.0%*** | ***56.1%*** | ***6.7%*** | ***26.7%*** | ***$0.84*** | ***4.6%*** | ***5.6%*** | ***60.8%*** | ***29.0%*** | ***27*** | ***0*** | ***3.3*** |
| | (H) Direct Gain + St | 42,294 | 8.0% | 0.0% | 58.0% | 6.4% | 27.6% | $0.83 | 3.6% | 5.3% | 61.6% | 29.4% | 25 | 0 | 3.3 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 32,918 | 15.3% | 0.0% | 39.5% | 9.7% | 35.5% | $0.60 | 7.1% | 8.5% | 43.8% | 40.5% | 29 | 0 | 2.4 |
| | (L) Skylights | 26,714 | 22.5% | 0.0% | 23.8% | 10.0% | 43.7% | $0.46 | 11.6% | 7.8% | 27.6% | 53.0% | 25 | 0 | 2.0 |
| | (L) Sawtooth Ap | 27,469 | 23.9% | 0.0% | 19.2% | 14.4% | 42.5% | $0.46 | 12.0% | 12.2% | 23.2% | 52.6% | 36 | 0 | 2.1 |
| | (L) Monitor Ap. | 29,321 | 22.0% | 0.0% | 24.7% | 13.5% | 39.8% | $0.50 | 10.9% | 12.4% | 28.3% | 48.4% | 36 | 0 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***55,806*** | ***6.0%*** | ***32.0%*** | ***35.5%*** | ***5.6%*** | ***20.9%*** | ***$1.14*** | ***2.3%*** | ***40.1%*** | ***36.2%*** | ***21.3%*** | ***14*** | ***23*** | ***5.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 55,231 | 6.1% | 30.6% | 35.9% | 6.3% | 21.1% | $1.13 | 2.3% | 39.5% | 36.6% | 21.6% | 14 | 23 | 5.7 |
| | (C) Natural Vent | 54,013 | 6.2% | 29.7% | 36.7% | 5.8% | 21.6% | $1.11 | 2.4% | 38.7% | 37.1% | 21.8% | 14 | 23 | 5.7 |
| | (L) Windows | 50,594 | 7.5% | 36.7% | 26.9% | 5.8% | 23.1% | $1.02 | 2.8% | 45.9% | 27.4% | 23.9% | 16 | 22 | 4.9 |
| | (L) Skylights | 41,057 | 12.3% | 38.6% | 12.5% | 8.1% | 28.4% | $0.81 | 5.2% | 52.0% | 12.7% | 30.1% | 14 | 24 | 4.5 |
| | (L) Sawtooth Ap | 45,619 | 12.4% | 45.6% | 9.4% | 7.1% | 25.6% | $0.90 | 4.6% | 58.7% | 9.7% | 27.1% | 20 | 24 | 4.5 |
| | (L) Monitor Ap. | 47,210 | 11.9% | 44.2% | 12.4% | 6.8% | 24.7% | $0.92 | 4.4% | 56.8% | 12.5% | 26.3% | 20 | 24 | 4.5 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***33,480*** | ***2.3%*** | ***0.0%*** | ***59.2%*** | ***3.6%*** | ***34.8%*** | ***$0.68*** | ***1.1%*** | ***3.1%*** | ***60.3%*** | ***35.5%*** | ***11*** | ***0*** | ***2.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 27,485 | 3.4% | 0.0% | 49.3% | 4.9% | 42.4% | $0.55 | 1.6% | 4.2% | 50.2% | 44.0% | 12 | 0 | 2.3 |
| | (L) Skylights | 19,533 | 8.0% | 0.0% | 26.3% | 6.0% | 59.7% | $0.38 | 4.0% | 4.7% | 27.1% | 64.3% | 11 | 0 | 1.8 |
| | (L) Sawtooth Ap | 19,486 | 9.4% | 0.0% | 21.9% | 8.9% | 59.9% | $0.38 | 4.0% | 8.1% | 23.1% | 64.8% | 16 | 0 | 1.8 |
| | (L) Monitor Ap. | 21,068 | 8.6% | 0.0% | 27.8% | 8.2% | 55.4% | $0.40 | 3.8% | 7.5% | 28.5% | 60.2% | 16 | 0 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 7

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***62,612*** | ***12.7%*** | ***46.3%*** | ***23.2%*** | ***9.8%*** | ***8.0%*** | ***$1.24*** | ***5.5%*** | ***61.4%*** | ***24.4%*** | ***8.6%*** | ***29*** | ***44*** | ***7.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 62,209 | 12.9% | 44.8% | 23.4% | 10.9% | 8.0% | $1.23 | 5.6% | 61.0% | 24.7% | 8.7% | 29 | 44 | 7.3 |
| | (C) Natural Vent | 59,784 | 13.3% | 43.7% | 24.3% | 10.2% | 8.4% | $1.20 | 5.7% | 60.3% | 25.2% | 8.9% | 29 | 44 | 7.5 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***86,538*** | ***9.5%*** | ***43.5%*** | ***33.0%*** | ***8.1%*** | ***5.9%*** | ***$1.74*** | ***4.0%*** | ***55.5%*** | ***34.2%*** | ***6.3%*** | ***29*** | ***50*** | ***9.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 86,385 | 9.6% | 42.5% | 33.1% | 9.0% | 5.9% | $1.73 | 4.1% | 55.4% | 34.2% | 6.3% | 29 | 50 | 9.3 |
| | (C) Natural Vent | 82,442 | 10.0% | 40.7% | 34.6% | 8.5% | 6.2% | $1.68 | 4.2% | 53.9% | 35.4% | 6.5% | 29 | 50 | 9.3 |
| | (L) Windows | 75,301 | 12.4% | 48.4% | 24.3% | 8.0% | 6.8% | $1.48 | 5.1% | 61.8% | 25.8% | 7.3% | 31 | 43 | 7.7 |
| | (L) Skylights | 55,603 | 20.1% | 46.9% | 13.3% | 10.6% | 9.2% | $1.05 | 9.1% | 65.0% | 15.5% | 10.4% | 24 | 41 | 6.1 |
| | (L) Sawtooth Ap | 54,802 | 19.5% | 48.0% | 14.7% | 8.4% | 9.3% | $1.04 | 7.9% | 64.8% | 16.8% | 10.5% | 31 | 32 | 5.8 |
| | (L) Monitor Ap. | 60,438 | 19.1% | 48.8% | 15.5% | 8.2% | 8.5% | $1.14 | 7.7% | 65.3% | 17.3% | 9.6% | 34 | 34 | 6.1 |
| | (L) Atrium | 70,958 | 16.1% | 54.6% | 11.4% | 10.8% | 7.2% | $1.37 | 7.2% | 72.2% | 12.7% | 7.9% | 29 | 53 | 7.7 |
| ***O*** | ***TRAINING >5000*** | ***71,835*** | ***6.7%*** | ***39.3%*** | ***39.9%*** | ***6.9%*** | ***7.1%*** | ***$1.46*** | ***2.8%*** | ***49.0%*** | ***40.8%*** | ***7.5%*** | ***19*** | ***36*** | ***7.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 71,330 | 6.8% | 38.0% | 40.2% | 7.8% | 7.2% | $1.45 | 2.8% | 48.6% | 41.1% | 7.5% | 19 | 36 | 7.3 |
| | (C) Natural Vent | 68,648 | 7.0% | 36.5% | 41.8% | 7.3% | 7.5% | $1.41 | 2.8% | 47.3% | 42.1% | 7.7% | 19 | 36 | 7.6 |
| | (L) Windows | 59,125 | 9.4% | 40.3% | 35.4% | 6.2% | 8.7% | $1.17 | 3.7% | 50.3% | 36.7% | 9.3% | 20 | 26 | 5.5 |
| | (L) Skylights | 46,697 | 15.6% | 46.6% | 16.8% | 10.0% | 11.0% | $0.91 | 6.7% | 62.6% | 18.7% | 12.0% | 17 | 34 | 5.1 |
| | (L) Sawtooth Ap | 47,074 | 16.6% | 51.9% | 12.2% | 8.5% | 10.9% | $0.92 | 6.3% | 67.5% | 14.4% | 11.8% | 25 | 29 | 5.4 |
| | (L) Monitor Ap. | 53,019 | 15.1% | 50.1% | 17.3% | 7.8% | 9.7% | $1.03 | 5.8% | 64.7% | 18.9% | 10.6% | 26 | 30 | 5.5 |
| | (L) Atrium | 52,544 | 12.3% | 48.6% | 20.1% | 9.3% | 9.8% | $1.04 | 5.1% | 63.3% | 21.1% | 10.5% | 19 | 35 | 5.3 |

# CLIMATE REGION 7

Appendix E

| | | ENERGY USE | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***67,819*** | ***3.7%*** | ***40.0%*** | ***42.3%*** | ***6.5%*** | ***7.6%*** | ***$1.41*** | ***1.4%*** | ***48.4%*** | ***42.5%*** | ***7.7%*** | ***13*** | ***33*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 67,127 | 3.7% | 38.7% | 42.7% | 7.2% | 7.6% | $1.40 | 1.5% | 47.8% | 42.9% | 7.8% | 13 | 33 | 6.9 |
| | (C) Natural Vent | 64,482 | 3.8% | 36.9% | 44.5% | 6.8% | 8.0% | $1.36 | 1.5% | 46.4% | 44.1% | 8.0% | 13 | 33 | 7.3 |
| | (L) Windows | 55,259 | 5.5% | 41.8% | 37.9% | 5.6% | 9.3% | $1.12 | 2.1% | 49.7% | 38.5% | 9.7% | 14 | 23 | 5.2 |
| | (L) Skylights | 52,784 | 6.2% | 45.7% | 31.2% | 7.2% | 9.7% | $1.08 | 2.4% | 55.9% | 31.7% | 10.1% | 13 | 28 | 5.4 |
| | (L) Sawtooth Ap | 50,061 | 6.9% | 47.4% | 28.5% | 7.0% | 10.2% | $1.03 | 2.6% | 57.4% | 29.5% | 10.6% | 15 | 26 | 5.4 |
| | (L) Monitor Ap. | 52,012 | 6.9% | 47.0% | 29.4% | 6.8% | 9.9% | $1.07 | 2.6% | 56.9% | 30.2% | 10.2% | 16 | 26 | 5.5 |
| | (L) Atrium | 54,785 | 6.3% | 49.9% | 26.4% | 8.0% | 9.4% | $1.12 | 2.5% | 61.1% | 26.7% | 9.7% | 14 | 33 | 5.6 |
| ***Q*** | ***TRAINING, GYM*** | ***47,254*** | ***13.6%*** | ***0.0%*** | ***75.3%*** | ***11.1%*** | ***0.0%*** | ***$0.83*** | ***7.3%*** | ***9.5%*** | ***83.2%*** | ***0.0%*** | ***35*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 31,258 | 32.0% | 0.0% | 52.1% | 16.0% | 0.0% | $0.44 | 20.1% | 11.9% | 68.0% | 0.0% | 33 | 0 | 0.9 |
| | (L) Sawtooth Ap | 31,137 | 30.0% | 0.0% | 48.5% | 21.4% | 0.0% | $0.45 | 18.2% | 20.3% | 61.5% | 0.0% | 45 | 0 | 1.0 |
| | (L) Monitor Ap. | 33,807 | 28.6% | 0.0% | 50.9% | 20.5% | 0.0% | $0.50 | 17.0% | 19.4% | 63.6% | 0.0% | 46 | 0 | 1.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***12,586*** | ***32.7%*** | ***0.0%*** | ***56.3%*** | ***11.0%*** | ***0.0%*** | ***$0.20*** | ***17.8%*** | ***8.3%*** | ***73.9%*** | ***0.0%*** | ***13*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 11,050 | 23.9% | 0.0% | 64.1% | 11.9% | 0.0% | $0.19 | 12.4% | 9.8% | 77.9% | 0.0% | 12 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 11,310 | 25.5% | 0.0% | 62.6% | 11.8% | 0.0% | $0.19 | 13.0% | 9.9% | 77.1% | 0.0% | 12 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 8,115 | 60.3% | 0.0% | 22.6% | 17.0% | 0.0% | $0.09 | 42.8% | 18.0% | 39.2% | 0.0% | 13 | 0 | 0.3 |
| | (L) Sawtooth Ap | 7,230 | 52.6% | 0.0% | 21.1% | 26.3% | 0.0% | $0.09 | 36.2% | 29.9% | 34.0% | 0.0% | 18 | 0 | 0.4 |
| | (L) Monitor Ap. | 7,878 | 49.3% | 0.0% | 26.6% | 24.1% | 0.0% | $0.10 | 33.4% | 26.2% | 40.4% | 0.0% | 18 | 0 | 0.4 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 8

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***98,010*** | ***0.0%*** | ***59.4%*** | ***29.1%*** | ***6.3%*** | ***5.2%*** | ***$1.72*** | ***0.0%*** | ***66.3%*** | ***28.4%*** | ***5.3%*** | ***5*** | ***46*** | ***8.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 84,153 | 0.0% | 67.2% | 20.4% | 6.2% | 6.1% | $1.44 | 0.0% | 73.1% | 20.6% | 6.4% | 5 | 40 | 7.5 |
| | (L) Skylights | 57,900 | 0.0% | 71.5% | 11.0% | 8.7% | 8.8% | $1.05 | 0.0% | 79.9% | 11.4% | 8.7% | 4 | 38 | 6.5 |
| | (L) Sawtooth Ap | 57,354 | 0.0% | 73.2% | 11.1% | 6.8% | 8.9% | $0.99 | 0.0% | 78.6% | 12.1% | 9.3% | 5 | 29 | 5.6 |
| | (L) Monitor Ap. | 62,719 | 0.0% | 73.7% | 11.6% | 6.6% | 8.1% | $1.07 | 0.0% | 79.3% | 12.1% | 8.6% | 6 | 31 | 5.9 |
| | (L) Atrium | 79,798 | 0.0% | 77.1% | 8.3% | 8.2% | 6.4% | $1.40 | 0.0% | 84.7% | 8.7% | 6.6% | 5 | 50 | 7.7 |
| ***B*** | ***ADMIN >5000 SF*** | ***79,853*** | ***0.0%*** | ***52.1%*** | ***35.9%*** | ***5.6%*** | ***6.4%*** | ***$1.38*** | ***0.0%*** | ***58.1%*** | ***35.2%*** | ***6.6%*** | ***3*** | ***34*** | ***7.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 63,235 | 0.0% | 54.6% | 32.3% | 4.9% | 8.1% | $1.06 | 0.0% | 59.7% | 31.7% | 8.6% | 3 | 24 | 5.4 |
| | (L) Skylights | 49,464 | 0.0% | 68.2% | 13.1% | 8.4% | 10.4% | $0.88 | 0.0% | 76.0% | 13.6% | 10.4% | 3 | 31 | 5.3 |
| | (L) Sawtooth Ap | 52,921 | 0.0% | 74.1% | 9.6% | 6.6% | 9.7% | $0.91 | 0.0% | 78.5% | 11.5% | 10.1% | 4 | 26 | 5.2 |
| | (L) Monitor Ap. | 57,211 | 0.0% | 72.1% | 12.7% | 6.3% | 9.0% | $0.97 | 0.0% | 77.2% | 13.3% | 9.5% | 4 | 27 | 5.3 |
| | (L) Atrium | 58,682 | 0.0% | 67.6% | 16.3% | 7.4% | 8.7% | $1.01 | 0.0% | 75.4% | 15.4% | 9.1% | 3 | 33 | 5.6 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***76,965*** | ***0.0%*** | ***50.7%*** | ***37.3%*** | ***5.4%*** | ***6.7%*** | ***$1.34*** | ***0.0%*** | ***56.4%*** | ***36.8%*** | ***6.8%*** | ***2*** | ***31*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 60,915 | 0.0% | 53.4% | 33.6% | 4.6% | 8.4% | $1.02 | 0.0% | 57.6% | 33.4% | 9.0% | 2 | 21 | 5.2 |
| | (L) Skylights | 60,324 | 0.0% | 59.4% | 26.2% | 5.9% | 8.5% | $1.04 | 0.0% | 65.4% | 25.7% | 8.8% | 2 | 27 | 5.7 |
| | (L) Sawtooth Ap | 57,569 | 0.0% | 62.2% | 23.3% | 5.6% | 8.9% | $0.99 | 0.0% | 66.4% | 24.4% | 9.3% | 3 | 24 | 5.4 |
| | (L) Monitor Ap. | 59,084 | 0.0% | 62.0% | 23.9% | 5.5% | 8.7% | $1.01 | 0.0% | 66.2% | 24.7% | 9.1% | 3 | 25 | 5.4 |
| | (L) Atrium | 63,746 | 0.0% | 64.0% | 21.5% | 6.4% | 8.0% | $1.09 | 0.0% | 70.7% | 20.8% | 8.4% | 2 | 31 | 5.8 |

# CLIMATE REGION 8

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***162,058*** | ***0.0%*** | ***41.9%*** | ***20.2%*** | ***6.0%*** | ***32.0%*** | ***$2.68*** | ***0.0%*** | ***48.0%*** | ***19.9%*** | ***32.1%*** | ***5*** | ***51*** | ***12.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 161,075 | 0.0% | 41.5% | 20.3% | 6.0% | 32.2% | $2.67 | 0.0% | 47.8% | 20.0% | 32.2% | 5 | 51 | 12.6 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 146,228 | 0.0% | 42.7% | 16.7% | 5.2% | 35.5% | $2.39 | 0.0% | 48.1% | 16.0% | 35.9% | 5 | 41 | 11.1 |
| | (L) Skylights | 127,283 | 0.0% | 45.9% | 5.8% | 7.6% | 40.7% | $2.13 | 0.0% | 53.5% | 6.2% | 40.3% | 5 | 48 | 10.8 |
| | (L) Sawtooth Ap | 130,528 | 0.0% | 49.3% | 4.3% | 6.7% | 39.7% | $2.18 | 0.0% | 55.6% | 5.1% | 39.4% | 6 | 44 | 11.0 |
| | (L) Monitor Ap. | 137,996 | 0.0% | 48.7% | 7.3% | 6.4% | 37.6% | $2.28 | 0.0% | 55.2% | 7.1% | 37.7% | 6 | 45 | 11.1 |
| | (L) Atrium | 141,696 | 0.0% | 48.6% | 7.4% | 7.4% | 36.6% | $2.34 | 0.0% | 56.2% | 7.1% | 36.7% | 5 | 53 | 11.4 |
| ***E*** | ***DINING FACILITY*** | ***125,177*** | ***0.0%*** | ***42.6%*** | ***25.1%*** | ***7.3%*** | ***25.0%*** | ***$1.50*** | ***0.0%*** | ***66.0%*** | ***31.0%*** | ***3.0%*** | ***4*** | ***39*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 112,397 | 0.0% | 49.6% | 14.4% | 8.1% | 27.9% | $1.30 | 0.0% | 80.1% | 16.4% | 3.5% | 5 | 39 | 6.0 |
| | (L) Skylights | 93,143 | 0.0% | 45.0% | 12.7% | 8.7% | 33.6% | $0.98 | 0.0% | 80.2% | 15.2% | 4.7% | 4 | 33 | 4.5 |
| | (L) Sawtooth Ap | 106,638 | 0.0% | 50.7% | 12.1% | 7.8% | 29.4% | $1.19 | 0.0% | 82.6% | 13.6% | 3.8% | 5 | 34 | 5.3 |
| | (L) Monitor Ap | 112,392 | 0.0% | 50.9% | 13.6% | 7.5% | 27.9% | $1.27 | 0.0% | 81.5% | 14.9% | 3.6% | 5 | 35 | 5.4 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***67,680*** | ***0.0%*** | ***63.9%*** | ***21.8%*** | ***8.2%*** | ***6.0%*** | ***$1.04*** | ***0.0%*** | ***67.7%*** | ***24.7%*** | ***7.7%*** | ***2*** | ***23*** | ***4.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 65,759 | 0.0% | 63.1% | 22.5% | 8.2% | 6.2% | $1.01 | 0.0% | 66.9% | 25.2% | 7.9% | 2 | 23 | 4.1 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 64,421 | 0.0% | 67.4% | 19.0% | 7.3% | 6.3% | $0.96 | 0.0% | 73.7% | 18.0% | 8.3% | 2 | 19 | 3.6 |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 8

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***49,646*** | ***0.0%*** | ***46.4%*** | ***32.0%*** | ***10.7%*** | ***11.0%*** | ***$0.77*** | ***0.0%*** | ***55.7%*** | ***34.7%*** | ***9.6%*** | ***1*** | ***16*** | ***3.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 47,483 | 0.0% | 44.3% | 33.4% | 10.8% | 11.4% | $0.75 | 0.0% | 54.6% | 35.6% | 9.8% | 1 | 16 | 3.4 |
| | (C) Natural Vent | 42,882 | 0.0% | 38.0% | 37.0% | 12.3% | 12.7% | $0.69 | 0.0% | 50.7% | 38.6% | 10.7% | 1 | 16 | 3.4 |
| | (L) Windows | 41,344 | 0.0% | 53.4% | 22.5% | 10.9% | 13.1% | $0.62 | 0.0% | 68.8% | 19.1% | 12.0% | 2 | 13 | 2.5 |
| | (L) Skylights | 36,441 | 0.0% | 49.6% | 25.1% | 10.4% | 14.9% | $0.54 | 0.0% | 64.6% | 21.6% | 13.8% | 1 | 10 | 2.2 |
| | (L) Sawtooth Ap | 35,262 | 0.0% | 49.1% | 25.0% | 10.5% | 15.4% | $0.52 | 0.0% | 64.3% | 21.5% | 14.2% | 1 | 10 | 2.2 |
| | (L) Monitor Ap. | 37,824 | 0.0% | 50.3% | 24.9% | 10.5% | 14.4% | $0.56 | 0.0% | 65.4% | 21.3% | 13.3% | 2 | 10 | 2.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***43,303*** | ***0.0%*** | ***0.0%*** | ***45.8%*** | ***0.2%*** | ***53.9%*** | ***$0.74*** | ***0.0%*** | ***0.1%*** | ***45.8%*** | ***54.1%*** | ***0*** | ***0*** | ***3.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 27,886 | 0.0% | 0.0% | 15.9% | 0.3% | 83.8% | $0.47 | 0.0% | 0.1% | 14.1% | 85.8% | 0 | 0 | 2.5 |
| | (L) Sawtooth Ap | 27,145 | 0.0% | 0.0% | 13.6% | 0.4% | 86.0% | $0.46 | 0.0% | 0.1% | 12.5% | 87.4% | 0 | 0 | 2.5 |
| | (L) Monitor Ap. | 29,750 | 0.0% | 0.0% | 21.2% | 0.3% | 78.5% | $0.49 | 0.0% | 0.1% | 17.8% | 82.1% | 0 | 0 | 2.5 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***16,641*** | ***0.0%*** | ***0.0%*** | ***68.0%*** | ***1.6%*** | ***30.4%*** | ***$0.30*** | ***0.0%*** | ***0.3%*** | ***69.5%*** | ***30.2%*** | ***0*** | ***0*** | ***1.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 13,050 | 0.0% | 0.0% | 59.2% | 2.0% | 38.8% | $0.23 | 0.0% | 0.5% | 60.0% | 39.5% | 0 | 0 | 1.4 |
| | (L) Skylights | 7,849 | 0.0% | 0.0% | 32.2% | 3.3% | 64.5% | $0.13 | 0.0% | 0.8% | 30.1% | 69.2% | 0 | 0 | 0.9 |
| | (L) Sawtooth Ap | 7,863 | 0.0% | 0.0% | 32.3% | 3.3% | 64.4% | $0.13 | 0.0% | 0.8% | 30.1% | 69.1% | 0 | 0 | 0.9 |
| | (L) Monitor Ap. | 8,204 | 0.0% | 0.0% | 35.1% | 3.2% | 61.7% | $0.14 | 0.0% | 0.8% | 32.1% | 67.2% | 0 | 0 | 0.9 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 8

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***J*** | ***MAINT, HI-BAY*** | ***36,296*** | ***0.0%*** | ***0.0%*** | ***67.6%*** | ***0.3%*** | ***32.2%*** | ***$0.62*** | ***0.0%*** | ***0.1%*** | ***67.7%*** | ***32.3%*** | ***0*** | ***0*** | ***3.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 23,414 | 0.0% | 0.0% | 49.7% | 0.4% | 49.9% | $0.39 | 0.0% | 0.1% | 48.4% | 51.5% | 0 | 0 | 2.1 |
| | (L) Skylights | 17,251 | 0.0% | 0.0% | 31.7% | 0.6% | 67.7% | $0.28 | 0.0% | 0.1% | 28.8% | 71.0% | 0 | 0 | 1.6 |
| | (L) Sawtooth Ap | 16,337 | 0.0% | 0.0% | 27.9% | 0.6% | 71.5% | $0.27 | 0.0% | 0.1% | 26.1% | 73.7% | 0 | 0 | 1.6 |
| | (L) Monitor Ap. | 17,538 | 0.0% | 0.0% | 32.9% | 0.6% | 66.6% | $0.29 | 0.0% | 0.1% | 29.7% | 70.2% | 0 | 0 | 1.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***59,854*** | ***0.0%*** | ***42.7%*** | ***33.1%*** | ***4.7%*** | ***19.5%*** | ***$1.05*** | ***0.0%*** | ***48.5%*** | ***32.4%*** | ***19.1%*** | ***2*** | ***21*** | ***5.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 59,518 | 0.0% | 41.9% | 33.3% | 5.2% | 19.6% | $1.04 | 0.0% | 48.3% | 32.5% | 19.2% | 2 | 21 | 5.5 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 55,460 | 0.0% | 50.9% | 23.3% | 4.8% | 21.0% | $0.94 | 0.0% | 56.1% | 22.6% | 21.2% | 3 | 20 | 4.7 |
| | (L) Skylights | 43,510 | 0.0% | 56.2% | 10.2% | 6.9% | 26.8% | $0.77 | 0.0% | 65.6% | 8.5% | 25.9% | 2 | 23 | 4.4 |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***31,590*** | ***0.0%*** | ***0.0%*** | ***62.8%*** | ***0.3%*** | ***36.9%*** | ***$0.54*** | ***0.0%*** | ***0.1%*** | ***62.8%*** | ***37.1%*** | ***0*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 24,576 | 0.0% | 0.0% | 52.1% | 0.4% | 47.5% | $0.41 | 0.0% | 0.1% | 51.4% | 48.5% | 0 | 0 | 2.1 |
| | (L) Skylights | 16,190 | 0.0% | 0.0% | 27.4% | 0.6% | 72.0% | $0.27 | 0.0% | 0.2% | 24.7% | 75.2% | 0 | 0 | 1.5 |
| | (L) Sawtooth Ap | 15,452 | 0.0% | 0.0% | 23.9% | 0.6% | 75.5% | $0.26 | 0.0% | 0.2% | 22.2% | 77.6% | 0 | 0 | 1.5 |
| | (L) Monitor Ap. | 16,423 | 0.0% | 0.0% | 28.4% | 0.6% | 71.0% | $0.27 | 0.0% | 0.1% | 25.4% | 74.4% | 0 | 0 | 1.5 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 8

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***67,126*** | ***0.0%*** | ***63.1%*** | ***21.7%*** | ***7.8%*** | ***7.5%*** | ***$1.19*** | ***0.0%*** | ***71.6%*** | ***20.8%*** | ***7.6%*** | ***5*** | ***40*** | ***6.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***98,010*** | ***0.0%*** | ***59.4%*** | ***29.1%*** | ***6.3%*** | ***5.2%*** | ***$1.72*** | ***0.0%*** | ***66.3%*** | ***28.4%*** | ***5.3%*** | ***5*** | ***46*** | ***8.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 84,153 | 0.0% | 67.2% | 20.4% | 6.2% | 6.1% | $1.44 | 0.0% | 73.1% | 20.6% | 6.4% | 5 | 40 | 7.5 |
| | (L) Skylights | 57,900 | 0.0% | 71.5% | 11.0% | 8.7% | 8.8% | $1.05 | 0.0% | 79.9% | 11.4% | 8.7% | 4 | 38 | 6.5 |
| | (L) Sawtooth Ap | 57,354 | 0.0% | 73.2% | 11.1% | 6.8% | 8.9% | $0.99 | 0.0% | 78.6% | 12.1% | 9.3% | 5 | 29 | 5.6 |
| | (L) Monitor Ap. | 62,719 | 0.0% | 73.7% | 11.6% | 6.6% | 8.1% | $1.07 | 0.0% | 79.3% | 12.1% | 8.6% | 6 | 31 | 5.9 |
| | (L) Atrium | 79,798 | 0.0% | 77.1% | 8.3% | 8.2% | 6.4% | $1.40 | 0.0% | 84.7% | 8.7% | 6.6% | 5 | 50 | 7.7 |
| ***O*** | ***TRAINING >5000*** | ***79,853*** | ***0.0%*** | ***52.1%*** | ***35.9%*** | ***5.6%*** | ***6.4%*** | ***$1.38*** | ***0.0%*** | ***58.1%*** | ***35.2%*** | ***6.6%*** | ***3*** | ***34*** | ***7.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 63,235 | 0.0% | 54.6% | 32.3% | 4.9% | 8.1% | $1.06 | 0.0% | 59.7% | 31.7% | 8.6% | 3 | 24 | 5.4 |
| | (L) Skylights | 49,464 | 0.0% | 68.2% | 13.1% | 8.4% | 10.4% | $0.88 | 0.0% | 76.0% | 13.6% | 10.4% | 3 | 31 | 5.3 |
| | (L) Sawtooth Ap | 52,921 | 0.0% | 74.1% | 9.6% | 6.6% | 9.7% | $0.91 | 0.0% | 78.5% | 11.5% | 10.1% | 4 | 26 | 5.2 |
| | (L) Monitor Ap. | 57,211 | 0.0% | 72.1% | 12.7% | 6.3% | 9.0% | $0.97 | 0.0% | 77.2% | 13.3% | 9.5% | 4 | 27 | 5.3 |
| | (L) Atrium | 58,682 | 0.0% | 67.6% | 16.3% | 7.4% | 8.7% | $1.01 | 0.0% | 75.4% | 15.4% | 9.1% | 3 | 33 | 5.6 |

# CLIMATE REGION 8

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***P*** | ***TRAINING, MULTISTORY*** | ***76,965*** | ***0.0%*** | ***50.7%*** | ***37.3%*** | ***5.4%*** | ***6.7%*** | ***$1.34*** | ***0.0%*** | ***56.4%*** | ***36.8%*** | ***6.8%*** | ***2*** | ***31*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 60,915 | 0.0% | 53.4% | 33.6% | 4.6% | 8.4% | $1.02 | 0.0% | 57.6% | 33.4% | 9.0% | 2 | 21 | 5.2 |
| | (L) Skylights | 60,324 | 0.0% | 59.4% | 26.2% | 5.9% | 8.5% | $1.04 | 0.0% | 65.4% | 25.7% | 8.8% | 2 | 27 | 5.7 |
| | (L) Sawtooth Ap | 57,569 | 0.0% | 62.2% | 23.3% | 5.6% | 8.9% | $0.99 | 0.0% | 66.4% | 24.4% | 9.3% | 3 | 24 | 5.4 |
| | (L) Monitor Ap. | 59,084 | 0.0% | 62.0% | 23.9% | 5.5% | 8.7% | $1.01 | 0.0% | 66.2% | 24.7% | 9.1% | 3 | 25 | 5.4 |
| | (L) Atrium | 63,746 | 0.0% | 64.0% | 21.5% | 6.4% | 8.0% | $1.09 | 0.0% | 70.7% | 20.8% | 8.4% | 2 | 31 | 5.8 |
| ***Q*** | ***TRAINING, GYM*** | ***37,772*** | ***0.0%*** | ***0.0%*** | ***94.2%*** | ***5.8%*** | ***0.0%*** | ***$0.53*** | ***0.0%*** | ***1.2%*** | ***98.8%*** | ***0.0%*** | ***0*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 17,543 | 0.0% | 0.0% | 87.5% | 12.5% | 0.0% | $0.20 | 0.0% | 3.3% | 96.7% | 0.0% | 0 | 0 | 0.6 |
| | (L) Sawtooth Ap | 16,577 | 0.0% | 0.0% | 86.8% | 13.2% | 0.0% | $0.19 | 0.0% | 3.5% | 96.5% | 0.0% | 0 | 0 | 0.6 |
| | (L) Monitor Ap. | 17,843 | 0.0% | 0.0% | 87.7% | 12.3% | 0.0% | $0.20 | 0.0% | 3.3% | 96.7% | 0.0% | 0 | 0 | 0.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***7,094*** | ***0.0%*** | ***0.0%*** | ***99.9%*** | ***0.1%*** | ***0.0%*** | ***$0.12*** | ***0.0%*** | ***0.0%*** | ***100.0%*** | ***0.0%*** | ***0*** | ***0*** | ***0.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 1,592 | 0.0% | 0.0% | 99.5% | 0.5% | 0.0% | $0.02 | 0.0% | 0.1% | 99.9% | 0.0% | 0 | 0 | 0.2 |
| | (L) Sawtooth Ap | 1,327 | 0.0% | 0.0% | 99.3% | 0.7% | 0.0% | $0.02 | 0.0% | 0.2% | 99.8% | 0.0% | 0 | 0 | 0.2 |
| | (L) Monitor Ap. | 1,673 | 0.0% | 0.0% | 99.5% | 0.5% | 0.0% | $0.02 | 0.0% | 0.1% | 99.9% | 0.0% | 0 | 0 | 0.2 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 9

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***A*** | ***ADMIN <5000 SF*** | ***66,236*** | ***23.8%*** | ***16.7%*** | ***43.1%*** | ***8.6%*** | ***7.7%*** | ***$0.80*** | ***13.6%*** | ***26.4%*** | ***51.0%*** | ***9.1%*** | ***24*** | ***38*** | ***7.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 58,332 | 30.4% | 18.3% | 34.3% | 8.2% | 8.8% | $0.67 | 17.4% | 29.0% | 42.7% | 10.9% | 26 | 31 | 6.1 |
| | (L) Skylights | 48,034 | 44.6% | 10.8% | 24.4% | 9.6% | 10.6% | $0.49 | 29.8% | 21.0% | 34.3% | 15.0% | 20 | 29 | 4.7 |
| | (L) Sawtooth Ap | 45,906 | 45.8% | 13.9% | 22.0% | 7.1% | 11.1% | $0.46 | 27.9% | 24.9% | 31.3% | 15.8% | 26 | 21 | 4.4 |
| | (L) Monitor Ap. | 51,131 | 43.6% | 15.6% | 23.9% | 7.0% | 10.0% | $0.53 | 26.1% | 26.8% | 33.2% | 13.9% | 28 | 23 | 4.6 |
| | (L) Atrium | 54,640 | 39.8% | 17.2% | 21.6% | 12.0% | 9.3% | $0.58 | 27.0% | 31.3% | 29.1% | 12.6% | 24 | 41 | 6.0 |
| ***B*** | ***ADMIN >5000 SF*** | ***55,929*** | ***16.8%*** | ***15.6%*** | ***51.3%*** | ***7.1%*** | ***9.2%*** | ***$0.71*** | ***9.0%*** | ***23.1%*** | ***57.5%*** | ***10.3%*** | ***16*** | ***27*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 48,119 | 22.3% | 15.9% | 45.3% | 5.8% | 10.7% | $0.59 | 11.8% | 22.8% | 52.9% | 12.4% | 17 | 17 | 4.2 |
| | (L) Skylights | 39,442 | 36.0% | 11.1% | 30.7% | 9.3% | 13.0% | $0.43 | 22.2% | 20.9% | 39.9% | 16.9% | 14 | 25 | 3.9 |
| | (L) Sawtooth Ap | 37,773 | 41.5% | 17.5% | 19.5% | 8.0% | 13.6% | $0.40 | 24.4% | 30.4% | 26.7% | 18.5% | 21 | 20 | 4.3 |
| | (L) Monitor Ap. | 43,646 | 35.9% | 17.7% | 27.5% | 7.2% | 11.8% | $0.48 | 20.1% | 28.8% | 35.8% | 15.3% | 22 | 21 | 4.3 |
| | (L) Atrium | 41,480 | 30.8% | 15.0% | 32.6% | 9.3% | 12.4% | $0.48 | 18.2% | 25.7% | 40.7% | 15.4% | 16 | 26 | 4.1 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***51,741*** | ***9.1%*** | ***18.4%*** | ***55.4%*** | ***7.2%*** | ***9.9%*** | ***$0.70*** | ***4.7%*** | ***25.9%*** | ***58.9%*** | ***10.5%*** | ***11*** | ***27*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 44,312 | 12.9% | 20.9% | 49.2% | 5.4% | 11.6% | $0.58 | 6.5% | 27.2% | 53.7% | 12.6% | 12 | 17 | 4.2 |
| | (L) Skylights | 40,447 | 15.2% | 18.6% | 45.7% | 7.8% | 12.7% | $0.52 | 8.0% | 27.3% | 50.7% | 14.1% | 11 | 22 | 4.5 |
| | (L) Sawtooth Ap | 38,545 | 17.0% | 21.4% | 41.0% | 7.3% | 13.3% | $0.49 | 8.7% | 30.3% | 46.0% | 14.9% | 13 | 20 | 4.4 |
| | (L) Monitor Ap. | 40,652 | 16.8% | 21.6% | 42.0% | 7.0% | 12.6% | $0.52 | 8.5% | 30.2% | 47.1% | 14.1% | 14 | 20 | 4.5 |
| | (L) Atrium | 40,243 | 16.3% | 20.3% | 41.4% | 9.3% | 12.7% | $0.52 | 8.8% | 30.7% | 46.3% | 14.2% | 12 | 27 | 4.7 |

# CLIMATE REGION 9

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***122,650*** | ***9.8%*** | ***14.6%*** | ***26.6%*** | ***6.7%*** | ***42.3%*** | ***$1.64*** | ***4.8%*** | ***21.6%*** | ***28.5%*** | ***45.1%*** | ***23*** | ***40*** | ***11.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 117,374 | 12.2% | 16.5% | 22.0% | 5.2% | 44.2% | $1.55 | 5.8% | 22.4% | 23.8% | 47.9% | 24 | 30 | 9.5 |
| | (L) Skylights | 104,747 | 17.8% | 11.7% | 13.3% | 7.7% | 49.5% | $1.33 | 9.0% | 20.1% | 15.0% | 55.9% | 21 | 38 | 9.1 |
| | (L) Sawtooth Ap | 101,570 | 18.9% | 14.4% | 8.1% | 7.7% | 51.0% | $1.28 | 9.6% | 23.1% | 9.2% | 58.1% | 28 | 33 | 9.5 |
| | (L) Monitor Ap. | 110,274 | 16.5% | 15.1% | 14.5% | 6.9% | 47.0% | $1.41 | 8.2% | 23.0% | 16.2% | 52.6% | 28 | 34 | 9.6 |
| | (L) Atrium | 106,567 | 15.0% | 13.6% | 14.3% | 8.5% | 48.7% | $1.38 | 7.7% | 22.6% | 15.9% | 53.8% | 24 | 42 | 9.6 |
| ***E*** | ***DINING FACILITY*** | ***106,272*** | ***26.5%*** | ***7.6%*** | ***29.6%*** | ***6.8%*** | ***29.5%*** | ***$0.99*** | ***20.6%*** | ***15.1%*** | ***45.4%*** | ***18.9%*** | ***44*** | ***27*** | ***5.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 99,562 | 32.0% | 8.3% | 20.8% | 7.4% | 31.5% | $0.87 | 25.4% | 18.8% | 34.1% | 21.6% | 46 | 26 | 4.0 |
| | (L) Skylights | 95,837 | 39.1% | 4.4% | 17.3% | 6.5% | 32.7% | $0.76 | 34.0% | 9.9% | 31.3% | 24.8% | 42 | 20 | 2.9 |
| | (L) Sawtooth Ap | 99,204 | 36.6% | 8.0% | 16.9% | 7.0% | 31.6% | $0.82 | 29.5% | 18.6% | 29.1% | 22.8% | 49 | 21 | 3.5 |
| | (L) Monitor Ap. | 103,865 | 35.8% | 8.6% | 18.4% | 7.0% | 30.2% | $0.88 | 27.9% | 19.8% | 31.0% | 21.3% | 51 | 22 | 3.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***31,329*** | ***10.3%*** | ***14.7%*** | ***47.2%*** | ***14.9%*** | ***12.9%*** | ***$0.42*** | ***7.9%*** | ***27.7%*** | ***50.5%*** | ***13.8%*** | ***10*** | ***19*** | ***4.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 30,612 | 14.7% | 17.9% | 41.7% | 12.5% | 13.2% | $0.40 | 9.7% | 29.7% | 46.0% | 14.6% | 11 | 16 | 3.0 |
| | (L) Skylights | 31,834 | 18.5% | 16.3% | 38.7% | 13.8% | 12.7% | $0.40 | 12.6% | 29.0% | 43.9% | 14.4% | 10 | 18 | 3.1 |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 9

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***54,354*** | ***41.4%*** | ***3.4%*** | ***29.2%*** | ***16.0%*** | ***10.0%*** | ***$0.57*** | ***29.9%*** | ***16.3%*** | ***40.0%*** | ***13.7%*** | ***66*** | ***14*** | ***3.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 53,113 | 42.4% | 1.2% | 29.9% | 16.4% | 10.2% | $0.55 | 30.9% | 13.6% | 41.3% | 14.2% | 66 | 14 | 3.3 |
| | (L) Windows | 49,367 | 47.1% | 4.1% | 21.6% | 16.2% | 11.0% | $0.49 | 38.4% | 14.6% | 31.1% | 15.9% | 67 | 11 | 2.0 |
| | (L) Skylights | 51,727 | 50.2% | 2.9% | 20.8% | 15.6% | 10.5% | $0.50 | 41.5% | 12.3% | 30.7% | 15.6% | 64 | 8 | 1.6 |
| | (L) Sawtooth Ap | 47,631 | 50.2% | 2.7% | 20.9% | 14.8% | 11.4% | $0.46 | 42.3% | 9.7% | 31.0% | 16.9% | 71 | 7 | 1.6 |
| | (L) Monitor Ap. | 51,569 | 50.4% | 3.2% | 21.2% | 14.6% | 10.5% | $0.50 | 41.7% | 11.1% | 31.5% | 15.7% | 73 | 8 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***46,260*** | ***3.9%*** | ***0.0%*** | ***42.9%*** | ***2.7%*** | ***50.5%*** | ***$0.65*** | ***2.0%*** | ***2.2%*** | ***44.0%*** | ***51.8%*** | ***12*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 35,526 | 8.0% | 0.0% | 23.0% | 3.3% | 65.7% | $0.48 | 4.2% | 2.3% | 24.2% | 69.3% | 11 | 0 | 2.9 |
| | (L) Sawtooth Ap | 36,456 | 14.3% | 0.0% | 15.4% | 6.2% | 64.1% | $0.47 | 7.4% | 5.0% | 17.0% | 70.6% | 21 | 0 | 2.9 |
| | (L) Monitor Ap. | 39,553 | 10.0% | 0.0% | 26.2% | 4.8% | 59.0% | $0.53 | 4.9% | 4.0% | 28.0% | 63.1% | 18 | 0 | 2.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***25,247*** | ***27.3%*** | ***0.0%*** | ***44.8%*** | ***7.8%*** | ***20.1%*** | ***$0.30*** | ***16.1%*** | ***5.2%*** | ***54.4%*** | ***24.3%*** | ***18*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | 24,687 | 26.0% | 0.0% | 45.8% | 7.7% | 20.5% | $0.29 | 14.9% | 5.5% | 55.1% | 24.6% | 17 | 0 | 1.8 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 22,792 | 31.4% | 0.0% | 37.8% | 8.6% | 22.2% | $0.26 | 19.3% | 5.6% | 47.3% | 27.8% | 18 | 0 | 1.5 |
| | (L) Skylights | 20,525 | 44.9% | 0.0% | 22.6% | 7.8% | 24.7% | $0.21 | 29.2% | 4.3% | 31.8% | 34.7% | 15 | 0 | 1.2 |
| | (L) Sawtooth Ap | 19,529 | 42.5% | 0.0% | 20.6% | 11.0% | 25.9% | $0.20 | 28.4% | 7.6% | 28.3% | 35.7% | 20 | 0 | 1.2 |
| | (L) Monitor Ap. | 21,091 | 42.0% | 0.0% | 23.0% | 11.0% | 24.0% | $0.22 | 27.9% | 7.6% | 31.6% | 32.9% | 21 | 0 | 1.2 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 9

Appendix E

| | | ENERGY USE | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***46,187*** | ***16.4%*** | ***0.0%*** | ***53.1%*** | ***5.2%*** | ***25.3%*** | ***$0.59*** | ***8.8%*** | ***3.5%*** | ***59.4%*** | ***28.3%*** | ***22*** | ***0*** | ***3.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 37,304 | 22.0% | 0.0% | 39.6% | 7.1% | 31.3% | $0.46 | 12.5% | 5.0% | 46.1% | 36.5% | 24 | 0 | 2.5 |
| | (L) Skylights | 33,537 | 28.6% | 0.0% | 30.1% | 6.5% | 34.8% | $0.39 | 17.0% | 3.4% | 36.9% | 42.7% | 20 | 0 | 2.1 |
| | (L) Sawtooth Ap | 32,518 | 32.5% | 0.0% | 21.4% | 10.3% | 35.9% | $0.37 | 19.8% | 7.8% | 27.0% | 45.4% | 30 | 0 | 2.2 |
| | (L) Monitor Ap. | 34,894 | 29.8% | 0.0% | 27.2% | 9.6% | 33.5% | $0.40 | 18.1% | 6.9% | 33.6% | 41.4% | 30 | 0 | 2.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***45,732*** | ***14.5%*** | ***11.6%*** | ***43.4%*** | ***5.0%*** | ***25.5%*** | ***$0.59*** | ***7.2%*** | ***16.8%*** | ***47.8%*** | ***28.1%*** | ***12*** | ***16*** | ***4.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 41,287 | 18.3% | 12.9% | 35.4% | 5.1% | 28.3% | $0.52 | 8.9% | 18.9% | 40.1% | 32.0% | 13 | 15 | 3.9 |
| | (L) Skylights | 35,190 | 27.2% | 9.3% | 23.2% | 7.1% | 33.1% | $0.42 | 15.5% | 16.2% | 28.1% | 40.2% | 11 | 18 | 3.4 |
| | (L) Sawtooth Ap | 37,087 | 30.7% | 16.2% | 15.2% | 6.5% | 31.5% | $0.43 | 16.3% | 25.6% | 18.9% | 39.2% | 17 | 17 | 3.6 |
| | (L) Monitor Ap. | 39,101 | 28.8% | 15.6% | 19.6% | 6.1% | 29.8% | $0.46 | 15.1% | 24.2% | 24.1% | 36.6% | 17 | 17 | 3.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***33,658*** | ***3.5%*** | ***0.0%*** | ***58.9%*** | ***2.9%*** | ***34.7%*** | ***$0.47*** | ***1.8%*** | ***2.4%*** | ***60.3%*** | ***35.5%*** | ***9*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 28,879 | 5.3% | 0.0% | 50.5% | 3.8% | 40.4% | $0.40 | 2.7% | 3.2% | 52.3% | 41.8% | 10 | 0 | 2.3 |
| | (L) Skylights | 23,039 | 9.9% | 0.0% | 35.4% | 4.1% | 50.6% | $0.31 | 5.6% | 2.6% | 37.8% | 54.1% | 9 | 0 | 1.9 |
| | (L) Sawtooth Ap | 21,668 | 13.6% | 0.0% | 25.9% | 6.6% | 53.8% | $0.28 | 7.2% | 5.4% | 28.4% | 59.0% | 13 | 0 | 1.9 |
| | (L) Monitor Ap. | 23,702 | 12.4% | 0.0% | 32.3% | 6.0% | 49.2% | $0.31 | 6.6% | 4.8% | 35.1% | 53.5% | 13 | 0 | 1.9 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 9

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool (Btu/hr/sf) | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***48,124*** | ***35.1%*** | ***15.9%*** | ***30.2%*** | ***8.4%*** | ***10.4%*** | ***$0.53*** | ***20.9%*** | ***26.6%*** | ***39.1%*** | ***13.4%*** | ***25*** | ***27*** | ***5.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***66,236*** | ***23.8%*** | ***16.7%*** | ***43.1%*** | ***8.6%*** | ***7.7%*** | ***$0.80*** | ***13.6%*** | ***26.4%*** | ***51.0%*** | ***9.1%*** | ***24*** | ***38*** | ***7.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 58,332 | 30.4% | 18.3% | 34.3% | 8.2% | 8.8% | $0.67 | 17.4% | 29.0% | 42.7% | 10.9% | 26 | 31 | 6.1 |
| | (L) Skylights | 48,034 | 44.6% | 10.8% | 24.4% | 9.6% | 10.6% | $0.49 | 29.8% | 21.0% | 34.3% | 15.0% | 20 | 29 | 4.7 |
| | (L) Sawtooth Ap | 45,906 | 45.8% | 13.9% | 22.0% | 7.1% | 11.1% | $0.46 | 27.9% | 24.9% | 31.3% | 15.8% | 26 | 21 | 4.4 |
| | (L) Monitor Ap. | 51,131 | 43.6% | 15.6% | 23.9% | 7.0% | 10.0% | $0.53 | 26.1% | 26.8% | 33.2% | 13.9% | 28 | 23 | 4.6 |
| | (L) Atrium | 54,640 | 39.8% | 17.2% | 21.6% | 12.0% | 9.3% | $0.58 | 27.0% | 31.3% | 29.1% | 12.6% | 24 | 41 | 6.0 |
| ***O*** | ***TRAINING >5000*** | ***55,929*** | ***16.8%*** | ***15.6%*** | ***51.3%*** | ***7.1%*** | ***9.2%*** | ***$0.71*** | ***9.0%*** | ***23.1%*** | ***57.5%*** | ***10.3%*** | ***16*** | ***27*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 48,119 | 22.3% | 15.9% | 45.3% | 5.8% | 10.7% | $0.59 | 11.8% | 22.8% | 52.9% | 12.4% | 17 | 17 | 4.2 |
| | (L) Skylights | 39,442 | 36.0% | 11.1% | 30.7% | 9.3% | 13.0% | $0.43 | 22.2% | 20.9% | 39.9% | 16.9% | 14 | 25 | 3.9 |
| | (L) Sawtooth Ap | 37,773 | 41.5% | 17.5% | 19.5% | 8.0% | 13.6% | $0.40 | 24.4% | 30.4% | 26.7% | 18.5% | 21 | 20 | 4.3 |
| | (L) Monitor Ap. | 43,646 | 35.9% | 17.7% | 27.5% | 7.2% | 11.8% | $0.48 | 20.1% | 28.8% | 35.8% | 15.3% | 22 | 21 | 4.3 |
| | (L) Atrium | 41,480 | 30.8% | 15.0% | 32.6% | 9.3% | 12.4% | $0.48 | 18.2% | 25.7% | 40.7% | 15.4% | 16 | 26 | 4.1 |

# CLIMATE REGION 9

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***51,741*** | ***9.1%*** | ***18.4%*** | ***55.4%*** | ***7.2%*** | ***9.9%*** | ***$0.70*** | ***4.7%*** | ***25.9%*** | ***58.9%*** | ***10.5%*** | ***11*** | ***27*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 44,312 | 12.9% | 20.9% | 49.2% | 5.4% | 11.6% | $0.58 | 6.5% | 27.2% | 53.7% | 12.6% | 12 | 17 | 4.2 |
| | (L) Skylights | 40,447 | 15.2% | 18.6% | 45.7% | 7.8% | 12.7% | $0.52 | 8.0% | 27.3% | 50.7% | 14.1% | 11 | 22 | 4.5 |
| | (L) Sawtooth Ap | 38,545 | 17.0% | 21.4% | 41.0% | 7.3% | 13.3% | $0.49 | 8.7% | 30.3% | 46.0% | 14.9% | 13 | 20 | 4.4 |
| | (L) Monitor Ap. | 40,652 | 16.8% | 21.6% | 42.0% | 7.0% | 12.6% | $0.52 | 8.5% | 30.2% | 47.1% | 14.1% | 14 | 20 | 4.5 |
| | (L) Atrium | 40,243 | 16.3% | 20.3% | 41.4% | 9.3% | 12.7% | $0.52 | 8.8% | 30.7% | 46.3% | 14.2% | 12 | 27 | 4.7 |
| ***Q*** | ***TRAINING, GYM*** | ***50,346*** | ***20.6%*** | ***0.0%*** | ***70.7%*** | ***8.7%*** | ***0.0%*** | ***$0.62*** | ***12.5%*** | ***6.0%*** | ***81.5%*** | ***0.0%*** | ***30*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 41,582 | 40.9% | 0.0% | 49.1% | 10.0% | 0.0% | $0.44 | 27.2% | 6.1% | 66.6% | 0.0% | 28 | 0 | 1.0 |
| | (L) Sawtooth Ap | 39,042 | 42.1% | 0.0% | 43.5% | 14.5% | 0.0% | $0.41 | 29.0% | 11.4% | 59.7% | 0.0% | 38 | 0 | 1.1 |
| | (L) Monitor Ap. | 42,483 | 40.0% | 0.0% | 46.3% | 13.8% | 0.0% | $0.45 | 27.0% | 10.7% | 62.3% | 0.0% | 39 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***16,645*** | ***50.7%*** | ***0.0%*** | ***42.6%*** | ***6.7%*** | ***0.0%*** | ***$0.16*** | ***34.3%*** | ***2.4%*** | ***63.3%*** | ***0.0%*** | ***10*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 14,926 | 45.4% | 0.0% | 47.5% | 7.1% | 0.0% | $0.15 | 28.6% | 4.3% | 67.1% | 0.0% | 10 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 14,662 | 44.3% | 0.0% | 48.3% | 7.3% | 0.0% | $0.15 | 27.8% | 4.6% | 67.7% | 0.0% | 10 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 14,389 | 72.0% | 0.0% | 20.3% | 7.8% | 0.0% | $0.11 | 58.9% | 3.3% | 37.8% | 0.0% | 10 | 0 | 0.4 |
| | (L) Sawtooth Ap | 11,933 | 70.0% | 0.0% | 16.8% | 13.1% | 0.0% | $0.09 | 58.9% | 10.4% | 30.7% | 0.0% | 14 | 0 | 0.4 |
| | (L) Monitor Ap. | 12,944 | 66.7% | 0.0% | 21.2% | 12.1% | 0.0% | $0.11 | 53.5% | 9.3% | 37.2% | 0.0% | 14 | 0 | 0.4 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 10

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***A*** | ***ADMIN <5000 SF*** | ***70,702*** | ***28.7%*** | ***14.5%*** | ***40.4%*** | ***9.1%*** | ***7.2%*** | ***$1.12*** | ***18.2%*** | ***24.1%*** | ***48.9%*** | ***8.8%*** | ***32*** | ***41*** | ***7.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 69,460 | 29.3% | 13.0% | 41.1% | 9.3% | 7.4% | $1.09 | 18.6% | 22.4% | 50.0% | 8.9% | 32 | 41 | 7.9 |
| | (L) Windows | 63,418 | 35.9% | 16.2% | 31.3% | 8.6% | 8.1% | $0.95 | 23.1% | 26.7% | 39.9% | 10.3% | 35 | 35 | 6.3 |
| | (L) Skylights | 54,903 | 49.5% | 10.1% | 21.5% | 9.6% | 9.3% | $0.74 | 36.0% | 20.0% | 30.7% | 13.3% | 26 | 33 | 4.6 |
| | (L) Sawtooth Ap | 53,241 | 51.1% | 11.6% | 19.3% | 8.4% | 9.6% | $0.70 | 35.9% | 22.3% | 27.9% | 13.9% | 35 | 24 | 4.6 |
| | (L) Monitor Ap. | 57,906 | 48.9% | 13.3% | 20.4% | 8.5% | 8.8% | $0.78 | 33.9% | 24.5% | 29.1% | 12.6% | 37 | 26 | 4.8 |
| | (L) Atrium | 62,320 | 45.1% | 16.1% | 18.8% | 11.8% | 8.2% | $0.87 | 33.2% | 29.6% | 25.9% | 11.3% | 32 | 45 | 6.3 |
| ***B*** | ***ADMIN >5000 SF*** | ***58,587*** | ***21.1%*** | ***13.6%*** | ***49.0%*** | ***7.6%*** | ***8.8%*** | ***$0.98*** | ***12.5%*** | ***21.3%*** | ***56.1%*** | ***10.0%*** | ***22*** | ***30*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 58,030 | 21.3% | 12.7% | 49.4% | 7.7% | 8.8% | $0.97 | 12.7% | 20.4% | 56.8% | 10.1% | 22 | 30 | 6.4 |
| | (L) Windows | 52,120 | 27.6% | 14.5% | 41.7% | 6.3% | 9.8% | $0.83 | 16.3% | 21.8% | 50.1% | 11.8% | 23 | 20 | 4.4 |
| | (L) Skylights | 44,548 | 41.0% | 10.5% | 27.7% | 9.3% | 11.5% | $0.64 | 27.6% | 20.2% | 36.9% | 15.3% | 19 | 27 | 4.1 |
| | (L) Sawtooth Ap | 42,892 | 47.5% | 15.0% | 16.6% | 8.9% | 12.0% | $0.58 | 32.3% | 27.6% | 23.3% | 16.8% | 28 | 22 | 4.5 |
| | (L) Monitor Ap. | 48,428 | 41.4% | 15.5% | 24.2% | 8.3% | 10.6% | $0.69 | 26.7% | 26.8% | 32.3% | 14.1% | 30 | 23 | 4.4 |
| | (L) Atrium | 46,102 | 36.4% | 13.8% | 29.3% | 9.4% | 11.1% | $0.69 | 23.7% | 24.4% | 37.6% | 14.3% | 22 | 29 | 4.2 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***52,813*** | ***11.7%*** | ***16.6%*** | ***54.3%*** | ***7.6%*** | ***9.7%*** | ***$0.94*** | ***6.5%*** | ***24.6%*** | ***58.5%*** | ***10.5%*** | ***15*** | ***29*** | ***6.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 52,183 | 11.9% | 15.6% | 55.0% | 7.7% | 9.8% | $0.93 | 6.6% | 23.6% | 59.2% | 10.6% | 15 | 29 | 6.4 |
| | (L) Windows | 46,828 | 16.1% | 20.8% | 46.4% | 5.7% | 11.0% | $0.81 | 9.0% | 27.4% | 51.5% | 12.1% | 16 | 19 | 4.3 |
| | (L) Skylights | 42,554 | 19.2% | 17.2% | 43.4% | 8.1% | 12.1% | $0.72 | 11.1% | 26.1% | 49.1% | 13.6% | 15 | 24 | 4.7 |
| | (L) Sawtooth Ap | 40,481 | 21.3% | 19.5% | 38.9% | 7.7% | 12.7% | $0.68 | 12.1% | 28.7% | 44.6% | 14.5% | 18 | 22 | 4.5 |
| | (L) Monitor Ap. | 42,469 | 20.8% | 19.7% | 40.0% | 7.5% | 12.1% | $0.71 | 11.8% | 28.6% | 45.8% | 13.8% | 18 | 22 | 4.6 |
| | (L) Atrium | 42,708 | 20.4% | 19.1% | 39.0% | 9.5% | 12.0% | $0.72 | 12.2% | 29.7% | 44.5% | 13.7% | 16 | 28 | 4.8 |

# CLIMATE REGION 10

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***125,586*** | ***12.7%*** | ***12.8%*** | ***26.0%*** | ***7.2%*** | ***41.3%*** | ***$2.22*** | ***6.9%*** | ***20.2%*** | ***28.2%*** | ***44.7%*** | ***30*** | ***44*** | ***11.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 125,331 | 12.8% | 12.5% | 26.1% | 7.2% | 41.4% | $2.21 | 7.0% | 19.9% | 28.3% | 44.9% | 30 | 44 | 11.6 |
| | (L) Windows | 121,128 | 15.7% | 14.4% | 21.2% | 5.8% | 42.8% | $2.10 | 8.3% | 20.9% | 23.5% | 47.3% | 31 | 34 | 9.8 |
| | (L) Skylights | 110,556 | 21.6% | 10.6% | 12.8% | 8.1% | 46.9% | $1.84 | 12.0% | 19.3% | 14.7% | 54.0% | 27 | 42 | 9.1 |
| | (L) Sawtooth Ap | 108,396 | 23.8% | 12.7% | 7.4% | 8.3% | 47.8% | $1.78 | 13.5% | 22.0% | 8.6% | 55.9% | 37 | 37 | 9.5 |
| | (L) Monitor Ap. | 116,004 | 20.7% | 13.3% | 13.6% | 7.7% | 44.7% | $1.94 | 11.5% | 21.8% | 15.6% | 51.1% | 38 | 39 | 9.8 |
| | (L) Atrium | 112,293 | 19.0% | 12.4% | 13.5% | 8.9% | 46.2% | $1.90 | 10.7% | 21.8% | 15.3% | 52.2% | 31 | 46 | 9.7 |
| ***E*** | ***DINING FACILITY*** | ***117,480*** | ***32.7%*** | ***5.7%*** | ***26.8%*** | ***8.1%*** | ***26.7%*** | ***$1.48*** | ***26.2%*** | ***14.5%*** | ***40.9%*** | ***18.4%*** | ***61*** | ***32*** | ***5.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 116,347 | 33.0% | 4.8% | 27.1% | 8.2% | 26.9% | $1.45 | 26.6% | 13.2% | 41.5% | 18.7% | 61 | 32 | 5.4 |
| | (L) Windows | 111,703 | 38.7% | 6.4% | 18.2% | 8.7% | 28.0% | $1.31 | 32.6% | 16.9% | 29.7% | 20.8% | 64 | 31 | 4.4 |
| | (L) Skylights | 108,911 | 44.9% | 3.5% | 15.1% | 7.7% | 28.8% | $1.19 | 39.8% | 10.9% | 26.4% | 22.9% | 59 | 25 | 3.1 |
| | (L) Sawtooth Ap | 113,558 | 43.0% | 6.1% | 14.8% | 8.5% | 27.6% | $1.28 | 37.0% | 16.6% | 25.1% | 21.3% | 67 | 27 | 3.9 |
| | (L) Monitor Ap. | 117,894 | 41.9% | 6.8% | 16.1% | 8.6% | 26.6% | $1.36 | 35.3% | 17.7% | 26.9% | 20.1% | 70 | 28 | 4.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***33,862*** | ***16.5%*** | ***13.1%*** | ***43.6%*** | ***14.9%*** | ***12.0%*** | ***$0.58*** | ***12.1%*** | ***26.1%*** | ***48.5%*** | ***13.3%*** | ***14*** | ***21*** | ***3.6*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 33,020 | 16.9% | 10.9% | 44.7% | 15.2% | 12.3% | $0.57 | 12.5% | 24.0% | 49.8% | 13.7% | 14 | 21 | 3.5 |
| | (L) Windows | 32,855 | 20.8% | 15.4% | 38.7% | 12.7% | 12.3% | $0.55 | 13.9% | 27.7% | 44.3% | 14.1% | 15 | 17 | 2.6 |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 10

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***G*** | ***FIRE STATION*** | ***62,697*** | ***43.2%*** | ***4.2%*** | ***25.3%*** | ***18.6%*** | ***8.7%*** | ***$0.88*** | ***38.3%*** | ***15.2%*** | ***34.6%*** | ***11.9%*** | ***94*** | ***15*** | ***3.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 60,835 | 44.5% | 1.3% | 26.1% | 19.1% | 8.9% | $0.84 | 39.9% | 11.6% | 36.1% | 12.4% | 94 | 15 | 2.9 |
| | (L) Windows | 57,885 | 48.8% | 4.6% | 18.3% | 18.9% | 9.4% | $0.77 | 45.6% | 14.7% | 26.2% | 13.5% | 96 | 11 | 2.1 |
| | (L) Skylights | 59,949 | 51.1% | 3.2% | 17.9% | 18.7% | 9.1% | $0.79 | 50.2% | 10.7% | 26.0% | 13.2% | 91 | 9 | 1.8 |
| | (L) Sawtooth Ap | 58,211 | 53.1% | 2.9% | 17.0% | 17.6% | 9.3% | $0.76 | 51.2% | 9.9% | 25.1% | 13.8% | 101 | 8 | 1.8 |
| | (L) Monitor Ap. | 61,676 | 52.8% | 3.5% | 17.6% | 17.3% | 8.8% | $0.80 | 49.1% | 12.1% | 25.9% | 13.0% | 104 | 9 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***48,226*** | ***6.6%*** | ***0.0%*** | ***41.2%*** | ***3.8%*** | ***48.4%*** | ***$0.89*** | ***3.6%*** | ***3.1%*** | ***42.9%*** | ***50.5%*** | ***17*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 38,238 | 13.0% | 0.0% | 21.4% | 4.5% | 61.1% | $0.67 | 7.3% | 3.1% | 23.3% | 66.3% | 16 | 0 | 3.0 |
| | (L) Sawtooth Ap | 40,298 | 19.9% | 0.0% | 13.9% | 8.2% | 58.0% | $0.68 | 11.9% | 6.4% | 15.8% | 65.9% | 30 | 0 | 3.1 |
| | (L) Monitor Ap. | 43,056 | 14.9% | 0.0% | 24.4% | 6.4% | 54.2% | $0.75 | 8.2% | 5.3% | 26.9% | 59.6% | 25 | 0 | 3.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***29,526*** | ***34.8%*** | ***0.0%*** | ***38.3%*** | ***9.8%*** | ***17.2%*** | ***$0.45*** | ***22.9%*** | ***6.7%*** | ***48.6%*** | ***21.7%*** | ***26*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 27,112 | 39.1% | 0.0% | 31.6% | 10.6% | 18.7% | $0.40 | 26.9% | 7.2% | 41.4% | 24.5% | 26 | 0 | 1.6 |
| | (L) Skylights | 25,856 | 53.2% | 0.0% | 18.1% | 9.1% | 19.6% | $0.34 | 39.7% | 4.6% | 26.8% | 28.9% | 21 | 0 | 1.3 |
| | (L) Sawtooth Ap | 24,634 | 50.1% | 0.0% | 16.5% | 12.8% | 20.6% | $0.33 | 38.0% | 8.8% | 23.8% | 29.5% | 28 | 0 | 1.3 |
| | (L) Monitor Ap. | 26,243 | 49.8% | 0.0% | 17.9% | 13.1% | 19.3% | $0.35 | 37.3% | 9.5% | 25.6% | 27.6% | 30 | 0 | 1.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 10

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***J*** | ***MAINT, HI-BAY*** | ***51,054*** | ***22.1%*** | ***0.0%*** | ***48.0%*** | ***7.0%*** | ***22.9%*** | ***$0.85*** | ***13.6%*** | ***4.5%*** | ***55.5%*** | ***26.4%*** | ***31*** | ***0*** | ***3.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 42,519 | 29.0% | 0.0% | 34.3% | 9.3% | 27.5% | $0.67 | 18.7% | 6.3% | 41.6% | 33.3% | 35 | 0 | 2.6 |
| | (L) Skylights | 39,706 | 36.9% | 0.0% | 25.5% | 8.2% | 29.4% | $0.59 | 25.2% | 4.1% | 32.9% | 37.9% | 28 | 0 | 2.3 |
| | (L) Sawtooth Ap | 38,960 | 39.5% | 0.0% | 17.8% | 12.8% | 30.0% | $0.57 | 28.1% | 9.1% | 23.4% | 39.4% | 43 | 0 | 2.4 |
| | (L) Monitor Ap. | 41,104 | 37.0% | 0.0% | 22.5% | 12.1% | 28.4% | $0.61 | 25.8% | 8.6% | 29.0% | 36.6% | 43 | 0 | 2.4 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***47,659*** | ***18.6%*** | ***9.9%*** | ***41.6%*** | ***5.5%*** | ***24.5%*** | ***$0.81*** | ***10.1%*** | ***15.5%*** | ***46.9%*** | ***27.6%*** | ***15*** | ***18*** | ***4.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 47,267 | 18.7% | 9.1% | 41.9% | 5.5% | 24.7% | $0.80 | 10.2% | 14.7% | 47.3% | 27.8% | 15 | 18 | 5.0 |
| | (L) Windows | 43,749 | 23.1% | 11.3% | 33.4% | 5.6% | 26.7% | $0.72 | 12.6% | 17.6% | 38.8% | 31.0% | 17 | 17 | 4.1 |
| | (L) Skylights | 38,630 | 32.6% | 8.6% | 21.2% | 7.4% | 30.2% | $0.59 | 20.3% | 15.6% | 26.4% | 37.6% | 15 | 20 | 3.2 |
| | (L) Sawtooth Ap | 40,622 | 36.2% | 14.4% | 13.8% | 6.9% | 28.7% | $0.61 | 22.0% | 23.6% | 17.7% | 36.8% | 23 | 19 | 3.8 |
| | (L) Monitor Ap. | 42,355 | 34.1% | 14.2% | 17.6% | 6.5% | 27.5% | $0.64 | 20.2% | 22.8% | 22.2% | 34.7% | 23 | 19 | 3.6 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***35,138*** | ***6.3%*** | ***0.0%*** | ***56.4%*** | ***4.0%*** | ***33.2%*** | ***$0.65*** | ***3.6%*** | ***3.2%*** | ***58.7%*** | ***34.5%*** | ***13*** | ***0*** | ***2.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 30,595 | 9.0% | 0.0% | 47.6% | 5.2% | 38.1% | $0.55 | 5.2% | 4.1% | 50.4% | 40.3% | 15 | 0 | 2.4 |
| | (L) Skylights | 25,183 | 15.7% | 0.0% | 32.5% | 5.4% | 46.3% | $0.44 | 9.6% | 3.3% | 36.0% | 51.2% | 13 | 0 | 2.0 |
| | (L) Sawtooth Ap | 24,276 | 20.3% | 0.0% | 23.1% | 8.5% | 48.0% | $0.41 | 12.6% | 6.2% | 26.3% | 54.8% | 19 | 0 | 2.0 |
| | (L) Monitor Ap. | 26,046 | 18.6% | 0.0% | 28.7% | 8.0% | 44.8% | $0.44 | 11.4% | 5.8% | 32.3% | 50.5% | 19 | 0 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 10

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***M*** | ***AUDITORIUM*** | ***52,313*** | ***41.0%*** | ***12.4%*** | ***27.8%*** | ***9.3%*** | ***9.6%*** | ***$0.75*** | ***27.5%*** | ***22.7%*** | ***37.0%*** | ***12.7%*** | ***33*** | ***32*** | ***5.4*** |
| | (H) Direct Gain + St<br>(H) Indirect Gain<br>(H) Direct Gain<br>(H) Sunspace<br>(C) Night Mech Vent<br>(C) Natural Vent<br>(L) Windows<br>(L) Skylights<br>(L) Sawtooth Ap<br>(L) Monitor Ap.<br>(L) Atrium | 51,491 | 41.7% | 11.0% | 28.2% | 9.4% | 9.7% | $0.74 | 28.1% | 21.1% | 37.8% | 13.0% | 33 | 32 | 5.4 |
| ***N*** | ***TRAINING <5000 SF*** | ***70,702*** | ***28.7%*** | ***14.5%*** | ***40.4%*** | ***9.1%*** | ***7.2%*** | ***$1.12*** | ***18.2%*** | ***24.1%*** | ***48.9%*** | ***8.8%*** | ***32*** | ***41*** | ***7.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 69,460 | 29.3% | 13.0% | 41.1% | 9.3% | 7.4% | $1.09 | 18.6% | 22.4% | 50.0% | 8.9% | 32 | 41 | 7.9 |
| | (L) Windows | 63,418 | 35.9% | 16.2% | 31.3% | 8.6% | 8.1% | $0.95 | 23.1% | 26.7% | 39.9% | 10.3% | 35 | 35 | 6.3 |
| | (L) Skylights | 54,903 | 49.5% | 10.1% | 21.5% | 9.6% | 9.3% | $0.74 | 36.0% | 20.0% | 30.7% | 13.3% | 26 | 33 | 4.6 |
| | (L) Sawtooth Ap | 53,241 | 51.1% | 11.6% | 19.3% | 8.4% | 9.6% | $0.70 | 35.9% | 22.3% | 27.9% | 13.9% | 35 | 24 | 4.6 |
| | (L) Monitor Ap. | 57,906 | 48.9% | 13.3% | 20.4% | 8.5% | 8.8% | $0.78 | 33.9% | 24.5% | 29.1% | 12.6% | 37 | 26 | 4.8 |
| | (L) Atrium | 62,320 | 45.1% | 16.1% | 18.8% | 11.8% | 8.2% | $0.87 | 33.2% | 29.6% | 25.9% | 11.3% | 32 | 45 | 6.3 |
| ***O*** | ***TRAINING >5000*** | ***58,587*** | ***21.1%*** | ***13.6%*** | ***49.0%*** | ***7.6%*** | ***8.8%*** | ***$0.98*** | ***12.5%*** | ***21.3%*** | ***56.1%*** | ***10.0%*** | ***22*** | ***30*** | ***6.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 58,030 | 21.3% | 12.7% | 49.4% | 7.7% | 8.8% | $0.97 | 12.7% | 20.4% | 56.8% | 10.1% | 22 | 30 | 6.4 |
| | (L) Windows | 52,120 | 27.6% | 14.5% | 41.7% | 6.3% | 9.8% | $0.83 | 16.3% | 21.8% | 50.1% | 11.8% | 23 | 20 | 4.4 |
| | (L) Skylights | 44,548 | 41.0% | 10.5% | 27.7% | 9.3% | 11.5% | $0.64 | 27.6% | 20.2% | 36.9% | 15.3% | 19 | 27 | 4.1 |
| | (L) Sawtooth Ap | 42,892 | 47.5% | 15.0% | 16.6% | 8.9% | 12.0% | $0.58 | 32.3% | 27.6% | 23.3% | 16.8% | 28 | 22 | 4.5 |
| | (L) Monitor Ap. | 48,428 | 41.4% | 15.5% | 24.2% | 8.3% | 10.6% | $0.69 | 26.7% | 26.8% | 32.3% | 14.1% | 30 | 23 | 4.4 |
| | (L) Atrium | 46,102 | 36.4% | 13.8% | 29.3% | 9.4% | 11.1% | $0.69 | 23.7% | 24.4% | 37.6% | 14.3% | 22 | 29 | |

# CLIMATE REGION 10

Appendix E

| | | ENERGY USE | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***52,813*** | ***11.7%*** | ***16.6%*** | ***54.3%*** | ***7.6%*** | ***9.7%*** | ***$0.94*** | ***6.5%*** | ***24.6%*** | ***58.5%*** | ***10.5%*** | ***15*** | ***29*** | ***6.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 52,183 | 11.9% | 15.6% | 55.0% | 7.7% | 9.8% | $0.93 | 6.6% | 23.6% | 59.2% | 10.6% | 15 | 29 | 6.4 |
| | (L) Windows | 46,828 | 16.1% | 20.8% | 46.4% | 5.7% | 11.0% | $0.81 | 9.0% | 27.4% | 51.5% | 12.1% | 16 | 19 | 4.3 |
| | (L) Skylights | 42,554 | 19.2% | 17.2% | 43.4% | 8.1% | 12.1% | $0.72 | 11.1% | 26.1% | 49.1% | 13.6% | 15 | 24 | 4.7 |
| | (L) Sawtooth Ap | 40,481 | 21.3% | 19.5% | 38.9% | 7.7% | 12.7% | $0.68 | 12.1% | 28.7% | 44.6% | 14.5% | 18 | 22 | 4.5 |
| | (L) Monitor Ap. | 42,469 | 20.8% | 19.7% | 40.0% | 7.5% | 12.1% | $0.71 | 11.8% | 28.6% | 45.8% | 13.8% | 18 | 22 | 4.6 |
| | (L) Atrium | 42,708 | 20.4% | 19.1% | 39.0% | 9.5% | 12.0% | $0.72 | 12.2% | 29.7% | 44.5% | 13.7% | 16 | 28 | 4.8 |
| ***Q*** | ***TRAINING, GYM*** | ***58,423*** | ***28.3%*** | ***0.0%*** | ***60.9%*** | ***10.8%*** | ***0.0%*** | ***$0.93*** | ***18.8%*** | ***7.7%*** | ***73.5%*** | ***0.0%*** | ***42*** | ***0*** | ***2.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 52,400 | 49.8% | 0.0% | 38.7% | 11.5% | 0.0% | $0.70 | 37.0% | 7.6% | 55.5% | 0.0% | 40 | 0 | 1.2 |
| | (L) Sawtooth Ap | 49,662 | 49.6% | 0.0% | 34.0% | 16.4% | 0.0% | $0.67 | 37.9% | 13.5% | 48.6% | 0.0% | 55 | 0 | 1.3 |
| | (L) Monitor Ap. | 53,045 | 47.5% | 0.0% | 36.5% | 16.0% | 0.0% | $0.72 | 35.8% | 13.0% | 51.3% | 0.0% | 57 | 0 | 1.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***20,409*** | ***57.3%*** | ***0.0%*** | ***34.7%*** | ***8.0%*** | ***0.0%*** | ***$0.25*** | ***43.6%*** | ***3.1%*** | ***53.2%*** | ***0.0%*** | ***15*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 18,940 | 54.5% | 0.0% | 37.4% | 8.1% | 0.0% | $0.24 | 39.3% | 4.8% | 55.9% | 0.0% | 14 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 18,844 | 54.1% | 0.0% | 37.6% | 8.3% | 0.0% | $0.24 | 39.1% | 4.9% | 56.0% | 0.0% | 14 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 18,625 | 75.5% | 0.0% | 15.7% | 8.8% | 0.0% | $0.19 | 67.0% | 4.0% | 29.0% | 0.0% | 15 | 0 | 0.4 |
| | (L) Sawtooth Ap | 16,876 | 74.5% | 0.0% | 11.9% | 13.6% | 0.0% | $0.18 | 69.0% | 9.4% | 21.7% | 0.0% | 21 | 0 | 0.5 |
| | (L) Monitor Ap. | 17,535 | 71.7% | 0.0% | 15.2% | 13.1% | 0.0% | $0.19 | 64.3% | 8.7% | 26.9% | 0.0% | 21 | 0 | 0.5 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 11

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***A*** | ***ADMIN <5000 SF*** | ***80,212*** | ***11.3%*** | ***38.8%*** | ***35.6%*** | ***8.0%*** | ***6.4%*** | ***$1.37*** | ***5.7%*** | ***49.0%*** | ***38.5%*** | ***6.9%*** | ***22*** | ***46*** | ***8.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 80,248 | 11.9% | 37.5% | 35.6% | 8.7% | 6.4% | $1.36 | 5.9% | 48.5% | 38.7% | 6.9% | 22 | 46 | 8.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 69,130 | 14.5% | 43.1% | 27.1% | 8.0% | 7.4% | $1.15 | 7.1% | 54.7% | 30.0% | 8.2% | 23 | 39 | 7.2 |
| | (L) Skylights | 51,378 | 22.5% | 42.4% | 14.8% | 10.4% | 9.9% | $0.80 | 12.7% | 58.2% | 17.4% | 11.7% | 18 | 37 | 6.2 |
| | (L) Sawtooth Ap | 50,019 | 23.7% | 41.3% | 16.6% | 8.1% | 10.2% | $0.78 | 11.7% | 56.3% | 19.8% | 12.1% | 24 | 29 | 5.5 |
| | (L) Monitor Ap. | 55,644 | 22.7% | 42.0% | 18.3% | 7.9% | 9.2% | $0.87 | 11.2% | 56.4% | 21.5% | 10.8% | 25 | 31 | 5.7 |
| | (L) Atrium | 65,025 | 18.3% | 49.9% | 13.1% | 10.9% | 7.9% | $1.05 | 10.0% | 66.1% | 14.9% | 9.0% | 22 | 49 | 7.8 |
| ***B*** | ***ADMIN >5000 SF*** | ***66,669*** | ***7.8%*** | ***34.7%*** | ***43.0%*** | ***6.9%*** | ***7.7%*** | ***$1.16*** | ***3.8%*** | ***42.7%*** | ***45.4%*** | ***8.1%*** | ***14*** | ***33*** | ***7.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 66,340 | 8.4% | 33.1% | 43.2% | 7.5% | 7.7% | $1.15 | 4.1% | 41.9% | 45.8% | 8.2% | 14 | 33 | 7.2 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 55,026 | 10.7% | 35.8% | 38.4% | 5.9% | 9.3% | $0.94 | 5.0% | 43.7% | 41.3% | 10.0% | 15 | 23 | 5.2 |
| | (L) Skylights | 42,830 | 17.2% | 42.0% | 18.9% | 10.0% | 12.0% | $0.70 | 9.2% | 55.9% | 21.3% | 13.5% | 13 | 31 | 5.4 |
| | (L) Sawtooth Ap | 42,834 | 19.3% | 46.3% | 14.0% | 8.4% | 12.0% | $0.69 | 9.1% | 61.0% | 16.1% | 13.7% | 19 | 26 | 5.3 |
| | (L) Monitor Ap. | 48,584 | 17.5% | 43.7% | 20.5% | 7.7% | 10.6% | $0.79 | 8.2% | 56.6% | 23.3% | 11.9% | 20 | 27 | 5.2 |
| | (L) Atrium | 48,035 | 14.0% | 43.5% | 22.5% | 9.3% | 10.7% | $0.80 | 7.1% | 56.3% | 24.8% | 11.8% | 14 | 33 | 5.5 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***62,918*** | ***4.2%*** | ***35.5%*** | ***45.6%*** | ***6.6%*** | ***8.2%*** | ***$1.13*** | ***2.0%*** | ***42.7%*** | ***46.9%*** | ***8.4%*** | ***10*** | ***31*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 62,361 | 4.8% | 33.7% | 46.0% | 7.2% | 8.2% | $1.11 | 2.2% | 41.7% | 47.5% | 8.5% | 10 | 31 | 7.0 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 51,954 | 6.3% | 37.9% | 40.6% | 5.4% | 9.9% | $0.92 | 2.8% | 44.5% | 42.4% | 10.3% | 11 | 21 | 4.9 |
| | (L) Skylights | 48,450 | 7.0% | 40.8% | 34.4% | 7.3% | 10.6% | $0.85 | 3.3% | 49.6% | 36.0% | 11.1% | 10 | 27 | 5.4 |
| | (L) Sawtooth Ap | 46,384 | 7.8% | 42.9% | 31.3% | 6.9% | 11.1% | $0.81 | 3.5% | 51.8% | 33.0% | 11.7% | 12 | 24 | 5.2 |
| | (L) Monitor Ap. | 48,297 | 7.9% | 42.3% | 32.4% | 6.8% | 10.6% | $0.84 | 3.6% | 51.1% | 34.2% | 11.2% | 12 | 24 | 5.2 |
| | (L) Atrium | 49,779 | 7.0% | 44.8% | 29.6% | 8.3% | 10.3% | $0.87 | 3.3% | 54.8% | 31.0% | 10.8% | 11 | 31 | 5.7 |

# CLIMATE REGION 11

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool (Btu/hr/sf) | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***142,204*** | ***4.5%*** | ***29.2%*** | ***23.0%*** | ***6.8%*** | ***36.5%*** | ***$2.54*** | ***2.1%*** | ***36.6%*** | ***23.7%*** | ***37.6%*** | ***20*** | ***50*** | ***12.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 141,175 | 4.9% | 28.3% | 23.2% | 6.9% | 36.7% | $2.52 | 2.3% | 35.7% | 23.9% | 38.0% | 20 | 50 | 12.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 131,775 | 5.5% | 30.3% | 19.0% | 5.8% | 39.3% | $2.34 | 2.5% | 36.8% | 19.8% | 40.9% | 21 | 40 | 10.9 |
| | (L) Skylights | 115,172 | 8.1% | 30.4% | 8.0% | 8.4% | 45.0% | $2.01 | 4.0% | 39.9% | 8.5% | 47.6% | 18 | 48 | 11.1 |
| | (L) Sawtooth Ap | 113,999 | 8.6% | 32.3% | 5.8% | 7.7% | 45.5% | $1.98 | 4.0% | 41.6% | 6.2% | 48.3% | 25 | 43 | 10.7 |
| | (L) Monitor Ap. | 124,074 | 7.7% | 31.8% | 11.5% | 7.2% | 41.8% | $2.17 | 3.5% | 40.3% | 12.1% | 44.1% | 25 | 44 | 10.9 |
| | (L) Atrium | 122,300 | 6.5% | 32.7% | 9.7% | 8.7% | 42.4% | $2.16 | 3.2% | 42.4% | 10.2% | 44.3% | 21 | 52 | 11.6 |
| ***E*** | ***DINING FACILITY*** | ***114,209*** | ***10.8%*** | ***26.8%*** | ***27.6%*** | ***7.4%*** | ***27.4%*** | ***$1.59*** | ***7.9%*** | ***41.0%*** | ***36.6%*** | ***14.5%*** | ***37*** | ***39*** | ***6.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 103,345 | 13.0% | 30.1% | 18.3% | 8.3% | 30.3% | $1.37 | 9.9% | 47.9% | 25.4% | 16.8% | 39 | 38 | 5.6 |
| | (L) Skylights | 91,963 | 18.9% | 25.1% | 13.9% | 8.1% | 34.1% | $1.12 | 15.4% | 43.0% | 21.1% | 20.6% | 36 | 32 | 4.5 |
| | (L) Sawtooth Ap | 99,108 | 16.4% | 29.2% | 14.9% | 7.9% | 31.6% | $1.26 | 12.1% | 48.0% | 21.6% | 18.3% | 41 | 34 | 5.0 |
| | (L) Monitor Ap. | 103,814 | 15.8% | 29.4% | 16.7% | 7.9% | 30.2% | $1.34 | 11.7% | 47.4% | 23.8% | 17.1% | 43 | 35 | 5.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***44,374*** | ***1.5%*** | ***43.7%*** | ***33.3%*** | ***12.4%*** | ***9.1%*** | ***$0.81*** | ***1.0%*** | ***56.2%*** | ***33.6%*** | ***9.2%*** | ***9*** | ***23*** | ***4.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 42,315 | 2.9% | 40.0% | 34.9% | 12.6% | 9.6% | $0.76 | 1.6% | 53.1% | 35.6% | 9.8% | 9 | 23 | 4.8 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 41,592 | 2.4% | 46.5% | 30.1% | 11.2% | 9.7% | $0.75 | 1.3% | 58.2% | 30.6% | 9.9% | 10 | 19 | 3.4 |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 11

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***49,223*** | ***21.1%*** | ***23.0%*** | ***32.2%*** | ***12.7%*** | ***11.0%*** | ***$0.77*** | ***10.0%*** | ***39.2%*** | ***37.9%*** | ***13.0%*** | ***54*** | ***16*** | ***3.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 47,521 | 21.8% | 20.5% | 33.4% | 12.9% | 11.4% | $0.75 | 10.2% | 37.3% | 39.1% | 13.4% | 54 | 16 | 3.4 |
| | (C) Natural Vent | 44,010 | 23.6% | 13.8% | 36.1% | 14.2% | 12.4% | $0.68 | 11.4% | 30.5% | 43.2% | 14.8% | 54 | 16 | 3.9 |
| | (L) Windows | 41,947 | 25.5% | 24.4% | 24.0% | 13.1% | 13.0% | $0.63 | 13.2% | 41.7% | 29.3% | 15.8% | 55 | 13 | 2.2 |
| | (L) Skylights | 42,101 | 31.1% | 20.0% | 23.2% | 12.8% | 12.9% | $0.61 | 17.0% | 36.9% | 29.6% | 16.4% | 52 | 10 | 2.1 |
| | (L) Sawtooth Ap | 37,128 | 26.8% | 20.2% | 25.3% | 13.0% | 14.6% | $0.56 | 16.2% | 34.6% | 31.2% | 18.0% | 58 | 9 | 1.8 |
| | (L) Monitor Ap. | 40,502 | 27.1% | 21.0% | 25.4% | 13.1% | 13.4% | $0.60 | 16.3% | 35.7% | 31.3% | 16.6% | 59 | 10 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***44,808*** | ***1.2%*** | ***0.0%*** | ***44.3%*** | ***2.4%*** | ***52.1%*** | ***$0.82*** | ***0.9%*** | ***1.9%*** | ***44.7%*** | ***52.5%*** | ***10*** | ***0*** | ***3.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 30,764 | 3.7% | 0.0% | 17.2% | 3.2% | 75.9% | $0.55 | 2.1% | 2.4% | 17.6% | 77.8% | 9 | 0 | 2.8 |
| | (L) Sawtooth Ap | 32,167 | 7.3% | 0.0% | 14.3% | 5.8% | 72.6% | $0.56 | 4.2% | 4.0% | 15.1% | 76.7% | 17 | 0 | 2.8 |
| | (L) Monitor Ap. | 35,064 | 4.9% | 0.0% | 23.9% | 4.5% | 66.6% | $0.62 | 2.8% | 3.6% | 24.8% | 68.9% | 15 | 0 | 2.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***21,329*** | ***15.5%*** | ***0.0%*** | ***53.1%*** | ***7.7%*** | ***23.7%*** | ***$0.35*** | ***8.5%*** | ***5.1%*** | ***59.8%*** | ***26.7%*** | ***15*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 18,384 | 18.7% | 0.0% | 44.8% | 9.0% | 27.5% | $0.30 | 10.8% | 6.4% | 51.2% | 31.6% | 15 | 0 | 1.5 |
| | (L) Skylights | 13,838 | 31.7% | 0.0% | 21.8% | 9.9% | 36.6% | $0.20 | 20.2% | 5.5% | 27.7% | 46.6% | 13 | 0 | 1.1 |
| | (L) Sawtooth Ap | 14,398 | 29.4% | 0.0% | 22.9% | 12.5% | 35.2% | $0.21 | 18.2% | 9.4% | 28.6% | 43.8% | 17 | 0 | 1.1 |
| | (L) Monitor Ap. | 15,656 | 29.5% | 0.0% | 25.7% | 12.5% | 32.3% | $0.23 | 17.8% | 9.8% | 32.1% | 40.2% | 18 | 0 | 1.1 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 11

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***42,271*** | ***9.6%*** | ***0.0%*** | ***58.0%*** | ***4.8%*** | ***27.6%*** | ***$0.73*** | ***5.3%*** | ***3.2%*** | ***62.0%*** | ***29.5%*** | ***19*** | ***0*** | ***3.2*** |
| | (H) Direct Gain + St | 40,392 | 5.7% | 0.0% | 60.7% | 4.7% | 28.9% | $0.72 | 3.2% | 3.6% | 63.1% | 30.1% | 18 | 0 | 3.2 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 31,717 | 14.0% | 0.0% | 42.2% | 7.0% | 36.8% | $0.53 | 7.5% | 4.8% | 46.9% | 40.9% | 20 | 0 | 2.4 |
| | (L) Skylights | 25,142 | 20.3% | 0.0% | 26.0% | 7.3% | 46.4% | $0.40 | 12.0% | 4.3% | 30.0% | 53.7% | 17 | 0 | 2.0 |
| | (L) Sawtooth Ap | 26,120 | 23.1% | 0.0% | 21.7% | 10.5% | 44.7% | $0.41 | 13.4% | 8.0% | 25.7% | 52.9% | 25 | 0 | 2.0 |
| | (L) Monitor Ap. | 28,198 | 21.0% | 0.0% | 27.9% | 9.7% | 41.4% | $0.45 | 11.7% | 7.7% | 32.4% | 48.2% | 25 | 0 | 2.0 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***51,604*** | ***6.4%*** | ***27.1%*** | ***38.4%*** | ***5.5%*** | ***22.6%*** | ***$0.91*** | ***3.0%*** | ***33.3%*** | ***40.1%*** | ***23.6%*** | ***10*** | ***21*** | ***5.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 51,189 | 7.3% | 25.2% | 38.7% | 6.0% | 22.8% | $0.90 | 3.3% | 32.0% | 40.7% | 24.0% | 10 | 21 | 5.4 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 46,491 | 8.2% | 31.4% | 29.6% | 5.7% | 25.1% | $0.81 | 3.6% | 38.5% | 31.3% | 26.5% | 11 | 20 | 4.6 |
| | (L) Skylights | 37,693 | 13.1% | 33.9% | 14.0% | 8.0% | 30.9% | $0.63 | 6.8% | 44.0% | 15.4% | 33.9% | 10 | 22 | 4.0 |
| | (L) Sawtooth Ap | 41,718 | 13.8% | 40.3% | 11.0% | 7.0% | 28.0% | $0.70 | 6.1% | 50.9% | 12.1% | 30.8% | 15 | 22 | 4.5 |
| | (L) Monitor Ap | 43,270 | 13.4% | 38.3% | 14.7% | 6.6% | 27.0% | $0.73 | 6.0% | 48.3% | 16.1% | 29.6% | 15 | 21 | 4.2 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***32,678*** | ***1.1%*** | ***0.0%*** | ***60.7%*** | ***2.5%*** | ***35.7%*** | ***$0.60*** | ***0.8%*** | ***2.1%*** | ***61.1%*** | ***36.0%*** | ***8*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 26,718 | 1.6% | 0.0% | 51.3% | 3.4% | 43.7% | $0.49 | 1.1% | 2.9% | 51.9% | 44.1% | 8 | 0 | 2.3 |
| | (L) Skylights | 18,525 | 4.3% | 0.0% | 28.5% | 4.3% | 63.0% | $0.33 | 2.7% | 3.2% | 29.3% | 64.8% | 7 | 0 | 1.7 |
| | (L) Sawtooth Ap | 18,389 | 5.2% | 0.0% | 24.9% | 6.5% | 63.4% | $0.33 | 3.0% | 5.5% | 25.8% | 65.7% | 11 | 0 | 1.8 |
| | (L) Monitor Ap. | 20,213 | 5.0% | 0.0% | 31.4% | 5.9% | 57.7% | $0.36 | 2.8% | 5.0% | 32.5% | 59.7% | 11 | 0 | 1.8 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 11

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***57,326*** | ***15.5%*** | ***41.1%*** | ***25.4%*** | ***9.3%*** | ***8.7%*** | ***$0.95*** | ***8.0%*** | ***53.9%*** | ***28.3%*** | ***9.7%*** | ***22*** | ***39*** | ***6.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 57,092 | 16.7% | 38.8% | 25.5% | 10.2% | 8.8% | $0.94 | 8.5% | 52.9% | 28.7% | 9.9% | 22 | 39 | 6.8 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***80,212*** | ***11.3%*** | ***38.8%*** | ***35.6%*** | ***8.0%*** | ***6.4%*** | ***$1.37*** | ***5.7%*** | ***49.0%*** | ***38.5%*** | ***6.9%*** | ***22*** | ***46*** | ***8.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 80,248 | 11.9% | 37.5% | 35.6% | 8.7% | 6.4% | $1.36 | 5.9% | 48.5% | 38.7% | 6.9% | 22 | 46 | 8.9 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 69,130 | 14.5% | 43.1% | 27.1% | 8.0% | 7.4% | $1.15 | 7.1% | 54.7% | 30.0% | 8.2% | 23 | 39 | 7.2 |
| | (L) Skylights | 51,378 | 22.5% | 42.4% | 14.8% | 10.4% | 9.9% | $0.80 | 12.7% | 58.2% | 17.4% | 11.7% | 18 | 37 | 6.2 |
| | (L) Sawtooth Ap | 50,019 | 23.7% | 41.3% | 16.6% | 8.1% | 10.2% | $0.78 | 11.7% | 56.3% | 19.8% | 12.1% | 24 | 29 | 5.5 |
| | (L) Monitor Ap. | 55,644 | 22.7% | 42.0% | 18.3% | 7.9% | 9.2% | $0.87 | 11.2% | 56.4% | 21.5% | 10.8% | 25 | 31 | 5.7 |
| | (L) Atrium | 65,025 | 18.3% | 49.9% | 13.1% | 10.9% | 7.9% | $1.05 | 10.0% | 66.1% | 14.9% | 9.0% | 22 | 49 | 7.8 |
| ***O*** | ***TRAINING >5000*** | ***66,669*** | ***7.8%*** | ***34.7%*** | ***43.0%*** | ***6.9%*** | ***7.7%*** | ***$1.16*** | ***3.8%*** | ***42.7%*** | ***45.4%*** | ***8.1%*** | ***14*** | ***33*** | ***7.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 66,340 | 8.4% | 33.1% | 43.2% | 7.5% | 7.7% | $1.15 | 4.1% | 41.9% | 45.8% | 8.2% | 14 | 33 | 7.2 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 55,026 | 10.7% | 35.8% | 38.4% | 5.9% | 9.3% | $0.94 | 5.0% | 43.7% | 41.3% | 10.0% | 15 | 23 | 5.2 |
| | (L) Skylights | 42,830 | 17.2% | 42.0% | 18.9% | 10.0% | 12.0% | $0.70 | 9.2% | 55.9% | 21.3% | 13.5% | 13 | 31 | 5.4 |
| | (L) Sawtooth Ap | 42,834 | 19.3% | 46.3% | 14.0% | 8.4% | 12.0% | $0.69 | 9.1% | 61.0% | 16.1% | 13.7% | 19 | 26 | 5.3 |
| | (L) Monitor Ap | 48,584 | 17.5% | 43.7% | 20.5% | 7.7% | 10.6% | $0.79 | 8.2% | 56.6% | 23.3% | 11.9% | 20 | 27 | 5.2 |
| | (L) Atrium | 48,035 | 14.0% | 43.5% | 22.5% | 9.3% | 10.7% | $0.80 | 7.1% | 56.3% | 24.8% | 11.8% | 14 | 33 | 5.5 |

# CLIMATE REGION 11

Appendix E

| | | ENERGY USE | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***62,918*** | ***4.2%*** | ***35.5%*** | ***45.6%*** | ***6.6%*** | ***8.2%*** | ***$1.13*** | ***2.0%*** | ***42.7%*** | ***46.9%*** | ***8.4%*** | ***10*** | ***31*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | 62,361 | 4.8% | 33.7% | 46.0% | 7.2% | 8.2% | $1.11 | 2.2% | 41.7% | 47.5% | 8.5% | 10 | 31 | 7.0 |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 51,954 | 6.3% | 37.9% | 40.6% | 5.4% | 9.9% | $0.92 | 2.8% | 44.5% | 42.4% | 10.3% | 11 | 21 | 4.9 |
| | (L) Skylights | 48,450 | 7.0% | 40.8% | 34.4% | 7.3% | 10.6% | $0.85 | 3.3% | 49.6% | 36.0% | 11.1% | 10 | 27 | 5.4 |
| | (L) Sawtooth Ap | 46,384 | 7.8% | 42.9% | 31.3% | 6.9% | 11.1% | $0.81 | 3.5% | 51.8% | 33.0% | 11.7% | 12 | 24 | 5.2 |
| | (L) Monitor Ap. | 48,297 | 7.9% | 42.3% | 32.4% | 6.8% | 10.6% | $0.84 | 3.6% | 51.1% | 34.2% | 11.2% | 12 | 24 | 5.2 |
| | (L) Atrium | 49,779 | 7.0% | 44.8% | 29.6% | 8.3% | 10.3% | $0.87 | 3.3% | 54.8% | 31.0% | 10.8% | 11 | 31 | 5.7 |
| ***Q*** | ***TRAINING, GYM*** | ***44.542*** | ***11.9%*** | ***0.0%*** | ***79.9%*** | ***8.2%*** | ***0.0%*** | ***$0.75*** | ***7.7%*** | ***4.9%*** | ***87.5%*** | ***0.0%*** | ***25*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 27,943 | 28.7% | 0.0% | 58.8% | 12.5% | 0.0% | $0.41 | 19.6% | 5.7% | 74.7% | 0.0% | 23 | 0 | 0.9 |
| | (L) Sawtooth Ap | 28,618 | 29.4% | 0.0% | 54.3% | 16.3% | 0.0% | $0.42 | 19.5% | 11.8% | 68.7% | 0.0% | 31 | 0 | 0.9 |
| | (L) Monitor Ap. | 31,423 | 27.8% | 0.0% | 56.8% | 15.4% | 0.0% | $0.47 | 17.6% | 12.7% | 69.7% | 0.0% | 33 | 0 | 0.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***11,539*** | ***30.5%*** | ***0.0%*** | ***61.4%*** | ***8.1%*** | ***0.0%*** | ***$0.17*** | ***18.2%*** | ***4.8%*** | ***77.1%*** | ***0.0%*** | ***9*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | 9,831 | 18.8% | 0.0% | 72.1% | 9.1% | 0.0% | $0.16 | 11.0% | 6.6% | 82.4% | 0.0% | 8 | 0 | 0.7 |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | 10,287 | 22.3% | 0.0% | 68.9% | 8.8% | 0.0% | $0.16 | 12.8% | 6.2% | 81.0% | 0.0% | 8 | 0 | 0.7 |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 7,145 | 60.5% | 0.0% | 26.4% | 13.1% | 0.0% | $0.08 | 46.3% | 9.4% | 44.3% | 0.0% | 9 | 0 | 0.3 |
| | (L) Sawtooth Ap | 6,177 | 52.4% | 0.0% | 26.5% | 21.1% | 0.0% | $0.07 | 40.0% | 18.1% | 41.9% | 0.0% | 12 | 0 | 0.3 |
| | (L) Monitor Ap. | 6,934 | 48.5% | 0.0% | 32.7% | 18.8% | 0.0% | $0.08 | 35.6% | 14.9% | 49.5% | 0.0% | 12 | 0 | 0.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 12

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***A*** | ***ADMIN <5000 SF*** | ***87,799*** | ***4.8%*** | ***49.6%*** | ***32.5%*** | ***7.3%*** | ***5.8%*** | ***$2.19*** | ***1.2%*** | ***61.5%*** | ***31.3%*** | ***6.0%*** | ***25*** | ***47*** | ***9.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 83,867 | 5.0% | 47.2% | 34.1% | 7.7% | 6.1% | $2.16 | 1.2% | 60.8% | 31.9% | 6.1% | 25 | 47 | 9.1 |
| | (L) Windows | 75,282 | 6.2% | 55.2% | 24.4% | 7.4% | 6.8% | $1.84 | 1.5% | 67.4% | 24.0% | 7.1% | 26 | 41 | 7.5 |
| | (L) Skylights | 53,872 | 9.7% | 57.5% | 13.4% | 9.9% | 9.5% | $1.36 | 2.4% | 73.5% | 14.4% | 9.7% | 21 | 39 | 6.2 |
| | (L) Sawtooth Ap | 53,258 | 10.7% | 56.7% | 15.3% | 7.8% | 9.6% | $1.30 | 2.4% | 71.4% | 16.0% | 10.1% | 27 | 30 | 5.7 |
| | (L) Monitor Ap. | 58,615 | 10.3% | 57.2% | 16.3% | 7.6% | 8.7% | $1.40 | 2.4% | 72.1% | 16.2% | 9.3% | 29 | 32 | 6.0 |
| | (L) Atrium | 70,261 | 7.8% | 63.5% | 11.4% | 10.0% | 7.3% | $1.75 | 2.0% | 78.8% | 11.7% | 7.5% | 25 | 51 | 7.8 |
| ***B*** | ***ADMIN >5000 SF*** | ***73,435*** | ***3.3%*** | ***44.4%*** | ***39.1%*** | ***6.3%*** | ***7.0%*** | ***$1.82*** | ***0.8%*** | ***54.1%*** | ***37.8%*** | ***7.2%*** | ***16*** | ***35*** | ***7.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 70,216 | 3.4% | 41.8% | 40.9% | 6.6% | 7.3% | $1.79 | 0.8% | 53.4% | 38.5% | 7.3% | 16 | 35 | 7.4 |
| | (L) Windows | 58,679 | 4.6% | 45.3% | 35.7% | 5.6% | 8.7% | $1.40 | 1.1% | 55.0% | 34.5% | 9.4% | 17 | 24 | 5.4 |
| | (L) Skylights | 46,315 | 7.2% | 55.7% | 16.6% | 9.3% | 11.1% | $1.17 | 1.8% | 69.7% | 17.2% | 11.2% | 15 | 32 | 5.4 |
| | (L) Sawtooth Ap | 46,399 | 8.7% | 60.0% | 12.4% | 7.9% | 11.1% | $1.18 | 1.8% | 72.2% | 14.7% | 11.2% | 21 | 27 | 5.3 |
| | (L) Monitor Ap. | 52,408 | 7.9% | 57.2% | 17.8% | 7.3% | 9.8% | $1.27 | 1.8% | 70.2% | 17.7% | 10.3% | 22 | 28 | 5.3 |
| | (L) Atrium | 52,760 | 5.9% | 56.0% | 19.8% | 8.5% | 9.7% | $1.30 | 1.4% | 69.9% | 18.5% | 10.1% | 16 | 34 | 5.5 |
| ***C*** | ***ADMIN, MULTISTORY*** | ***70,364*** | ***1.9%*** | ***44.1%*** | ***40.8%*** | ***6.0%*** | ***7.3%*** | ***$1.77*** | ***0.4%*** | ***52.5%*** | ***39.6%*** | ***7.4%*** | ***11*** | ***32*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 66,979 | 2.0% | 41.3% | 42.8% | 6.3% | 7.7% | $1.73 | 0.4% | 51.5% | 40.5% | 7.6% | 11 | 32 | 7.1 |
| | (L) Windows | 55,845 | 2.9% | 45.3% | 37.5% | 5.2% | 9.2% | $1.34 | 0.7% | 53.1% | 36.5% | 9.8% | 12 | 22 | 5.1 |
| | (L) Skylights | 54,408 | 3.1% | 50.7% | 30.1% | 6.7% | 9.4% | $1.36 | 0.7% | 60.6% | 29.0% | 9.7% | 11 | 27 | 5.6 |
| | (L) Sawtooth Ap | 51,555 | 3.5% | 52.3% | 27.8% | 6.4% | 9.9% | $1.30 | 0.8% | 61.0% | 28.1% | 10.1% | 13 | 25 | 5.3 |
| | (L) Monitor Ap. | 53,502 | 3.5% | 51.9% | 28.7% | 6.2% | 9.6% | $1.33 | 0.8% | 60.8% | 28.5% | 9.9% | 13 | 25 | 5.4 |
| | (L) Atrium | 56,537 | 3.1% | 54.9% | 25.5% | 7.4% | 9.1% | $1.40 | 0.7% | 65.9% | 24.1% | 9.4% | 12 | 32 | 5.6 |

# CLIMATE REGION 12

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool (Btu/hr/sf) | (w/sf) |
| ***D*** | ***ADMIN, COMP FAC*** | ***154,719*** | ***1.9%*** | ***37.0%*** | ***21.1%*** | ***6.4%*** | ***33.5%*** | ***$3.59*** | ***0.5%*** | ***45.2%*** | ***20.8%*** | ***33.5%*** | ***22*** | ***52*** | ***13.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 148,728 | 2.0% | 34.4% | 22.0% | 6.7% | 34.9% | $3.52 | 0.5% | 44.1% | 21.2% | 34.2% | 22 | 52 | 13.0 |
| | (L) Windows | 141,198 | 2.4% | 37.7% | 17.6% | 5.6% | 36.7% | $3.22 | 0.6% | 45.3% | 16.8% | 37.4% | 23 | 42 | 11.2 |
| | (L) Skylights | 124,039 | 3.3% | 39.8% | 7.1% | 8.0% | 41.8% | $2.88 | 0.9% | 49.8% | 7.5% | 41.8% | 21 | 50 | 10.6 |
| | (L) Sawtooth Ap | 122,997 | 3.8% | 41.4% | 5.2% | 7.4% | 42.2% | $2.91 | 0.9% | 51.3% | 6.3% | 41.5% | 27 | 45 | 10.9 |
| | (L) Monitor Ap. | 133,649 | 3.4% | 40.7% | 10.3% | 6.8% | 38.8% | $3.07 | 0.9% | 50.6% | 9.4% | 39.2% | 28 | 46 | 11.0 |
| | (L) Atrium | 133,675 | 2.7% | 41.8% | 8.6% | 8.1% | 38.8% | $3.10 | 0.7% | 52.2% | 8.2% | 38.9% | 23 | 54 | 11.2 |
| ***E*** | ***DINING FACILITY*** | ***117,648*** | ***4.3%*** | ***34.8%*** | ***26.8%*** | ***7.5%*** | ***26.6%*** | ***$2.04*** | ***2.1%*** | ***58.0%*** | ***31.0%*** | ***8.9%*** | ***39*** | ***41*** | ***7.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 105,505 | 5.2% | 39.2% | 17.4% | 8.5% | 29.7% | $1.75 | 2.6% | 69.1% | 17.9% | 10.3% | 41 | 41 | 5.9 |
| | (L) Skylights | 89,667 | 7.5% | 34.9% | 13.9% | 8.7% | 34.9% | $1.37 | 4.0% | 67.8% | 15.1% | 13.2% | 38 | 34 | 4.8 |
| | (L) Sawtooth Ap | 100,188 | 6.6% | 39.2% | 14.6% | 8.3% | 31.3% | $1.62 | 3.2% | 71.0% | 14.6% | 11.1% | 44 | 36 | 5.3 |
| | (L) Monitor Ap. | 105,419 | 6.4% | 39.5% | 16.2% | 8.2% | 29.7% | $1.72 | 3.2% | 70.3% | 15.9% | 10.6% | 46 | 37 | 5.3 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***F*** | ***DORMITORY*** | ***56,616*** | ***0.9%*** | ***55.9%*** | ***26.1%*** | ***10.0%*** | ***7.2%*** | ***$1.25*** | ***0.2%*** | ***61.5%*** | ***29.0%*** | ***9.3%*** | ***10*** | ***23*** | ***4.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 53,110 | 1.3% | 58.5% | 23.4% | 9.1% | 7.6% | $1.10 | 0.4% | 67.3% | 21.7% | 10.5% | 11 | 20 | 3.4 |
| | (L) Skylights | 54,916 | 1.7% | 59.3% | 21.8% | 9.8% | 7.4% | $1.12 | 0.5% | 69.9% | 19.2% | 10.4% | 10 | 22 | 3.3 |
| | (L) Sawtooth Ap | 53,691 | 2.0% | 59.7% | 21.8% | 8.9% | 7.5% | $1.12 | 0.6% | 70.2% | 18.9% | 10.4% | 12 | 20 | 3.3 |
| | (L) Monitor Ap. | 54,928 | 2.1% | 59.5% | 22.2% | 8.8% | 7.4% | $1.14 | 0.6% | 70.2% | 19.1% | 10.2% | 13 | 20 | 3.4 |
| | (L) Atrium | 60,202 | 2.1% | 61.5% | 19.0% | 10.7% | 6.7% | $1.23 | 0.6% | 74.7% | 15.2% | 9.5% | 11 | 26 | 3.7 |

# CLIMATE REGION 12

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***G*** | ***FIRE STATION*** | ***47,386*** | ***8.0%*** | ***35.1%*** | ***33.5%*** | ***12.0%*** | ***11.5%*** | ***$0.98*** | ***2.3%*** | ***49.0%*** | ***38.6%*** | ***10.1%*** | ***56*** | ***16*** | ***3.3*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 41,478 | 9.1% | 25.9% | 38.3% | 13.7% | 13.1% | $0.89 | 2.5% | 43.8% | 42.6% | 11.1% | 56 | 16 | 3.8 |
| | (L) Windows | 39,339 | 10.0% | 38.7% | 25.0% | 12.5% | 13.8% | $0.77 | 3.1% | 62.7% | 21.3% | 12.9% | 57 | 13 | 2.4 |
| | (L) Skylights | 36,588 | 12.6% | 34.7% | 26.0% | 11.8% | 14.9% | $0.69 | 4.0% | 58.4% | 23.2% | 14.4% | 54 | 10 | 2.1 |
| | (L) Sawtooth Ap | 34,972 | 13.1% | 33.1% | 25.9% | 12.4% | 15.5% | $0.66 | 4.4% | 57.2% | 23.4% | 15.1% | 61 | 10 | 1.9 |
| | (L) Monitor Ap. | 37,859 | 13.1% | 33.9% | 26.4% | 12.3% | 14.4% | $0.71 | 4.3% | 58.6% | 23.3% | 13.8% | 62 | 11 | 2.1 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***H*** | ***INDUSTRIAL FAC*** | ***44,869*** | ***0.9%*** | ***0.0%*** | ***44.2%*** | ***2.8%*** | ***52.1%*** | ***$1.07*** | ***0.5%*** | ***2.2%*** | ***44.6%*** | ***52.7%*** | ***12*** | ***0*** | ***3.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 30,378 | 2.6% | 0.0% | 16.5% | 4.0% | 76.9% | $0.70 | 1.0% | 3.2% | 14.7% | 81.1% | 11 | 0 | 2.6 |
| | (L) Sawtooth Ap | 31,455 | 5.3% | 0.0% | 13.7% | 6.7% | 74.2% | $0.71 | 1.8% | 5.2% | 13.0% | 79.9% | 20 | 0 | 2.7 |
| | (L) Monitor Ap. | 34,670 | 3.5% | 0.0% | 23.8% | 5.3% | 67.4% | $0.76 | 1.3% | 4.3% | 19.7% | 74.8% | 17 | 0 | 2.7 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***I*** | ***MAINTENANCE, <5000*** | ***20,231*** | ***9.6%*** | ***0.0%*** | ***55.9%*** | ***9.4%*** | ***25.0%*** | ***$0.48*** | ***2.9%*** | ***6.4%*** | ***63.3%*** | ***27.4%*** | ***18*** | ***0*** | ***1.8*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 17,126 | 11.8% | 0.0% | 47.5% | 11.1% | 29.6% | $0.38 | 3.7% | 8.1% | 53.9% | 34.3% | 18 | 0 | 1.5 |
| | (L) Skylights | 11,906 | 19.9% | 0.0% | 24.1% | 13.5% | 42.5% | $0.23 | 6.7% | 10.1% | 27.0% | 56.2% | 15 | 0 | 1.0 |
| | (L) Sawtooth Ap | 12,882 | 19.3% | 0.0% | 25.0% | 16.4% | 39.3% | $0.25 | 6.6% | 14.6% | 27.0% | 51.8% | 20 | 0 | 1.0 |
| | (L) Monitor Ap. | 13,720 | 19.0% | 0.0% | 27.6% | 16.5% | 36.9% | $0.26 | 6.5% | 15.1% | 28.9% | 49.5% | 21 | 0 | 1.0 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 12

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***J*** | ***MAINT, HI-BAY*** | ***41,117*** | ***6.0%*** | ***0.0%*** | ***59.6%*** | ***5.9%*** | ***28.4%*** | ***$0.93*** | ***1.8%*** | ***4.0%*** | ***63.8%*** | ***30.4%*** | ***23*** | ***0*** | ***3.2*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 29,989 | 8.8% | 0.0% | 43.5% | 8.7% | 38.9% | $0.63 | 2.6% | 7.5% | 45.2% | 44.7% | 24 | 0 | 2.3 |
| | (L) Skylights | 23,114 | 12.8% | 0.0% | 26.8% | 9.8% | 50.5% | $0.46 | 4.3% | 7.1% | 27.4% | 61.1% | 21 | 0 | 1.9 |
| | (L) Sawtooth Ap | 23,577 | 14.3% | 0.0% | 22.6% | 13.5% | 49.5% | $0.48 | 4.5% | 12.1% | 24.0% | 59.4% | 30 | 0 | 1.9 |
| | (L) Monitor Ap. | 25,558 | 13.0% | 0.0% | 28.9% | 12.5% | 45.7% | $0.50 | 4.1% | 11.5% | 28.4% | 56.0% | 30 | 0 | 1.9 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***K*** | ***MAINT, AIR COND*** | ***56,638*** | ***2.9%*** | ***36.3%*** | ***35.0%*** | ***5.1%*** | ***20.6%*** | ***$1.40*** | ***0.7%*** | ***44.9%*** | ***34.2%*** | ***20.2%*** | ***12*** | ***22*** | ***5.5*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 54,877 | 3.0% | 34.3% | 36.1% | 5.3% | 21.3% | $1.38 | 0.7% | 44.3% | 34.6% | 20.4% | 12 | 22 | 5.5 |
| | (L) Windows | 51,027 | 3.7% | 41.3% | 26.8% | 5.4% | 22.9% | $1.23 | 0.8% | 50.9% | 25.3% | 23.0% | 13 | 21 | 4.8 |
| | (L) Skylights | 40,727 | 5.8% | 45.7% | 12.3% | 7.5% | 28.6% | $1.00 | 1.4% | 60.2% | 10.2% | 28.2% | 12 | 23 | 4.2 |
| | (L) Sawtooth Ap | 45,274 | 6.4% | 51.7% | 9.5% | 6.6% | 25.8% | $1.10 | 1.4% | 64.5% | 8.4% | 25.7% | 17 | 23 | 4.4 |
| | (L) Monitor Ap. | 46,806 | 6.1% | 49.9% | 12.7% | 6.3% | 24.9% | $1.11 | 1.3% | 62.8% | 10.4% | 25.4% | 17 | 22 | 4.4 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***L*** | ***MAINT, LOW-BAY*** | ***32,681*** | ***0.7%*** | ***0.0%*** | ***60.7%*** | ***3.0%*** | ***35.7%*** | ***$0.78*** | ***0.3%*** | ***2.4%*** | ***61.1%*** | ***36.1%*** | ***9*** | ***0*** | ***2.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | 26,516 | 1.0% | 0.0% | 51.1% | 4.0% | 44.0% | $0.62 | 0.4% | 3.4% | 50.3% | 45.9% | 10 | 0 | 2.2 |
| | (L) Skylights | 18,110 | 2.7% | 0.0% | 27.7% | 5.2% | 64.4% | $0.41 | 1.1% | 4.4% | 25.1% | 69.4% | 9 | 0 | 1.6 |
| | (L) Sawtooth Ap | 18,031 | 3.9% | 0.0% | 23.9% | 7.5% | 64.7% | $0.41 | 1.4% | 6.5% | 22.7% | 69.4% | 13 | 0 | 1.7 |
| | (L) Monitor Ap. | 19,684 | 3.6% | 0.0% | 30.3% | 6.9% | 59.3% | $0.43 | 1.3% | 6.2% | 26.9% | 65.6% | 13 | 0 | 1.7 |
| | (L) Atrium | | | | | | | | | | | | | | |

# CLIMATE REGION 12

Appendix E

| | BUILDING DESC | ENERGY USE Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | ENERGY COST Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | HVAC Heat (Btu/hr/sf) | HVAC Cool (Btu/hr/sf) | PEAK LOAD (w/sf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***M*** | ***AUDITORIUM*** | ***62,799*** | ***6.1%*** | ***54.0%*** | ***23.2%*** | ***8.7%*** | ***8.0%*** | ***$1.58*** | ***1.5%*** | ***68.1%*** | ***22.2%*** | ***8.2%*** | ***25*** | ***41*** | ***7.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 60,104 | 6.4% | 51.9% | 24.2% | 9.1% | 8.3% | $1.57 | 1.5% | 68.0% | 22.3% | 8.3% | 25 | 41 | 7.1 |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | | | | | | | | | | | | | | |
| | (L) Sawtooth Ap | | | | | | | | | | | | | | |
| | (L) Monitor Ap. | | | | | | | | | | | | | | |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***N*** | ***TRAINING <5000 SF*** | ***87,799*** | ***4.8%*** | ***49.6%*** | ***32.5%*** | ***7.3%*** | ***5.8%*** | ***$2.19*** | ***1.2%*** | ***61.5%*** | ***31.3%*** | ***6.0%*** | ***25*** | ***47*** | ***9.1*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 83,867 | 5.0% | 47.2% | 34.1% | 7.7% | 6.1% | $2.16 | 1.2% | 60.8% | 31.9% | 6.1% | 25 | 47 | 9.1 |
| | (L) Windows | 75,282 | 6.2% | 55.2% | 24.4% | 7.4% | 6.8% | $1.84 | 1.5% | 67.4% | 24.0% | 7.1% | 26 | 41 | 7.5 |
| | (L) Skylights | 53,872 | 9.7% | 57.5% | 13.4% | 9.9% | 9.5% | $1.36 | 2.4% | 73.5% | 14.4% | 9.7% | 21 | 39 | 6.2 |
| | (L) Sawtooth Ap | 53,258 | 10.7% | 56.7% | 15.3% | 7.8% | 9.6% | $1.30 | 2.4% | 71.4% | 16.0% | 10.1% | 27 | 30 | 5.7 |
| | (L) Monitor Ap. | 58,615 | 10.3% | 57.2% | 16.3% | 7.6% | 8.7% | $1.40 | 2.4% | 72.1% | 16.2% | 9.3% | 29 | 32 | 6.0 |
| | (L) Atrium | 70,261 | 7.8% | 63.5% | 11.4% | 10.0% | 7.3% | $1.75 | 2.0% | 78.8% | 11.7% | 7.5% | 25 | 51 | 7.8 |
| ***O*** | ***TRAINING >5000*** | ***73,435*** | ***3.3%*** | ***44.4%*** | ***39.1%*** | ***6.3%*** | ***7.0%*** | ***$1.82*** | ***0.8%*** | ***54.1%*** | ***37.8%*** | ***7.2%*** | ***16*** | ***35*** | ***7.4*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 70,216 | 3.4% | 41.8% | 40.9% | 6.6% | 7.3% | $1.79 | 0.8% | 53.4% | 38.5% | 7.3% | 16 | 35 | 7.4 |
| | (L) Windows | 58,679 | 4.6% | 45.3% | 35.7% | 5.6% | 8.7% | $1.40 | 1.1% | 55.0% | 34.5% | 9.4% | 17 | 24 | 5.4 |
| | (L) Skylights | 46,315 | 7.2% | 55.7% | 16.6% | 9.3% | 11.1% | $1.17 | 1.8% | 69.7% | 17.2% | 11.2% | 15 | 32 | 5.4 |
| | (L) Sawtooth Ap | 46,399 | 8.7% | 60.0% | 12.4% | 7.9% | 11.1% | $1.18 | 1.8% | 72.2% | 14.7% | 11.2% | 21 | 27 | 5.3 |
| | (L) Monitor Ap. | 52,408 | 7.9% | 57.2% | 17.8% | 7.3% | 9.8% | $1.27 | 1.8% | 70.2% | 17.7% | 10.3% | 22 | 28 | 5.3 |
| | (L) Atrium | 52,760 | 5.9% | 56.0% | 19.8% | 8.5% | 9.7% | $1.30 | 1.4% | 69.9% | 18.5% | 10.1% | 16 | 34 | 5.5 |

# CLIMATE REGION 12

Appendix E

| | | ENERGY USE | | | | | | ENERGY COST | | | | | HVAC | | PEAK LOAD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BUILDING DESC | Bldg Btu/sf-yr | QHeat (%) | QCool (%) | QLite (%) | QVent (%) | QProc (%) | Bldg $/sf | $Heat (%) | $Cool (%) | $Lite (%) | $Othr (%) | Heat (Btu/hr/sf) | Cool | (w/sf) |
| ***P*** | ***TRAINING, MULTISTORY*** | ***70,364*** | ***1.9%*** | ***44.1%*** | ***40.8%*** | ***6.0%*** | ***7.3%*** | ***$1.77*** | ***0.4%*** | ***52.5%*** | ***39.6%*** | ***7.4%*** | ***11*** | ***32*** | ***7.0*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | 66,979 | 2.0% | 41.3% | 42.8% | 6.3% | 7.7% | $1.73 | 0.4% | 51.5% | 40.5% | 7.6% | 11 | 32 | 7.1 |
| | (L) Windows | 55,845 | 2.9% | 45.3% | 37.5% | 5.2% | 9.2% | $1.34 | 0.7% | 53.1% | 36.5% | 9.8% | 12 | 22 | 5.1 |
| | (L) Skylights | 54,408 | 3.1% | 50.7% | 30.1% | 6.7% | 9.4% | $1.36 | 0.7% | 60.6% | 29.0% | 9.7% | 11 | 27 | 5.6 |
| | (L) Sawtooth Ap | 51,555 | 3.5% | 52.3% | 27.8% | 6.4% | 9.9% | $1.30 | 0.8% | 61.0% | 28.1% | 10.1% | 13 | 25 | 5.3 |
| | (L) Monitor Ap. | 53,502 | 3.5% | 51.9% | 28.7% | 6.2% | 9.6% | $1.33 | 0.8% | 60.8% | 28.5% | 9.9% | 13 | 25 | 5.4 |
| | (L) Atrium | 56,537 | 3.1% | 54.9% | 25.5% | 7.4% | 9.1% | $1.40 | 0.7% | 65.9% | 24.1% | 9.4% | 12 | 32 | 5.6 |
| ***Q*** | ***TRAINING, GYM*** | ***42,724*** | ***7.1%*** | ***0.0%*** | ***83.3%*** | ***9.6%*** | ***0.0%*** | ***$0.78*** | ***2.9%*** | ***6.5%*** | ***90.6%*** | ***0.0%*** | ***28*** | ***0*** | ***1.9*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 24,034 | 16.7% | 0.0% | 66.8% | 16.4% | 0.0% | $0.33 | 8.7% | 12.6% | 78.7% | 0.0% | 27 | 0 | 0.8 |
| | (L) Sawtooth Ap | 24,595 | 17.3% | 0.0% | 61.7% | 21.1% | 0.0% | $0.34 | 8.5% | 19.0% | 72.4% | 0.0% | 35 | 0 | 0.8 |
| | (L) Monitor Ap. | 27,037 | 16.0% | 0.0% | 64.1% | 19.9% | 0.0% | $0.38 | 7.9% | 17.9% | 74.1% | 0.0% | 36 | 0 | 0.8 |
| | (L) Atrium | | | | | | | | | | | | | | |
| ***R*** | ***WAREHOUSE*** | ***9,936*** | ***17.2%*** | ***0.0%*** | ***71.3%*** | ***11.5%*** | ***0.0%*** | ***$0.20*** | ***6.2%*** | ***9.4%*** | ***84.4%*** | ***0.0%*** | ***11*** | ***0*** | ***0.7*** |
| | (H) Direct Gain + St | | | | | | | | | | | | | | |
| | (H) Indirect Gain | | | | | | | | | | | | | | |
| | (H) Direct Gain | | | | | | | | | | | | | | |
| | (H) Sunspace | | | | | | | | | | | | | | |
| | (C) Night Mech Vent | | | | | | | | | | | | | | |
| | (C) Natural Vent | | | | | | | | | | | | | | |
| | (L) Windows | | | | | | | | | | | | | | |
| | (L) Skylights | 4,972 | 41.0% | 0.0% | 36.0% | 23.0% | 0.0% | $0.07 | 20.3% | 27.1% | 52.5% | 0.0% | 11 | 0 | 0.3 |
| | (L) Sawtooth Ap | 4,971 | 38.2% | 0.0% | 31.0% | 30.8% | 0.0% | $0.07 | 17.4% | 37.8% | 44.8% | 0.0% | 14 | 0 | 0.3 |
| | (L) Monitor Ap. | 5,581 | 34.4% | 0.0% | 38.2% | 27.5% | 0.0% | $0.08 | 16.0% | 33.6% | 50.4% | 0.0% | 14 | 0 | 0.3 |
| | (L) Atrium | | | | | | | | | | | | | | |

# Index

This index is a cross-reference for the information in the first three volumes of the Passive Solar Handbook. For each entry, the volume number is shown in parentheses, followed by the page number in that volume upon which the information is located. If the information is found in more than one volume, semicolons are used to separate volumes. For instance, for the entry **Air movement: (I) 26; (II) 5,** information about air movement is contained in Volume I on page 26 and in Volume II on page 5.

## A



## B



## C

## D

**E**



**F**



**G, H**

## Q, R



## S

**T**



**U**

## V



## W, X, Y, Z